FDM

Clinical and Theoretical Application of the
Fascial Distortion Model
Within the Practice of Medicine and Surgery

Stephen Typaldos, D.O.

Illustrations by Anita Crane

FDM is dedicated to the memory of Dimil Andreassen, M.D.
(September 18, 1922 - May 29, 2000)

First Edition 1997
Second Edition 1998
Third Edition 1999
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This text is not intended as a substitute for the medical advice of a physician. Shown in the following pages are possible considerations and treatments for patients with injuries or medical conditions. It is the responsibility of the treating physician, relying on his/her experience and knowledge, to determine the best course of therapy for each patient. Each physician is cautioned to use his or her best judgment before employing these or any other treatment modalities. The good clinician will modify the treatments according to the special needs of each individual patient. The publisher cannot be responsible for any clinical decisions made by the practitioner, or the side effects or adverse outcomes of any particular treatment discussed in this book.

Cautionary Note: Within the United States, the clinical practice of the FDM by non-physicians (i.e., those who do not hold a valid and current state medical license) may legally be interpreted as the practice of medicine without a license and thus subject to disciplinary action and criminal charges.

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ABOUT THE BOOK

This book is written for physicians — especially orthopedists. It is also designed to meet the clinical needs and stimulate the interest of neurologists, physiatrists, family doctors, emergency physicians, cardiologists, and medical researchers. Much of the text is centered on the nuts and bolts of fascial distortion model manipulative treatments of the most commonly seen orthopedic injuries (from ankle sprains and fractures to frozen shoulders). However, in addition to presenting treatments and the theoretical basis of the fascial distortion model, it also looks to the future and proposes conceptually new therapeutic perspectives for a wide range of conditions from myocardial infarctions to seizures.

FDM: Clinical and Theoretical Application of the Fascial Distortion Model Within the Practice of Medicine and Surgery is the fourth edition of what previously was called *Orthopathic Medicine: The Unification of Orthopedics with Osteopathy Through the Fascial Distortion Model* (third edition published Spring 1999). However, the publication you are holding in your hands better reflects the fascial distortion model's broad scope and greater focus on the current and future practice of medicine and surgery.

Structurally this book is divided into five sections:

1. Introduction to Theory and Techniques
2. Medical Concepts
3. Treatment of Musculoskeletal Injuries
4. Case Histories
5. Addendum and Glossary

Section One leads the physician through general concepts of the model and explains the anatomical basis of current manual FDM techniques. Section Two explores the FDM interpretation of selected medical topics in the fields of orthopedics, neurology and rehabilitation, and internal medicine. Section Three is the how-to and hands-on portion of the book which shows step-by-step procedures to correct ankle sprains, frozen shoulders, carpal tunnel syndrome, back and neck pain, and a host of other injuries. Section Four consists of case histories which demonstrate clinical points and emphasizes practical concepts discussed in the text. And finally Section Five is the glossary and addendum where a quick understanding of key words and clinical conditions are right at the physician's fingertips.

There are several people to thank for their contributions to the massive project of putting this book together. First and foremost is Marjorie Kasten who played many roles, some of which include: chief editor, computer layout specialist, printer, photographer[2], and business manager. Her long hours and tireless efforts are humbly appreciated and enthusiastically accepted. Next I'd like to thank Anita Crane; her drawings bring the concepts and treatments alive. Thirdly, thanks go to John Kasten who not only is the grammar specialist, but also the final authority in editorial decisions. And my final thank you goes to Irv Marsters who, without his help (and that of the Bangor Letter Shop) this book would never have become a reality.

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[2]Please note that no models are used in any photographs. Each and every photo is of a real patient who received a successful treatment for the condition or injury described in the associated text.

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SECTION ONE

INTRODUCTION TO THEORY AND TECHNIQUES

Chapter 1

INTRODUCTION

The fascial distortion model (FDM) is an anatomical perspective in which the underlying etiology of virtually every musculoskeletal injury (and many neurological and medical conditions as well) is considered to be comprised of one or more of six specific pathological alterations of the body's connecting tissues (fascial bands, ligaments, tendons, retinacula, etc.). This model not only allows for strikingly effective manipulative treatments for diverse afflictions such as pulled muscles, fractures, and frozen shoulders, but the results are objective, obvious, measurable, and immediate.

In the manipulative practice of the FDM (known as Typaldos manual therapy, or TMT), each injury is envisioned through the model and the subjective complaints, body language, mechanism of injury, and objective findings are woven together to create a meaningful diagnosis that has practical applications. For instance, in contrast to the orthopedic model in which a sprained ankle is rested so *torn ligaments* can heal, in the FDM approach, the specific anatomical distortions of the capsule, ligaments, or surrounding fascia are physically reversed. Therefore, the anatomical injury no longer exists, and the patient can walk without a limp and is pain free. Thus the typical sequence of orthopedic interventions obligatorily prescribed (resting, ice, compression, elevation, anti-inflammatory drugs, and crutches) is no longer considered clinically relevant.

The application of the FDM within the practice of medicine and surgery (known as fascial distortion medicine, which also has the acronym FDM) currently allows for a wide array of medical and neurological conditions to be fascially contemplated and manipulatively treated. In some cases the FDM approach replaces the medical protocol (as can be with renal colic), whereas in other conditions it augments the treatment (such as with pancreatitis). But perhaps the biggest impact of all will be on cardiology. In this field, new surgical, electrical, and pharmaceutical interventions developed through the fascial distortion model may soon pave the way for preventing myocardial infarctions, predicting who will get them, and stopping them in progress.

PRINCIPAL TYPES OF FASCIAL DISTORTIONS

Triggerband	—	distorted banded fascial tissue
Herniated Triggerpoint	—	abnormal protrusion of tissue through fascial plane
Continuum Distortion	—	alteration of transition zone between ligament, tendon, or other connective tissue and bone
Folding Distortion	—	three-dimensional alteration of fascial plane
Cylinder Distortion	—	overlapping of cylindrical fascial coils
Tectonic Fixation	—	alteration in ability of fascial surfaces to glide

Since the six principal fascial distortion types are anatomical entities with distinct clinical presentations, they require specific corrective approaches. Note that current treatments are predominantly manual.

TRIGGERBANDS: The most common of all, these are twisted or wrinkled fascial fibers that cause a *burning* or *pulling* pain along the course of the fascial band. Patients often subconsciously make a sweeping motion with their fingers along the involved pathway when describing their discomfort. (You can think of TB's as a twisted ribbon, a twisted shoulder harness, or a *Ziploc*® bag that has become unzipped.)
TREATMENT: Untwist the twisted fibers and iron out the wrinkle
NOTE: During treatment the pain can be *moved* along the course of the fascial band

HERNIATED TRIGGERPOINTS: Rarely found in the extremities, HTP's feel like spongy marbles, and are almond-sized or smaller fascial herniations.
TREATMENT: Push protruding tissue below fascial plane

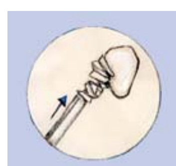
CONTINUUM DISTORTIONS: Think of these distortions as tiny injuries of the bone-ligament transition zone. Patients point to CD's with the tip of their finger and complain of pain in one spot.
TREATMENT: Force osseous components in the transition zone to shift back into the bone

FOLDING DISTORTIONS: These injuries are similar to what happens to a road map that unfolds and then refolds in a contorted condition. Folding distortions hurt deep in the joint.
TREATMENT: Unfolding injuries – traction joint to allow folding fascia to unfold and then refold less contorted
Refolding injuries – compress joint to overfold folding fascia which then springs back (unfolds) less contorted

CYLINDER DISTORTIONS: Anatomically reminiscent of a tangled *Slinky*® toy, cylinder distortions cause deep pain in predominantly non-jointed areas which cannot be reproduced or magnified with palpation.
TREATMENT: Untangle overlapped fascial coils
NOTE: Watch for pathological phenomena of pain *jumping* from one location to another

TECTONIC FIXATIONS: When patients complain that their joint is stiff or feels like it is a *quart low on oil*, they are describing a tectonic fixation. TF's are fascial surfaces which have lost their ability to glide.
TREATMENT:
1. Manual techniques are used to pump synovial fluid through joint
2. Thrusting manipulations slide fixated surfaces

Comparison of Principal Types of Fascial Distortions

Principal Type	Definition	Artist's Rendition	Common Associated Body Languages
Triggerband	Distorted fascial band		Sweeping fingers along painful linear pathway
Herniated Triggerpoint	Protrusion of tissue through fascial plane		Pushing fingers, thumb, or knuckles into protruding tissue
Continuum Distortion	Alteration of transition zone between tissue types		Pointing with one finger to spot(s) of pain
Folding Distortion	Three dimensional alteration of fascial plane		<u>Extremities</u>: cupping joint with hand <u>Back</u>: placing dorsum of hand or fist on spine
Cylinder Distortion	Tangling of circular fascia		1. Repetitively squeezing soft tissues 2. Broad sweeping motion of palm along wide area of discomfort
Tectonic Fixation	Loss of ability of fascial surfaces to glide		<u>Shoulder</u>: anterior rotation with abduction <u>Hip</u>: placing hands on iliac crest <u>Low Back</u>: repetitively twisting torso

The FDM philosophy of determining the underlying fascial distortion types present in an injury and correcting them *one by one* with the appropriate TMT technique is illustrated in the following clinical examples:

Clinical Example #1

Ms. F. is a 74 year old woman who fell on the seashore and sustained an impacted fracture of the distal radius. She was initially seen at an urgent care center, x-rayed, and placed in a sling and splint with instructions to return for casting. However, she refused (concerned about lasting stiffness) and so instead three days later was evaluated and treated with Typaldos manual therapy.

Figure 1-1. X-Ray of Distal Radius Fracture

On exam the wrist, forearm, and fingers were swollen and ecchymosis was present. She had limited extension, flexion, pronation, and supination. When asked where her discomfort was, she showed the following body language:

1. Sweeping fingers along lateral forearm (triggerbands)
2. Pointing with one finger to a point of pain within the fracture site (continuum distortion)
3. Gently cupping fractured wrist with opposite palm (folding distortion)

Ms. F. was treated with continuum technique of fracture site and posterior wrist, and triggerband technique of forearm on initial visit. She immediately had improved flexion and extension of the wrist as well as diminished pain (so much so that no splint, wrap, or sling was needed). She returned two days later and folding techniques were done. Upon her next office visit (five days later) her condition was improved to an extent that prior to her treatment she was observed knitting in the waiting room.

Figure 1-2. FDM Treatment of Wrist Fracture: (left) Continuum Technique of Posterior Wrist Continuum Distortion (restored extension), (middle) Refolding Technique of Wrist Fracture Site, (right) Unfolding Technique of Interosseous Membrane

Clinical Example #2

Mr. P. is a 72 year old gentleman who, for four months, had pronounced weakness of his right upper extremity (as evidenced by inability to abduct his right shoulder). Previous diagnostic workup included MRI and evaluation by neurologist and neurosurgeon. Proposed treatment plan was surgical excision of spinal bone spur and bone grafting. When Mr. P. described his discomfort he exhibited the following body language:

1. Pushing fingers into supraclavicular fossa (herniated triggerpoint)
2. Sweeping fingers along anterior upper arm and shoulder (anterior shoulder triggerband pathway)
3. Sweeping fingers along posterior shoulder (posterior shoulder triggerband pathway)

Mr. P. had driven from Indiana to Maine for a second opinion prior to his scheduled surgery and was staying in town long enough to receive ten treatments. Initial findings included:

Abduction	45° (180° is full motion)
External rotation	90° (normal)
Internal rotation	8" above waist line (same as left shoulder)
Flexion	80° (180° is full motion)

After first treatment of supraclavicular herniated triggerpoint and anterior and posterior shoulder triggerband pathways:

Abduction	180°
External rotation	90°
Internal rotation	11" above waist line
Flexion	180°

Figure 1-3. Mr. P. Re-Enacting Loss of Abduction Before First FDM Treatment (left) and Showing Abduction After Second Treatment (right)

Following fifth treatment, Mr. P. was sent home to Indiana pain free and with normal motion. Telephone follow-up call eighteen months later (March 18, 2002) found him to be doing well, with normal shoulder motion and without pain.

Clinical Example #3

On July 31, 1999, Ms. I. was walking her neighbor's 90 pound male labrador retriever with the handle of the leash looped around her left wrist. Suddenly the pet lunged at a nearby passing male dog. This motion yanked and twisted Ms. I. so much so that she was knocked to the ground and was dragged sixty feet down a hill. From this incident the third finger sustained an extensive comminuted fracture of the proximal phalanx. The fourth finger also had a "hairline fracture." Her hand was casted and the fingers were taped for four weeks (but no surgery). Once the cast was removed the third and fourth fingers were buddy taped together for two weeks. After that she wore a velcro wrist brace for a week and then received six months of occupational therapy. She continued exercises at home one hour a day for a year (without result). Second and third opinions were obtained and hand surgery was decided against. However, Ms. I. remained frustrated with the outcome since she was unable to properly use a keyboard or make a fist (therefore unable to grab things), and was in constant discomfort.

On initial fascial distortion exam of July 11, 2001, it was noted that the third finger was painful, deformed, and unable to flex without overlapping the fourth finger. Ms. I. returned on July 16 for her first treatment which consisted of slow tectonic pump, triggerband technique, and refolding and unfolding manipulations. Immediately she was able to make a fist and had significant reduction in discomfort. Over the next several visits she regained near normal function of her hand and fingers. On follow-up phone conversation of March 10, 2002, she stated she had retained her motion and function.

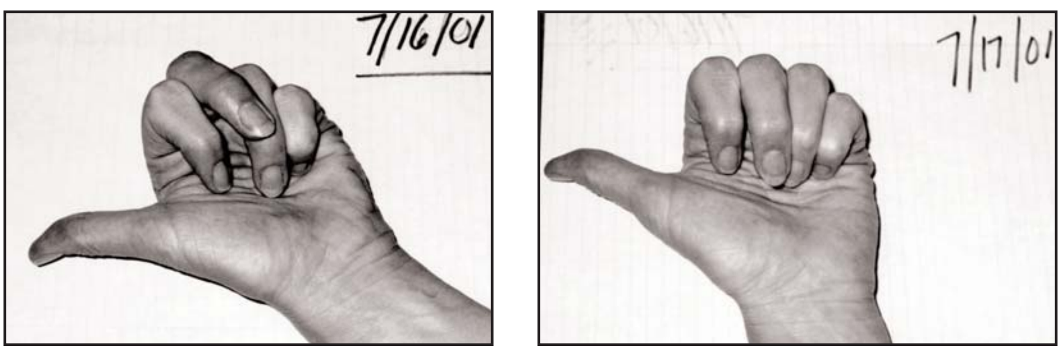


Figure 1-4. Before and After FDM Treatment of Long-Standing Finger Injury
(Photos by Michael Knox)

FDM approach taken: tectonic fixations formed secondary to casting, so were treated first (slow tectonic pump increased synovial fluid flow in joint). Then triggerbands were corrected (the leash twisted and torqued the fingers), followed by correction of refolding distortions (she fell on hand as she was knocked to ground and dragged), and finally unfolding distortions were addressed (dog leash tractioned joints).

The Ubiquitous Fascia

Fascia is found throughout the body and constitutes a tremendous amount of sheer weight and bulk. As the primary connective tissue, it presents in many well-known forms such as tendons, ligaments, retinacula, fascial bands, aponeuroses, adhesions, pericardial sac, pleura, meninges, and the perimysium and epimysium of muscles, as well as many other structures. In addition to connecting, fascia surrounds, engulfs, encases, separates, compartmentalizes, divides, protects, insulates, and buffers bones, nerves, muscles, and other tissues. In fact, each individual muscle fiber is sheathed with fascia, as is each and every individual muscle bundle, and each and every muscle, as well as every group of muscles.

Structural Kinds of Fascia

Since fascia has many functions, different anatomical arrangements are present in the body. In some areas, such as the supraclavicular fossa, there is a trade-off of motion for strength. Because this area is covered with smooth rather than banded tissue, the neck is able to freely rotate, and the shoulder easily abducts and internally rotates. However, the drawback is that herniated triggerpoints frequently occur even from seemingly minor external forces as tissue from below is forced through the weakly covered fossa.

The primary kinds of structural fascia are listed below:

Banded (from which triggerbands and continuum distortions form): examples include ligaments, tendons, and iliotibial tract
Function: Protects joints and linear regions of trunk and limbs, blood vessels and tissues from perpendicular forces

Coiled (from which cylinder distortions form): encircles entire portions of limbs, trunk, back, vessels and organs
Function: Predominantly protects non-jointed tissues from traction or compression forces

Folding (from which folding distortions form): comprises capsules, intermuscular septa, and interosseous membranes (i.e., planes of fascial tissue capable of folding)
Function: Predominantly protects joints from traction and compression forces

Smooth (from which tectonic fixations and herniated triggerpoints form): lines joints, abdomen, viscera and makes up planes of non-folding fascial tissue
Function: Keeps joints and tissues lubricated which allows for gliding of one fascial structure on another

Although every person has each of the above kinds of structural fascia, that does not mean that they occur in every individual in the same percentages. Using athletes as examples, it can be inferred that weight lifters and American football players are endowed with a

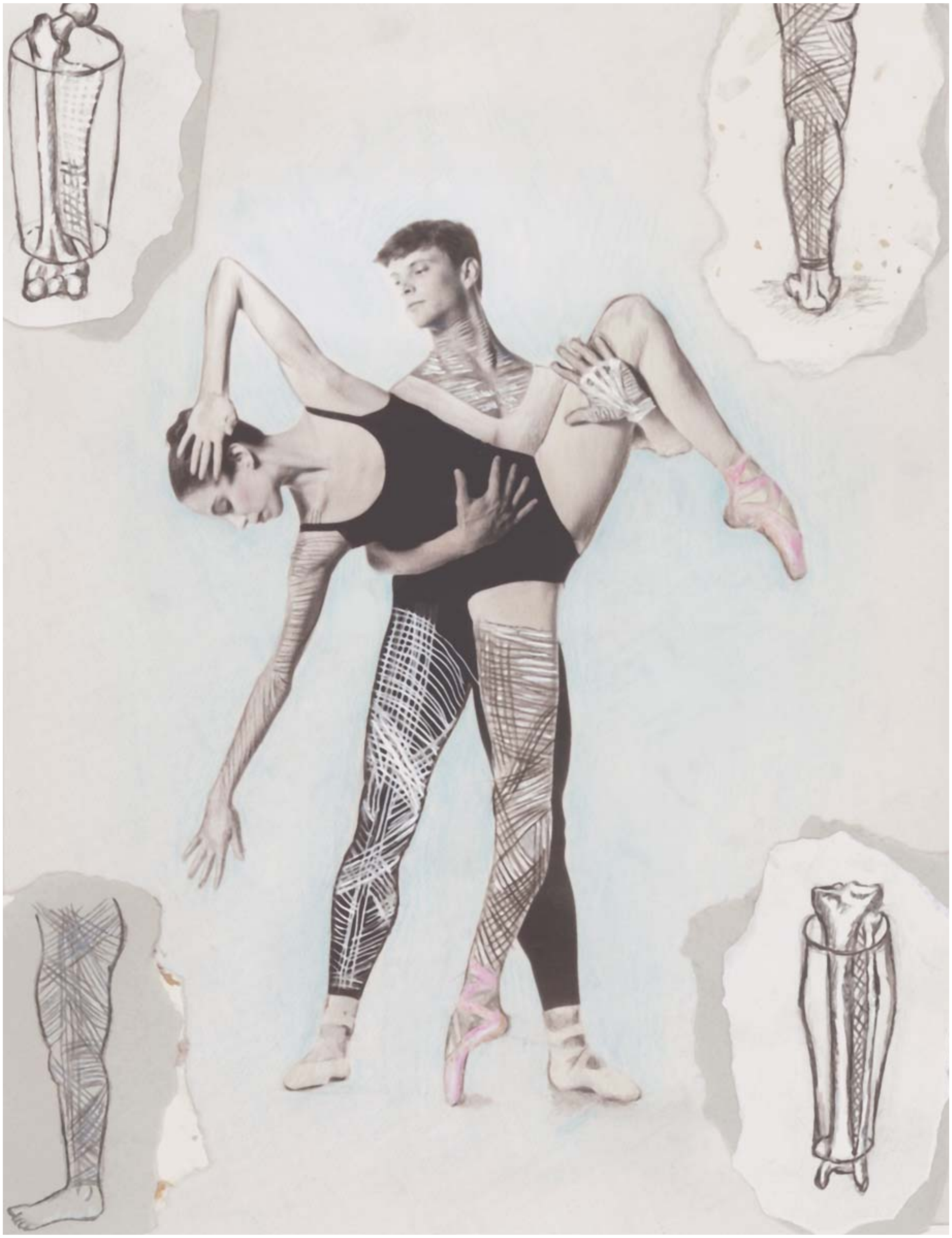


Figure 1-5. Banded and Coiled Fascia

Maria Terezia Balogh and Todd Edson model some of the millions of fascial fibers found throughout the body. Injured fascial bands (called triggerbands) and tangled fascial coils (called cylinder distortions) cause pain that is inconsistent with previously described neurological, muscular, or dermatomal patterns. Drawing based on illustrations from Gerlach, U.J., and Lierse, W.: Functional Construction of the Superficial and Deep Fascia of the Lower Limb in Man. *Acta Anact* (Basel) 1990;139 (1):11-25.

Photographer: Ellen Appel. Photo Courtesy of the Fort Worth/Dallas Ballet.

preponderance of banded fascia. This gives them great strength since their muscles have a firm surface to contract against (and thus push against). Ballet dancers, in contrast need flexibility, so those interested individuals with an above average amount of folding fascia tend to be attracted to this form of art and exercise. Athletes that are good at jumping, such as basketball players and hurdlers, are thought to be anatomically gifted with a robust amount of coiled fascia. And finally people with an excess amount of smooth fascia are likely relegated to participate in competitive athletics only as spectators. However, they may have the distinct advantage of never suffering a heart attack (see Internal Medicine Chapter – *Theoretical Cardiology*).

As stated earlier, there is a trade off of one kind of structural fascia for another. Clinically, football players and weight lifters tend to get triggerbands with adhesions (fibromyalgia), ballerinas often complain of weak and painful joints (folding distortions), and basketball players suffer from muscle cramps and diffuse leg and thigh pains (cylinder distortions).

Fascia: The Living Tissue

Fascia is alive! It is a living tissue. Therefore it needs oxygen as well as nutrients to sustain itself and a system for removing waste products. Although fascia is generally considered to have a *poor* blood supply, in its healthy state this is not a problem. This is because fascia acts as a fluid transport network of equal or greater size than the vascular system. However, injuries to it (i.e., fascial distortions) disrupt fluid flow and keep *downstream* portions of the fascial network from receiving adequate new supplies (necessary hormones, chemicals, minerals, nutrients, and oxygen) that are being transported through it and to it from other areas of the body. Compounding the situation is that *upstream* waste products and toxins accumulate and can't be *shipped out* to the blood stream for transport to the liver or other cleansing organs.

Even though the primary etiology of fascial distortions is thought to be physical injury, there are other potential causes as well. These include, but are not limited to, viruses and bacteria clogging fluid transport, genetic deficiencies in production of fascial fluid components, and dietary vitamin or mineral deficiencies. Since healthy fascia has strong resistance to external forces, metabolically inadequate fascia is lacking in resilience and becomes injured (tears, mal-folds, tangles, etc.) from even minor external forces. In particular, it should be noted that the *myalgia* (aching muscle pain) of viral influenza is, within the FDM, considered to be caused by cylinder distortions. These tiny and diffuse tangles form as a consequence of disrupted cylinder fascial fluid flow, altering the ability of the cylinder coils to adequately coil and recoil. Thus when you have the flu, they tangle from even normal muscle contractions.

Fascial bands are made up of parallel fibers that transmit tension forces to neurological centers. In this way, fascia acts as a sensor of mechanical tension. An analogy of this is our own clothing, which has a similar capability. If something or someone should tug on our pant cuff but not directly touch any part of our body, we would still have a fair appreciation of both the location and nature of the stimulus. This is because the tension on the pant cuff is transmitted up the pant leg to the waist where the stimulus is integrated into the neurological system. In this way, when a pant cuff is tugged, we know whether it is from one of our young children attempting to get our attention or from a rambunctious pet parrot doing the same (this is a true-life experience!).

Figure 1-6. Clothing as a Mechanical Sensory System

Individual fibers of fascial bands (called *sub-bands*) maintain a natural tension. This tension force is called *pitch* and is unique for each particular fiber. When the sub-band is stimulated, it vibrates slightly. The greater the stimulus, the more it vibrates. The amount of resonance from each of the millions of sub-bands throughout the body supplies higher centers with in-depth and constant transmission of proprioceptive information.

In this way, fascial fibers function much as stringed musical instruments do. For example, a guitar or piano works on the principle of vibration. Each string has a specific diameter and tension, and when stimulated, it vibrates at a precise frequency and causes a specific note to play.

Just as our ears hear music, our nervous system is interpreting fascial tension input. But, when the piano is out of tune, the expected frequency of the notes is changed. This is also the case with a distorted fascial band in which the *off-key* vibratory frequency is transmitted through the nervous system to the brain where it is deciphered as burning, tightness, pulling, or pain.

In addition to assisting in proprioception, fascial fibers are thought to have still other physiological functions. One of these is to coordinate motor movements and muscle contractions. The instantaneous changes in fascial fiber tension supply the nervous system with split-second information from every area of each small section of the muscle during contraction.

The connectedness of the fascial fibers can be thought of as a *continuity* of the tissue itself. For instance, although the lateral collateral ligament of the knee (LCL) and the iliotibial band (ITB) seem to be very different anatomical structures — they are in a sense one and the same. This is because some of the fibers of the LCL extend into the ITB and continue superiorly up to the iliac crest. The FDM consideration of continuity is that an injury to any of the connecting structures can have ramifications everywhere along the same pathway.

In contrast to the continuity of fascial fibers, the FDM also considers the *continuum* of the structures. In this perception of anatomy, the fascia not only connects different tissue types, but the different tissues themselves are envisioned as compositional forms of each other. Bone and ligament, for instance, represent opposite ends of the continuum that is one anatomical structure. The concept of *anatomical continuum* is articulated in this book in Chapter 5. In the junction between ligament and bone, the fibers of the ligament merge into the osseous matrix and become the bone itself. This intermediate area (*transition zone*) has properties in between either adjacent tissue, and therefore is physically stiffer than ligament yet more flexible than bone.

The *physiological continuum* of fascia is demonstrated by the ligament/bone transition zone's ability to instantaneously shift its physical characteristics from bone-like to ligament-like, and vice versa, depending on the physical stresses encountered. This shifting of the continuum is analogous to the properties obtained when mixing cornstarch and water. In this amorphous substance a finger can be gently inserted and stirred (multidirectional forces are applied) and the mixture behaves as a liquid. But if a unidirectional force is introduced, such as from tapping, the mixture acts like a solid.

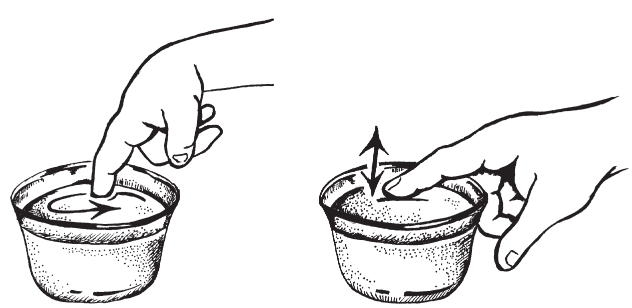


Figure 1-7. Cornstarch/Water Phenomenon

In the FDM, the fascial network, therefore, is not viewed as the hopelessly superfluous mesh of wasted complexity that so many suppose it to be. It is instead envisioned as a well-organized organ system in its own right. And through this *connective tissue highway*, bones and other tissues are constantly replenished with chemicals and nutrients. Thus fascial distortions not only physically restrict motion, alter proprioception, and inhibit muscle function, but also disrupt fascial fluid transport and thereby disturb the chemical balance of the associated tissues.

INFLAMMATION, FRACTURES, SPRAINS, AND PAIN

In the practice of modern medicine, pain is constantly attributed to inflammation. Whether the injury or condition is tendonitis[1] (even if physical exam reveals no reproducible soft tissue crepitus), a sprained ankle, or rheumatoid arthritis, the underlying cause of discomfort of most musculoskeletal injuries is assumed to be swelling or inflammation (particularly traumatic inflammation). Therefore, with musculoskeletal injuries anti-inflammatory drugs are prescribed by doctors in virtually every clinical encounter to reduce inflammation and thereby diminish or alleviate pain. And in a similar vein, broken bones and torn ligaments are said to be generators of pain. Since these injuries are accompanied with inflammation, current standard of care includes prescribing non-steroidal anti-inflammatory drugs (NSAID's).

However, in the FDM, inflammation, fractured bones, and torn ligaments are considered to be MINOR producers of pain. It is instead fascial distortions which are proposed to be the primary generators of pain. Therefore, when the distortions are corrected, the injured limb or other body part no longer hurts because the MAJOR pain producers, i.e., fascial distortions, no longer exist. This point is demonstrated in case histories and clinical examples discussed for numerous injuries and conditions throughout this text.

And although treating tendonitis, a sprained ankle, fracture, or other injury with fascial distortion techniques is expected to eliminate (or at least greatly diminish) pain . . . this is not the goal of treatment. The purpose of treatment is to correct anatomical fascial distortions. Once this is done the *results* of your efforts are striking — loss of pain, increase in motion, and normalization of function and strength.

[1]bmj.com Khan et al., http://bmj.com/cgi/content/full/324/7338/626

Chapter 2

Finesse and Brawn of FDM Techniques

In the FDM, finesse and brawn are concepts of clinical practicality. Finesse is the ability to modify the precise action of a manipulative technique so that it can be specifically applied to each individual injury. Brawn, in contrast, means that the necessary and appropriate amount of physical force is utilized to make the anatomical correction. As a whole, manipulative fascial distortion techniques tend to be both more exact and more aggressive than other manual therapies and, from a purely mechanical point of view, are classified as either thumb or whole hand treatments. The breakdown is shown below:

Thumb	Whole Hand
Triggerband technique	Folding technique
Herniated triggerpoint therapy	Cylinder technique
Continuum technique	(Indian burn/squeegee)
Cylinder technique (double thumb)	Tectonic technique

Thumb Techniques

In Typaldos manual therapy, the human thumb is appreciated as an instrument of great manipulative dexterity. It is the ideal tool for palpating and engaging small soft tissue structures such as fascial distortions. It is compact and strong, tactile and flexible. And unlike the fingers, it bends only once in its middle which allows the treating force to be focused evenly and precisely beneath it.

In all FDM thumb techniques, the initial position of the thumb is essentially the same. The first metacarpophalangeal joint is held in a slightly abducted posture as the interphalangeal joint is flexed. The fingers are used to steady the hand and are stretched apart from the thumb. The hand itself is held loosely so that the wrist can be rotated to the appropriate angle. Direction of force is through the distal phalanx of the thumb. For this reason, the forearm, wrist, and thumb should not be in a straight line. If that is the case, the thumb is forced into extension (and ultimately hyperextension) which displaces the focus of contact from the tip of the thumb to the volar aspect (i.e., where a thumbprint is obtained). This widens the contact surface, unsteadies the force, and decreases endurance.

To be successful with thumb techniques, the contact point must be just slightly to the volar aspect of the end of the distal tuft. This is particularly true in treating small triggerbands and in all continuum distortions. To help steady the treating hand, the non-treating hand and thumb may grip around the treating hand or thumb to help direct the force. Please note that to ensure patient comfort the treating thumbnail should be kept as short as possible.

In treating large herniated triggerpoints, a widened surface of the thumb (more of the volar aspect) is used. Since HTP's tend to be moderate to large in size and fairly soft, this wider surface is necessary. As the HTP begins to release, constant force is maintained. Near the end of release, the thumb-tip is slightly extended and the volar aspect is gently rocked back and forth. This final act of herniated triggerpoint therapy is called *milking* and helps drive the protruded tissue below the fascial plane.

In continuum technique, the release is much smaller and faster than in herniated triggerpoint therapy. However, at the instant of release, it is helpful to increase the amount of force by again extending the thumb tip. This slight increase in pressure directly into the shifting transition zone can also be thought of as *milking* the release.

Thumb cylinder techniques (double thumb and double thumb CCV) are best utilized in the treatment of focal cylinder distortions. They are perhaps the easiest of all the FDM techniques to master. However, their one major drawback is their inability to combat the *jumping phenomenon* which in some patients can be annoying, irritating, and confusing all at once. Note that when jumping occurs, whole hand cylinder techniques or cupping-with-movement are the preferred approaches.

Thumb Strength/Size

Although the human thumb is a wonderful instrument of medical dexterity, it has limitations. When FDM techniques — particularly triggerband technique — are first being learned, there is often an accompanying degree of thumb fatigue and soreness. Fortunately, with time and practice, strength and stamina improve markedly! Some doctors erroneously believe that they will never acquire the appropriate strength to effectively perform triggerband technique because their thumbs are too small. What they may not realize is that for what they lack in size, they make up for in precision. This is because a small tip is easier to *worm* through tissue layers because it has less bulk and drag. Also it can maintain a much narrower focus on the distortion than a thick thumb can. And in certain areas such as the face and hands, small treating thumbs are advantageous.

Whole Hand Techniques

Most folding, cylinder, and tectonic treatments require both treating hands. All these therapies necessitate some amount of brute strength (particularly in long-standing injuries) and in some ways demand more effort than thumb techniques. Folding technique is either a modified traction or compression therapy which requires upper arm strength to be successful. However, the more precisely the technique is applied the less physical force is necessary. For example, in the treatment of a long-standing injury, such as a frozen wrist secondary to fracture, the finesse involved consists of:

1. Envisioning the injury as a folding distortion of the radio-ulnar interosseous membrane

2. Making folding/thrusting manipulations that are anatomically directed (i.e., forcefully thrusting one of the bones away from or into the other bone at a 45° angle)[1]

Whole hand cylinder techniques (squeegee, Indian burn and their CCV counterparts) are treatments of choice for cylinder distortions that involve large segments or areas of the thorax or limbs. Although to the onlooker these therapies may appear effortless, nothing could be further from the truth! Both Indian burn and squeegee, at times, tax the strength of the treating hands and forearms to their limits.

Tectonic techniques engage tectonic fixations either directly (by using both hands to shove the capsule) or indirectly (by using the limb as a lever). Note that indirect approaches (frogleg and reverse frogleg manipulations) require predominantly finesse, whereas direct approaches (such as brute force maneuvers) necessitate the use of copious amounts of brawn.

Why Use Fascial Distortion Techniques?

Fascial distortion techniques provide physicians with non-invasive modalities which when properly utilized, demonstrate objective, clear-cut, and immediate results. In the case of whiplash injury, for example, the elimination of symptoms and restoration of cervical motion not only benefits the patient but also clinically confirms the diagnosis. In addition, the success of the treatment underscores the implausibility of serious secondary injuries (such as fracture) being concurrently present. And since the objective post-treatment findings are easily documented, they add credence to the contention that quality care was delivered.

In Typaldos manual therapy, the treatment is selected according to the anatomical distortion present in the injury. Deciding which fascial distortion technique to use in any given injury then becomes obvious. For instance, if a triggerband is the underlying cause of an injury, then triggerband technique is chosen. In contrast, if the injury is the result of a continuum distortion, then continuum technique would be selected. And the same matching of distortion with technique applies to herniated triggerpoints, tectonic fixations, and folding and cylinder distortions.

Although there are many other osteopathic and non-osteopathic therapies which are commonly used in the treatment of musculoskeletal injuries, only fascial distortion model techniques are specifically designed to correct fascial distortions.

[1]Note that in manipulating the radio-ulnar interosseous membrane, the inclination of the doctor is to traction/thrust one of the bones apart from the other at a 90° angle. Although 90° traction/thrust hand placement is more comfortable than 45° treatment, the 90° approach is rarely successful. Reason: The preponderance of fibers of the folding fascia that become injured in a fracture are those that cross obliquely from the radius to the ulna rather than at right angles to the bones.

Side Effects & Contraindications

The most common side effect of FDM techniques is pain during treatment (close to 100 percent of the time with triggerband and continuum techniques and herniated triggerpoint therapy, less so in cylinder, folding, and tectonic techniques). Erythema of the skin also occurs with triggerband, and to a lesser extent, various cylinder techniques. Soreness and tenderness following FDM treatments are variable. Some patients are quite sore for several days, others are not. Bruising occurs most frequently from the first several chronic pain treatments and is temporary. Hemorrhagic petechiae are expected with use of plunger technique and cupping-with-movement.

Figure 2-1. Erythema, Bruising, and Hemorrhagic Petechiae

Although undesirable reactions from treatments are possible, FDM techniques, when properly applied, have a very low rate of adverse effects. Still, complications could occur and be anything from stroke to phlebitis. Each physician should decide what he or she feels comfortable treating with each individual patient. Contraindications to FDM techniques are mostly relative and a partial list is offered. Each doctor should, of course, use his or her best judgment before employing these (or any other) treatment modalities.

Partial List of Contraindications

Aneurysms	Infectious arthritis
Arteriosclerosis	Open wounds
Bleeding disorders	Osteomyelitis
Bone fractures	Phlebitis
Cancer	Poor doctor/patient rapport
Cellulitis	Pregnancy (treatment of abdomen or pelvis)
Collagen vascular diseases	Previous strokes
Edema	Skin wounds
Hematomas	Vascular diseases
Infections	

Vasovagal responses such as nausea, dizziness, fainting, and vomiting rarely occur. Note that some patients with chronic pain experience the *hit-by-truck effect* after the first one or two FDM treatments. This transient but dramatic increase in symptoms is a good prognostic sign and is an indication that the injured fascia has been anatomically encountered.

Chapter 3

TRIGGERBANDS AND TRIGGERBAND TECHNIQUE

Triggerbands are anatomical injuries to banded fascial tissues in which the fibers have become distorted (i.e., twisted, separated, torn, or wrinkled). The associated verbal description of burning or pulling pain along a linear course accompanied by the corresponding body language (sweeping motion with fingers along triggerband pathway), directs the corrective treatment specifically to the distorted fibers of the afflicted fascial band, ligament, or tendon.

Triggerband technique is the manual method for correcting distorted fascial bands. The goal of the treatment is to physically break fascial adhesions (if the injury is chronic), untwist the distorted band or sub-bands (individual fibers of the band), and re-approximate the torn fibers. In essence, triggerband technique is accomplished by *ironing out* the wrinkled fascia with the physician's thumb. And although there are several subtypes (see table in Addendum) all triggerbands are treated the same way, and that is with triggerband technique.

TRIGGERBAND TECHNIQUE AND THE ZIP LOCK ANALOGY

When a physician encounters a patient in the office with a triggerband, he or she wants to know two things: what a triggerband feels like and exactly how to do triggerband technique. If the triggerband can't be identified and corrected, then the treatment will fail. As with all of the fascial distortion treatments, triggerband technique puts the skills of the physician *out on the line* where neither a treatment success nor a failure is easily hidden.

Perhaps the best way to describe what a triggerband feels like is to compare it to a Ziploc® plastic bag. Triggerbands feel and behave in a similar manner. The zip lock portion of the bag is banded (like fascial bands) and the plastic fibers run along the length of the banded portion (again like fascial bands). When the bag is zipped tight, the fibers are all straight, in line, and approximated (same as fascial bands). But when the zip lock fibers are forcefully pulled apart, the fibers separate, the edges twist, and the ends of the Ziploc® bag are pulled closer together (just as with a triggerband). As the injurious force continues, the fibers separate farther, become more twisted, and the opening enlarges. If the force persists, the Ziploc® bag will become fully unzipped (for a triggerband *fully unzipped* means that the entire triggerband pathway is affected).

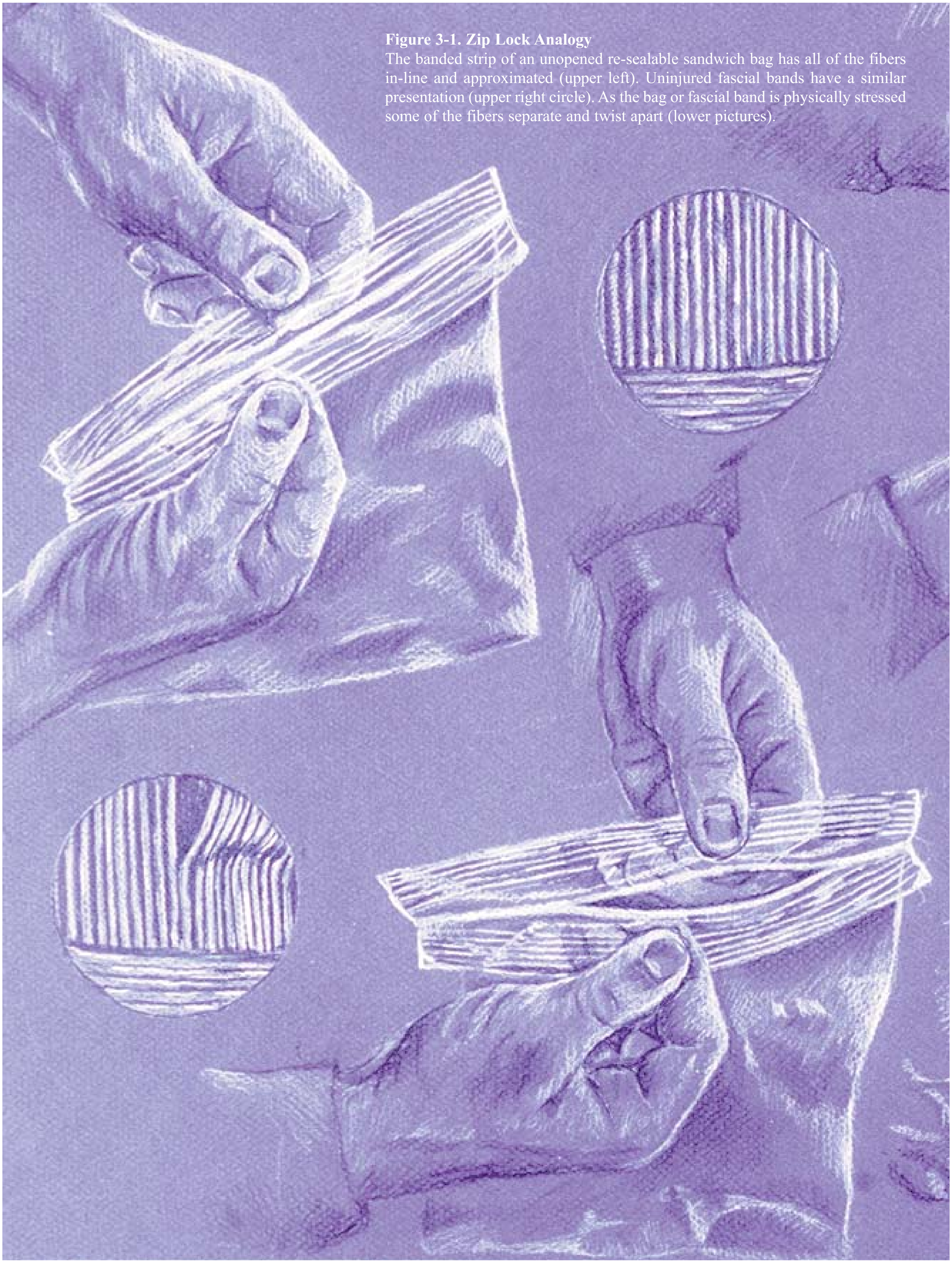


Figure 3-1. Zip Lock Analogy
The banded strip of an unopened re-sealable sandwich bag has all of the fibers in-line and approximated (upper left). Uninjured fascial bands have a similar presentation (upper right circle). As the bag or fascial band is physically stressed some of the fibers separate and twist apart (lower pictures).

In the upper drawings the fibers have separated along their entire length. The bottom pictures show triggerband technique untwisting the twist and re-approximating the separated fibers of both the triggerband and the Ziploc® bag.

Fascial bands function the same way as Ziploc® bags. They have banded fibers that are closely approximated and feel very much like the banded portion of the bag. When a force is encountered, the entire band may twist and torque slightly (just as with the Ziploc® bag). But if a shearing force accompanies the twisting motion, some fibers are pulled apart from each other. If the force persists, then the separation between the fibers spreads throughout the entire length of the band.

Re-zipping the Ziploc® Bag

In this zip lock analogy of a triggerband, a distorted fascial band looks, feels, and behaves like an open or opening Ziploc® sandwich bag. In correcting a triggerband, the thumb is used to re-approximate the separated fibers in the same manner as you would re-zip a Ziploc® bag.

To get the best feel for how a triggerband can be corrected, the reader should actually grab a Ziploc® bag from the kitchen drawer and lay it down on the table. With the bag unzipped and the ends secured in place with two heavy weights, you are ready to attempt to correct a *zip lock triggerband*. With the tip of your thumb (and with your eyes closed) feel for the distorted fibers. Then push the fibers back together along the entire length of the zip lock.

Why Triggerbands Stay Fixed

Two questions frequently asked about triggerband technique are:

- "Why don't the fibers just separate again as soon as you push them back together?"
- "What's holding them in place?"

These questions apply equally well to the Ziploc® bag. But you can appreciate from your own experimenting that once re-zipped the seal is tight and only a force similar to the initial injury could cause the same separation.

When a triggerband is corrected it is *cured*. There is no need for healing time because once the fibers are re-approximated, they seal instantaneously. And just as the zip lock fibers can be pulled apart and sealed over and over again, with no appreciable loss of function, the same is also true with fascial bands.

Triggerbands and Crosslinks

Fascial bands have one significant structural advantage over zip lock bags — crosslinks. Crosslinks hold the fibers of the band together in the same manner that chains bundle logs into a load for transportation on a truck. However, if sufficient external force is directed into the band, the crosslinks will fracture and the fascial fibers will separate.

Healing of the distorted fascial band, ligament, tendon, or other banded fascial structure occurs when the separated fibers are re-approximated and the ends of the fractured crosslinks reattach. The healing time for re-linking is almost immediate when the fascial fibers are in close proximity, but is extended if the fibers are not properly realigned.

If the injured fascial fibers are allowed to heal on their own, the fractured crosslinks reach out and re-link their broken segments, which then physically pull the separated fibers together and untwist the distorted fascial fibers. However, the danger in reattachment is that the wrong crosslinks may be united. If this occurs the fascial band is inappropriately anchored to a neighboring band which further decreases the flexibility of both structures. In the FDM, this mal-attached crosslink unit is called an *adhesion*. And from a clinical perspective, any injury which contains adhesions is considered to be *chronic*.

Acute triggerbands (i.e., those triggerband injuries without adhesions) have four possible futures:

1. Heal quickly (almost immediately) with triggerband technique
2. Heal slowly on their own (crosslinks properly reattach by reaching out to their appropriate counterparts)
3. Not heal at all (injury persists but because of physical exercise, crosslinks don't reattach)
4. Become chronic (crosslinks attach to inappropriate structures)

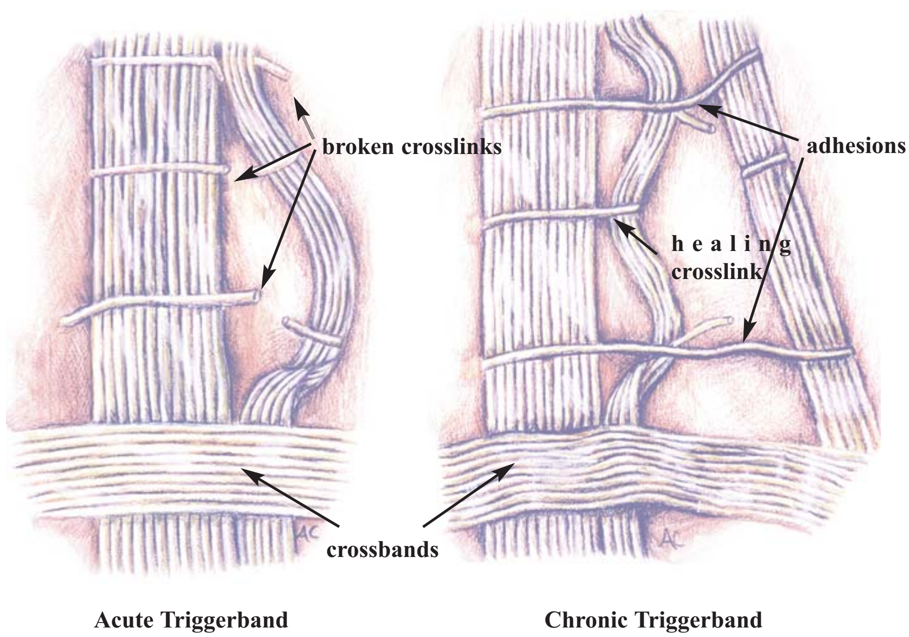


Figure 3-2. Acute and Chronic Triggerbands
In an acute triggerband (left) crosslinks have been fractured and some sub-bands (individual fibers) have twisted apart. Note that crossbands stop the fibers from tearing indefinitely and are the starting point for triggerband technique. If the torn crosslinks heal by attaching to structures other than their appropriate counterparts (right) they are called fascial *adhesions* and the injury is considered to be *chronic*.

Crossbands

During an injury, fascial fibers can't tear indefinitely — what stops them are *crossbands*. These are anatomical structures present in the same plane that intersect the affected fascial band at an angle. Crossbands may be retinacula, fascial bands, other banded fascial structures, and even bone; any of which can stop the progression of separating fibers.

Body Language

The associated body language of patients with triggerbands is always the same: sweeping motion with fingers along the triggerband pathway. Clinically, for instance, if someone complains of shoulder pain and makes a sweeping motion with their fingers along the bicipital groove (see Chapter 13) we can be confident of not only the diagnosis of triggerband sore shoulder but that the involved triggerband is the anterior shoulder pathway.

In addition to determining the specific identity of a triggerband, the body language also is helpful in ascertaining the following:

- Direction of triggerband (affected fibers run parallel to sweeping motion of fingers)
- Extent of pathway involved (the more sweeping the motion, the farther along the pathway fibers have separated)
- The deeper the triggerband is anatomically – the more firmly the person pushes into the fascia with his/her fingers

Treating the Triggerband Pathway

Triggerband technique includes the following steps:

1. Determining pathway
2. Palpating starting point
3. Re-zipping

Determining Pathway

Since different people tend to have the same anatomical arrangement of fascial bands, triggerbands occur in consistent patterns called *pathways*. In the anterior shoulder pathway for example, the triggerband course is always the same — starting point on proximal anterior forearm, with pathway that runs superiorly over the bicipital groove, up the lateral neck, and terminating at the mastoid on the same side.

Palpating Starting Point

The starting point (SP) is the clinical beginning place from which triggerband technique is initiated. This tender anatomical roughening in the contour of the fascia occurs at the intersection of the afflicted fascial band with its corresponding crossband. In the anterior shoulder pathway, the starting point is located on the ventral forearm where the superiorly directed fibers intersect with the horizontally oriented fibers of the bicipital aponeurosis.

To palpate the SP of the anterior shoulder pathway, the volar aspect of the treating thumb is laid across the forearm (pointing toward the antecubital fossa). And with increasing force the thumb prods the fascial tissue for the characteristic irregularity in tissue texture.

Re-Zipping Triggerband

Once the starting point is localized, the interphalangeal thumb joint is flexed to a 90° angle so that the tuft of the distal phalanx is abutted against but just inferior to the starting point. Next, the thumb is held stationary while the fingers are rotated superiorly and grasp the elbow. As the thumb maintains steady and firm force it is dragged superiorly across the skin which irons out the fascial band. Note that the thumb rotates either medially or laterally during the process and it is helped superiorly by the pull of the rotating hand which is anchored by the fingers around the elbow.

Once the thumb reaches the antecubital fossa the hand creeps superiorly so that the fingers grasp the distal humerus and are pointing upward. The thumb is again dragged superiorly until the hand creeps up yet again. In this manner the thumb advances up the arm much like a car is hoisted with a jack. The treatment of the anterior shoulder pathway continues up the arm and through the bicipital groove, over the clavicle, up the lateral neck, and finally to the mastoid on the same side where the fibers terminate.

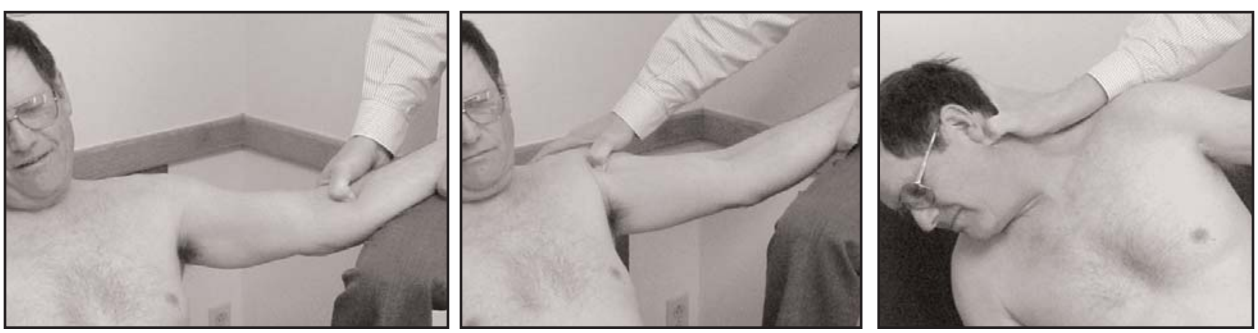


Figure 3-3. Triggerband Technique of Anterior Shoulder Pathway

When using triggerband technique, it is important to stay on the pathway. If you are concerned that you have wandered off-course, ask the patient, "Am I still on it?" Even patients that have no idea of what you are talking about will be able to easily answer, "Yes, definitely," or "No, you lost it." If a patient says, "You left it," that means that you are no longer on the pathway.

Treating the Chronic Triggerband

Unlike acute triggerbands, chronic triggerbands don't zip right back together. They can't because adhesions are holding them in the unzipped position. They therefore require multiple treatments and more force to correct. And since adhesions are fractured, bruising and soreness from the initial treatments are expected. An additional approach in fracturing adhesions of chronic pain is the *comb* (see glossary term *Comb Technique*). This technique involves literally raking the skin with a steel comb. *Old Scratchy*, as it is affectionately called, fractures the small adhesions of fibromyalgia and is a valuable tool in the treatment of chronic pain.

Not Starting at Starting Point

In treating the anterior shoulder pathway (or any pathway), it is generally best to begin at the starting point. This assures that the entire triggerband is properly treated and that all of the separated fibers have been re-approximated. However, in some patients it may not be necessary to treat the entire length of the pathway. Just as with the Ziploc® bag, the band may have only separated along a middle portion of its course. Starting in the middle requires greater palpatory skill but has the advantage of being a faster treatment. However, for those learning triggerband technique, it is suggested the entire pathway be treated every time until the technique is mastered.

Triggerband Movement

Clinically, during treatment triggerband twists exhibit *movement*. This is best appreciated when a twist is moved up or down the course of the pathway during triggerband technique. In a triggerband sore shoulder, for instance, the bicipital groove may initially be sore, but with triggerband technique, that soreness can be moved anywhere along the course of the pathway. The linear movement of pain is, of course, pathognomonic of a triggerband but has another ramification, namely that with triggerband technique it is possible to have *left the twist behind* when performing the treatment. When this occurs, the patient has a new pain in an area he/she didn't have before. This is another reason for treating the whole triggerband pathway rather than only part of it.

Mixing Techniques and Concepts

When using triggerband technique, lotions, gels, or creams should not be applied. These reduce the friction on the skin which is needed to correct the underlying structures. Also it is important to appreciate triggerband technique as being a distinct treatment entity. It is not a form of massage, myofascial release, rolfing, acupressure, or any other modality. *Mixing* triggerband technique (or other FDM concepts and practices) with other techniques and concepts decreases its focus and thus its effectiveness.

Chapter 4

Herniated Triggerpoints and Herniated Triggerpoint Therapy

Herniated triggerpoints (HTP's) are fascial distortions in which underlying tissue has protruded through an adjacent fascial plane and has become entrapped. These injuries are responsible for a wide range of painful complaints such as neck aches, sore shoulders, renal colic pain, abdominal pain, and buttock strain. The three most commonly encountered HTP's are: *supraclavicular*, *bull's-eye*, and *abdominal*.

The anatomical goal of herniated triggerpoint therapy is to force the entrapped tissue below the fascial plane with pressure from the physician's thumb. The three components of therapy include:

1. Palpating distortion
2. Applying pressure
3. Milking the release

SCHTP

Since the supraclavicular herniated triggerpoint is so prevalent it can be thought of as the *type specimen* for the group. The SCHTP is an almond-sized protrusion of tissue found in the indented space between the clavicle and the superior margin of the scapula. It is the usual culprit of thoracic tightness between shoulder and neck, loss of cervical rotation, one-sided headaches where the head is tilted to the side of pain, and in approximately one half the cases of acute sore shoulders in which abduction is completely or partially lost.

The body language for the SCHTP is always the same — fingers pushing directly into the supraclavicular fossa (see Figure 13-1). The clinical findings closely match the symptoms:

- If patient complains of upper back tightness, then palpatory expectation is tightened thoracic fascia (posterior to supraclavicular fossa)
- If complaint is a headache or neck ache, then diminished neck rotation is expected
- If complaint is shoulder pain, there is likely to be altered shoulder abduction or internal rotation

To palpate the supraclavicular herniated triggerpoint the thumb-tip presses into the fossa until it encounters an irregularity in the tissues which may feel like a spongy marble. But be aware that no two SCHTP's are exactly alike! In fact some protrusions occur in the middle portion of the fossa and are relatively soft, while others are more medially located (even abutted against C_7 or T_1) and firmer (almost almond-like in hardness).

In treating the SCHTP the patient is laid supine (sitting and prone are alternate positions) with the physician seated at the head-end of the table. The corresponding thumb, i.e., right thumb treats right SCHTP (secondary approach is left thumb for right SCHTP), applies pressure into the supraclavicular fossa and feels for the protruding tissue. Once palpated, firm pressure is directed into the most tender portion of the distortion as force from the volar aspect of the distal phalanx is increased. The thumb pressure should be continuous and progressive. If necessary recruit the non-treating hand to help push!

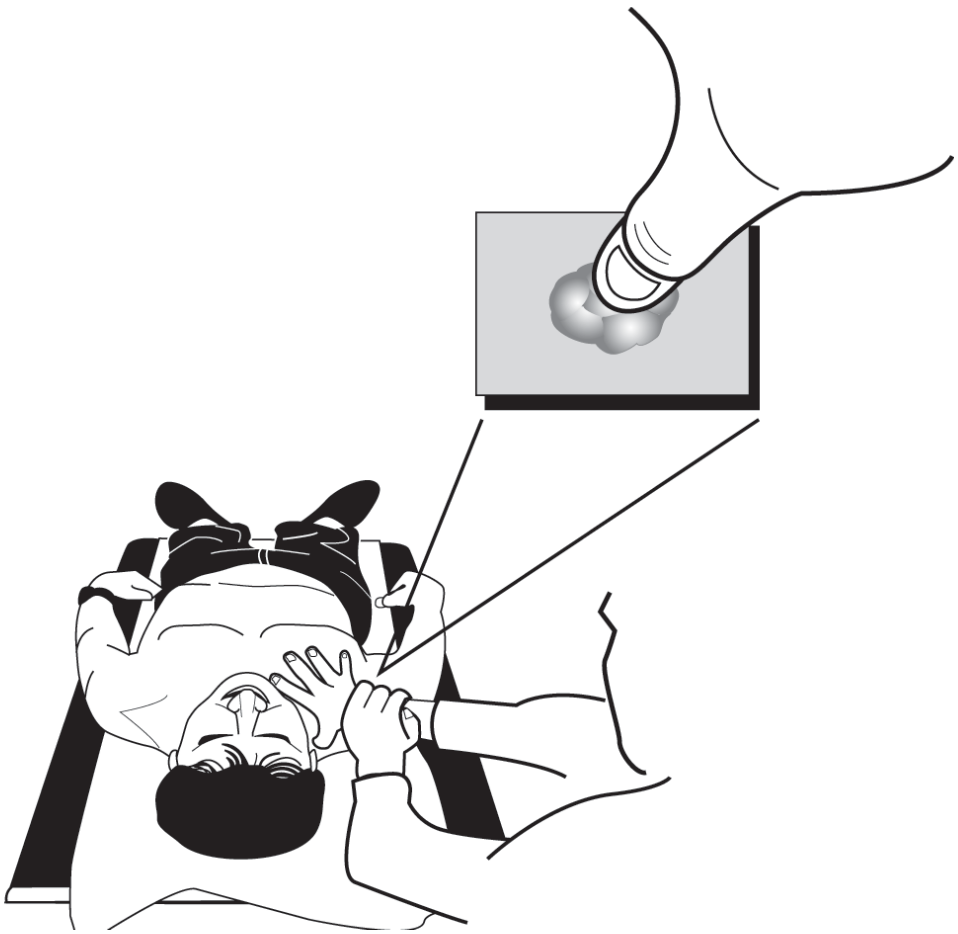


Figure 4-1. Herniated Triggerpoint Therapy of the SCHTP

The shortest part of the treatment is the release (5-10 seconds). It is defined as the *sensation experienced by physician and patient as the protruding tissue is physically driven below the fascial plane*. To the treating doctors the release palpates first as a softening in consistency and then a lessening in size of the HTP. To the patient, the release feels like a melting. The final process of herniated triggerpoint therapy is called *milking*. It is designed to coax even the smallest portions of the herniated tissue below the fascial plane by rocking the thumb back and forth during the release. Note that when first learning herniated triggerpoint therapy it may take the physician as long as two minutes to complete the treatment. (Most of this time is spent on locating the HTP and applying pressure.)

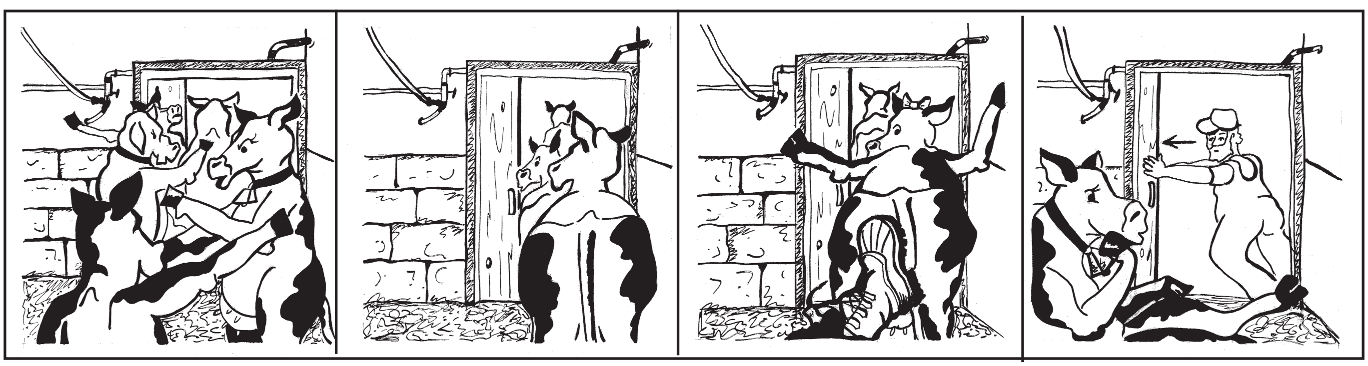
One colorful way to envision herniated triggerpoint therapy is to think of the *cows-through-the-barn-door analogy*. In this metaphor, cows are coming home from pasture and need to be herded through a narrow door into the barn. Three ways to maximize efficiency are:

1. Line up all the cows in a row head-to-tail – this keeps them from crowding together and blocking the entrance
2. Physically shove each cow through the door instead of allowing them to meander into the barn at their own pace
3. Widen the entrance

In herniated triggerpoint therapy the protruding tissue is analogous to the cows. So to maximize treatment:

1. Use thumb to line up irregular protruding tissue so that one part at a time can be pushed through the fascial plane (one cow walks through at a time)
2. Use sufficient force – don’t wait for the tissue to be pulled through on its own (kick the cows through the doorway!)
3. Have a second person traction the same-sided arm at a 30°- 45° angle to the body (see Figure 13-5) to increase the size of the fossa (open the barn door wider)

Figure 4-2. Cows-Through-the-Barn-Door Analogy



Recalcitrant cows outside barn | 1. Cows lined up | 2. Cows shoved into barn | 3. Barn door opened fully

BULL’S-EYE HTP

The bull’s-eye herniated triggerpoint is found in the middle or lateral gluteal area and is a frequent cause of not only hip and gluteal pain, but also what many patients describe as “low back pain.” Treatment consists of herniated triggerpoint therapy with patient prone or standing leaning against counter top (see glossary term *Bull’s-Eye Herniated Triggerpoint*). Since the bull’s-eye HTP is deep within the gluteal tissue, don’t be concerned about pushing too hard. The goal of herniated triggerpoint therapy of the bull’s-eye is the same as it is for the SCHTP — force protruding tissue below the fascial plane. The thumb-tip is again directed into the distortion until the protrusion is felt (the patient will know even if you don’t!) and force is applied and held until the release.

ABDOMINAL HTP'S

Abdominal herniated triggerpoint therapy (along with triggerband technique) is a clinical and practical adjunct procedure for relieving or diminishing the biting pain and aching discomfort associated with pancreatitis, biliary colic, pelvic pain, and appendicitis. Although it is *not a substitute for medical evaluation or surgical treatment*, it anatomically corrects a portion of the pain-producing elements of an acute abdomen and therefore offers the physician (and patient) an effective non-pharmaceutical pain-killing supplement to narcotic analgesics.

Abdominal HTP's are located deep within the abdominal cavity and are easily appreciated upon palpation (they hurt!). Associated areas of discomfort include:

Pancreatitis – left upper quadrant and epigastric areas
Biliary colic – right upper quadrant
Pelvic pain – pelvis
Appendicitis – McBurney's point

Treatment consists of herniated triggerpoint therapy, i.e., pushing thumb deep into abdomen to first locate and then correct the herniated triggerpoint. However the anatomical backdrop in the abdomen complicates the treatment because there is nothing firm behind the HTP to push against. To give the thumb a background resistance, the direction of force can be altered slightly to bring the HTP against a firmer surface (such as a muscle). This is done by lifting or moving the entire plane of fascia with the opposite hand and then redirecting the force from the treating thumb into the resistance. The HTP is held until release which should result in a significant and immediate reduction in pain. After the first HTP is eliminated the patient is reevaluated:

1. No change in pain – correction was not made, or FDM impression was wrong (re-treat or reconsider diagnosis)
2. Reduction in pain – other uncorrected HTP's or triggerbands are concurrently present (treat remaining distortions; continue medical/surgical evaluation and treatment)
3. Complete relief of pain – FDM treatment was successful (continue medical/surgical evaluation and treatment)

It should be noted that aortic aneurysms, bleeding disorders, ruptured viscus, and a variety of other conditions are absolute contraindications to herniated triggerpoint therapy (or triggerband technique) in the abdomen.

Chapter 5

CONTINUUM DISTORTIONS AND CONTINUUM TECHNIQUE

When the transition zone between ligament, tendon, or other fascial structure, and bone loses its ability to structurally respond to external forces, this is called a continuum distortion[1]. The presenting body language of this third principal fascial distortion type is distinct and obvious — pointing with one finger to the spot(s) of pain. And although some chronic injuries contain continuum distortions, the bulk of these exquisitely tender disruptions of the ligament/bone junction are found in acute injuries. Ankle sprains, cervical strains, sore shoulders, and sacroiliac pain are but a few examples of the many cases of continuum injuries encountered daily in the emergency room setting.

Treatment of continuum distortions is with pressure from the thumb-tip directed into the transition zone. The correction is made when the osseous components are forced to *shift* back into the bone. Although this approach initially seems straightforward, the technical success of the treatment is dependent upon an appreciation of continuum theory.

CONTINUUM THEORY

Since, in the fascial distortion model, ligament and bone are envisioned as two opposite ends of one anatomical spectrum, both structures are seen as merely compositional forms of each other. Bone is therefore a fascial tissue with a large percentage of osseous material, while ligament is a fascial tissue with minimal bony products. And in the junction between them where the fibers of ligament blend into bone, there is an area which has both osseous and ligamentous physical properties. This intermediate section is called the *transition zone*.

In its neutral state the transition zone (TZ) has physical properties in between ligament and bone, i.e., it is more flexible than bone but more rigid than ligament. However, within the continuum theory, the TZ is considered to have an additional physiological capability of instantly responding to external forces by altering the percentage of its osseous components. This shifting of bony components in and out of the transition zone gives the ligament/bone unit the capacity to make precise and computer-like structural responses to potentially injurious forces and thereby diminish the incidence of fractures and ligamental tears.

[1]Continuum distortions occur at the junction of fascia with *any* other tissue type. It should be noted that the discussion in this book is limited to continuum distortions of the transition zone between ligament or tendon and bone (which are responsible for calcified tendonitis and the most common type of ankle sprain). Examples of other kinds of tissue continuum distortions include myositis ossificans (bony products deposited in muscle) and calcified blood vessels (bony products shifted into vascular system).

In the course of our daily lives, at any given moment the external forces that the ligament/bone junction encounter determine the percentage of osseous components that inhabit the transition zone. For instance, when the ligament and bone are subjected to unidirectional forces (such as from compression), osseous components are pulled from the bone into the TZ. However, if the ligament/bone junction instead encounters multidirectional forces (such as from circumducting a joint), osseous components shift back into the bone. The osseous configuration is therefore stronger (but stiffer), which protects the ligamental insertion from buckling, whereas the less strong but more flexible ligamental configuration shields against ligamental tears. It is this shifting of the continuum back and forth through the transition zone which gives our bones and ligaments the facility to minimize serious injuries.

Continuum distortions occur when a portion of the transition zone is subjected to a unidirectional force at the same time as another portion of the same zone encounters a multidirectional force. The result is that the transition zone splits its identity — one part becomes osseous and the other ligamental. These dual forces hold the TZ in two dichotomous states which, if one of the forces is extreme enough, may cause the responding section of the zone to *overshift* — meaning that so much osseous material is pushed in one direction, that even after the forces cease, that portion of the zone is unable to transfer sufficient bony components to be able to shift back into the neutral state. This imbalance in the transition zone between bone and ligament disrupts function of the ligament (some fibers are stiff, while others are flexible), and transmits to the brain uneven mechanical sensory information which is interpreted as pain.

Thus, continuum distortions can be thought of as a breakdown in the adaptive ability of the transition zone to shift. Therefore, when the injured transition zone encounters new forces that require the opposite configuration, that portion of the zone is incapable of responding (i.e., shifting). Since the TZ can become stuck in either the osseous or ligamental configuration, there are two subtypes of continuum distortions:

1. Everted (ECD) – Portion of transition zone is stuck in osseous configuration, i.e., osseous components can't shift *from* transition zone into bone
2. Inverted (ICD) – Portion of transition zone is stuck in ligamental configuration, i.e., osseous components can't shift *into* transition zone from bone

How To Do Continuum Technique

Continuum technique is the manual method for correcting continuum distortions. Note that the continuum distortion itself is palpated as a small (approximately the size of a lentil) roughening in the tissues which is impressively tender. The actual treatment consists of applying firm and continuous pressure directly into the continuum distortion and forcing the transition zone to shift, i.e., bony products are forced out of the transition zone and into the bone. The volar aspect of the physician's thumb directs and focuses force into the altered transition zone which is held until shifting occurs.

Figure 5-1. Continuum Distortions and the Ice/Slush/Water Analogy

In the FDM, ligament and bone are considered to be a continuum of one anatomical entity and the ice/slush/water analogy illustrates this point. In the illustrations below, ligamental fibers (top of drawings) are the water, transition zone between ligament and bone is the slush (shown as a snow cone), and bone (bottom of drawings) is the ice. Far left diagram shows transition zone in the neutral state.

When the ligament/bone unit encounters forces from several different directions, the transition zone shifts into the flexible ligamental configuration (middle left). But if force is instead solely from one direction, the transition zone shifts into the stronger osseous configuration (middle right).

Continuum distortions form when the transition zone is subjected to simultaneous external singular and multidirectional forces. These uneven stresses result in one portion of the zone shifting into the ligamental configuration and the other being held in the osseous configuration. If one of the external forces is sufficient, the corresponding portion of the transition zone will *overshift* and become stuck in that configuration (far right drawing).

Two pathological possibilities exist (far right drawing):

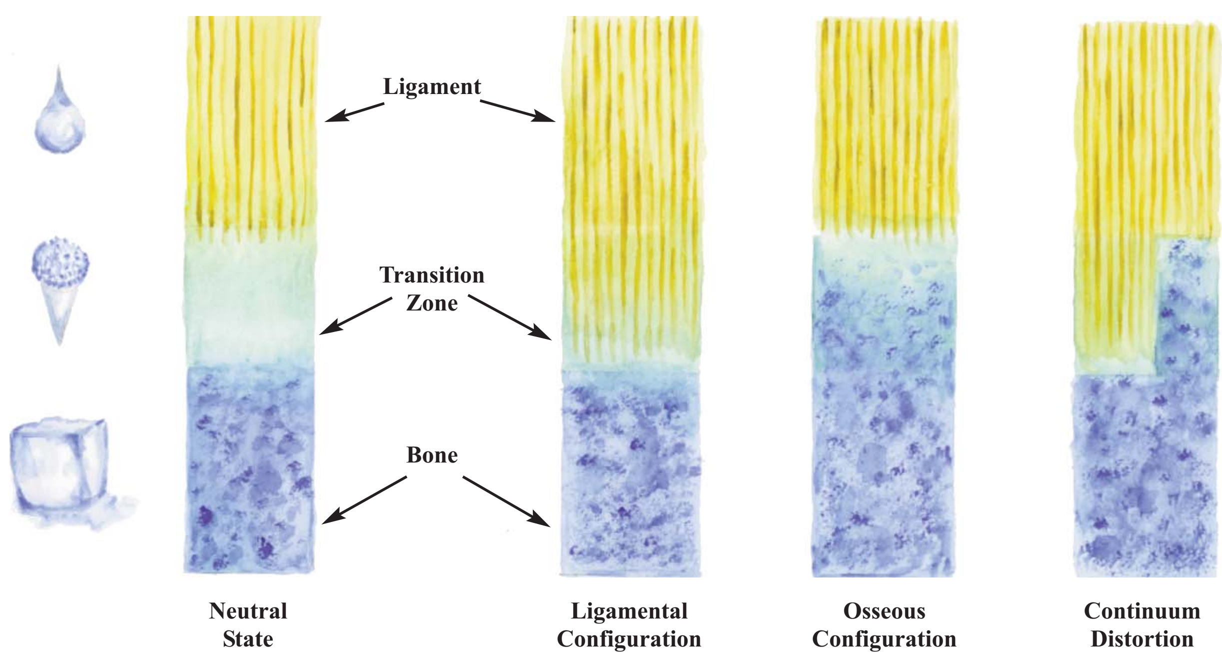
1. Uninjured portion of transition zone (yellow) has shifted back into ligamental configuration while adjacent injured part (blue) is held in osseous configuration (everted subtype)
2. Uninjured portion (blue) has shifted back into osseous state while injured part (yellow) is held in ligamental state (inverted subtype)

<u>Treatment of ECD's:</u>

1. Apply pressure with thumb onto *stuck* osseous portion of transition zone (blue) and physically force it to shift

<u>Treatment of ICD's:*</u>

1. Apply pressure with thumb onto *unstuck* osseous portion of transition zone (blue) and physically force it to shift
2. Thrusting manipulation of nearby joint to draw osseous components into ligamental fibers (yellow)



*Future treatments of ICD's will involve more precise methods of pulling or suctioning bony elements into the transition zone.

To find the continuum distortion, the tip of the thumb worms its way through the peripheral tissue until it rests on the distortion. Force is focused directly into the most painful spot. If the patient should say, “That’s not too bad,” this implies that the direction of force is off-mark. Readjust the thumb-tip and change the angle of force to maximize the pain and hold in that position until the transition zone shifts (normally this requires 5-30 seconds of holding firm pressure before shifting occurs). The release itself lasts from 1-5 seconds and feels to both doctor and patient like a *button-slipping-into-a-buttonhole*. Note that once the zone shifts, the patient will immediately relate a dramatic reduction in discomfort.

The force used in continuum technique should be of opposite direction to the force that caused the injury, but of equal intensity. For instance, in a continuum sprained ankle, the calcaneofibular ligament typically exhibits an everted continuum distortion because bony components were pulled into it when the ankle buckled laterally. If the CD occurs at the origin of the ligament, the direction of force from the treating thumb should be directed into the attachment of the ligament on the calcaneus (see below). However, if the CD occurs at the insertion of the ligament, the direction of force from the treating thumb should be directed into the attachment of the ligament on the fibula. In either case, the amount of treatment force should be significant because the force of injury was significant.

Figure 5-2. Treatment of Lateral Ankle Continuum Distortion

Once the continuum distortion has resolved, it no longer exists, and the injured area is immediately improved (i.e., there is dramatically less pain and the neighboring joint demonstrates increased strength with greater mobility). Note that the two most significant factors of a successful continuum treatment are:

1. Proper direction
2. Adequate force

The All-or-None Principle

Continuum technique works on the *all-or-none* principle. Either the transition zone shifted, or it didn't. There is no in-between. If the direction or intensity of force is insufficient, then the transition zone won't shift. With continuum technique you cannot get a partial result because either the transition zone shifted, or it didn't.

Everted and Inverted Continuum Distortions

Continuum technique is best suited to correct everted continuum distortions. These are the injuries in which excess osseous components have been pulled into, and are *stuck*, in a portion of the transition zone between ligament and bone. Although the remaining portions of the transition zone may shift back and forth freely as different external forces are encountered, the injured portion remains stuck in the everted configuration.

Since in inverted continuum distortions, the osseous components need to be pulled out of the bone, not pushed in, they typically respond less well to continuum technique. However, continuum technique may still correct them. This is because the uninjured area (i.e., the *unstuck*, more osseous portion of the transition zone) can be forced to shift into the ligamentous state. Because that portion is then in the same configuration as the stuck portion next to it, it may *pull* the stuck portion with it when it shifts again into the neutral state.

Although inverted continuum distortions initially respond well to continuum technique, a few hours or days later some seem to reoccur. This re-emergence of the clinical signs and symptoms of a continuum distortion is possible because in an inverted treatment (unlike an everted correction) the *unstuck* portion of the transition zone has shifted, not the stuck part. So later, when the zone shifts again, it may do so as a whole unit (meaning that the treatment was successful), or only part of it may shift and the other part stays stuck (meaning that the treatment needs to be repeated).

Note that thrusting manipulation can be utilized as an adjunct treatment to continuum technique for the correction of inverted continuum distortions (particularly those of the sacroiliac joint, and cervical, thoracic, and lumbar spines). Reason – the manipulation tugs on the bony matrix and pulls osseous components into the transition zone. However, it should be made clear that manipulation is contraindicated in treating everted continuum distortions because:

1. It can make the distortion more symptomatic by pulling additional bony products into the already overshifted osseous portion of the transition zone
2. During the first 24 hours following correction of an ECD, the zone is not completely structurally united, and thrusting manipulation may force osseous material into the recently corrected portion of the zone and thus recreate the ECD

What To Do After Continuum Technique

Once a continuum distortion is corrected, there is little aftercare. If the patient is pain-free and the injured area has normal motion and strength, then there are no automatic restrictions. For an athlete with a continuum sprained ankle, he or she may be allowed to continue participating immediately (or in a day or two, depending on the comfort level of the treating physician). For all continuum injuries ice massage is a possible adjunct treatment since it seems to be helpful in reducing generalized discomfort. However, thrusting manipulation of everted distortions, and heat in the first 24 hours are two *big no's*.

Continuum Treatment Failures

If the treatment result is less than dramatic, then either the technique was improperly applied, or additional types of fascial distortions (including continuum distortions) are present. Remember that continuum technique works on an all-or-none principle. There are no partial results. If proper direction and force are held and the distortion won't release this is most likely because it is not a continuum distortion, but a small triggerband. To determine if it is a triggerband, push the distortion at a slight angle to see if it moves. If it does, then it is a triggerband and should be treated with triggerband technique.

Some injuries consist of many continuum distortions. If so, a successful treatment is just a question of numbers; the more that are corrected, the better the result. If necessary, bring the patient back the next day and *don't take any prisoners*.

Chapter 6

Folding Distortions and Folding Technique

When fascia in or around a joint becomes distorted from either traction or compression forces, this is called a folding distortion. These three-dimensional injuries of the fascial plane hurt deep within the joint and diminish the ability of the fascia to protect against pulling or pushing injuries. Within the FDM there are two subtypes of folding distortions — *unfolding* and *refolding*. Unfolding distortions occur when a pulling and twisting force is introduced into a joint and the fascia unfolds, torques, and refolds contorted. The main structural ramification of this injury is that the fascia can't refold completely. Refolding injuries, in contrast, occur when the fascia becomes jammed or compressed onto itself and then can't unfold completely.

Folding Distortion Subtypes

Unfolding and refolding distortions can be distinguished from each other by:

1. Mechanism of injury
2. Direction of force which reduces or exacerbates pain (unfolding injuries feel better with traction and worse with compression, while refolding injuries feel better with compression and worse with traction)
3. Therapeutic response to folding techniques (unfoldings respond to unfolding techniques, i.e., traction and/or traction/thrusting; whereas refoldings respond to refolding techniques, i.e., compression and/or compression/thrusting)

Note that folding techniques of any kind should not be painful. If they are this means that the direction of thrusting force is wrong and needs to be reversed, i.e., changed from traction to compression or from compression to traction.

Unfolding Distortions

Unfolding distortions hurt deep within the joint and result from the limb or other body part being yanked. In the shoulder, a common mechanism of injury is of a pet pulling on its harness or leash. The unknowing partners in these incidents are generally horses and dogs. In the case of the horse, the accident occurs as the equine suddenly throws its head forward and the force of pull is directed through the reins and into its rider's shoulder. In the case of the dog, the accident occurs as the canine lurches forward at an unexpected moment, jerking both its leash and its owner's shoulder (see Figure 6-1).

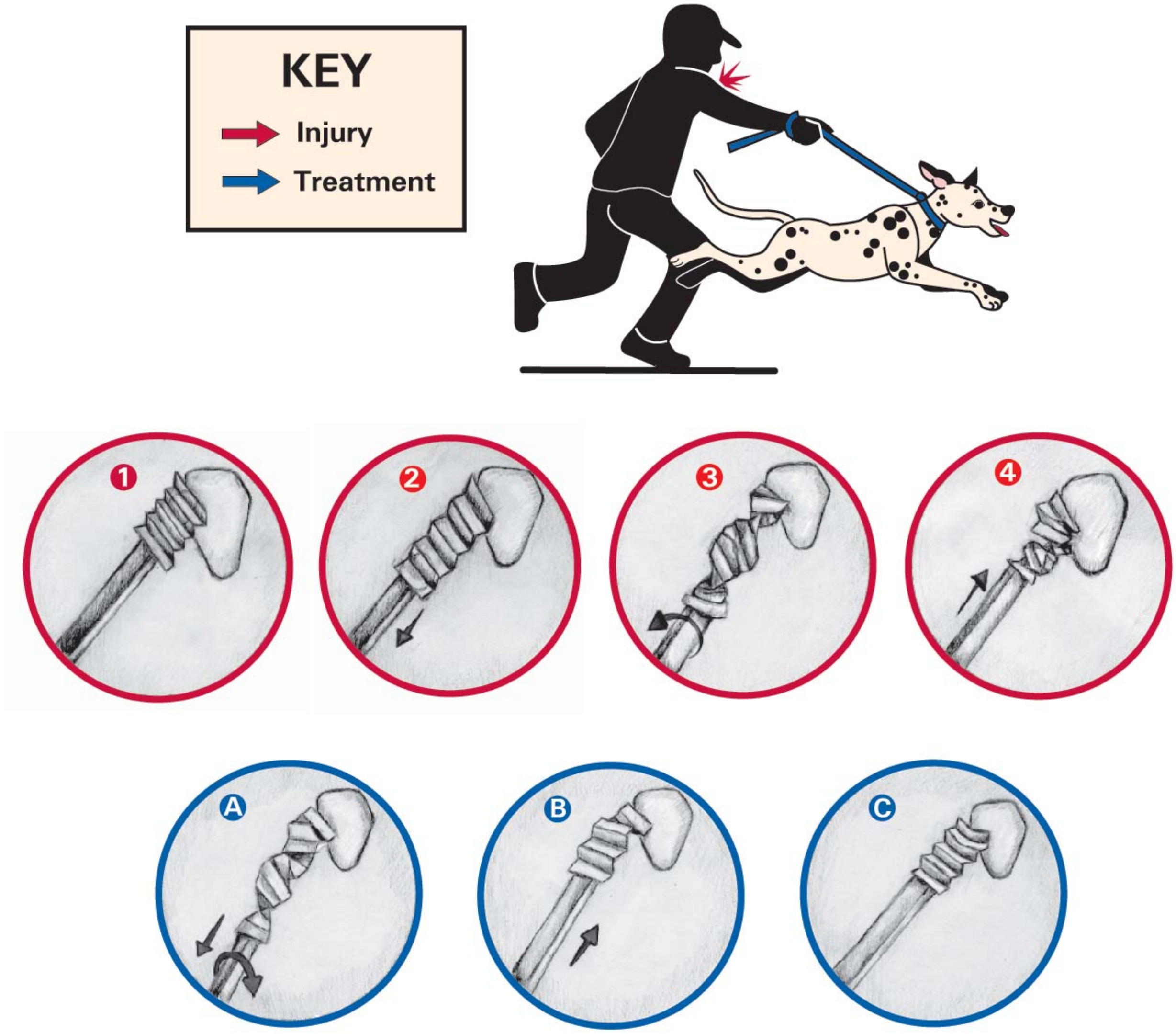


Figure 6-1. Unfolding Shoulder Injury and Treatment

<u>Mechanism of Injury</u>

1. Schematic of uninjured folding fascia
2. Fascia unfolds as shoulder is yanked
3. Flinching from pain causes fascia to torque
4. Torqued fascia refolds contorted

<u>Treatment of Unfolding Distortion</u>

A. Treatment consists of traction and untorquing the torqued folding fascia
B. Once correction is made, traction is terminated and fascia begins to refold
C. Corrected fascia, now refolded, is no longer contorted

The treatment of unfolding distortions is conceptually similar to that for reducing a dislocated shoulder, only less force is necessary for resolution. To treat, traction is applied to the affected joint until the fascia unfolds and then refolds into its proper configuration. With unfolding technique of the shoulder, for example, the injured limb is subjected to traction and torque in a variety of different directions. First, traction is applied in one direction and then another until the desired result is achieved. As traction is maintained, a slight twisting motion should be initiated to help untorque the contorted fascia. A second approach to treating unfolding distortions is the whip technique (see Figures 13-7 and 13-9), which is also discussed in the Chapter 8.

When an unfolding correction is made, the tension on the joint diminishes. This lessening of tension may feel to the patient or doctor as a *release*. Some unfolding distortions, in contrast, resolve with a *clunk*. Others correct with a *staccato manipulation*, which is felt or heard as a series of rapid pops as portions of the contorted fascial plane unfold. Be aware that if the folding injury is chronic (i.e., fascial adhesions have formed), then triggerband technique should precede unfolding technique. Unfolding/thrusting manipulation is a more aggressive and far more effective form of unfolding technique. With these procedures, traction is quickly followed by an aggressive thrust away from the joint. A pop signifies a successful result.

Clinically, unfolding distortions are responsible for a wide array of commonly seen injuries such as some types of sore shoulders, sprained ankles, low back pain, and knee sprains. In addition, they are typically present in injuries of the interosseous membranes and intermuscular septa.

REFOLDING DISTORTIONS

Refolding distortions hurt deep in the joint (like unfoldings) and occur when the fascia around or within a joint become physically over-compressed. This *squashing* of the folding fascia compresses it so much that it is then unable to unfold completely. In the shoulder, the most common mechanism of a refolding injury is slipping on the ice and falling on an outstretched hand. Providing that the wrist or elbow isn't fractured, the force of the hand hitting the ground is transferred up the extremity to the capsule and folding fascia in and around the gleno-humeral joint.

Treatment of refoldings is to physically *overfold* the mis-compressed fascia. Compression along with an accompanying thrust refolds the tissue still more tightly and allows it to spring back (i.e., unfold) less contorted once the force is terminated.

Note that unfolding corrections *pop* or *clunk* during the traction/thrusting procedure, but with refolding corrections the audible *click* is generally not heard until immediately after the compression/thrusting is terminated. Since it is the snapping apart of the fascial planes that is responsible for the sound, refolding corrections aren't often audibly appreciated until a second or two after the thrust — which is the time it takes for the contorted fascia to first refold and then unfold.

Figure 6-2. Refolding Shoulder Injury and Treatment

Clinical Examples of Unfolding and Refolding Injuries

<u>Shoulder Pain</u>

1. Horse bucked its head forward and jerked reins which rider was holding
   Dx: Unfolding injury
   PE: Pain reduced by traction, and increased by pushing head of humerus into glenoid fossa
   Tx: Unfolding technique, i.e., traction/thrusting humeral head away from glenoid fossa

2. Ice skater falls on outstretched arm
   Dx: Refolding injury
   PE: Pain reduced by pushing upper arm into shoulder, and increased by pulling on arm
   Tx: Refolding technique, i.e., compression/thrusting of humerus into glenoid fossa

<u>Knee Pain</u>

3. Football player tackled and knee hyper-extended and then twisted
   Dx: Unfolding injury
   Hx: Pain increased by walking and relieved by resting
   Tx: Unfolding technique, i.e., traction/thrusting tibia away from femur

4. Walked down steps, anticipated a final step that wasn't there, and foot came down hard onto floor
   Dx: Refolding injury
   Hx: Most stiff after resting, stiffness decreases with walking
   Tx: Refolding technique, i.e., compression/thrusting tibia into femur

<u>Low Back Pain</u>

5. Auto accident in which there was a head-on collision – air bag protected head and face, seat belt restrained passenger in seat
   Dx: Unfolding injury
   PE: Discomfort is increased by compression and relieved by stretching
   Tx: Chair traction/thrusting manipulation

6. Tripped down stairs and fell on buttocks
   Dx: Refolding injury
   PE: Stretching lumbar spine hurts, but pushing hard down on shoulders diminishes low back pain
   Tx: Chair compression/thrusting manipulation

Unfolding and Refolding Combination Injuries

Joints may become injured from concurrent compression and traction forces that simultaneously unfold and twist one portion of the fascia and compress and overfold another portion. The currently preferred treatment approach of these combination folding distortions is to first refold the folding fascia and then unfold it. To augment this refolding/unfolding process, compress and then traction the joint repeatedly until the folding fascia manipulates (i.e., an articular snap or a series of snaps is heard or felt as the fascia first refolds and then quickly unfolds).

Cervical, Thoracic, and Lumbar Folding Injuries

During a folding injury to the spine such as from an auto accident, the paravertebral fascia either becomes stretched upwards and refolds contorted, or compressed downward and can't unfold properly. Symptoms of either subtype include deep pain or aching within involved spinal segments. Treatment for neck, as well as thoracic, and lumbar folding injuries consists of first correcting other distortions that are present (particularly triggerbands with adhesions if the injury is chronic) and then utilizing either traction/thrusting for unfolding injuries or compression/thrusting for refoldings. Note that inversion therapy (discussed shortly) is for patients with stubborn folding injuries as an adjunct approach which augments folding/thrusting manipulations.

Cervical Folding Manipulations

If a patient is to be treated for an acute folding neck injury in the supine position, the physician sits at the head-end of the table. If instead it is felt that the patient would be more comfortable sitting, the doctor stands behind or just to the side of the chair. In either case, the principles of treatment are similar.

In an unfolding correction, the actual treatment begins with the introduction of a firm superiorly directed traction force into the occiput. This pulling force is maintained for two-five seconds or so before a folding/thrusting manipulation is performed. The thrusting manipulation can be of two types:

1. Straight traction (physician's hands quickly tug occiput in superior direction)
2. Rotation

The preferred hand arrangement for rotational thrust is the same whether it is performed on the seated or supine patient — thrusting thumb is placed on fixated cervical transverse process and the index and middle finger are positioned along the angle of the jaw. If the left side of the neck is to be manipulated, the right hand continues to traction as the left hand rotates the neck to the right until the physiological barrier is engaged. Then a rapid thrusting force from the thumb is directed into the transverse process. The vector of force follows along the mandible. It should be remembered that this is an unfolding manipulation, so traction must be maintained throughout the procedure. Care should be taken to avoid pinching the ear.

In refolding cervical manipulations, the hand position with the patient seated is such that the non-thrusting hand pushes downward, as the thrusting hand delivers the rotational manipulation. In the supine position both hands compress the neck before and during the thrust. In either seated or supine refolding manipulations, it is advisable to compress for two-five seconds before rotational manipulative forces are introduced.

Figure 6-3. Folding/Thrusting Manipulations of the Cervical Spine

Thoracic Folding Manipulations

The most effective unfolding techniques for the thoracic spine are hallelujah maneuver (upper thoracic) and wall technique (lower thoracic). The most effective refolding technique for the thoracic spine (chair technique) is discussed in the section on lumbar folding manipulations. The hallelujah is performed with patient standing or sitting and the shoulders externally rotated so that the elbows are pointing laterally. The doctor reaches from behind and places his/her hands through the triangular opening created by the patient's forearm, elbow, and neck. The treating fingers are then intertwined and placed on top of patient's intertwined fingers. The thrusting maneuver is performed at the termination of a deep exhalation as the patient leans back into the physician. The finesse of this manipulation is such that patient first falls limply backwards and then is smoothly but firmly lifted superiorly. Note that in Europe the hallelujah maneuver is better known as *standing lift*.

Wall technique is performed with patient standing, facing and leaning against a wall. The feet are brought to within several inches of the wall, head rests on a pillow and is turned to either the right or left. A double pisiform hand position is taken so that physician's left lateral hand and left pisiform traction the left paravertebral fascia, while right lateral hand and pisiform traction right paravertebral fascia. The hands, forearms, and even the doctor's chest can be used to traction and thrust the fascia. The direction of the thrust itself is toward patient's chin. It should be emphasized that to be successful with this technique the direction of traction and thrust should be as superiorly as possible. (Physician may wish to cushion his/her own chest with a pillow or life preserver.)

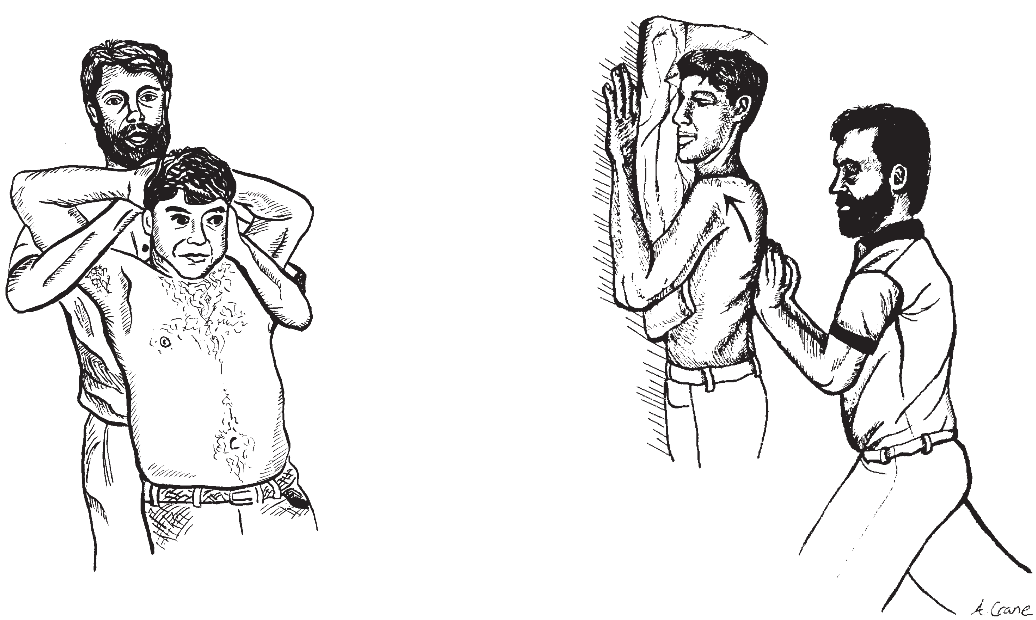


Figure 6-4. Hallelujah Maneuver (left) and Wall Technique (right)

Lumbar Folding Manipulations

Unfolding techniques: Treatment of lumbar unfolding strains currently involves utilizing traction/thrusting manipulations and, for stubborn injuries, inversion therapy. From a clinical perspective, less involved lumbar folding distortions respond best to traction/thrusting, whereas extensive, diffuse, and long-standing injuries often require concurrent inversion therapy (see following section and *Role of Physical Therapy in Fascial Distortion Medicine* in Chapter 9).

Although there are several thrusting manipulations which can be employed in the treatment of simple lumbar unfolding injuries, keep in mind the necessity of traction. One particularly effective method is *chair technique*. In this procedure, patient sits backwards in a chair (i.e., straddles) so that he/she is facing towards the wall. The feet are tucked inside the legs of the chair that are closest to the wall and forearms are crossed so that each hand holds onto the opposite shoulder.

To make the correction, physician stands behind patient and reaches around with non-thrusting hand and grips one or both elbows. Palm of thrusting hand is placed over the transverse process and paravertebral fascia of area to be manipulated. Simultaneously, both hands of the physician are used to traction and extend the spine. Once traction is maximized, the spine is rotated until the physiological barrier is reached. (When treating the right lumbar spine physician's right hand is thrusting hand.) Once the physiological barrier is engaged, a quick lateral and superiorly directed thrust is made by the palm of the treating hand. Please note that uncomplicated thoracic spine folding distortions can be corrected by a similar procedure.

Refolding techniques: Chair technique is also utilized to correct lumbar or thoracic refolding distortions. The positioning is identical to that as described above but with refolding corrections thrust is preceded and accompanied by compression. This compression force is delivered through the hands, arms, shoulder (and at times even chin!) of the physician.

Figure 6-5. Chair Technique

INVERSION THERAPY

In extensive folding injuries of the thoracic and lumbar spine the sheer number of folding distortions renders folding/thrusting manipulations by themselves ineffective. Currently the preferred treatment of these stubborn injuries is inversion therapy performed immediately prior to folding/thrusting manipulation. In inversion therapy the weight of the patient's body is utilized to force the paravertebral fascia to unfold or refold. These physical therapist-guided, gravity-assisted folding techniques in which the patients are tilted or placed upside down (or close to it) are collectively known as inversion therapy.

With ball therapy the paravertebral fascia is unfolded by stretching the spine over a therapy ball. Multiple positions, such as flexion, extension, and side bending, engage different portions of the paravertebral fascia. If necessary, unfolding or refolding of the contorted fascia can be augmented by concurrent manual traction or compression of the spine or neck by the treating physical therapist.

Figure 6-6. Ball Therapy

Inversion traction therapies are more generalized but aggressive forms of gravity-assisted folding techniques in which the patient is tipped to an upside-down or near upside-down position. If an inversion table is used (and there are no medical contraindications) the patient is placed supine onto the table and then slowly brought backwards to a 70-90° angle below the horizontal plane (see Figure 6-7, left photo).

Once the desired inverted position is achieved the patient is asked not to make any unnecessary movements of the spine or limbs for a minimum of fifteen seconds. This allows time for the paraspinal fascia to unfold in the neutral position. Following this short quiescent period the patient is encouraged to side bend, rotate, and traction his or her own back to facilitate the unfolding of fascia that is contorted. While in a fully inverted position, assisted and/or resisted body rotation can be introduced by the therapist to help untorque the mis-folded fascia.

Perhaps the most effective inversion therapy for the upper back and neck utilizes an apparatus in which the patient's hips and knees are flexed (right photo below). To direct the force of gravity into the thoracic and cervical spine, the patient is tipped forward until fully inverted. The therapist then forcefully unfolds the paravertebral fascia with the assistance of gravity. Just as with the other types of inversion treatments, the patient remains upside down for several minutes and can assist the procedure by pulling or pushing against the equipment which sequentially focuses gravitational and lateral forces throughout the affected paraspinal segments.

Figure 6-7. Inversion Traction

Please note that inversion therapy should only be performed after medical approval has been granted by the patient's physician and under the direct supervision of a physician or physical therapist. Medical contraindications include hypertension, increased intracranial pressure, congestive heart failure, C.O.P.D., past history of cerebral hemorrhage, bleeding disorders, osteoporosis, glaucoma, vertigo, etc.

Warning: Positional changes should be made slowly to avoid the side effects of vertigo, nausea, and hypotension.

Chapter 7

CYLINDER DISTORTIONS AND CYLINDER TECHNIQUE

Anatomically, cylinder distortions are *tangled coils of circular fascia* which pathologically restrict motion by acting as a tourniquet around muscles or other tissues. It is this entangling which inhibits the coils' ability to uncoil and recoil, thereby diminishing their resilience to absorb pulling and pushing forces.[1] Paradoxically, the deep pain in a non-jointed area which is so characteristic of cylinder distortions, involves distorted cylindrically-oriented fascia which is surprisingly superficial.

Cylinder distortions are of particular interest to physicians because of their propensity to exhibit seemingly bizarre symptoms that mimic neurological conditions — such as tingling, numbness, and even reflex sympathetic dystrophy (see Chapter 10). Also cylinder distortions in their most vicious forms present with symptoms that resemble orthopedic injuries — such as humeral head or neck fractures (see Chapter 13). But fortunately, most cylinder injuries are far less symptomatic and can be clinically recognized by the characteristic body language of *repetitively squeezing the affected soft tissues.*

The complaint of pain *jumping* from one area to another is expected with cylinder distortions, and indicates that the altered coils are being impeded in their rotation around underlying muscles. Since the coils tangle in varying arrangements depending on the sequence of muscle contractions, the pain seems to periodically and abruptly change its anatomical location. In the FDM, this sudden geographical transposition of discomfort from one area to another is called the *jumping phenomenon*. Note that jumping:

- Is pathognomonic of cylinder distortions
- Occurs spontaneously on its own as coils rotate with muscle contractions
- Can be induced with cylinder technique

Two mechanisms that distort circular fascia:

1. Twisting/traction forces separate coils which recoil tangled
2. Twisting/compression forces cause coils to overlap

From the above mechanisms the conditions we commonly refer to as carpal tunnel syndrome, weak muscles, upper arm strains, and low back spasms often occur.

[1]Note that folding fascia is the other fascial shock absorber. The difference between the two is that cylinder fascia primarily protects muscles and other soft tissues, whereas folding fascia defends against injurious forces to joints and bones.

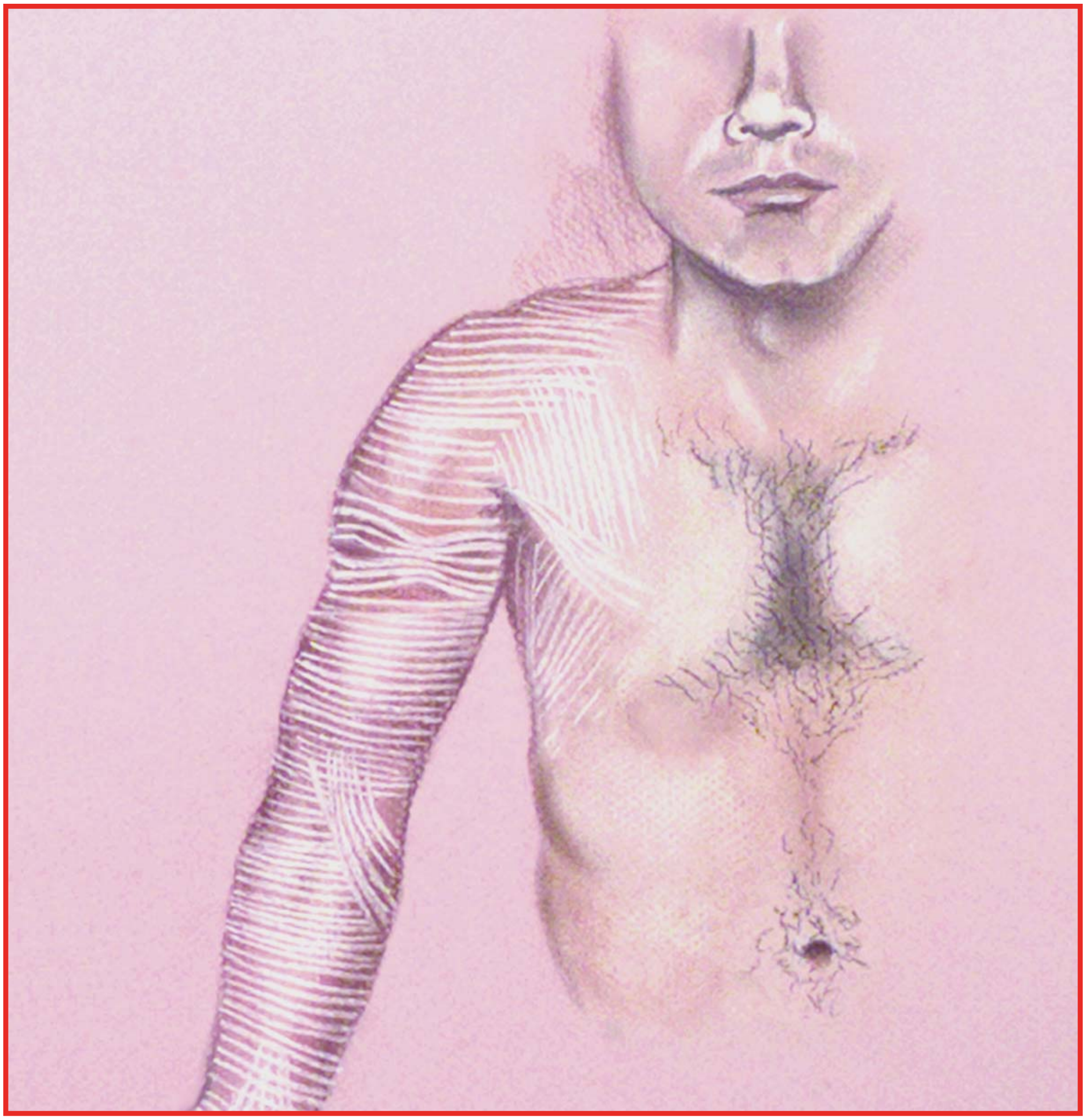


Figure 7-1. Cylinder Distortion of Brachial Fascia

Common manifestations of less symptomatic cylinder injuries include:

- Deep pain in non-jointed areas
- No tenderness to palpation
- Grossly normal motion
- Diffuse or vague discomfort
- Paresthesias
- Spasm

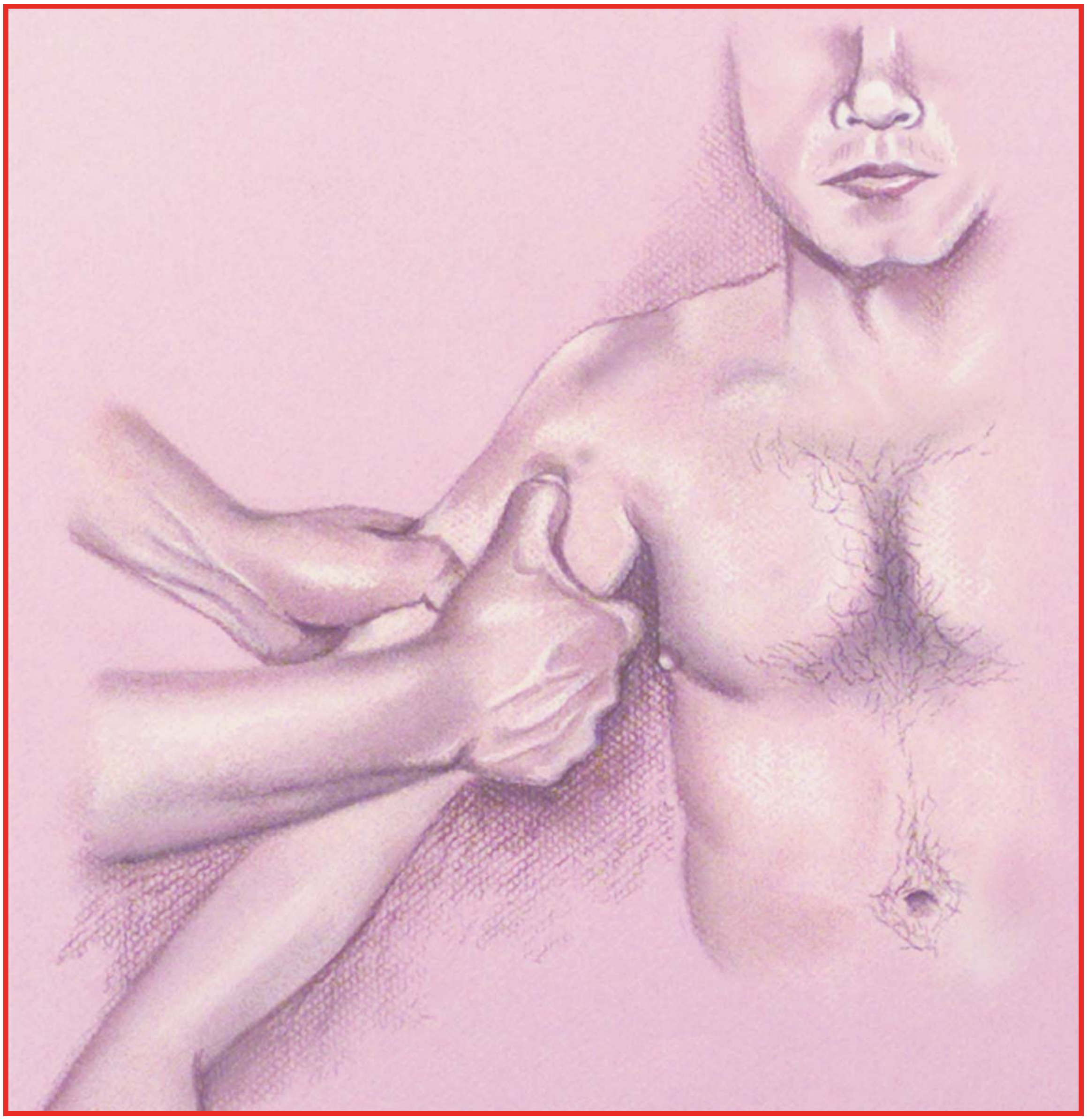


Figure 7-2. Treatment with Double Thumb Cylinder Technique

- Patients attempt to locate the discomfort with their fingers and say something to the effect that, “It’s deep in there somewhere, but I can’t seem to find it”
- Poor subjective response to muscle relaxers, non-steroidal anti-inflammatory medicines, and narcotic drugs (also true of other fascial distortion types)
- Aching or severe pain may spontaneously abate at the same moment a similar aching or severe pain occurs in an area non-adjacent to the original pain (jumping phenomenon)

Cylinder Techniques

In treating cylinder distortions, the goal is to untangle the tangled cylinder coils. This is currently done primarily by one of five techniques:

- Indian burn
- Double thumb
- Squeegee
- Compression cylinder variants (CCV)
- Cupping-with-movement

Cylinder distortions can be envisioned as a snarled Slinky® toy, but the tangled coils themselves are so small that they cannot be directly appreciated through palpation. Instead, the tautness of the tissue around them is indicative of their presence.

Schematic of Uninjured Cylinder Fascia **Schematic of Tangled Cylinder Fascia**

Figure 7-3.

In the *Indian burn* approach, the physician's hands are positioned one to two inches apart and just above and below the symptomatic area. The hands grasp firmly onto and around the involved extremity and pull apart. As traction is maximized, one hand initiates a twisting motion in a clockwise direction while the other hand does so in a counterclockwise direction. The forces of twisting and traction are held until the tautness of the tissue diminishes. If the treatment should be unsuccessful, then reversing the rotation of the hands may be beneficial. To treat a larger area, begin therapy close to the proximal joint and *march down* the extremity by repeating the above sequence over the entire segment of that limb until the distal joint is reached (see Figures 7-4 and 14-11). Failure to march will likely result in an ineffective treatment because the discomfort may *jump* from one area to another. Remember — *never use Indian burn on the upper arm, foot, or ankle* because in those areas the cylinder fascia is very delicate and more cylinder distortions may be created than corrected!

Figure 7-4. Marching Down the Forearm with Indian Burn Cylinder Technique

The *double thumb* approach (see Figures 7-5 and 14-9) is designed to correct localized distortions and is far less labor intensive for the physician than is Indian burn. First, the deeper cylinder fascia is treated by applying traction with the thumbs placed to each side of the taut tissue. Since the deeper fibers run parallel to the long bones, the direction of force is perpendicular to the axis of the bones. Note that traction is maintained until the release is felt (i.e., the tautness of the tissue diminishes as the coils untangle).

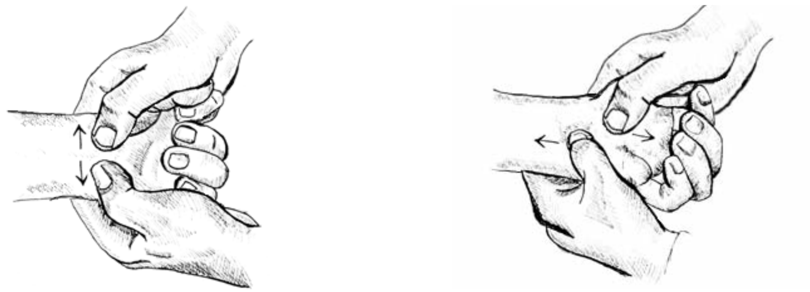


Figure 7-5. Double Thumb Cylinder Technique for Deep (left) and Superficial (right) Layers of Wrist Flexor Retinaculum

After the deep layer has been corrected, treat the superficial layer. This is done in the same manner, only the direction is changed. To untangle these fibers that encircle the extremity in a perpendicular fashion, traction is applied to the tight tissue so that the force is parallel to the axis of the long bones. And just as with the deep layer, force is maintained until the tissue tautness diminishes.

When using the double thumb method, several focal areas may need to be treated, but caution should be exercised so as not to over-treat on any one visit. Also note that with the double thumb approach marching down the limb is unnecessary, instead only symptomatic areas are treated.

Squeegee technique is an option for those patients with diffuse cylinder pain throughout an entire limb (or a large portion of it). To treat, one or both hands are wrapped around the proximal or distal portion of the extremity and together slide along the limb while a constant squeezing tension is maintained (think of a gas station attendant channeling water off your windshield with a squeegee wiper).

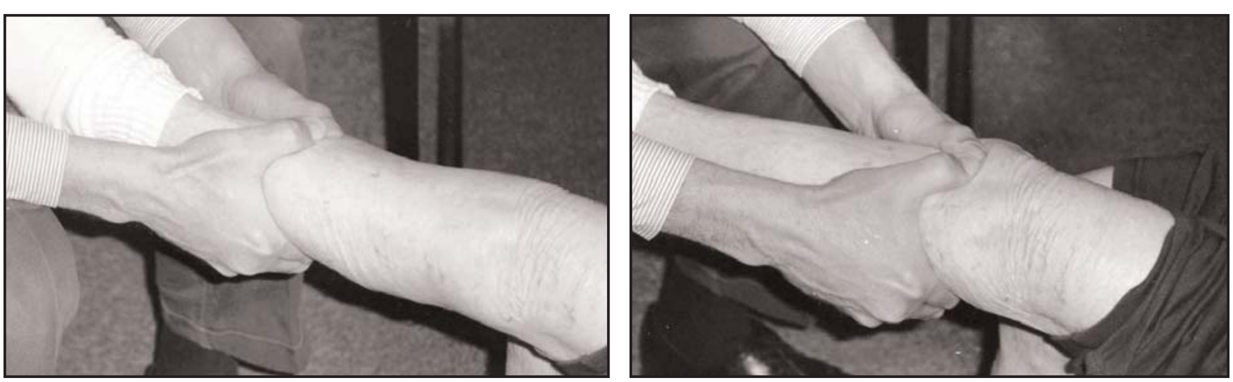


Figure 7-6. Squeegee Cylinder Technique of Lower Leg

Modifications in cylinder technique in which the fascial coils are pushed together, rather than pulled apart, are possible for three cylinder techniques (Indian burn, double thumb, and squeegee) and are collectively known as *compression cylinder variants* (CCV). The hand position for double thumb (see Figures 7-7 and 13-8) and Indian burn are identical to what has been shown, but the cylinder fascia is compressed rather than tractioned. In the compression variant for squeegee technique (see Figure 13-8) the hands are placed so that one is positioned at the proximal portion of the affected limb as the other hand grasps the distal limb portion. Together they squeegee the cylinder fascia until they meet in the middle.

Figure 7-7. Double Thumb Compression Cylinder Variant of Gluteal/Posterior Thigh Junction

Currently the most effective of all the cylinder techniques is *cupping-with-movement*. In this modern adaptation of an ancient Chinese custom, a suction gun is utilized to create a vacuum so that plastic bells can be suctioned onto the upper arm, thigh, low back or other body surface. The traction of the cups coupled with underlying muscular movements tugs tangled cylinder coils apart.

Although exact location of cup placement is not yet documented for every cylinder injury, a general method is to apply the cups so that one or two are placed above the tangle and one or two below it. The patient is then instructed to move the affected limb or body part continuously for five to ten minutes.

If necessary, re-treatment with modification of cup location can be done the next day. Cupping-with-movement works best on the thigh (see Figure 15-6), upper arm (see Figure 14-3), and low back (see *Body Language and Treatments for Low Back Pain*) and worst on areas that are more rounded or have a significant amount of hair (i.e., they stick poorly on distal portions of extremities).

It should be noted that secondary to the vacuum effect, the suctioned skin is pulled a half inch or more into the cup. Patients should be forewarned of the obvious but usually harmless side effect of hemorrhagic petechiae.

Chapter 8

TECTONIC FIXATIONS AND TECTONIC TECHNIQUE

The sixth described principal fascial distortion type is the tectonic fixation. It is defined as a *physiological alteration in which the fascial surface has lost its ability to properly glide*. Since fixated fascial surfaces can occur in any joint in the body (as well as the viscera, see case history *Pleurisy in a 27 Year Old Woman*), tectonic fixations are common and widespread. Physically the non-gliding surfaces of a tectonic fixation behave almost as if they were two magnets attracting each other. As the name of the distortion implies, fascial surfaces stuck to each other are reminiscent of geological plates of the Earth's crust jammed together.

The fixation itself occurs secondary to loss of synovial fluid transport between two structures. With less synovial fluid recycling through the joint, the magnetic field changes and the fascia loses its ability to repel the adjacent tissue, and instead attracts it. This *flip-flopping of the magnetic field* is analogous to that of a magnet that when turned over changes from repelling another magnet to attracting it.

In treating tectonic fixations the goals are:

1. Correct any other fascial distortions (particularly triggerbands with adhesions and folding distortions)
2. Increase synovial fluid circulation (slow tectonic pump, hot packs, plunger technique)
3. Re-initiate gliding by physically forcing fixated surfaces to slide (thrusting tectonic techniques such as frogleg and reverse frogleg manipulations, brute force maneuvers, and Kirksville crunch)

Once the stuck structures are budged, some tectonic fixations are instantaneously resolved (this is particularly true of facet tectonic fixations), while for more long-standing conditions, multiple treatments are required. In the most severe cases, stagnant synovial fluid degrades from a clear colorless liquid into a thick white paste. In this condition, resolution occurs only when enough fresh synovial fluid is pumped between the fixated surfaces (and the stagnant fluid is flushed out and reabsorbed) to cause the magnetic field to flip again so that the surfaces once more repel each other.

Three tectonic fixations of primary interest to the general orthopedist are:

1. Shoulder
2. Hip
3. Facet

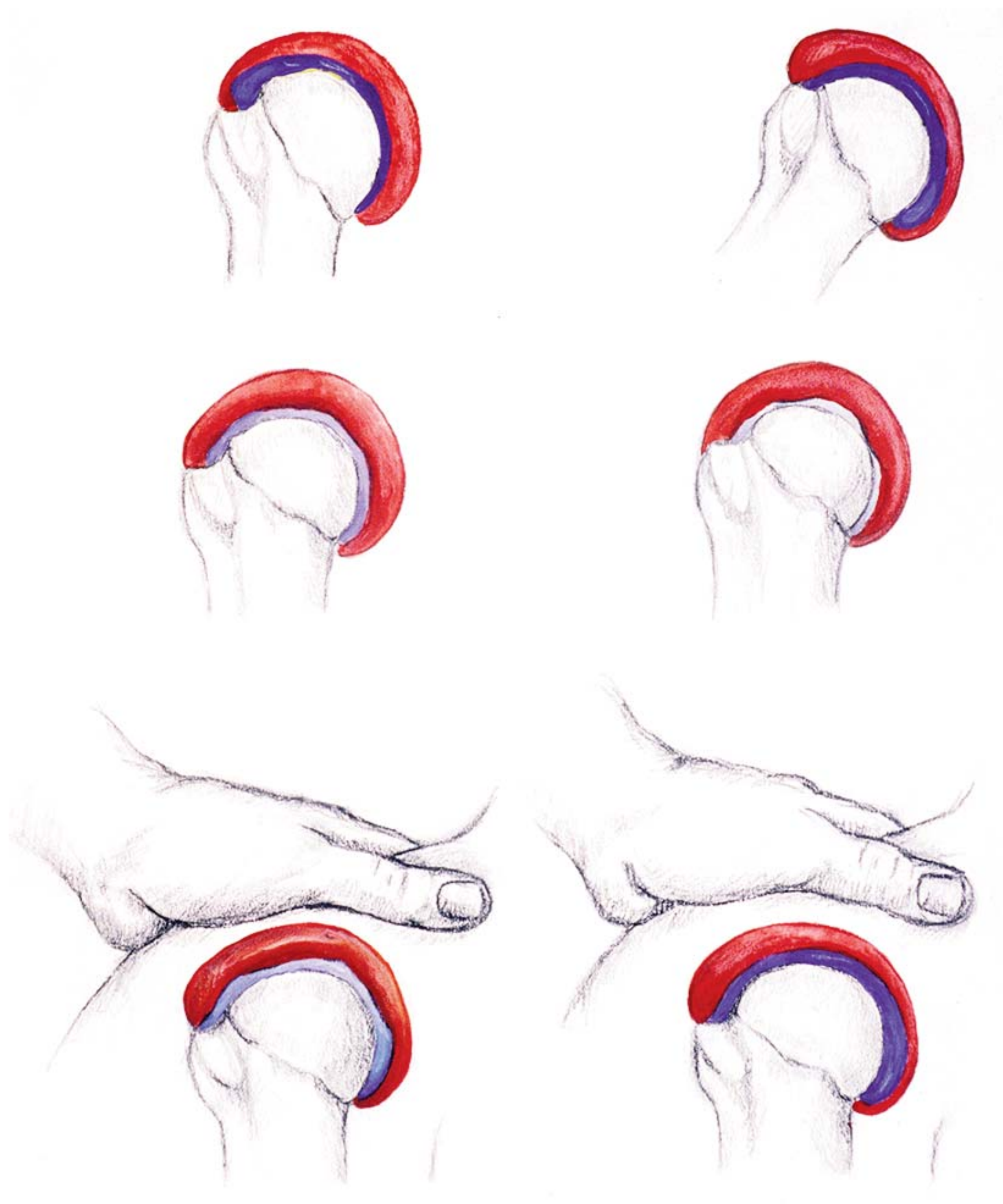


Figure 8-1. Tectonic Fixation of the Shoulder

Top Drawings: With normal shoulder motion the capsule (red) glides on the head of the humerus. This rocking back and forth of the capsule facilitates circulation of synovial fluid (dark blue) within joint.

Middle Drawings: If shoulder motion becomes restricted from an injury, such as a triggerband, the fluid may fail to circulate properly throughout the entire joint. Eventually, small pockets of stagnated fluid accumulate (light blue). In these areas of devitalized synovial fluid, the magnetic field becomes altered so that the capsule and bone now attract rather than repel each other. When portions of the capsule become fixated on the bone this is called a *tectonic fixation*.

Lower Drawings: Tectonic technique is designed to literally force the capsule to slide. Capsular sliding physically plunges non-stagnant synovial fluid into fixated areas of the joint and pumps stagnated fluid out where it can be reabsorbed. Once a sufficient quantity of revitalized fluid seeps between the two fixated surfaces, the magnetic field reverts so the capsule and bone once again repel each other.

Shoulder Tectonic Fixations

In a tectonic fixation of the shoulder, the entire capsule, or a portion of it, has become fixated to the underlying bone (in the orthopedic model, these distortions are commonly classified as *adhesive capsulitis*). Severely affected patients present with global loss of motion (i.e., diminished or non-existent abduction, external rotation and internal rotation), and say that they feel as if the joint is a *quart low on oil*. In less severe cases the movement of the shoulder resembles the stiff-jointed *Tin Man* from the movie *The Wizard of Oz*. Note that on physical exam there is an inability to abduct the shoulder without anterior rotation, and the shoulder can't lay flat against the table in the prone swimmers position (see Figure 13-1).

The current preferred treatment of these difficult injuries is:

1. Correct other fascial distortions which generally include
   - A. SCHTP
   - B. Triggerbands: star, upper trapezius, and anterior and posterior shoulder pathways
   - C. Star folding
   - D. First-rib refolding
   - E. Upper thoracic foldings
   - F. Thoracic and cervical facet tectonic fixations
2. Slow tectonic pump of shoulder
3. Folding techniques of shoulder
4. Frogleg and reverse frogleg tectonic techniques or other assorted tectonic manipulations

Tectonic Shoulder Techniques

In shoulder tectonic fixations that demonstrate profound loss of motion, slow tectonic pump is a crucial component of the treatment. It is performed with the patient seated or supine and is designed to force fresh synovial fluid between the fixated capsule and humeral head. To treat: Physician grasps the wrist of the affected shoulder with both hands and slowly pumps the extremity by alternately flexing and extending, or abducting and adducting, or tractioning and compressing the shoulder joint.

Figure 8-2. Slow Tectonic Pump

Care should be taken to pump the shoulder leisurely (optimal frequency is one cycle every 3-5 seconds) because faster rates don't allow sufficient time for the sluggish devitalized synovial fluid to flow out of the joint. The number of pumping cycles to be employed is determined by:

1. Degree of fixation
2. Amount of energy and strength available on part of treating doctor

However, a general rule concerning slow tectonic pump is — *the more the better*.

Frogleg and reverse frogleg manipulations are currently the two most successful tectonic thrusting techniques of the shoulder. For both of these treatments, patient is sitting with physician standing on same side as injured shoulder. Frogleg is performed first, followed by reverse frogleg.

Frogleg technique of right shoulder –

- Physician's right hand grasps right wrist
- Physician's left palm cups right elbow
- Shoulder abducted between 80° and 120°
- Elbow flexed
- Continuous force applied so that elbow is pushed forward as wrist is pulled backward
- Correction is made with simultaneous quick thrusting of elbow anteriorly and swift pulling of wrist posteriorly

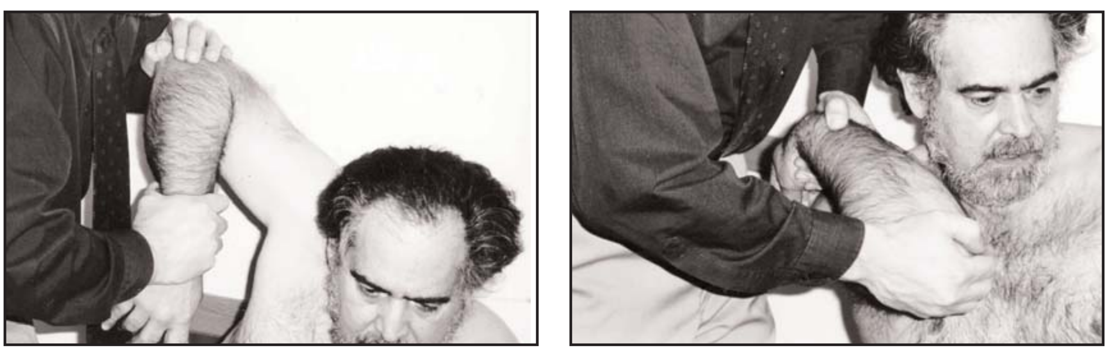


Figure 8-3. Frogleg (left) and Reverse Frogleg (right) Manipulations of Shoulder

Reverse frogleg technique of right shoulder –

- Physician's right hand cups right elbow
- Physician's left hand grasps right wrist
- Shoulder flexed 60° to 120°
- Elbow fully flexed and pointing forward
- Continuous force applied so that elbow is pushed toward opposite shoulder and wrist is pulled toward physician
- Correction is made by thrusting elbow toward opposite shoulder and pulling wrist toward physician

Note that a large pop or slide/clunk accompanies a successful frogleg or reverse frogleg manipulation and that if the two procedures are performed repetitively and slowly they can be used as a form of slow tectonic pump.

Other shoulder tectonic techniques include:
- Brute force maneuvers
- Whip technique
- Plunger technique

Brute force maneuver of the shoulder is performed with physician standing behind seated patient. The right hand is placed on top of right shoulder as left hand is positioned on top of left shoulder. The doctor then leans onto the shoulders from above so that the weight of his or her body is transmitted into the patient's two shoulders. The treating hands are rocked back and forth in a rhythmic fashion to pump synovial fluid by alternating the amount of force directed onto the affected shoulder capsule. Please note that for this procedure to succeed, it is often necessary for the physician to use all of his/her strength and body weight.

Brute force maneuver of the scapula is performed with patient seated and physician standing so that right hand is used to treat right scapula. Patient is leaning slightly forward and left hand is placed on top of right hand. The thenar and hypothenar eminences contact the scapular spine and force is directed downward. Inferiorly directed repetitive thrusts are then introduced into the scapula. A positive result is evident when one or more pops or clicks are heard as the scapula slides on the thorax. Note that patient prone is an alternate treatment position.

Figure 8-4. Brute Force Maneuvers – Shoulder (left), Scapula (middle & right)

Whip technique (see Figures 13-7 and 13-9) has the dual role of:
1. Forcing the fixated capsule to slide
2. Correcting unfolding distortions

In this approach, patient's shoulder and elbow are first fully flexed and then forcefully and suddenly extended. This motion is repeated over and over again at a rapid pace until a desirable outcome is achieved (a pop is heard as the fixated surfaces slide or the contorted fascia unfolds). Note that although whip technique appears to be a faster and more aggressive form of slow tectonic pump, it is not. This is because the speed of whipping is ineffective in circulating the thickened and stagnated synovial fluid of a long-standing shoulder tectonic fixation.

Plunger technique (see glossary term *Plunger Technique*) is still another tectonic approach in treating particularly stubborn shoulder fixations. In this modality, the mouth of a small sink plunger is suctioned onto the shoulder and pumped 10-20 times before being repositioned. The aim of the procedure is two-fold:

1. Pump synovial fluid between fixated surfaces
2. Physically force capsule to slide

One final thought about treating tectonic frozen shoulders — it cannot be emphasized enough that by far the biggest reason for treatment failures is inability to adequately circulate stagnant synovial fluid. Therefore, slow tectonic pump is the key to a successful result (see Chapter 13 – *Typical Steps in Treating a Tectonic Frozen Shoulder*). And immediately prior to manipulation under general anesthesia (while the patient is unconscious) copious amounts of slow tectonic pump should be performed prior to frogleg and reverse frogleg manipulations (see Chapter 9).

HIP TECTONIC FIXATIONS

Tectonic fixations of the hip involve the head of the femur and the acetabulum. Although some patients with hip TF's complain of hip or gluteal discomfort, most complain of "low back pain." The associated body language with this distortion is placing the hands over the iliac crests (see *Body Language and Treatments for Low Back Pain*).

Treatment of hip tectonic fixations generally involves utilizing the hip version of frogleg and reverse frogleg tectonic techniques. However, some stubborn injuries cannot be corrected until the following have been performed:

1. Triggerband technique of posterior thigh and lateral thigh pathways
2. Refolding or unfolding manipulations of hip
3. Slow tectonic pump of hip

Frogleg technique of the hip is performed with patient supine and physician standing beside the table on the same side as hip to be manipulated. If right hip is to be treated, the following positioning is required:

- Physician stands on right side of table
- Hip is flexed and externally rotated
- Knee is flexed
- Doctor's right hand grasps ankle and brings it to midline
- Doctor's left hand is placed on bent knee and pushes inferiorly (i.e., towards foot end of table) as right hand pushes ankle superiorly. Force is increased until barrier is reached
- Thrust is made simultaneously with each hand through barrier

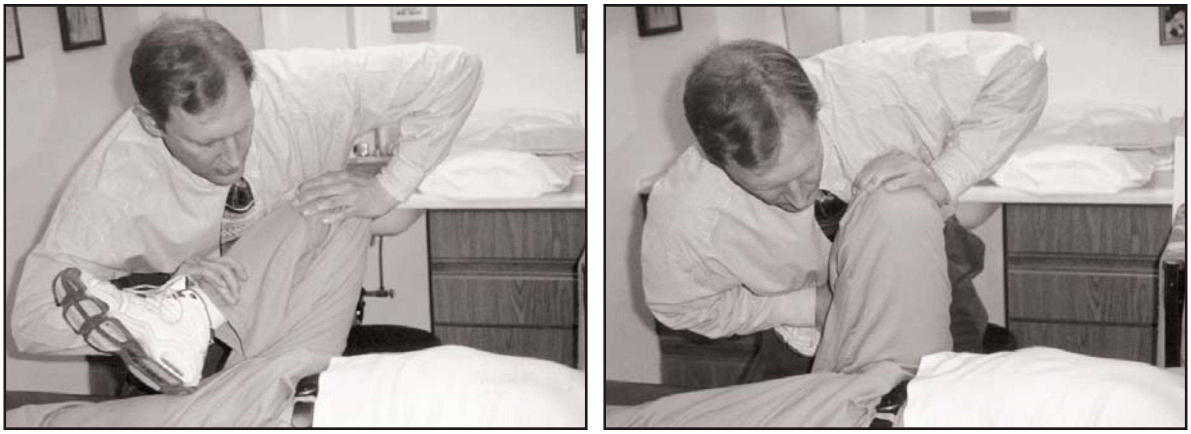


Figure 8-5. Frogleg (left) and Reverse Frogleg (right) Manipulations of Hip

Reverse frogleg technique is performed immediately following a successful or unsuccessful frogleg treatment. Points to remember in treating the right hip:

- Doctor stands on right side of table
- Doctor's right hand grasps right ankle and pulls it laterally and superiorly
- Doctor's left hand pushes on right knee which is flexed more than 90° – direction of force is both across patient's body and inferiorly
- Force on ankle and knee are increased until barrier is reached, then thrust is made through barrier
- Manipulation is facilitated with compression of hip (leaning chest onto knee)
- Successful frogleg or reverse frogleg manipulation is accompanied with an audible slide-clunk or pop

Slow tectonic pump of the hip is performed in much the same manner as it is for the shoulder. One hand grasps the ankle and the other the knee so that the hip and knee can be repetitively flexed and extended, abducted and adducted, and internally and externally rotated. Just as in the shoulder, optimal speed is one cycle every three to five seconds.

Facet Tectonic Fixations

Stuck vertebral facet joints are perhaps the most common reason patients seek osteopathic or chiropractic care. The associated verbal assertion that their "back needs to be cracked" is indicative of this particular lesion. Thrusting facet tectonic techniques are in many ways similar to those shown in the folding chapter. The difference is that folding techniques require either traction or compression to engage the paravertebral folding fascia, whereas tectonic techniques are dependent upon neutral direction thrusts to focus the force into the facet joints.

Examples of facet tectonic techniques include:

- Cervical – sitting or supine neutral thrust
- Thoracic – Kirksville crunch (a.k.a. dog technique), double pisiform thrust, chair neutral thrust
- Lumbar – lumbar roll, chair neutral thrust

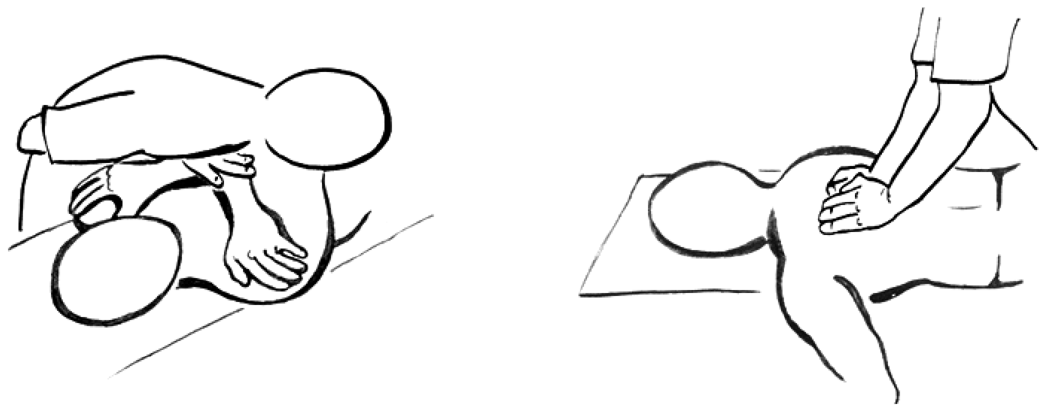


Figure 8-6. Kirksville Crunch (left) and Double Pisiform Thrust (right)

Tectonic Fixations and Heat

Unlike the other five principal fascial distortion types, tectonic fixations clinically respond favorably to the application of a hot, wet compress prior to treatment with tectonic techniques. The reason for this is that heat temporarily (and minimally) decreases the thickness of the synovial fluid which allows for improved joint fluid circulation. However, it should be strongly noted that heat has a tendency to make any accompanying acute triggerbands, herniated triggerpoints, continuum distortions, folding distortions, or cylinder distortions considerably more symptomatic and clinically more difficult to correct.

Section Two

Medical Concepts

Chapter 9

ORTHOPEDICS

Orthopedic treatments can be thought of as forms of fascial distortion techniques. Examples: Reduction of a dislocation is a generalized folding technique, the surgical repair of a ruptured quadriceps tendon includes pulling and untwisting the fibers (triggerband technique), and carpal tunnel release surgery involves an incision of the retinaculum (fracturing adhesions and cutting apart tangled cylinder coils).

When orthopedic injuries are consciously envisioned as fascial distortions, specific modifications in orthopedic procedures can be made. For instance, in the reduction of a dislocation, if the goal is to unfold the fascia, then the added finesse of doing so allows for an easier reduction and minimizes pharmaceutical support. In the case of a quadriceps rupture, if the residual distorted tendon fibers are intra-surgically straightened, post-operative stiffness is reduced. Similarly, if carpal tunnel surgery were focused on selectively untangling cylinder distortions and ironing out distorted fascial fibers, the surgery itself would be less intrusive than it currently is and much more effective.

The success of any specific orthopedic intervention is, at least in part, contingent upon the type of fascial distortion present. For instance, injecting a steroid into the gleno-humeral joint of a frozen shoulder is only likely to be effective for a tectonic fixation. In the FDM, the positive outcome from the drug itself is thought to be derived from the increased volume and improved synovial fluid circulation which occurs as the added liquid is physically pumped into the joint. Then over the next several hours or days, the now re-circulating fluid slowly seeps between the fixated surfaces and changes the magnetic field, which allows for capsular sliding. In the future, more specific drugs or solutions could be developed which would be even more successful.[1] And perhaps the best treatment to come will be drawing synovial fluid from another joint and injecting and pumping it back and forth through the fixated joint.

In addition to volume enhancement, steroid injections (and oral steroid prescriptions) have the physiological effect of chemically shifting the entire continuum of musculoskeletal tissues so that osseous components are pulled from the bone into the attaching fascial structures. The practicality of this approach can be seen in treating a specific condition such as tendonitis. In the FDM, the underlying anatomical injuries associated with the symptoms clinically diagnosed as tendonitis are triggerbands and continuum distortions.

[1]Current viscosupplementation injectables include Hylan G-F 20 and Sodium Hyaluronate

In the case of triggerband tendonitis, the sensation of pain is due not only to the mechanical shortening of the fibers, but also to the sensory changes secondary to altered fluid transmission in the osseous-depleted portions of the fiber that are distal to the twist (*roadblock effect*). The subjective benefit of steroid treatment is that the shifting of osseous components into the fascia floods and replenishes the ligamental fibers and thereby eliminates one of the pain-generating mechanisms of the anatomical injury. In the case of continuum tendonitis, the flood of osseous components through the transition zone forces the entire zone into the osseous configuration. Having all of the areas of the zone in one configuration balances the mechanical tension forces and thereby eliminates the difference in sensory tension that is subjectively appreciated as pain.

However, as the physiological effects from the steroid diminish over time, the flow of osseous components into the fascia from the bone slows and then reverses. In the triggerband this means that areas distal to the twist once again experience deficiencies in osseous components. In the case of tendonitis from a continuum distortion, the transition zone slowly shifts back into the neutral state. The problem is that if the portion of the zone stuck in the osseous configuration remains stuck, the continuum distortion seems to reoccur. In either of these two scenarios, patients are likely to express the renewal of their symptoms by saying “the shot wore off.”

Other desired effects and side effects of steroid therapy involve this same shifting process of the continuum. The apparent increased muscular strength is derived from osseous components stiffening myofascia and providing a firmer background for muscular contractions. The ligaments, like the tendons, become less flexible and more brittle, making them susceptible to tears between the fibers (i.e., forming triggerbands). The bone itself becomes osteoporotic which increases the risk of unidirectional forces causing compression and stress fractures.

Although steroids are the most common chemical therapy for manipulating the musculoskeletal continuum, other non-drug approaches also exist. Examples of structural continuum technique include surgery for lengthening long bones and orthodontic braces.

For many injuries, physicians prescribe non-steroidal anti-inflammatory drugs (NSAID’s) to reduce inflammation (although they do so to a much lesser extent than steroids). NSAID’s subjectively reduce pain by diminishing the overall amount of fascial fluid seeping from distorted fascial tissues, such as mal-folded joint capsules. Therefore, they give the most relief to patients with folding distortions, since of all the distortions these disrupt the fascial fluid network the most.

To a lesser extent, triggerbands and continuum distortions also disrupt fascial fluid flow, so NSAID’s have a minor value in treating these injuries. Herniated triggerpoints are rarely associated with inflammation, so NSAID’s are generally not effective in reducing the discomfort of these injuries. Cylinder distortions can at times cause inflammation by blocking fascial fluid transport (particularly cylinder foot sprains), and therefore NSAID’s are a possible adjunct therapy. Finally, since tectonic fixations do not cause inflammation, NSAID’s have no direct effect on them.

Clinically, extensive folding distortions of extremities are appreciated by circumferential joint swelling. For instance, in folding ankle sprains, bi-malleolar traumatic inflammation is expected. The FDM explanation for swelling on both sides of the joint has to do with the folding injury to the capsule or other peri-capsular folding tissues that stretch within, along or around the joint. When a folding distortion occurs in these structures, fascial fluid transportation is physically blocked in virtually every direction. Thus fluid flowing through the capsule or similar structures is blockaded and pushed out of the fascia and into either the joint space causing an effusion, or into the extracellular fluid resulting in swelling. In either case, the accumulation of fluid around the mal-folded tissue then exerts an additional pressure against the capsule or peri-capsular ligaments which further restricts fascial fluid flow and which again results in increased spilling. In time this vicious cycle fills either the entire joint or the surrounding soft tissues with fluid. Aspiration to remove excess fluid without correction of the folding distortion is beneficial but not curative.

FRACTURES

In the FDM, bone fractures are perceived to be extensions of fascial distortions into the osseous matrix. Spiral fractures, for instance, follow the pathway of a single fascial triggerband into the bone as it becomes a *bony triggerband*. Chip and avulsion fractures result when the challenged transition zone is unable to shift quickly enough into its proper protective configuration (osseous if the force is unidirectional and ligamentous if it is multidirectional). And finally, comminuted fractures occur when a fascial or ligamental triggerband is driven into a continuum distortion and the bony matrix is splintered — this is analogous to a block of ice being shattered by an ice pick.

Manual treatment of fractures should include fascial distortion techniques. For instance, patients with greenstick fractures point to a spot of pain with one finger (body language indicative of a continuum distortion). Therefore, the FDM treatment is continuum technique — firm pressure from the physician's thumb directed onto the point of maximum discomfort and held until release (i.e., shifting of stuck transition zone). The expected subjective result of a successful treatment is complete elimination of pain and immediate restoration of lost motion. (Note that a small residual soreness may still be present for several days.) Since in this type of fracture (as in almost all fractures) the continuum distortion is of the everted subtype, there is virtually no chance for recurrence of symptoms. Secondary interventions such as application of ice, casting, or splinting are generally not necessary but are options that the orthopedist may wish to consider on an individual basis.

Stable fractures of the ankle also respond well to fascial distortion techniques. Again, focus of treatment is directed by body language, which typically includes:

1. Sweeping fingers along linear pathway (triggerbands of medial or lateral ankle pathway)
2. Pointing to spot(s) of pain along lateral or medial ankle (continuum distortions)
3. Gently wrapping fingers around proximal dorsal foot or ankle (folding distortion of articular capsule of ankle)

In these fractures, triggerbands, continuum distortions and folding distortions are usually all present. Physical findings are similar to a folding ankle sprain and include loss of dorsiflexion, bi-malleolar swelling, ecchymosis, and pain (particularly with weight bearing).

Treatment sequence typically includes:

1. Continuum technique to correct anterior ankle continuum distortion (restores dorsiflexion)
2. Folding technique of ankle articular capsule (allows for proper folding of capsule, thus permitting non-painful weight bearing)
3. Continuum technique of lateral and/or medial ankle continuum distortions (eliminates restrictions of ankle inversion and eversion)
4. Triggerband technique of lateral and/or medial ankle triggerband pathways (removes restrictions of ankle medial and lateral pivoting movements)

Note that in some patients, steps two and three may need to be reversed. This is because correcting the folding distortion with unfolding technique pulls additional osseous components from the bone into the ligament, thus increasing the continuum distortion. Therefore, if the patient is unable to tolerate the traction or compression of folding technique — treat with continuum technique first and then bring the patient back the next day for folding technique. (See Chapters 15 & 16 for specifics of actual treatment procedures.) Again, accessory interventions such as casting or splinting are options the orthopedist may wish to consider on an individual basis.

Lumbar Compression Fractures

Compression fractures of the lumbar spine are common in osteoporotic, elderly women who present clinically with two complaints of discomfort:

1. Sudden onset of sharp pain which originates at moment of injury and lasts for several weeks or months
2. Continuous aching of involved spinal segments which, left untreated, is often permanent

In the treatment of new onset compression fractures, the sharp pain of the recent injury is from continuum distortions of the disrupted osseous matrix. These will eventually heal on their own if left untreated, but to do so leaves the patient in significant discomfort for several weeks. Since continuum technique directed into the exact spots of pain is an almost intolerable experience, it should be explained that it is a procedure of very short duration which eliminates the biting pain that is generally so unresponsive to medications.

In the FDM, the compression fractures themselves, are pathologically considered to be refolding distortions of the osseous matrix in which the vertebrae has been over-compressed and collapses (ultimate refolding injury), and then can't rebound to its normal shape (i.e., unfold). The dull ache deep in the spine so typical of this condition is from the paravertebral folding distortions and not from the fracture itself. Therefore, following continuum technique, the goal of the FDM approach is to refold the distorted fascia and then unfold it (see Chapter 6). This is done in the following fashion:

1. Careful chair refolding technique (apply only a slight compression force)
2. Next treatment session – repeat chair refolding technique. If unsuccessful (i.e., there is no articular pop or click from paravertebral fascia refolding and then unfolding) use chair unfolding technique
3. Next session treat with modified hallelujah and gentle unfolding wall technique (focus unfolding into lumbar spine)
4. For those patients who continue to have aching discomfort, begin a well-controlled and gentle inversion therapy regimen

Fractures in the Extremities

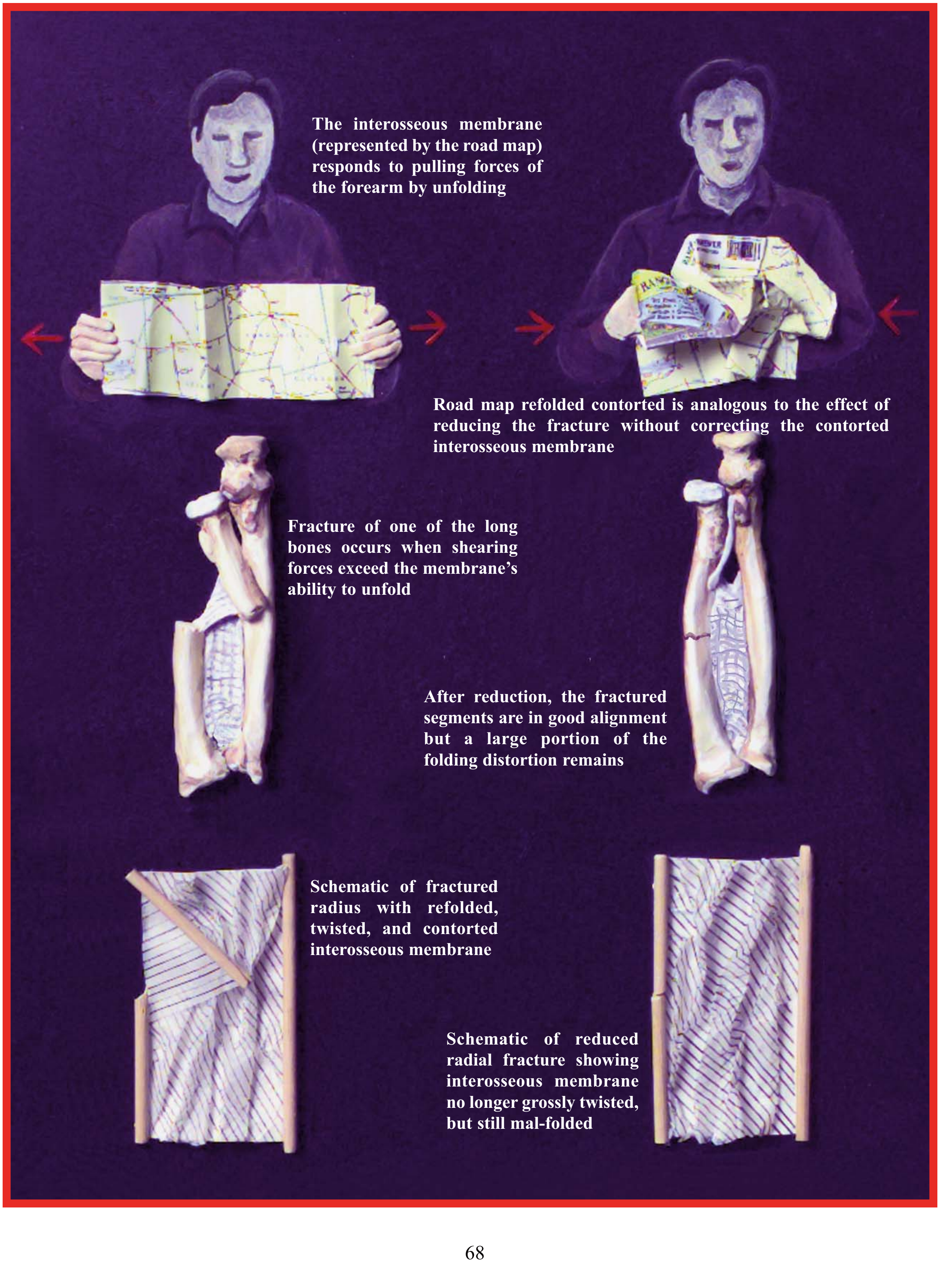
In fractures of the forearm, wrist, ankle, and leg, orthopedic management (either intra-surgically or pre- or post-casting) should include correction of interosseous membrane folding distortions (see Figure 9-1). The realigned and properly functioning membrane would then hold the fractured fragments of the bone in closer proximity, thereby accelerating healing, decreasing casting time, and lessening the chance of creating a tectonic fixation. And since there would be few, if any, folding distortions after removal of the cast, normal range of motion would be expected.

Uncorrected folding distortions of the radio-ulnar interosseous membrane are responsible for patient dissatisfaction following post-orthopedic casting treatments for forearm fractures (particularly Colles' fractures). This is because so many people are left with reduced (or in some cases absent) pronation and supination. From an FDM perspective, as the forearm supinates and pronates, the interosseous membrane unfolds and refolds. However, when the membrane is distorted it cannot do so, thus the forearm cannot supinate or pronate. Correction is possible in the following manner:

1. At time of reduction of fracture segments, and with benefit of nerve block for total relaxation, membrane is manually unfolded and then guided into proper refolded configuration
2. In those individuals that require intra-operative reduction with or without plates, the interosseous membrane can be more thoroughly engaged during surgery by directly tractioning with instruments physically placed on the structure
3. Post-casting unfolding and refolding/thrusting manipulations (see Figure 14-8)

In general, fractures are protective, in that the bone absorbs and disperses extreme external forces which otherwise would result in substantial injuries to interosseous membranes and other fascia. Although the osseous matrix is literally broken, in most cases it will heal (albeit in some cases poorly). However, folding distortions left uncorrected rarely heal on their own, so disability is permanent.

Figure 9-1. Road Map Analogy and Forearm Fracture

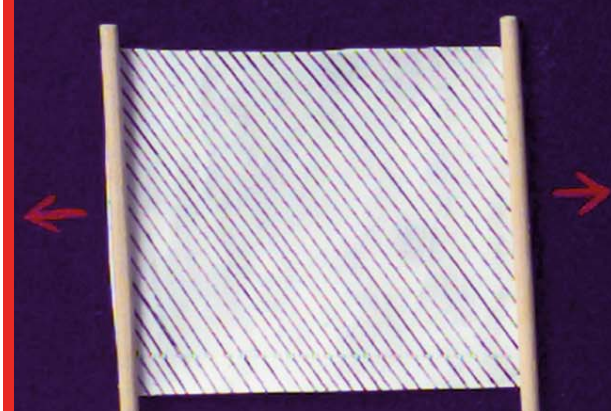


Once the fracture has healed, treatment of the folding distortion consists of applying traction to the interosseous membrane (unfolding the road map)

The road map once properly refolded is analogous to the interosseous membrane refolded uncontorted

Clinically, correction of the membrane is accomplished by physically pulling the radius and ulna apart with the physician's hands

Healed radius without folding distortion



Schematic of traction unfolding interosseous membrane

Schematic of forearm showing healed radius with refolded (and uncontorted) interosseous membrane

SPRAINS

In the FDM, *sprain* is not considered to be a practical clinical term because it does not delineate which of the underlying fascial distortions are involved in a soft tissue injury. Therefore, in the practice of fascial distortion medicine, the primary fascial distortion type present in the injury is added to the diagnosis of sprain. For instance, an injury which would be orthopedically diagnosed as a sprained ankle, would instead be differentiated into its pathological components. Therefore, depending on the mechanism of injury, verbal description of pain, body language, and physical findings, it would be classified as one of the following:

1. Continuum sprained ankle
2. Triggerband sprained ankle
3. Unfolding sprained ankle
4. Refolding sprained ankle
5. Combination sprained ankle

Adding the FDM interpretation to the diagnosis in sprains (and other injuries) improves continuity of care by giving the orthopedist instant insight into:

- How injury occurred
- Expected objective findings and subjective complaints
- What treatments are likely to be or have been instigated
- Clinical response to orthopedic and FDM interventions

It should be noted that in ankle sprains the orthopedic terms first, second, and third degree are not utilized since they don't influence the type of care selected or the success rate of the FDM care given. Also, it should be stressed that within the practice of Typaldos manual therapy, RICE is an adjunct therapy rarely employed for ankle sprains or other injuries because:

1. There is no practical benefit in *rest*ing an injury that is anatomically corrected (i.e., no reason to keep a patient who can walk without pain from walking).
2. Anti-inflammatory and analgesic properties of *ice* are clinically considered superfluous since swelling is not regarded as a cause of disability and post-treatment expectation is that the ankle is pain-free.
3. Not only is the usefulness of *compression* from an ace wrap, bandage, or other binding (including splint or air-cast) negated by a successful treatment, but if they are unwittingly torqued when applied, they cause cylinder distortions.
4. Reduction of swelling by *elevation* is also not emphasized. Instead, when the underlying pathology is eliminated, particularly folding distortions, the fascial fluid network is restored and excess interstitial fluid is reabsorbed.

Ligamental/Tendon Tears

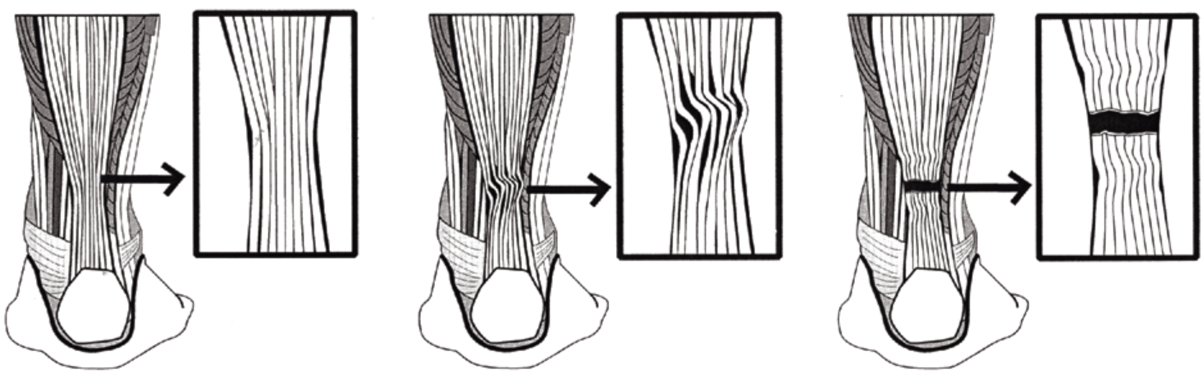
Although MRI evaluation and surgical inspection of severe sprains often reveal a tear across the width of the ligament or tendon, in the FDM this anatomical injury is considered to be a collection of longitudinally separated fibers.

Tears occur in the following steps:

1. Repetitive injurious motions focus forces into specific portions of ligament or tendon which sequentially rip individual fibers apart (triggerbands form).
2. The aggregation of longitudinally separated fibers span the width of the ligament or tendon (may be seen on MRI and interpreted as a partial tear).
3. Since the fibers of the ligament or tendon can no longer collectively absorb injurious forces, the separated fibers tear one by one until a single physical activity (such as pushing a lawn mower) suddenly causes the remaining intact fibers to also lacerate. The *straw that broke the camel's back* gives the patient the impression that this terminal event was solely responsible for the ligament or tendon tearing.

Figure 9-2. Achilles Tendon Tear

Longitudinally twisted and thus separated fibers of an injured Achilles tendon (middle drawing) diminish the strength of the tendon and allow for horizontal tears (right drawing)



Normal Achilles Tendon   Triggerbands Form Across Tendon   Tendon Rupture

Treatment of Partial Ligamental/Tendon Tears

External manipulative triggerband technique of the partially torn ligament or tendon re-aligns separated fibers, untwists twisted portions of the injured banded structure and thus restores the anatomy to the uninjured state, so that potential future ruptures are prevented. Treatment is initiated on those athletes or other individuals who feel a tightness or pulling sensation of the involved structure. In the case of a partially torn achilles tendon (confirmation can be made with MRI), the body language guides the treatment in the following manner:

1. Sweeping fingers along medial or lateral ankle identifies which portion(s) of tendon is (are) involved
2. Direction of treatment
   A. Sweeping fingers from proximal to distal indicates treatment should begin proximally and twist pushed distally
   B. Sweeping fingers from distal to proximal means twist should be pushed from distal to proximal
3. Amount of force – Superficial motion with fingers indicates only superficial fibers are involved, whereas if fingers dig into tendon or rub vigorously, this means deeper fibers are involved and a more forceful treatment is needed

Correction is typically achieved with several sessions and treatment is concluded when the patient verbally states the subjective tension of both achilles tendons is equal. Of interest to the orthopedist is that surgical procedures performed for repair of complete or partially torn achilles tendons operatively accomplish the same goal — anatomically restoring tendon to uninjured state by re-aligning separated fibers, and untwisting twisted portions of fibers. The difference is that in surgery the unattached fibers are physically re-attached to the bone. Perhaps, adding to the success of the intra-operative protocol would be use of a fine-toothed comb technique done with a delicate instrument. This would likely enhance recovery and thereby reduce rehabilitation time by forcing a more complete re-approximation of previously separated tendon fibers.

VISUALIZING A LIGAMENTAL TRIGGERBAND

Ligamental triggerbands are responsible for a wide range of commonly seen injuries and have been and continue to be one of the leading causes of involuntary retirement of professional athletes. In baseball pitchers and tennis stars it is the shoulder and elbow most often affected, whereas in football and soccer players the knees are commonly involved. Although the zip lock analogy is a general conceptual footstool for envisioning any triggerband, ligamental triggerbands can also be contemplated as ligamental fibers stuck in the wavy configuration (see Figure 9-3). There are normally two physiological configurations of ligaments:
1. Resting or non-working, also called unloaded (fibers are wavy)
2. Non-resting or working, also called loaded (fibers are straight)

Triggerband injuries result when only a portion of the ligamental fibers are subjected to loading forces and a neighboring section is not. This uneven shearing force fractures crosslinks (tiny perpendicular fibers that bundle the ligamental sub-bands together). The now unbundled sub-bands no longer are restrained during extension and therefore don't straighten. Thus the non-bundled fibers are considered to be stuck in the wavy configuration and cannot share in the work, so the joint is and feels weak. In addition, the two different tension forces from the two portions of the affected ligament are neurologically interpreted as pain and verbally expressed by patients as either *pulling* or *burning*.

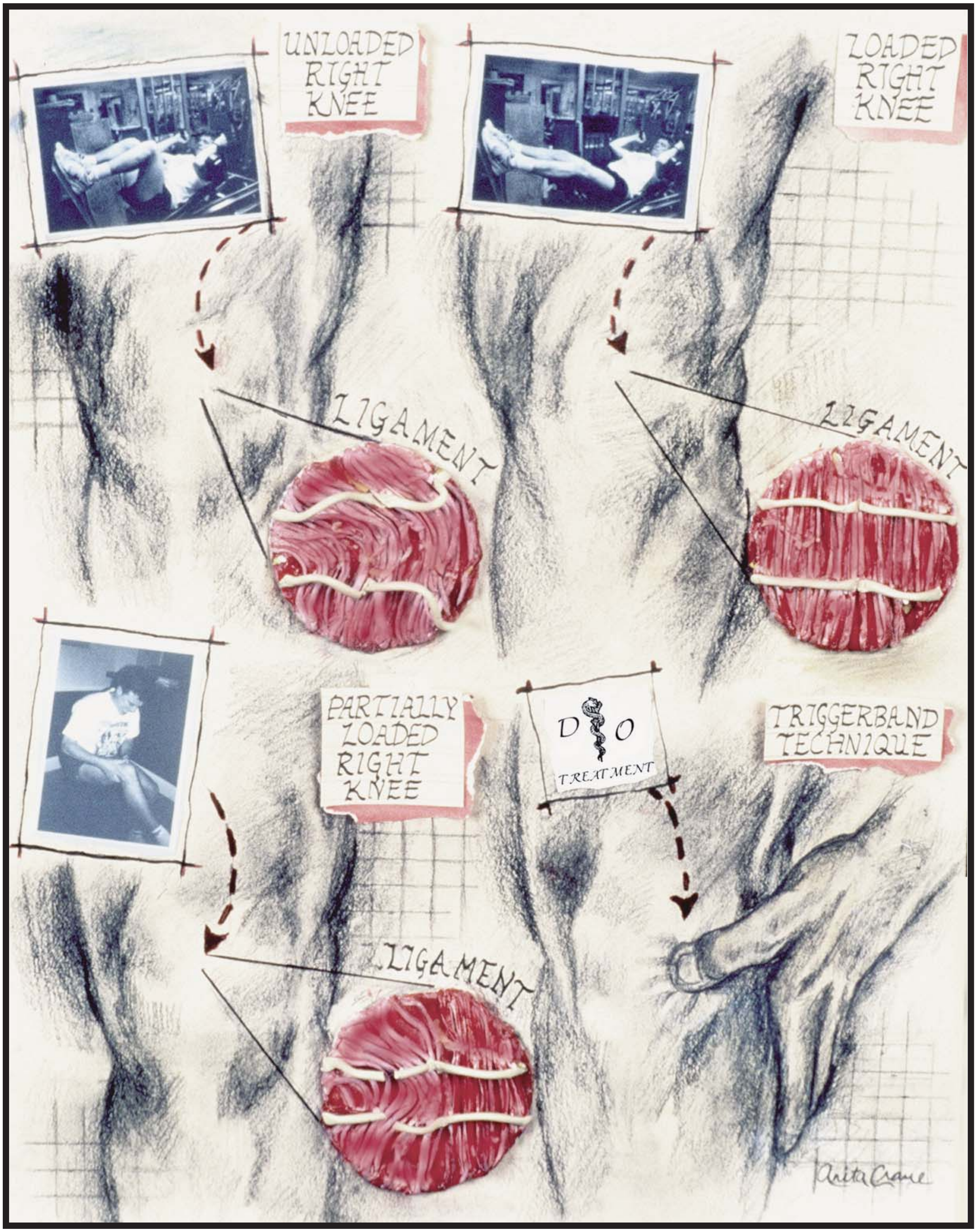


Figure 9-3. Ligamental Triggerband

Unloaded ligamental fibers are wavy (upper left) and loaded fibers are straight (upper right). If ligament is torqued during either loading or unloading, crosslinks may fracture. This causes the non-bundled fibers to become stuck in the wavy configuration (bottom left). Triggerband technique (bottom right) irons out the wave, re-approximates parallel fibers, and realigns crosslinks.

Triggerband technique unsticks these stuck fibers and manually straightens them. Once this is done, the crosslinks instantaneously re-attach. Note that the previously stuck wavy fibers were also twisted and slightly separated. The anatomical restoration of the stuck fibers therefore reverses the pathology, which is clinically evident by an immediate loss of pain and restoration of motion and strength.

In some instances, deep portions of the ligament are involved and surgical intervention is the treatment of choice. In those cases, the focus of the procedure is the same: unstick the fibers stuck in the wavy configuration, iron out the twisted portions, and re-approximate separated sub-bands. The advantages of intra-operative triggerband technique are:

1. Orthopedist's thumb can be applied directly onto the ligament itself
2. Variety of different sized instruments can be utilized for more precise correction

Physiological Effect of a Triggerband in a Ligament

In the fascial distortion model, a ligamental triggerband acts as a roadblock of fluid transport flowing between the two bones bridged by the ligament. The bone on one side of the triggerband becomes deprived of normal osseous material while the other side is saddled with a surplus that eventually overflows into the periosteum, fascia, and the ligament itself. Over time, this imbalance becomes radiographically evident as both a relative osteoporosis (the bone with decreased osseous flow) and as degenerative changes of the joint surface of the bone saturated with osseous flow. This relationship of osteoporosis and osteoarthritis is considered within the FDM to be a functional one in which these two disorders are viewed as being physiological mirror images of each other.

Generation of Fascial Distortions from Pre-Existing Injuries

Fascial distortions not only occur from injuries, but can arise from other pre-existing fascial distortions. For example, if a continuum sprained ankle is left untreated, a triggerband may form. The triggerband occurs because the more osseous portion of the transition zone (i.e., the portion inhabited by the continuum distortion) is functionally stiffer and thus responds differently to extrinsic forces than the non-injured portion. Over time, the more brittle osseous fibers tear apart from the more flexible fibers . . . and thus a triggerband is born.

The reverse process also occurs (i.e., continuum distortions are formed from triggerbands). In a triggerband sprained ankle, the twisted fibers are functionally shorter and exert more tension on the transition zone. Eventually that portion of the zone shifts into the more osseous configuration . . . and thus a continuum distortion is born.

Pulled Muscles

The FDM concept of pulled muscles is derived from the anatomical arrangement of fascial bands. Some bands near muscles have origins and insertions on either side of the muscle with a pathway that runs through the muscle. When the fascial band becomes injured (and

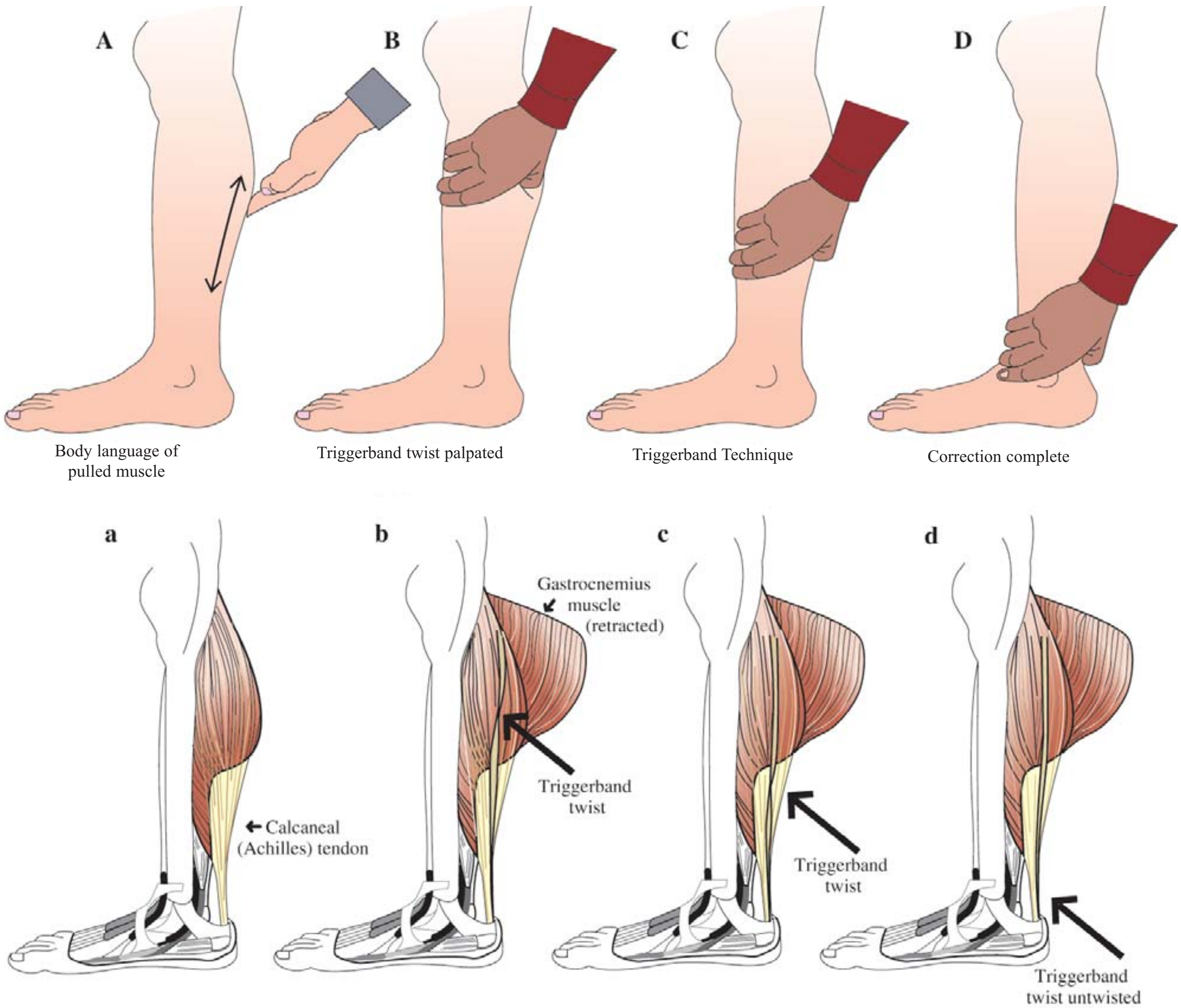


Figure 9-4. Correction of a Pulled Muscle

In the FDM, parallel fibers that traverse through a muscle can become twisted. These distorted bands (known as triggerbands) are responsible for the subjective symptoms and physical findings of what is commonly referred to as a *pulled muscle*. In the pulled calf muscle (shown above) a triggerband has formed deep in the gastrocnemius muscle.

A. Patient demonstrates body language associated with a pulled muscle (sweeping motion with fingers along triggerband pathway)
a. Twisted fibers of fascial band hidden deep within belly of gastrocnemius muscle

B. Twisted fibers palpated – triggerband technique (smoothing out twisted fibers with treating thumb along entire fascial band pathway) initiated by physician
b. Anatomical location of triggerband twist within belly of gastrocnemius muscle (superficial layers of muscle fictitiously retracted for visualization)

C. Triggerband twist pulled out of muscle and onto calcaneal tendon (symptoms of pulled muscle resolved but symptoms of tendonitis created)
c. Triggerband twist within fibers of calcaneal tendon

D/d. Correction complete – twisted fibers of fascial band/tendon are untwisted – patient is now asymptomatic thus distorted), it physically crumples and twists. Whenever the muscle surrounding the band subsequently contracts, the twisted fascial fibers act as a kink which impedes some of the contracting muscle fibers. This is clinically evident by a painful, weak, and poorly coordinated contraction.

Although the traditional approach of resting a pulled muscle empirically seems to be of benefit, it has a major drawback in the overall amount of time, pain, and disability before symptoms abate. Fascial distortion treatments, in contrast, manually correct the distortion, which allows for an almost instantaneous treatment result with virtually no recuperative time, and little chance of recurrence.

In Typaldos manual therapy, the distorted band is corrected by manually forcing the twist through the belly of the muscle and untwisting the twisted fibers. Once this is done, the fascial band is no longer kinked and the muscle can glide around it each time it contracts. The corrected fibers not only result in the patient being asymptomatic, but also in the muscle once again exhibiting normal contractile strength.

In the conventional treatment of pulled muscles, the injury is rested or splinted, which leads to atrophy of the muscle and allows more room for the twist to work its way back out of the belly of the muscle. Exercising, another traditional treatment option, may also seem beneficial since repetitive contractions may pull the twist out of the muscle. The negative aspect of these approaches is that the anatomical distortion is still present and has not been corrected. The same injury is likely to occur again when the muscle forcefully contracts and the twist is pulled back into its belly. In the fascial distortion model, once the fascial band is completely untwisted, the symptoms are eliminated because the distortion no longer exists.

ENHANCING ATHLETIC PERFORMANCE

Although the bulk of this book is focused on the treatment of musculoskeletal injuries, the fascial distortion model has another important application — to predict and prevent injuries before they happen. In this aspect, the FDM is a valuable tool in sports medicine to assist orthopedists in determining who is likely to be injured and why. Typaldos manual therapy techniques can then be used to correct the injury before it becomes symptomatic.

The first step in predicting future injuries is to review the past history of the person in question. If he or she sustained a strain, pulled muscle, or sore shoulder that had to be *worked through*, or *got better over time*, this indicates that an unresolved fascial distortion is present. Although the athlete may be performing at what appears to be an acceptable level, this same history suggests that a sub-acute injury exists which is restricting potential. Correcting the distortion not only avoids future injury, it also enhances current performance. An example of this can be seen in a baseball pitcher who in the past complained of a sore arm or shoulder. He may have had to avoid throwing for several weeks until he could do so again without pain. The fact that he says his arm “feels fine” does not mean that it is. Even though he has no current complaints, he may still be injured because the distortion that caused his disability has never been corrected.

In predicting a future extremity injury, motion should be carefully examined. If the shoulder of a baseball pitcher, for instance, demonstrates loss of internal rotation (gross loss of total height or even subtle changes, such as decrease in speed or loss of hand rotation, see Figure 13-3), the player should be treated as soon as possible. Ignoring the distortion will likely result in sub-optimal athletic performance and recurring injuries. However, once properly treated, he will be able to throw harder, longer, and more accurately than before. His additional bonus is a decrease in the likelihood of a serious injury. The same enhancement in performance is possible for sprinters, runners, football players, ballerinas, golfers, basketball players, and in fact athletes of every kind. The significance of fascial distortions in athletic performance cannot be emphasized enough. For instance, if a world-class sprinter should have just one small triggerband in his or her hamstring, this may be the competitive difference between finishing first and fifth.

Folding Injuries and Peri-Operative Traction

The selection of patients for surgery is currently based upon the orthopedic model; however, since folding injuries are so commonly present, but not recognized, they repeatedly affect the outcome. In folding injuries taken to surgery, tractioning forces introduced during the operative procedure are frequently the key component for success or failure of the entire process. For instance, in an *unfolding* knee injury:

No traction	=	**neutral result** – surgery fails to relieve patient's discomfort since relevant injury remains unchanged
Traction	=	**positive result** – patient's symptoms are diminished or eliminated because unfolding distortion was corrected

In a *refolding* knee injury, surgery with mild traction would likely yield a **negative** result since the capsule and peri-capsular tissue has not been properly refolded before being forced to unfold. However, because of the relaxing effect of anesthesia, if excessive traction forces are applied, the tissue can be completely unfolded which then allows for more correct refolding, thus a **positive** effect is still theoretically possible. It should be noted that the above example highlights only one of a number of factors that influence fascial distortions and thereby affect the success of surgical procedures.

Manipulation Under General Anesthesia

Manipulation under general anesthesia (MUGA) is an orthopedic procedure with potential efficacy for the following shoulder conditions:

1. Unfolding distortions of capsule
2. Refolding distortions of capsule
3. Tectonic fixations of gleno-humeral joint
4. Tectonic fixations of scapula

Capsular unfolding distortions respond particularly well to manipulation under general anesthesia when the procedure incorporates a great deal of traction followed by a simultaneous pulling thrust. Fortunately, the same unfolding effect can often be achieved with traction/thrusting manipulative techniques employed in the office.

Capsular refolding distortions also may respond to manipulation under general anesthesia. However, for the treatment to be successful there must be a significant compressive force instigated with the accompanying manipulation.

Gleno-humeral tectonic fixations are the most stubborn of all the etiologies of long-standing frozen shoulders and clinically respond favorably to MUGA. To maximize success, the procedure theoretically should include:

1. Slow tectonic pump of shoulder
2. Alternating sustained compression of humerus into joint with compression thrust (refolding technique of capsule), followed by traction of humerus away from joint with intermittent traction/thrusting (unfolding technique of capsule)
3. Simultaneous injection of fluid such as Hylan G-F 20 or Sodium Hyaluronate into the joint
4. Repetition of steps 1 through 3 until there is a large *slide-clunk* felt or heard (or until orthopedist tires)

Conceivably, recalcitrant scapular tectonic fixations (i.e., those which haven't responded to office-based manipulations) can also be corrected with MUGA. With the patient in the prone position, the scapula is first rocked back and forth slowly but forcefully (slow tectonic pump), followed by compression/thrusting forces repetitively introduced directly onto the shoulder blade. In this procedure, the palms of both hands are placed onto the shoulder blade and a short but strong thrust is directed from superior to inferior (or inferior to superior) along the mid-section of the scapula. Treatment is considered successful when a *slide-clunk* is heard or felt (fixation is broken and scapula slides).

It should, however, be made clear that MUGA is appropriate therapy only in suitable frozen shoulder candidates. Those patients must have:

1. Failed aggressive office TMT manipulative treatments
2. Underlying fascial pathology that is likely to respond to the procedure
3. Ability to medically tolerate general anesthesia

For a successful result, before any frozen shoulder is manipulated under general anesthesia, the accompanying primary fascial distortions (SCHTP, anterior and posterior shoulder triggerband pathways, etc.) should be corrected.

Repetitive Use Injuries

Orthopedically, repetitive use injuries (also known as overuse syndrome or cumulative trauma disorders) are generally considered to be musculoskeletal conditions caused by or aggravated through sustained exertion or repeated movement of the affected body part. Although most of these disorders involve the extremities (such as carpal tunnel syndrome, epicondylitis, flexor tendonitis, and shoulder or wrist pain deep in the joint), some affect the upper back (burning pain medial to the scapula), or neck (midline deep aching or pulling sensation along the margin of the upper trapezius muscle).

In FDM, repetitive use injuries are considered to be fascial distortions that occur from:

1. Accumulation of specific motions that increasingly physically distort the fascia, or
2. Single event[2] (one errant motion among thousands of seemingly similar repetitious movements).

In the FDM the first category of injuries is designated as *cumulative repetitive injuries* (CRI), while the second is considered to be *probability repetitive injuries* (PRI). The clinical relevance of accumulation versus single event etiology is that during the first office visit it allows the physician to determine which patients can immediately return to the same work (PRI's), and which should not (CRI's).

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"I N J U R Y"

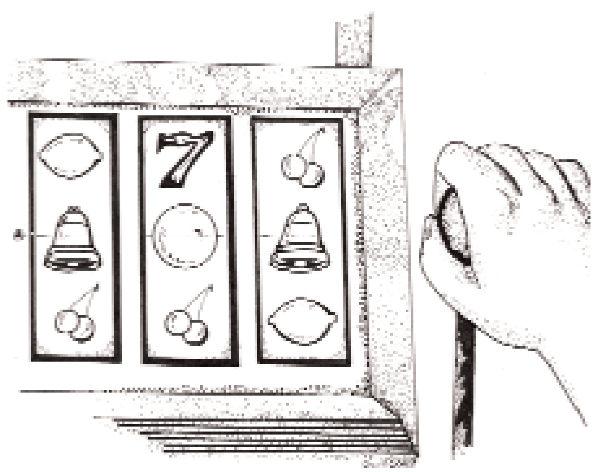
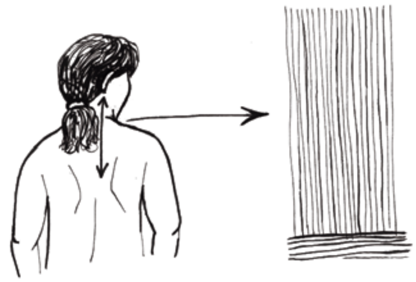


Figure 9-5. *Cumulative repetitive use injuries* (left) present as a progressing discomfort that, over time becomes more and more obvious until the patient finally claims an injury. With *probability repetitive use injuries,* the sudden onset of symptoms is analogous to a winning pull of a slot machine (right). Although each individual repetitive action by itself does not increase or decrease the odds of future injury, the more times the action is taken the more likely an injury is to occur.

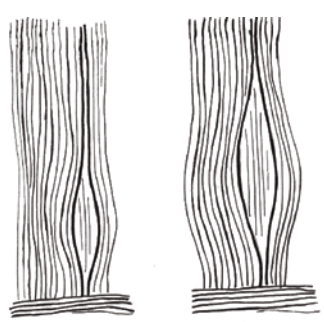
[2]Note: Trauma induced distortions such as from auto accidents are not PRI's since no probability is involved. Instead the injury becomes a mathematical certainty when shearing physical forces introduced into the fascia far exceed its ability to keep from tearing, mal-folding, tangling, etc.

TRIGGERBAND CUMULATIVE REPETITIVE INJURY



Uninjured fascial fibers of star triggerband pathway

Repetitive twisting of thorax . . .

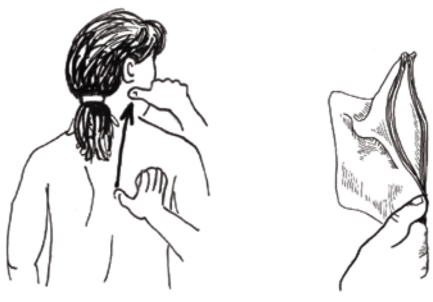


. . . progressively tears apart fascial fibers

Continuing offending motion eventually:
1. Leads to tearing of fibers along entire pathway
2. Involves multiple layers of fascia

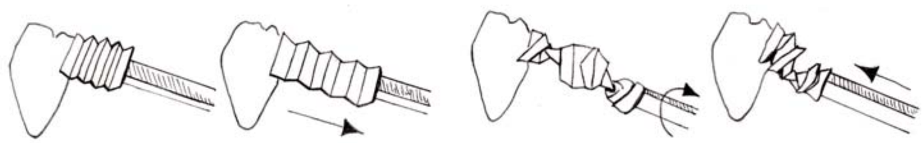
TREATMENT OF TRIGGERBAND INJURY

(Triggerband Technique)



Separated fascial fibers are re-approximated along course of their pathway with physical force from physician’s thumb (similar to re-sealing a Ziploc® bag)

UNFOLDING PROBABILITY REPETITIVE INJURY



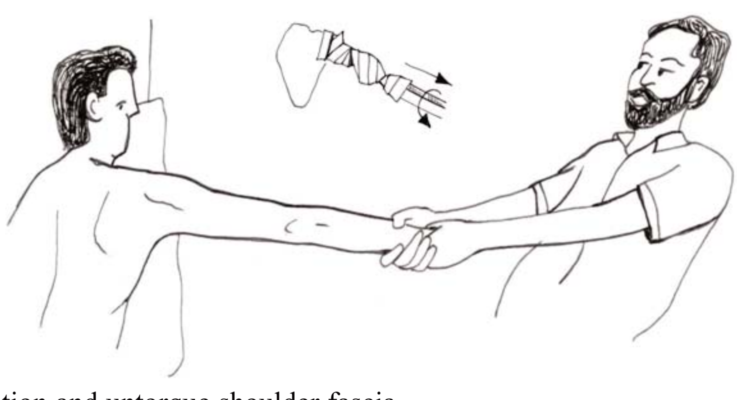
Schematic of resting folding fascia

Fascia unfolds as postal worker reaches into mailbox

As mail is laid down, hand is turned and shoulder fascia torques

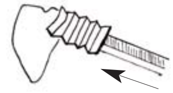
As hand is brought back into truck, shoulder fascia refolds contorted

TREATMENT OF UNFOLDING INJURY



Step 1. Traction and untorque shoulder fascia

Step 2. Unfolding traction/thrusting manipulation



Two Examples of Repetitive Use Injuries of the Shoulder

Showing Clinical Ramifications of Cumulative and Probability Etiologies

Distortion Type	Body Language	Verbal Description of Pain	Cumulative vs. Probability	Mechanism of Injury
Star Triggerband	Sweeping fingers along linear pathway of star triggerband	Burning or pulling pain from upper back to neck	Cumulative	Leaning forward and twisting (computer operator and dental hygienist)
Unfolding Distortion of Shoulder Joint	Clasps palm over shoulder	Ache deep in shoulder joint	Probability (Singular event)	Reaching and twisting (postal worker)

Star Triggerband – Each time offending motion is repeated, the anatomical distortion becomes greater (more tearing between fascial fibers).
Implications:

1. Once injured, the more times the action is repeated, the more the anatomical injury progresses, meaning patient becomes increasingly symptomatic

2. Once anatomical correction is made, if the offending activities continue, the anatomical injury will reoccur

3. Treatment: Physically re-approximate fibers with force from physician's thumb (triggerband technique)

4. Consider temporarily stopping the offending work activity until correction is made and patient becomes asymptomatic

5. If patient resumes same work and has continued exposure to offending activity, maintenance therapy will be required

Unfolding Distortion – The anatomical injury occurs from a single event which is probability related. The more times the potentially provocative activity occurs, the more likely the injury is to happen.
Implications:

1. Once injured, repeating the injurious motion may diminish anatomical distortion and make injury less symptomatic

2. Once anatomical correction is made, chance of re-injury is no greater than before previous injury (i.e., if patient becomes injured after 5 years of performing activity, on average same injury will reoccur in 5 years)

3. Treatment: Physically traction arm in same direction in which injury occurred (unfolding technique unfolds contorted tissue and allows it to refold uncontorted)

4. Do not rest injury. Do not stop offending injurious activity

5. If patient resumes same work and has continued exposure to offending activity, no maintenance therapy is required

Cumulative Repetitive Injuries

Cumulative repetitive injuries begin insidiously as small alterations in the fascia which enlarge anatomically as the offending activity continues. Since physically the distorted fascia can't evenly distribute the forces of external stresses, continued exposure to the activity leads to over-loading (i.e., injury) of adjacent and underlying fascia. In this way the symptoms of CRI's progress in both magnitude and locality — intensification of symptoms suggests underlying layers are affected, while geographical spreading of pain signifies adjacent fibers are involved.

Clinical considerations include:

- During treatment process, temporarily limiting exposure to injurious activity (offending motion physically reverses the anatomical gains of the therapy)
- Long-standing CRI's with magnification and spreading are anatomically complex and generally require multiple treatment sessions to correct
- If previous work schedule is resumed, periodic maintenance therapy is needed (distortions re-form)

Probability Repetitive Injuries

In contrast to CRI's, probability repetitive injuries don't accumulate from multiple small insults, but instead result simply as a matter of chance. In a worker's career each time a specific task is performed there is a risk of injury. That risk may be extremely small for any given activity, but when the action is repeated tens of thousands (or even millions) of times, the overall risk becomes substantial. However, the actual injury occurs from only one of those motions — a single rogue movement in which the external forces or angle varied just enough to physically pull, twist, unfold, jam, tangle, or tear the fascia.

PRI's (like CRI's) should be treated as soon as possible with the appropriate fascial distortion technique and then (unlike CRI's) sent back to work immediately. No resting or maintenance care is needed, and the activity that caused the injury should not be limited (it is extremely unlikely the random errant forces will be replicated).

The potential of reoccurrence is only a matter of probability. So if the periodicity of the injury for any given worker is every few years, once the correction is made, the next similar injury wouldn't be expected for several more years.

Clinically, PRI's can be differentiated from CRI's by the following:

- Injury is spontaneous with no warning or symptoms prior to initial moment of pain
- Symptoms don't progress with repetition of injurious activity
- Resumption of injurious motion may decrease pain and increase range of motion
- Correction is often possible with one aggressive treatment

Role of Physical Therapy in Fascial Distortion Medicine

Physical therapy is a common post-surgical approach prescribed by orthopedists to maintain strength and improve mobility of the affected limb or joint. However, from the FDM perspective, the goal of strengthening in non-surgical patients is considered irrelevant since painful injuries are anatomical in nature and are not due to weak muscles or weak ligaments. By the same token, improving mobility is a *result* of an effective therapy and says nothing about the anatomical intent of the treatment itself. From a practical point of view, the usual repertoire of modalities employed by physical therapists for non-surgical conditions are not designed to correct underlying anatomical pathology. Therefore, the therapeutic impact of their efforts is generally summarized by patients as ineffective.

In FDM, the role of the physical therapist is currently specifically delineated to augment the manipulative treatment of the physician by focusing on correcting recalcitrant folding distortions. Therefore, the field of *FDM physical therapy* consists of physical modalities employed to provide sustained traction or compression forces into injured joints. This approach is utilized when capsules or other folding fascia are so contorted that thrusting manipulative folding techniques are by themselves unable to fully correct the injury.

Currently, for most stubborn upper back, low back, and hip folding distortions, the patient is initially treated by the physician. Once the other non-folding distortions are eliminated, FDM physical therapy is initiated in the following manner:

1. Hour of PT ball and inversion therapy
2. Two to three days later: 30-45 minute session of ball and inversion therapy
3. Repeat of step two followed within one hour by folding/thrusting manipulation performed by physician
4. Two to three days later: 30-45 minute session PT
5. Two to three days later: 30-45 minute session PT followed by folding/thrusting manipulation by physician
6. Repeat sequence as needed

Since if left uncorrected, folding distortions tend to be permanent, their treatment by physical therapists is a critical factor in curing patients of so-called *chronic* or *permanent* neck and back pain. For the therapist practicing FDM physical therapy, he/she should realize it is a *physical* approach that requires the practitioner to be in good physical condition. Please note that to administer an effective treatment the therapist must have a complete understanding of the anatomical purpose of his/her treatment.

Chapter 10

Neurology / Rehabilitation

Neurology

There are a wide assortment of neurological injuries and conditions which can be envisioned through the fascial distortion model. Topics discussed in this section include brachial plexopathy, sequelae of neurological insults, spinal stenosis, sciatica, referred pain, foot drop, reflex sympathetic dystrophy, seizures, headaches and fibromyalgia. To illustrate how the fascial distortion model can impact neurology, carpal tunnel syndrome is chosen as one clinical condition to illustrate this point. Note that treatment of carpal tunnel syndrome is presented in Chapter 14.

Carpal Tunnel Syndrome

In the classic neurologic model of carpal tunnel syndrome the symptoms (hand, thumb, and finger paresthesias or numbness as well as loss of grip strength and the occasional atrophy of thenar musculature) are secondary to impingement of the median nerve within the carpal tunnel canal (bounded anteriorly by wrist flexor retinaculum). However, this explanation fails to explain the following complaints which are so often expressed by patients:

1. Paresthesias of forearm
2. Paresthesias and /or numbness of fingertips only
3. Dorsal hand paresthesias

The problem with each of these clinical presentations is that they cannot be directly attributable to median nerve distribution. Patients with paresthesia that involves the medial, lateral, posterior, and anterior aspects of the forearm would have, within the neurologic model, symptoms generated not only beyond the median nerve distribution (medial and lateral antecubital cutaneous nerves) but also proximal to the site of implied impingement of the median nerve, which is the wrist flexor retinaculum.

In the case of fingertip-only paresthesias, there are two concerns with the neurologic model of median nerve entrapment:

1. If the median nerve is impinged in the wrist, why are only the fingertips affected, rather than all the innervated aspects of the involved fingers?
2. Typically, not only are the thumb, index, and middle fingers symptomatic (median nerve distribution), but the entire fourth fingertip (generally half of which is ulnar nerve innervated) and the fifth fingertip (ulnar nerve innervation) are also equally symptomatic.

Additionally problematic for the strict definition of CTS being solely the result of median nerve impingement is the frequent complaint of dorsal hand paresthesias (radial nerve distribution).

In the fascial distortion model, what is generally referred to as carpal tunnel syndrome is broken down into two groups: *true carpal tunnel syndrome* (TCTS), and the much more common *carpal tunnel-like syndrome* (CTLS). True impingement of the median nerve in the carpal tunnel canal results in TCTS. This condition is best treated with cylinder technique of the retinaculum and fingers (see Figures 7-5, 14-9, and 14-15), with recalcitrant cases benefitting from carpal tunnel surgery. In the FDM, true carpal tunnel syndrome is envisioned as an anatomical impingement of the median nerve by a cylinder distortion of the flexor retinaculum. Therefore eliminating the cylinder distortion, by double thumb cylinder technique or surgery, eliminates the symptoms.

In contrast, those patients with fingertip-only paresthesias, paresthesias on the dorsum of the hand, or those with forearm paresthesias are considered to have CTLS. In this condition the symptoms are not (or are only partially) the result of median nerve impingement within the carpal tunnel canal. The non-median nerve distribution symptoms are considered to be the consequence of the following:

1. Cylinder distortions of antebrachial fascia – causing paresthesias of forearm
2. Triggerbands of forearm – causing burning or pulling pain along a linear (distal to proximal) pathway on anterior aspect of forearm
3. Cylinder distortions of fingertips – causing fingertip-only paresthesias and/or numbness
4. Cylinder distortions of hand – causing hand paresthesias

As predicted in the FDM, patients with CTLS respond poorly to current surgical procedures. However, for the practicing neurologist, a quick discussion of patient activities and traditional carpal tunnel medical interventions and their anatomical impact is presented below.

Shaking Hands to Relieve Tingling: Each time the wrist is pronated and supinated the superficial cylinder fascial coils which encircle the forearm rotate. Should one or more of the coils be physically forced on top of an adjacent coil and become entangled (i.e., become unable to be pulled off its neighbor) this is called a cylinder distortion (similar to a tangled Slinky® toy). Thereafter, each time the forearm pronates or supinates, the tangled coil inhibits the proper sequence of muscle contractions and physically restricts the motion, thus leading to the sensation of weakness since it takes more muscle contraction to accomplish the same movement.

And since fascia acts as a mechanical sensory system, cylinder distortions cause an uneven pull of the coils which is registered in the nervous system as unequal tension. The uneven mechanical pull varies each instant of muscle contraction since the coils rotate with contraction, pronation or supination. This sends constant but geographically changing inequalities of mechanical tension sensory input to the brain from very closely adjacent areas. The cognitive awareness of this is expressed by the patient as a *tingling* sensation (neurologically defined as *paresthesia*).

Vigorously shaking the involved forearm physically forces the tangled portion of the coil to rotate away from the area of muscle onto which it has become ensnared. By suddenly forcing the tangle away from the location in which it is causing the most symptoms, there is a reduction in the amount of uneven mechanical force. In this way shaking the hand, wrist, or forearm can provide instant reduction in symptoms. Unfortunately, this method of self treatment is rarely specific enough to actually untangle the overlapped coils, so the symptoms return again when a sequence of muscle contractions and/or pronation/supination motions force the tangle back into the anatomically most symptomatic locations.

Splints: Wrist restraints reduce the symptoms of cylinder distortions by inhibiting tangled circular fascial fibers from rotating. However, once the splints are removed, the tangled portion of the coil is free to be pulled back into more symptomatic areas. Splints also result in atrophy of forearm muscles which gives more room for the tangled coil to maneuver, which in some cases may allow it to untangle.

Resting from Injurious Activity: Diminishing the frequency of an injurious activity reduces the number of times during a given day in which cylinder fascia is forcibly rotated. This decreases the odds that it will become entangled (or more tangled). Although resting decreases the chances of the tangled coil becoming physically forced into a more symptomatic area, it doesn't of itself correct the anatomical distortion (except by passively allowing more maneuvering room for the tangle to untangle secondary to muscle atrophy).

Exercising: Repetitive motions performed over a short amount of time may have one or two positive effects:

1. Physically force tangled coils away from contracting muscle
2. Increase size of muscle which forces tangled coils away from contracting muscle

If the exercise is conducted in the proper fashion, the tangles themselves may be forced to untangle. However, since the exact muscle contraction sequences to achieve this are not currently known, exercising is currently a non-specific approach with a large number of clinical failures.

Anti-inflammatory Medicines: Although extracellular inflammation between tangled coils of circular fascia can physically impede untangling, inflammation is rarely appreciated clinically. Therefore, NSAID's have little practical impact in treating CTS.

Steroids: Unlike NSAID's steroids are potent anti-inflammatories. Because of this they can have positive effects in patients with CTS *and* inflammation. However, since so few patients actually have swelling, steroids are generally not indicated. And unfortunately, even in cases of TCTS or CTLS with inflammation, reducing inflammation still doesn't directly untangle the tangled coils, but may do so passively by allowing more space for them to maneuver.

Diuretics: In patients with peripheral edema diuretics draw extracellular fluid into the vascular system. This diminishing of extracellular fluid allows more room for the tangled coils to rotate but does not directly correct the anatomical distortion.

CTS Surgery: Operative incision of the flexor retinaculum untangles cylinder coils in the same way that cutting the coils of a Slinky® toy rids it of its tangles. However, this approach is not likely to have a desirable outcome for triggerband or cylinder CTLS that involve the forearms or only the fingertips. In the future, more specific (and thus more effective) surgical procedures will likely be designed that not only excise the tangle but delicately realign the fascial coils.

Thrusting Manipulation: Thrusting manipulations of the wrist either unfold or refold folding fascia or force fixated fascial surfaces to slide. Since the symptoms of TCTS and CTLS are secondary to cylinder distortions, and to a lesser extent triggerbands, the role of thrusting manipulation is limited. Patients that benefit from this approach include those:

1. With a concurrent folding injury
2. Who have developed tectonic fixations as a result of casting or splints

Myofascial Release: This therapy, if anatomically directed toward the involved distortions, can at times untangle some of the distorted cylinder coils.

Stretching: Whether this is done by the patient or the doctor, stretching may untangle some coils of cylinder distortions. However, it is very non-specific and like myofascial release would have no effect on triggerband CTLS or CTLS involving only the fingertips.

Electrical Stimulation: Surprisingly some patients do benefit from the application of electrical current directed into the symptomatic areas. This is because fascia is an electrical conducting system in its own right and also has the ability to buffer the flow of electrical current. Thus direct electrical current:

1. Results in increased fascial flow of chemicals and nutrients through the fibers which are partially blocked by the distortion
2. Potentially forces coils to untangle by stimulating isolated muscle contractions

Brachial Plexopathy

Serratus anterior paralysis (long thoracic nerve palsy), as well as a number of other brachial plexopathies, often respond well to aggressive Typaldos manual therapy treatments. In these conditions, loss of abduction (inability to raise the arm above the shoulder level) is impressive while external and internal rotation typically remain less affected.

Although the medical etiology of brachial plexopathies is considered to be neurologic, these injuries fit into the *FDM Flow Chart of the Acutely Sore Shoulder* as a sore shoulder without global loss of motion and with loss of abduction. Therefore, the TMT treatment consists first of vigorous herniated triggerpoint therapy of the SCHTP. On recheck of abduction, if it is not immediately and completely restored, herniated triggerpoint therapy should be repeated with more force followed by triggerband technique of the anterior and posterior shoulder pathways.

The treatment may need to be repeated with a day or two in between visits. Note that once restored abduction remains intact, an exercise regimen for strengthening can be implemented. Unfortunately, however, many brachial plexopathy patients will continue to exhibit scapular winging.

Sequelae of Neurological Insults

Many neurological events (including strokes and brachial plexopathies) leave permanent or seemingly permanent deficits which are generally attributed to the primary neurological insults. However, in the FDM it is noted that fascial distortions are formed as a secondary event and often remain long after the neurologic condition has recovered. The following case history illustrates this point.

Clinical Example: Eight Year Old Girl with Erb's Palsy Sequelae

This young girl had a long history of inability to properly supinate and extend her left forearm. Her difficulties began as a neonate when it was noted she had Erb's palsy. Despite a remarkable recovery she continued to have substantial forearm motion restriction. Even by age eight (when she had her first FDM exam – 01/28/02) partial supination could only be achieved by altering her body position (side bending torso, abducting shoulder, and rotating elbow so that it was four inches away from the side of her body). After several FDM treatments Molly was able to fully extend the elbow and fully supinate the forearm (without contorting her shoulder, elbow, or torso).

Discussion: From the FDM perspective supination and pronation of the forearm are to a large extent made possible by the ability of the radio-ulnar interosseous membrane to unfold and refold. The IOM was injured shortly after (or perhaps before) birth secondary to the weakness of C_5-C_6 innervated muscles. The loss of innervation meant that there was no counterbalance to the contractions of non-involved antagonistic muscles. This imbalance of tone forced the forearm into a state of constant and pronounced pronation, thus overfolding the forearm IOM creating refolding distortions. Although nerve function eventually normalized, since folding injuries tend to be permanent (if left uncorrected), this girl continued to have altered IOM function and therefore loss of supination.

Restoration of motion was obtained with five office visits of refolding technique followed by unfolding technique of the interosseous membrane. Note that the volume of articular sound appreciated as the IOM manipulates is directly related to the amount of unfolding of the membrane. Therefore in the case of Molly, since there was a profound distortion, the pops and clicks realized from the manipulation were not only surprisingly loud but easily appreciated by her mother standing on the other side of the room.

Spinal Stenosis

Symptoms of lumbar spinal stenosis (spinal canal narrowing) generally include buttock, thigh, and leg aching. Discomfort is magnified with ambulation, exercise, or lordosis and is relieved with resting or forward flexing of the lumbar spine. Persons at risk are those with lateral recesses of the canal or decreased anterior-posterior dimensions of the spinal cord.

In the FDM, the primary treatment approach is to anatomically unfold the paravertebral fascia which are constricting (either directly or indirectly) the spinal cord or surrounding structures. This is done primarily by three methods:

1. Inversion therapy
2. Chair unfolding technique
3. Wall technique

These approaches should be coupled so that they are employed on the same treatment day. Inversion therapy is done first, followed shortly thereafter by chair technique and wall technique. In inversion therapy and chair technique the primary corrective spinal position is traction with exaggerated flexion. Typically, spinal stenosis patients are treated three times a week with 5 to 15 sessions necessary for maximum recovery.

Note that triggerbands, particularly the posterior thigh pathway(see Figure 15-4) and lateral thigh pathway (see Figure 15-3), are often concurrently present and should be corrected before folding techniques are initiated. And for those patients with residual buttock or thigh pain, cupping-with-movement is utilized.

Sciatica and Pseudo-Sciatica

Pseudo-Sciatica

Most conditions neurologically diagnosed as sciatica are categorized in FDM as pseudo-sciatica. Clinically these are patients that present with a pulling or burning pain along the posterior thigh. On exam the straight-leg raising test is positive only in the sense that it elicits or magnifies a pulling sensation or tightness in the thigh or low back.

Pseudo-sciatica is treated with triggerband technique along the posterior thigh triggerband (or if the pain is more lateral, along the lateral thigh triggerband). The direction of triggerband technique is determined by body language of the patient. If upon initial questioning the patient displays a sweeping motion with the fingers from the posterior thigh superiorly, treatment begins just above the popliteal fossa and the pathway is followed superiorly up to the sacroiliac joint, then to the midline and down to the coccyx (see Figure 15-4). If instead the sweeping motion is from the sacroiliac joint inferiorly, treatment begins on the same-sided border of the sacrum and pathway is followed superiorly to the lumbar spine then laterally to the sacroiliac joint and finally inferiorly to the popliteal fossa.

Pseudo-sciatica is often a chronic condition, meaning that anatomically adhesions are present. Therefore maximum force must be used, and several sessions are needed to break the adhesions and to correct the deeper layers.

Although several vigorously performed triggerband treatments will reduce or eliminate the thigh tightness, this in itself will not reduce or eliminate the accompanying subjective complaint of low back stiffness that so often is present with the posterior thigh triggerband. This is because in addition to triggerbands occurring in chronic pseudo-sciatica, there are other distortions which likely have formed. These include hip tectonic fixations, lumbar unfolding or refolding distortions, and facet tectonic fixations. Therefore, after triggerband technique is completed the following manipulations should be performed:

1. Frogleg and reverse frogleg of hip (see Figure 8-5)
2. Chair technique (neutral, traction, or compression thrusts, see Figure 6-5)
3. Wall technique for upper lumbar and lower thoracic unfolding distortions (see Figure 6-4)
4. Hallelujah maneuver for thoracic unfolding distortions (see Figure 6-4)

Note that should chair and wall technique fail (i.e., you are unable to unfold or refold the paravertebral fascia as evident by hearing multiple large pops with traction or compression thrusts) on two successive office visits and patient still has low back pain, then inversion therapy should be initiated.

Leg and calf pain in pseudo-sciatica (and in true sciatica as well) are common complaints and are the last fascial distortions to be addressed in the treatment sequence. Some patients in describing their discomfort of the thigh will also make a sweeping motion with a finger or two along the lateral leg to the ankle. This body language is indicative of the lateral ankle triggerband pathway. It is treated in the same fashion as a typical triggerband sprained ankle (see Figure 16-5), although the amount of force applied can be much less.

However, more commonly, pseudo-sciatica or true sciatica patients with leg pain will show the following cylinder body languages and are treated with the accompanying cylinder techniques:

1. Sweeping palm of hand along leg (squeegee)
2. Squeezing of leg repetitively with hand (Indian burn)
3. Rubbing shin back and forth with several fingers (double thumb)
4. All the above (cupping-with-movement)

Sciatica

True sciatica (thigh pain secondary to sciatic nerve impingement) is far less common than pseudo-sciatica and is clinically evident by the following:

1. Electricity-like shooting pain down posterior thigh that lasts seconds or less
2. Positive straight-leg raising test in which symptoms of #1 are reproduced

Although the etiology of true sciatica is disc protrusion with nerve impingement, triggerbands and folding distortions are concurrently present and are a secondary cause of patient discomfort. In addition, these same fascial distortions are indirectly responsible for the impingement syndrome — the distorted para-lumbar fascia is shorter and therefore pulls on the disc and the tissues surrounding the disc, causing it to bulge.

The TMT treatment of true sciatica consists of the following steps:

1. Triggerband technique as described for pseudo-sciatica
2. Chair unfolding technique
3. Inversion therapy
4. Cylinder technique for leg pain as described for pseudo-sciatica
5. Cylinder technique for foot paresthesias (double thumb) or toe paresthesias (Indian burn)
6. Medical (steroids, injections, etc.) or surgical interventions, if above fail

Foot Drop

Within the FDM, foot drop has two etiologies:

1. Traumatic
2. Neurologic

Traumatic Foot Drop

Loss of dorsiflexion, seen commonly in ankle sprains, is considered to be foot drop secondary to the traumatic formation of the anterior ankle continuum distortion (see Chapter 16). The AACD forms in sprained ankles from the shearing forces of the trauma which cause a portion of the transition zone to shift and be held in the osseous configuration while an adjacent portion shifts into the ligamentous configuration. The osseous portion then becomes stuck (i.e., can't shift back into the neutral state). This stuck osseous part of the transition zone is physically too stiff to allow for foot dorsiflexion, thus foot drop occurs.

Traumatic foot drop can be immediately corrected with continuum technique (see Figure 16-4, and glossary term *Anterior Ankle Continuum Distortion*), or if left untreated, will generally resolve on its own when the injured transition zone eventually becomes unstuck and shifts back into the neutral state. However, in some patients traumatic foot drop can persist for years.

Figure 10-1. This 20 year old woman had foot drop for two years following a sprained ankle (neurological work-up was negative including a normal lumbar MRI). Her dorsiflexion was zero on a scale of one to four. Resolution of foot drop was complete with one treatment of the AACD (i.e., dorsiflexion was then measured as a four and was equal to the opposite ankle).

Neurologic Foot Drop

Neurologic foot drop in contrast to traumatic foot drop involves a specific nerve insult such as an L_5 radiculopathy or a more generalized etiology such as multiple sclerosis. In either case the underlying neurological condition causes foot drop because there is:

1. Decreased neurological stimulation of dorsiflexion muscles
2. Formation of the AACD which physically inhibits dorsiflexion

Decreased muscle stimulation secondary to the underlying neurological condition results in decreased strength of muscle contractions. However this in itself generally only weakens dorsiflexion, rather than inhibiting it altogether. Total loss of dorsiflexion is therefore normally caused by a combination of diminished stimulation *and* the formation of the anterior ankle continuum distortion.

In neurological foot drop, the AACD forms in much the same way as in traumatic foot drop, only it is trauma from the neurological injury that causes the shearing forces rather than an external insult. (See *Post-Stroke Spastic Paralysis* section for more detailed explanation.) Therefore, despite the underlying source (whether it be multiple sclerosis, radiculopathy, cerebral palsy, or stroke) measurable improvement in dorsiflexion (both motion and strength) is expected with elimination of the AACD.

Figure 10-2. This 60 year old woman had 15 years of foot drop secondary to multiple sclerosis, shown here on her second office visit holding dorsiflexion for 30 seconds.

The AACD is corrected with continuum technique as described in the Ankle Sprain Chapter. Once the AACD is eliminated, firm pressure over several easily located areas on the leg will spontaneously stimulate dorsiflexion. This seemingly involuntary generation of dorsiflexion can be made voluntary by instructing the patient to maintain dorsiflexion as long as possible. Within a few sessions dorsiflexion becomes increasingly voluntary, both in command of onset, and in strength.

Referred Pain

Within the FDM, conditions that are commonly neurologically given the label *referred pain* are broken down into two groups based on the anatomical origin of their discomfort:

1. Neurologic Pain – Discomfort corresponds to known innervation patterns such as true sciatica, and true carpal tunnel syndrome (see Chapter 14 and section earlier in this chapter)
2. Fascial Pain – Discomfort follows fascial pain patterns such as in carpal tunnel-like syndrome, and so-called bicipital tendonitis secondary to anterior shoulder triggerband pathway (see Chapters 13 & 14)

Reflex Sympathetic Dystrophy

In the FDM, the bizarre symptoms of reflex sympathetic dystrophy (hyperalgesia, vascular and atrophic skin changes, swelling, and bony demineralization) are primarily the by-product of immensely tangled circular fascia, i.e., severe cylinder distortions. The exquisite pain that these patients experience is due to the neurological interpretation of the garbled sensory input coming from the distorted fascial network. The brain, therefore, does not properly differentiate the tactile signals it is receiving and thus interprets any amount of stimuli (particularly light touch) as being injurious (which is verbally described as extreme pain).

Although in the FDM cylinder distortions are the primary etiology of RSD, other fascial distortions also have a part. When the function of fascial bands, or folding structures (such as interosseous and intermuscular septa) are impaired by injury (i.e., triggerbands and folding distortions are concurrently present), external forces that are normally absorbed by these tissues are instead transmitted directly into the delicate coils of cylinder fascia. Since cylinder coils are adapted only for dispersing pulling and pushing forces, they become easily injured (i.e., tangled) by these unchecked angular forces. This tangling of cylinder fascia physically shortens the coils and thus results in a tourniquet effect on the nerves, bones, and blood vessels it envelops. In addition, the tiny connecting fibers that reach to peripheral structures (such as hair follicles and sweat glands) also become shortened, thus pulling and strangulating them as well.

The overall FDM manipulative approach to treating reflex sympathetic dystrophy is:

1. Correct associated regional non-cylinder distortions
2. Eliminate cylinder distortions

Current steps for correction of RSD with upper back, shoulder, and upper extremity pain include:

1. Triggerband technique of star and upper trapezius triggerbands (vigorously employed to break adhesions and realign fibers of fascial bands)
2. Herniated triggerpoint therapy of SCHTP
3. Triggerband technique of anterior and posterior shoulder pathways
4. Folding manipulation of star folding distortion
5. Slow tectonic pump of shoulder
6. Frogleg and reverse frogleg manipulations of shoulder and elbow
7. Folding manipulations of neck, upper back (including hallelujah maneuver), shoulder, and upper arm intermuscular septa
8. Comb technique (see glossary term) of most symptomatic areas (breaks fascial adhesions and untangles fascial coils) of upper back, shoulder, and arm
9. Folding technique of forearm interosseous membrane and intermuscular septa
10. Double thumb cylinder technique for focal areas of pain and cupping-with-movement for diffuse areas of cylinder pain
11. Indian burn cylinder technique for forearm and fingers

The neurologist should be aware that:

- RSD patients typically experience an extreme amount of discomfort to even light touch, therefore manual FDM treatments are obviously painful
- Initial sessions are exquisitely painful, but subsequent treatments become less and less so
- The number of distortions attacked on any given office visit is generally determined by the pain threshold of each individual patient
- The less intense and thorough each professional encounter is, the less dramatic the overall result will be, and the more treatment sessions will ultimately be needed

FIBROMYALGIA

In the FDM, when there is a conglomeration of thoracic fascial distortions, this is called fibromyalgia. The physical findings always include triggerbands with adhesions (which make the injury chronic), the SCHTP, and paravertebral folding distortions. However, other fascial distortions are common, including continuum distortions and tectonic fixations. In extreme cases, symptoms of cylinder distortions are so prominent that they confuse the medical diagnosis by adding bizarre objective findings and neurologic-like complaints to the clinical presentation (see previous discussion of RSD).

In fibromyalgia there is an initial injury, likely a folding distortion, which goes uncorrected. When excess forces are encountered, the loss of the shock-absorbing ability of the paravertebral folding fascia causes surrounding fascial bands to distort. Because injured bands are functionally shorter, the newly-formed triggerbands pull other attaching fibers so tightly that those bands (including the fascial fibers around the supraclavicular fossa) also become distorted. Making matters worse, the fractured crosslinks are unable to properly re-align because of the uncorrected and twisted fascial fibers, and eventually heal improperly by attaching to inappropriate structures such as fascial coils, thus causing cylinder distortions. Since the shortened fascial bands pull unevenly on their origins and insertions, continuum distortions develop. And finally, this whole complex of anatomical disarray restricts joint movement and allows tectonic fixations to form.

The strategy in treating fibromyalgia is to identify the fascial distortion components and correct them *one by one*. Triggerbands and the accompanying adhesions as well as the SCHTP should be treated in the first several sessions. Then tectonic fixations and folding distortions are corrected. Once there is sufficient progress with the above, continuum distortions are addressed. Finally cylinder distortions, if present, are eliminated. Although fibromyalgia is often considered to be incurable and permanent, to the physician utilizing the FDM, each and every case represents a potentially correctable condition.

Headaches

Headaches are one of the most common complaints seen by neurologists. Once an organic etiology is ruled out, a fascial distortion model interpretation can be considered. Perhaps the best headache candidates to receive FDM techniques are those with a *pulling* or *burning* pain from the upper back or neck. Note again that the words pulling or burning signify that that the underlying etiology is a triggerband. The two most common headache triggerbands, the *star* and the *upper trapezius*, are differentiated from each other by the patient's body language (a sweeping motion with fingers from upper back to mastoid for the star, and a sweeping motion from shoulder to mastoid for the upper trapezius). To treat, triggerband technique is performed along the involved pathway (see Figures 12-1 and 12-2). Be advised that with star headaches, the fascial fibers are often twisted along the pathway in the peri-occipital region, so extra force is needed at the base of the skull to make the correction.

One-sided headaches with head tilted to side of pain are often the result of the supraclavicular herniated triggerpoint (SCHTP). The main symptom of this headache is an ache and tightness along the entire side of the affected neck, face, and head. Treatment consists of herniated triggerpoint therapy in which the SCHTP is first palpated and then reduced with force from physician's thumb. The goal of therapy is to push protruding tissue below the fascial plane. If there is a partial result with treatment, repeat the procedure with more force and finesse.

One particularly miserable headache is commonly referred to by patients as the *behind-the-eye headache*. Their complaint is of a dull but pronounced ache (similar to an ice cream headache of the sinuses) that is located just posterior to the affected orbit. Physical findings often include photophobia and an inability to open the eyelid fully. Treatment consists of three components:

1. Triggerband technique from just anterior to the TMJ along the eyebrow to the lacrimal bone
2. Herniated triggerpoint therapy of lacrimal HTP
3. Gentle ice massage along treated areas

Note that the triggerband subtype for this headache is either a *twist* or *grain of salt*. This means that the affected fascial band is very narrow, so only light force is needed for correction. Also, care must be taken in correcting the lacrimal HTP as it is the smallest and most delicate herniated triggerpoint in the body, so only the very tip of the thumb can be used. Remember that it is a tiny HTP and not a continuum distortion, so use petite pressure to coax the protruding tissue below the lacrimal bone.

Other cephalalgias include:

- *Migraine-like headaches* in which patient pushes his/her fingers into skull sutures – treat with refolding technique of sutures by literally thrusting skull bones together. A successful result is appreciated when a pop or click is heard.
- *Squeezing headaches* in which patient either describes discomfort as squeezing, or squeezes the scalp with his/her hands or fingers – treat with aggressive double thumb cylinder technique (or double thumb CCV) along areas of spasm.
- *Scalp headaches* with pain along a specific line – treat with triggerband technique along affected pathway.

SEIZURES

Medically, seizures have a number of etiologies (tumors, infections, drugs, electrolyte imbalances, trauma, etc.), and in 1870 they were described by Hughlings Jackson as "an occasional, excessive, and disorderly discharge of nerve tissue."[1] Today, over one hundred and thirty years later, the way in which neurologists envision seizures and epilepsy for the most part remains unchanged. However, Jackson's description has certain subtle connotations that have influenced the course of epileptic therapy, and can now be re-evaluated through the fascial distortion model.

Although envisioning epilepsy in the nineteenth century mold (as an excessive discharge of firing brain cells that begins and ends abruptly) is unquestionably useful, it carries the implication that seizures themselves are inherently pathological and should be suppressed. In fascial distortion medicine, the risks of seizures (hypoxia, brain damage, death, etc.) are fully appreciated, but so also is the possibility that seizures can, in some circumstances, be considered physiological and beneficial.

In the FDM, neural banded tissues that connect the two hemispheres of the brain (such as the corpus callosum) are capable of twisting, i.e., forming triggerbands. These distortions conceivably occur from trauma (such as childbirth or a blow to the head), clogging of

[1]Browne, Thomas R., M.D., "Epilepsy in Adolescents and Adults," ed. Rakel, Robert E., M.D., *Conn's Current Therapy 1995*, (Philadelphia: W.B. Saunders Company, 1995), pp. 806-819.

fascial pathways by living, dead, or dying bacteria or viruses, invasion from neighboring tumor, or secondary to electrolyte imbalance (which changes the fluid flow and makes the fibers more brittle so they more easily tear and separate).

The location of the twisted portion of the neural banded structure is clinically relevant. When situated outside the hemispheres it is relatively innocuous. However, when it is pulled into the cerebral cortex it not only disrupts electrical conduction and causes seizures, but potentially physically impairs function of the brain. One potential way of avoiding brain dysfunction is to push the twist out of the cortex by a seizure.

During a seizure, brain cells discharge excess electrical current through neural banded structures which temporarily changes the electrolyte balance and forces fluid through the crimped fibers. In addition, the seizure may physically force the twist out of the cerebral cortex which stops the seizure and also ultimately improves brain function. However, the seizure activity is destined to reoccur (on *occasion* as Jackson said) when the twist is eventually pulled back into the cortex. Thus the convulsion abruptly begins again, and then stops again as the twist is forced out of the cortex.

Current manual treatments are imprecise, crude, ineffective, and include:

1. Typaldos manual therapy manipulation of skull bones (corrects tectonic fixations and folding distortions which conceivably have connections to inter-cerebral connecting fibers)
2. Various forms of inversion therapy (uses assisted gravitational forces to affect the triggerband)

In the framework of the fascial distortion model, it can be inferred that current pharmaceutical approaches of suppressing seizures are not curative, and since the twist is still present in the cortex, rebound convulsions result when drug levels fall below the therapeutic threshold. The mechanism of action of future drugs will therefore likely center on rehydrating and replenishing fluid of depleted banded connecting fibers, thus physiologically allowing the twisted portions to untwist and curing the seizure disorder altogether. Surgical or laser obliteration of the twisted fibers also theoretically offers promise, as does the introduction of focal electrical charges into specific areas (this may draw fluid through the twist and in conjunction with drug therapy be augmentative). In addition, focal electrically-induced controlled seizures could be directed so as to physically dislodge the twist thus allowing it to be more easily coaxed out of the cortex.

Rehabilitation

General Rehabilitation Principles

In fascial distortion medicine the steps of rehabilitation are:
1. Remove fascial distortions/eliminate restrictions
2. If paralyzed, restore movement patterns or create new ones
3. Strengthen weak muscles
4. Evaluate and maximize activities of daily living

Note that with the FDM approach, the bulk of early treatment is performed by the physician (steps one and two), whereas the physical therapist[2] assists with step 3, and the occupational therapist is responsible for step 4.

It should be emphasized that in FDM philosophy it is physical restrictions (i.e., fascial distortions) that cause loss of motion — not weak muscles. Therefore, when a patient is sent for strengthening with an uncorrected injury, the therapy is destined to be not only painful, but non-productive.

Since post-stroke spastic paralysis is a premier condition treated by physiatrists, it is highlighted in the remainder of this chapter as the primary example of FDM rehabilitative strategy.

Post-Stroke Spastic Paralysis

In the fascial distortion model, the spastic paralysis of an extremity that so often follows a stroke is considered to be the cumulative result of:

1. *Uncorrected fascial distortions that anatomically restrict movement* – Multitudes of fascial injuries occur during the initial flaccid paralytic period when muscle tone is diminished secondary to temporary loss of neurological input. Without the physical support of the baseline muscle tone, fascia within and around affected joints and muscles crumple upon themselves. Once neurological input returns, the contorted fascial structures anatomically inhibit muscle contractions (both active and passive), resulting in *stiffness*.

2. *Scrambling of electrical impulses through distorted fascial network* diffuses neuro input to the target muscle (i.e., the muscle that the brain is commanding to move). Once the flaccid period is over, electrical impulses originating in the brain flood into the paralyzed areas, but because of the altered fascia, only a small portion of them are

[2]Physical therapists may also be utilized in step one for those patients requiring inversion therapy for stubborn folding distortions.

properly distributed within the target muscle. The resultant deficient muscle contractions are interpreted by patients as *weakness*.

3. *Spilling electrical impulses from target muscle into adjacent flexors and extensors* – The intermuscular septa and interosseous membranes when contorted are unable to isolate and buffer neighboring muscle groups from electrical impulses passing into the target muscle. This spill-over causes *hypertonicity*, *spasm*, and *tremors*, since at any given time commanding one muscle to contract results in other muscles also contracting.

The spastic or reflex-like movements so typical of post-stroke patients are, within the practice of FDM, considered not to be involuntary and purposeless, but instead voluntary yet spastic. In the FDM, muscle movement of any kind (even spasm, tremor, or hypertonia) is considered to be triggered by signals from the brain commanding that muscle to move. In the post-stroke patient, this tends to occur in an uncoordinated fashion. The triggered movement is therefore voluntary. But since the signal spills over into adjacent muscle groups, the desired contraction sequence cannot be coordinated and is instead accompanied by tremor (alternating spilling of electricity back and forth from flexors to extensors), spasm (simultaneous but intermittent stimulation of both flexors and extensors), or hypertonicity (continuous stimulation of the involved muscle groups).

The primary goal in FDM treatment of post-stroke spastic paralysis is to *change muscle contractions from voluntary/spastic to voluntary/controlled*. This is done in the following manner:

I. *Eliminate fascial distortions*.

II. *Consciously link together isolated spastic motions with seemingly unrelated coordinated motions*. For instance, flexing of the non-paralyzed right knee may initiate extension of the paralyzed left third finger. The patient is encouraged to mentally link these two behaviors together, so that when asked to extend the left third finger this can be done by first flexing the right knee.

III. *Mentally extinguish associated non-spastic motions so that when the brain commands movement only spastic motion remains*. In the above example the patient is taught to concentrate on extending the finger but to mentally inhibit flexing of the knee. In a short time, the finger extends without the knee flexing — thus making this motion both voluntary and coordinated.

IV. *Mentally extinguish other undesirable movements or behaviors*. Commonly in post-stroke patients with hemiplegia, movement of a spastic muscle elicits other seemingly unrelated spastic motions. In the case of the paralyzed left third finger, extension is often accompanied with unwanted flexion of the same-side elbow. The unsolicited elbow flexion is extinguished by first correcting associated regional fascial distortions (particularly cylinder and folding distortions of the elbow and forearm), and then by mentally inhibiting elbow flexion when practicing third finger extension.

It should be noted that some post-stroke spastic paralysis patients (PSSPP's) mentally exhaust themselves attempting to move their spastic limbs. Unfortunately, since excess electrical impulses generated by their brains simply spill over into adjacent muscle groups, the result is amplification of muscle tone, spasm, and tremor. Instead of *trying hard*, these individuals should be encouraged to *think gently*, and reminded that it doesn't take much strength to move a finger!

Philosophy of Treatment

Step I: Correct Fascial Distortions

Fascial distortions that form during a stroke not only scramble and diffuse electrical stimulation, but also physically restrict movement. This straitjacket effect keeps the target muscle from adequately contracting and triggers the positive feedback loop of the nervous system to repeat the command with increased electrical volume. However, the excess electricity is counter-productive since it spills into and stimulates neighboring muscles, thereby creating for the PSSPP a *spastic merry-go-round* — the more he or she tries to move, the more spasm results.

The restrictions of large conglomerations of fascial injuries can be clinically lumped together into general terms such as those listed below:

Frozen shoulder	Frozen hip
Frozen elbow	Frozen knee
Frozen wrist	Frozen ankle

In TMT, the initial approach in treating the PSSPP is essentially the same as has been discussed in other sections of the book: Break the gross restrictions down into their components and treat them with fascial distortion techniques. For instance, in a typical treatment scenario for the frozen shoulder component of the recovering stroke patient, the shoulder is examined and treated as discussed in Chapter 13. Virtually all of these patients have a chronic sore shoulder with global loss of active and passive range of motion (see *FDM Flow Chart of the Chronically Sore Shoulder*). First treat the SCHTP and the most common triggerbands (star, upper trapezius, and anterior and posterior shoulder pathways). Re-treat several days later. If there is still global loss of passive motion, slow tectonic pump and tectonic techniques (brute force maneuvers and frogleg and reverse frogleg manipulations) are employed. It may be helpful to apply wet heat to the shoulder prior to slow tectonic pump. If the motion remains unimproved, repeat the sequence several times in the next two weeks and consider plunger and prone tectonic techniques (see glossary terms).

Once the shoulder has some improved passive range of motion, it now has the possibility of acquiring at least some active motion. However, folding distortions in the interosseous membrane of the forearm and tectonic fixations of the wrist and elbow still restrict movement. These are corrected with modified frogleg and reverse frogleg techniques of the elbow, thrusting manipulation of the flexed wrist (tectonic technique), and traction/thrusting or compression/thrusting manipulation of the forearm interosseous membrane.

As the shoulder, wrist, and forearm become passively looser, attention is then directed to the hand which generally presents as a perpetually clenched fist. Folding distortions of the palmar and dorsal interosseous membranes are particularly responsible for this and are treated with folding/thrusting manipulation of the membranes surrounding the lumbricals.

Frozen hips of PSSPP's are treated with triggerband technique (the lateral thigh and posterior thigh pathways), and then slow tectonic pump followed by frogleg and reverse frogleg manipulations. Folding distortions also are common and may inhibit tectonic technique. If the hip is placed into the frogleg or reverse frogleg position and pain is elicited deep in the joint, this means that a folding distortion of the hip is present. When there are concurrent folding distortions and tectonic fixations of the hip, the folding distortion must be corrected first (this is because tectonic technique causes the fascia to fold into an even more contorted configuration). Be aware that a successful folding treatment of the hip requires a large amount of traction or compression plus physician strength.

Once the folding distortion is corrected (evident by the frogleg or reverse frogleg position no longer being painful), tectonic technique is performed. Please note that the direction and positioning of frogleg and reverse frogleg can be modified to engage either the knee or ankle.

Fascial Distortions and Loss of Sensation

Many PSSPP's complain of patches or large areas of numbness in the paralyzed extremity or trunk. This loss of sensation is thought to occur in part because of fascial distortions blocking mechanical fascial sensory information to the nervous system. Triggerbands and cylinder distortions are the most common distortions involved, and treatment of them may subjectively improve sensation.

Iliotibial Tract Triggerbands and Balance

The correction of triggerbands of the iliotibial band is a major component in improving proprioception and balance. The results of these treatments are typically immediate and can be documented with a stopwatch. To do so, have the patient stand on one foot and measure the time he or she can balance, then repeat the process on the other foot. Following treatment, measure the difference.

Step II: Link Together Spastic Motions with Coordinated Motions

As Step I progresses, spasms decrease and passive range of motion increases. The stroke victim is obviously more comfortable — but still paralyzed. However, even in this semiflaccid state the patient may suddenly spasm. If, for instance, he or she is sitting comfortably and attempts to move an uninjured portion of the body, this may cause the paralyzed arm or leg to move. By isolating the exact movement that triggers the spastic movement we can teach the patient to consciously reproduce the sequence. In this manner, for example, flexing the opposite non-paralyzed hip is followed by flexion of the paralyzed shoulder. In just a few minutes some patients can grasp this concept and learn to control the pattern so that when commanded by the physiatrist to flex the paralyzed shoulder this can be accomplished by first flexing the non-paralyzed hip.

This step regains gross yet voluntary movement. The more links that can be made between the non-paralyzed movements and the paralyzed limb, the more movement the patient will have. In a sense, Step II reprograms the neuro pathway for motion to the paralyzed limb by using a more accessible triggering mechanism somewhere else in the body.

Step III: Stop the Triggering Movement

In Step II we are able to regain new motion through secondary triggering mechanisms. However, it is highly undesirable to have to physically perform one action (flex a hip) to get another (flex the opposite shoulder). So in Step III the patient consciously thinks of the triggering mechanism but at the same time inhibits the actual activation of it. Typically, within only a few sessions the spastic motion can be commanded without having to physically employ the triggering movement. Surprisingly, the activation of the new motion becomes unconsciously ingrained to such an extent that it remains easily accessible even after the triggering mechanism is consciously long forgotten.

Step IV: Stop Other Unnecessary Movements

Although in Step III the triggering movement is extinguished, other unnecessary movements may still exist. For instance, when the command is given to flex the wrist, excess electricity spills out into neighboring muscle groups causing the elbow to flex and the wrist to pronate. These accessory and undesirable movements greatly diminish the usefulness of the motion and are an endless source of frustration for the patient.

Spilling of electricity into adjacent muscle groups occurs because of one or more of the following three mechanisms:

1. Scrambling of neurological input
2. Unconsciously commanding other muscles to contract
3. Amount of electricity sent by brain to target muscles is far in excess of what is required to cause desired movement

Extinguish accessory movements by:

1. Correcting regionally associated fascial distortions
2. Mentally focusing only on desired motion
3. Cutting down amount of electricity to muscle(s) that are being commanded to move

So in a PSSPP who demonstrates involuntary movement of the elbow with wrist flexion, the first plan of treatment is to identify and correct any residual fascial distortions. In particular, look for folding distortions of the forearm interosseous membrane and treat with traction/thrusting or compression/thrusting manipulations. Tectonic fixations of the elbow, if present, are corrected with modified frogleg and reverse frogleg techniques.

And finally it should be realized that in addition to making physical changes it is also necessary to make mental changes. PSSPP's unwittingly flood the entire paralyzed limb with the mental command of movement, which causes every muscle in the entire extremity to contract. To rectify this *spastic flooding*, patients must mentally focus on the desired movement only and refrain from attempting to move other portions of the spastic limb.

The third point listed above — cutting down the neurological input — cannot be stressed enough. PSSPP's typically *try too hard* to move the spastic extremity. To combat this tendency they must learn to *think gently*, meaning practicing over and over again moving the paralyzed limb with far less mental command than they feel will ever elicit a response.

PSSP and Electronic Prosthesis

The application of electronic prostheses may in the future pave the way for controlling and properly distributing the flow of electrical impulses to the post-stroke spastic limb. This principle is based on the observation that patients who have lost a hand (but have not had a stroke) when fitted with such a device often can, within a period of six months, develop the coordination and ability to perform simple tasks such as picking up a cup or holding a bottle. Purposeful and controlled actions of the prosthesis are triggered from tiny movements of the muscles in the forearm which are amplified and electronically transferred to the corresponding artificial thumb and fingers which then mechanically respond.

This same approach could be utilized to diminish the spasm and improve purposeful hand movement in the PSSPP. Steps in doing so might include:

1. Patient wears prosthesis that fits over hand like a glove but does not allow movement of fingers or thumb
2. Movement of prosthetic thumb and fingers is initiated and controlled by learned and practiced tiny muscle contractions in forearm (in same way amputee patients control gripping and releasing)
3. Glove is removed and fingers and thumb are gently commanded with same stimuli as moved glove

Wearing the rigid prosthetic glove physically inhibits the spastic hand from being spastic and forces the patient to learn to flex or extend the digits only through commanding the electrodes on the forearm muscles. This approach coerces the PSSPP to think gently; and providing the electrode placement corresponds with the desired movement of associated fingers and thumb, allows for replication of the necessary commands that elicits purposeful patterns of gripping and releasing.

Chronic Pain

The neurologic concept of *chronic pain* is contingent on time; if an injury has been present for six months or a year, then it is considered to be chronic. This temporal perspective implies that chronic injuries are long-standing (or even permanent), but says nothing about the nature of the anatomical injury, or why such injuries have failed to heal. In the fascial distortion model, chronic pain is viewed from an anatomical perspective. Once fascial adhesions form, the injury is considered to be chronic. Since fascial distortions of any kind can eventually generate triggerbands, and since adhesions form from torn crosslinks of triggerbands, any fascial injury can potentially become chronic. Note that splinting or resting injuries tends to increase fascial adhesion formation because muscular movements which break healing mis-attached fibers are minimized. Therefore, to prevent injuries from becoming chronic, triggerbands need to be corrected before adhesions form. Physical activities such as stretching and exercising are also useful since they keep crosslinks from inappropriately attaching to adjacent structures.

From a clinical perspective, identifying chronic pain patients is not difficult; these people have multiple areas of restricted motion in more than one plane and direction. On palpation the fascial structures are tight and are pulled from above, below, and beside the primary distortion. And unlike acute pain patients who define their discomfort clearly, chronic pain patients generalize, "It hurts everywhere," or "It just hurts." This inability to differentiate the pain into simple categories such as *sharp*, *tight*, *dull*, *ache*, or *pulling* is a fundamental clinical characteristic of chronic pain syndrome and is often mistaken by physicians as a sign of malingering. With the FDM, it is not difficult to understand why those with acute injuries are more precise in their descriptions. They have only one or several anatomical distortions to decipher. But chronic pain patients have multiple distortions and multiple distortion types to differentiate. Compounding the problem is the fact that adhesions have tied all of these distortions together into a confusing hodgepodge of pathological disarray. Just when a pull is felt in one direction, his/her brain receives simultaneous input of an ache, a sharp pain, and a pulling, etc. Although these individuals may attempt to describe where and how they hurt, they often can't.

Treating Chronic Pain with Fascial Distortion Techniques

The rationale in using fascial distortion techniques is simple: first make the injury acute again and then correct the acute injury. Making the injury acute is done by simply breaking adhesions. Once adhesions are broken the injury is no longer considered chronic, and thus is no longer incurable. Fracturing adhesions is done with aggressive triggerband technique. Often maximum force is used as distorted fascial fibers are re-aligned and adhesions are *plowed through*. As adhesions are eliminated, patients with folding distortions or tectonic fixations will say something to the effect that the treated area "feels like it needs to pop." This is the *green light* for using thrusting manipulation. When this occurs, a patient who had been very difficult to manipulate before triggerband technique was applied, now becomes easy to manipulate. The same person who refused manipulation in the past may now be asking that it be done. And a successful thrusting manipulation is an indication that the chronic injury has been made acute, and that the acute injury is being properly treated.

Since the fracturing of adhesions is traumatizing to fascial structures, bruising may occur. In addition, there is typically soreness lasting several days. For this reason, three to four days between the first and second treatments are allowed for the tissues to recuperate. One day less down time is usually needed between the second and third, and one day less than that between the third and fourth treatments. In contrast, acute pain patients can be treated again the very next day.

After several aggressive TMT sessions, treatments become less than half as painful, and surprisingly little or no bruising occurs no matter how much force is used. As the injury anatomically resolves, motion improves, tightness decreases, and pain begins to feel similar to when the injury first happened.

In some chronic pain patients, torn fascial band crosslinks have adhered to the superficial cylindric fascial coils and caused them to tangle. Treatment of *chronic cylinder distortions* includes not only triggerband technique, but the comb technique (see glossary term), which both separates the tangled fibers and fractures the adhesions. In this procedure, a steel grooming comb is raked over the affected area every day or two for two to four sessions. Despite the somewhat menacing appearance of the instrument, its application is typically only uncomfortable for the first one or two treatments.

Chapter 11

INTERNAL MEDICINE

THEORETICAL CARDIOLOGY

Overview of Conventional Myocardial Infarction Philosophy

In the 20th century cardiology model, myocardial infarction (death of heart tissue) is due to loss of blood supply (and thus oxygen) secondary to coronary artery occlusion. Within this perception, MI occurs when the artery itself becomes physically obstructed from plaque, thrombus, or spasm, and cardiac tissue supplied by that blocked portion of the vessel dies from hypoxia (lack of oxygen).

In the case of **plaque**, blood particles (platelets, etc.) aggregate along irregular surfaces of the intima (inside layer of artery) and progressively narrow the lumen. Obstruction of the artery, and its consequence — cardiac muscle death — occurs at the point in time when there is enough plaque accumulated to block blood flow.

In the case of **thrombus**, blood clot (glob of cells or other tissue products) forms on the interior wall of vessel where the endothelial lining has become roughened. This glob of tissue plaque (atheroma) causes diminished blood flow to portions of the heart supplied by the vessel (angina) or completely occludes the vessel causing death of heart muscle (myocardial infarction). In addition, parts of the atheroma can break loose and be flushed through the remaining portions of the involved vessel, which have increasingly smaller and smaller diameters . . . until it becomes wedged within the lumen . . . thus occluding blood flow to that portion of the heart, and resulting in focal areas of myocardial infarction.

In the case of **spasm**, smooth muscle in the wall of the coronary artery suddenly contracts, thus constricting the artery and restricting blood flow. Should the length of spasm time be short (several minutes or less) there will be no death of heart muscle (i.e., no myocardial infarction). However, if the spasm continues for several minutes or more, then MI results.

So within the traditional cardiology model, myocardial infarction, whether from plaque, thrombus, or spasm, conceptually occurs secondary to an obstruction on the **inside** of the artery or from spasm of muscle within the wall of the vessel. Thus modern procedural interventions (such as angioplasty) are designed to eliminate **intra**-arterial pathology, while drugs are meant to decrease plaque (i.e., lower cholesterol) or prevent spasm. The fascial distortion model proposes an additional conceptual perspective — myocardial infarctions occur from spasm or obstruction secondary to fascial pathology on the **outside** of the coronary arteries. Therefore, FDM coronary procedural interventions of the future will be designed and directed toward eliminating **exterior** arterial pathology.

FDM Myocardial Infarction Types

In the FDM, there are three kinds of myocardial infarctions: triggerband, cylinder, and mixed. Although, these three types all have seemingly identical EKG changes (ST segment elevation, with or without q waves present) they can be clinically differentiated from each other by patients' body language and verbal description of discomfort.

	Triggerband MI	Cylinder MI	Mixed MI
Body Language	Sweeping fingers along linear pathway (most commonly down left arm or across chest)	Presses palm(s) on chest	Combination of TB & CyD
Verbal Description of Discomfort	Burning pain down arm(s), across chest, or into neck	Chest heaviness, shortness of breath	Combination of TB & CyD

Differentiating MI's into their clinical fascial distortion types:

- Implies what pathology is present on the external surface of affected coronary artery
- Gives insight into anatomical and physiological consequences of conventional interventions
- Allows for development of treatment protocols specifically designed for individual patients and their underlying anatomy

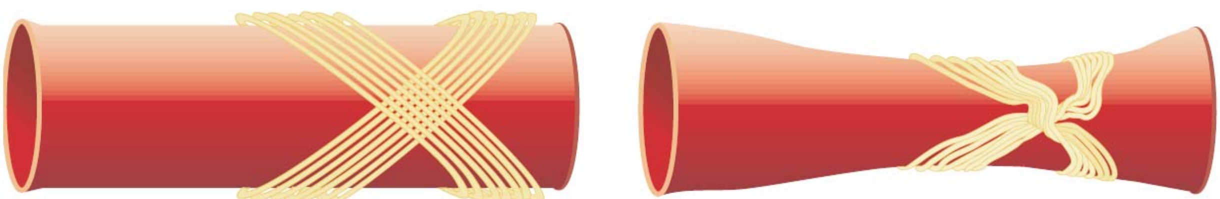
However, for the outlined fascial distortion myocardial infarction types to exist means that there must be at least four anatomical variants of exterior coronary fascial anatomy. Listed below are those proposed:

1. Non-banded/non-coiled (NBNC) — no criss-crossing fascial fibers or circumferential fascial coils present
2. Banded — criss-crossing fascial fibers present
3. Coiled — circumferential fascial coils present
4. Complex — criss-crossing fascial fibers and circumferential fascial coils present

External Coronary Artery Fascial Variant Types

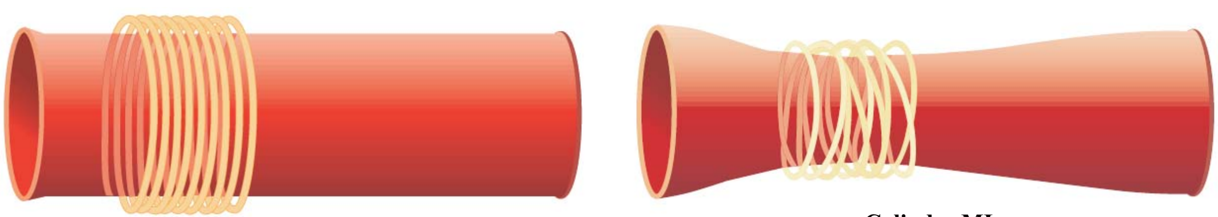
Non-banded/non-coiled: In this anatomical variant there are no external fascial fibers or coils that could potentially impinge the coronary artery. Therefore, the FDM predicts that persons with this exterior fascial structural arrangement will never suffer a myocardial infarction.

Banded: Patients who suffer myocardial infarctions with *radiation* of pain down an arm or up the neck, or across the chest, would be expected to have coronary arteries with this underlying criss-crossing fascial fiber pattern.



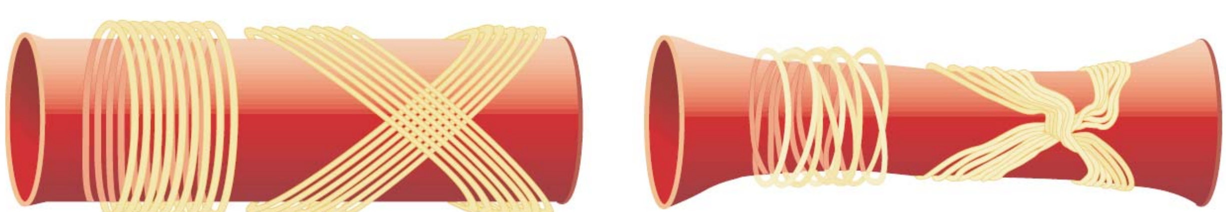
Triggerband MI

Coiled: In individuals that suffer symptoms of chest pressure and /or shortness of breath during an MI, it is thought that the cause is coronary artery cylinder distortions. Thus the external coronary artery fascial anatomy present in these individuals must consist of fascial coils.



Cylinder MI

Complex: Persons having anatomical arrangements of both exterior artery criss-crossing fascial fibers and circumferential coils are considered to be at risk for MI's with the following symptoms - radiating pain, shortness of breath, chest pressure.



Mixed MI

In the FDM, therefore, for a myocardial infarction to occur two factors must be present:

1. External fascial coronary artery anatomy of banded, coiled, or complex
2. Physical or physiological insult that causes triggerband or cylinder distortion of those fascial fibers or coils

Understanding fascial coronary artery pathology may change the way cardiology is practiced. In particular:

- Diagnostic imaging procedures could be developed showing coronary artery fascial anatomy . . . thus we would be able to firmly identify those people at risk. In addition, people not at risk could also be identified (this would reduce unnecessary hospitalization and repetitive cardiac workups).
- Preemptive surgical laser obliterations of potentially deadly anatomical arrangements could be performed to prevent future MI's.
- Specific surgical procedures could be developed which would stop an MI in progress.
- The effects of current medical and surgical therapies would be better assessed as to their therapeutic or pathological effect on coronary fascial fibers and coils.

Formation of External Coronary Artery Fascial Distortions and Future Treatments

Although this topic is completely theoretical, it lends insight into the anatomical effects of current treatments and offers clues into developing future approaches for coronary artery disease and myocardial infarctions.

Cylinder Distortions

Since elsewhere in the body cylinder fascia is the most delicate of all the fascial arrangements, it can be expected that external coronary artery fascial coils would also be easily injured. Therefore, any changes in the diameter of blood vessels — such as from an episode of hyper or hypotension — would likely tangle the delicate coils and thus narrow the lumen of the vessel. If the narrowing occurs suddenly and is extreme, as from a hopelessly tangled fascial coil, then a myocardial infarct results. However, if the coils are only slightly tangled, then the narrowing of the lumen will be minimal.

Although a minimally narrowed lumen may not seem life threatening, because blood flow through it is likely to be normal, the pinching effect of the cylinder distortion roughens the intimal wall. This roughening then becomes a collection site for platelets and other blood products that stick to the irregular surface — thus arteriosclerosis forms. So in the FDM, the future treatment of coronary atherosclerosis will not center on reducing cholesterol (which is considered to be a minor factor) but will instead focus on determining coronary artery fascial distortions and correcting them.

Please note that *stenting* (i.e., placing a structure within the artery to hold the vessel open) is effective from the FDM perspective because it thwarts the pinching effect of the cylinder distortion or triggerband. By the same token, angioplasty is less successful in preventing MI's than stenting because over time the lumen closes again, secondary to the uncorrected overlying fascial distortion. However, since some angioplasty patients have complete recovery with no recurrence, this is thought due to the procedure actually untangling fascial coils on the outside of the artery by increased pressure introduced on the inside of the artery forcing coils apart — much like inflating a balloon increases the exterior surface area.

If extreme fluctuations in blood pressure CAUSE coronary artery cylinder distortions they may also be used to CORRECT them. Perhaps in the future, patients with cylinder coronary artery disease will be subjected to short periods of chemically-induced hypertensive episodes. Or it may be that just the opposite is necessary — short periods of hypotension may be induced. Either effort (or a combination of both) may one day be utilized to untangle stubborn coronary artery cylinder distortions.

The standard cardiology practice of 2002 considers high blood pressure to be *bad* (i.e., castigated as a prime factor in the CAUSE of coronary artery disease and myocardial infarct), but in the future very high blood pressures may be intentionally induced (as well as fluctuations of blood pressure) to CURE coronary artery disease and to stop myocardial infarctions in progress. In addition, this approach could potentially be used as a pre-emptive method to avoid future MI's by correcting mildly tangled coils of coronary arteries before they tangle further.

Triggerbands

Clinically a large number of patients with MI in progress experience radiation of pain. Viewed through the FDM, the etiology of the pain is shortened fascial fibers hooked from the heart to distant structures. In particular the left arm is often symptomatic. The discomfort that person is experiencing can be demonstrably impacted during an acute MI by application of manual pressure on the starting point of the pain pathway (expressed by patient and shown by body language during ischemic event).

Triggerband technique following the pathway of pain may have one of three anatomical/clinical outcomes:

1. No appreciable change in pain or coronary artery blood flow
2. Diminished pain secondary to decrease in shortening of affected fibers (thus less impingement of vessel and increased coronary artery blood flow)
3. Diminished coronary artery blood flow and increased pain secondary to mis-application of triggerband technique (affected fibers are physically separated or twisted even more by the treatment and shortening effect increases impingement of artery)

Therefore, *triggerband technique is not only a potentially curative approach to treating triggerband myocardial infarction, it is also a potentially deadly one*. Thus it is recommended that before any experimental triggerband (or cylinder) coronary techniques are employed, the patient should be on a cardiac monitor and in cath lab so that adverse effects can be dealt with immediately.

In particular, negative and increasing EKG changes (such as exaggerating ST segment elevation or depression) strongly suggest that the direction of triggerband technique is wrong. Therefore, the procedure should be stopped and then applied again following the pathway in the opposite direction. A desirable result occurs when there are immediate positive ST segment changes and a diminishing of pain.

The starting point of the most common triggerband MI pathway is on the left upper arm and is readily shown by body language of patients with acute MI. In addition it is easily appreciated by palpation (patients feel it). However, treatment should only be attempted by a trained cardiologist or other physician who is equipped to deal with a negative aftermath.

It is not clear how coronary artery triggerbands occur. There are several possibilities:

- Injuries to connecting structures (such as previous shoulder dislocation) pull or twist fibers that connect to the heart
- Previous surgeries to connecting structures damage interconnecting fibers
- Specific drugs change the contents of fascial fluid concentrations thus making the fibers more brittle and thus more easily torn or twisted
- Genetic variations in fascial fluid production (both quantity and quality) result in physiologic inabilities of connective tissues to absorb external forces (such as diabetes, rheumatoid arthritis and other connective tissue diseases)
- Bacterial or viral particles clog up parallel fascial fibers so that the pumping action of the heart shears them apart from their unaffected more flexible neighboring sub-bands

Please note that extreme changes in blood pressure may also effect coronary artery fascial bands and the last three points may also be factors in cylinder distortion formation.

Mixed Distortions (Cylinder Distortions and Triggerbands Together)

This type of MI may be the most difficult of all to treat since what is done to correct one of the distortions may have an adverse effect on the other type. Therefore, for those individuals with a complex anatomical arrangement it currently seems most productive to identify them and to:

1. Obliterate those problematic structures by surgery or laser before an MI occurs (either procedure could potentially be done endoscopically), or
2. Place an intra-arterial stent at the areas identified as being high risk (location of external vessel criss-crossing fascial bands or cylinder coils).

Ventricular Fibrillation and Myocardial Infarction

In traditional cardiology philosophy, ventricular fibrillation is considered to be an inherently pathological condition which, left uncorrected, results in death. However, from time to time, a small number of patients spontaneously rebound from V-fib without medical intervention. From the FDM perspective this is suggestive that ventricular fibrillation associated with cylinder, triggerband, or mixed MI's could be, at least in some instances, a positive and thus occasionally life saving physiological therapeutic action.

In the FDM, ventricular fibrillation functions as a last ditch attempt employed by the heart to rid itself of the tourniquet effect imposed on it by external vessel triggerbands or cylinder distortions. Just as a bucking bronco rears and kicks frantically in an irregular pattern to rid itself of its cowboy rider, so may be the case with the dying heart. Theoretically, the therapeutic effect of electrically induced defibrillation also helps dislodge the constricting twisted fascial fibers or tangles. Or it might be that stopping the fibrillation prematurely results in consequent episodes of ventricular fib reoccurring. Perhaps in the future if this erratic rhythm can be selectively induced into specific areas of myocardia affected by coronary artery impingement, it will be clinically valuable as a method of myocardial infarction treatment.

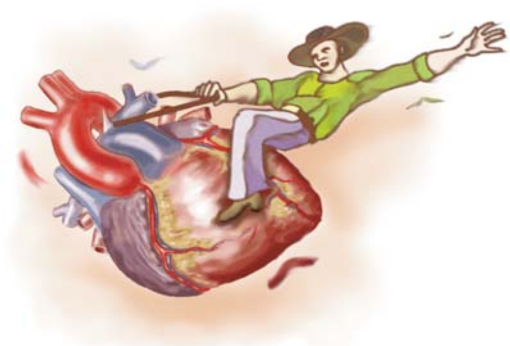


Figure 11-1. Ventricular Fibrillation Bucking Bronco

FDM Interpretation of Asthma

In the current medical model, asthma is considered to be a disease of reversible over-reactivity of airway passages (trachii and bronchi) to various intrinsic or extrinsic stimuli. It is clinically characterized by wheezing, coughing, shortness of breath, increased respiratory rate, and in extreme situations, hypoxia and death. The airway obstruction itself is thought to occur from bronchospasm and inflammation (mucosal edema, mucous secretions, and inflammatory cell infiltration) secondary to the over-reaction of the patient's pulmonary mucosal system.

In the fascial distortion model, all the intrinsic (emotional, exercise induced, etc.) and extrinsic (pollutants, allergic agents, etc.) factors relating to asthma are fully appreciated. However, it is proposed that for many of them to actually initiate wheezing, coughing, etc., an anatomical structure unique to asthmatics must also be present.

In the FDM this anatomical structure (named in advance of its possible discovery) is called the *key bronchus fascial band*. This hypothetical collection of fascial fibers is thought to be an anatomical variant — meaning that some people have this particular arrangement of fascia, whereas most do not. And those that do have it are therefore susceptible to becoming asthmatic.

The key bronchus fascial band (KBFB) is postulated to have a course that pierces through the lung itself in an anterior to posterior direction (perhaps anchored on each end by its attachment to the pleura). Its significance from a clinical perspective would be that three factors are then necessary for asthma to occur:

1. Internal or external irritating stimuli
2. Anatomical presence of KBFB
3. Injury to KBFB

Should an injury to the key bronchus fascial band occur, it then becomes a *key bronchus triggerband*. This now pathological structure would have within its domain (because of its size, location and extensive connections) the pathological ability to cause global tightening of virtually every fascial structure of the affected lung.

Therefore, when the twist of the distortion rests outside the lung there is no airway obstruction. But when the twist gets pulled into the lung this tugs on and shortens all of the fascial fibers connecting to it. In the FDM, when there is wide spread pulmonary fascial tightening of a severe degree this is called the *purse string effect* . . . and it is accompanied by all the signs and symptoms of an acute asthmatic attack.

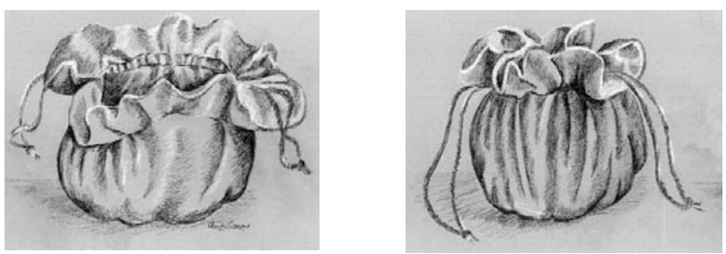


Figure 11-2. Purse String Effect

Current pharmaceutical approaches to treating asthma perhaps influence the ability of the twist to be pulled out of the lung parenchyma and thus end the acute attack. However, at a later time, it is pulled back into the lung again, and an acute asthmatic episode ensues. From a practical point of view, small amounts of coughing (physical force) and increased mucous production (lubricating effect) may aid in forcing the twist out of the lung. However, in severe cases of airway restriction coughing is ineffective and increased mucous decreases airflow.

FDM approaches of the future therefore would likely center on surgical or laser obliteration of the key bronchus triggerband which would theoretically eliminate the underlying anatomical factor and be a clinical cure for a large number of patients stricken with asthma.

Kidney Stone Pain

Renal colic pain is commonly encountered in the Emergency Department. The traditional therapeutic and diagnostic approaches generally include hydration with intravenous fluids, narcotic analgesics, and IVP studies. Although these methods have merit, most patients with renal colic continue to have substantial pain (which is often intolerable) for hours on end.

In the fascial distortion model, renal calculi are viewed as a normal occurrence. Everyone, or at least many people, routinely pass kidney stones. Few, however, suffer from renal colic. What separates asymptomatic people from those who experience discomfort is a fascial distortion constricting the ureter and keeping the stone from passing. Clinically there are two types of fascial distortions which are involved in renal colic: herniated triggerpoints and triggerbands. Both are found in the flank, with herniated triggerpoints being the more common of the two. Patients with renal colic complain of a dull ache in their side and present to the Emergency Department with one of two unmistakable body languages — 1. thumb pushing into flank (HTP renal colic), or 2. sweeping fingers from flank to groin (triggerband renal colic).

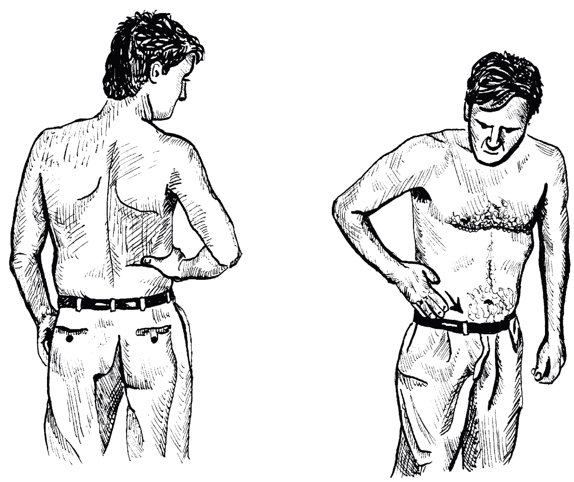


Figure 11-3. Body Language of Flank HTP (left) and Flank Triggerband (right)

Treatment of *flank HTP* consists of herniated triggerpoint therapy (i.e., pushing into the flank with tip of thumb and holding force until resolution). The amount of force necessary for correction is substantial — so much so that the doctor may need to use his/her knee to help push the elbow (and thereby the thumb) into the flank HTP. When resolution of the flank herniated triggerpoint occurs, there is either a dramatic reduction in pain or the pain is completely eliminated. Note that the release itself is perhaps the largest of any herniated triggerpoint in the body and is easily appreciated by both physician and patient.

Figure 11-4. Treatment of Flank HTP

Triggerband renal colic is obviously treated with triggerband technique. These patients complain of pain in the flank that radiates into the abdomen or groin. To treat, the thumb first locates the distortion deep in the flank and then irons it out along its entire pathway through the abdomen to the groin.

Following a successful treatment with either technique, the patient should be observed in the ER or office for an hour or so to be sure that there is no reoccurrence of pain. If there is pain, treatment is repeated. Typically, about half the patients with severe renal colic pain who receive FDM techniques will be pain-free without having needed IV narcotics or even a prescription. Of those who respond, most do so within only 60 seconds after initiating the procedure. In fact, some even feel the stone passing during the therapy.

For those who don't get complete relief, the majority will still report some subjective benefit from the treatment. A reduction in discomfort from a ten on arrival to a four after the procedure is typical (on a scale of 0-10). Small doses of narcotic medicine can then be given to further decrease pain. Surprisingly, most renal colic sufferers who only moments before were adamantly requesting drugs, and who obtained only partial relief of pain with the FDM treatment, will then refuse all analgesic medications.

Clinical Example: 45 Year Old Woman with Post-Pyelonephritis Flank Pain

Ms. L. suffered from a kidney infection in January of 2000 and was treated with several courses of antibiotics. Although the infection resolved, she continued to have right flank pain that was similar in character and intensity to the pain of the pyelonephritis. A full medical workup was initially done and included a CT, IVP, and bone scan; all were essentially normal. Pain medications were not helpful and she stated the osteopathic manipulation she received "made it worse." Her diagnostic workup was therefore expanded to include a second bone scan (also normal), and shortly thereafter she received cortisone injections times five.

However, Ms. L. continued to have discomfort so an MRI of her low back was done. Again, results were unremarkable. In August her pain suddenly intensified secondary to reaching with her hand into the bathtub. Because of this magnification of symptoms, Ms. L. went to the Emergency Room and was treated with morphine and Torodol.

In September 2000 Ms. L. first received herniated triggerpoint therapy and immediately felt significant relief. After several office visits she was having no flank discomfort. At recheck in March 2002 her flank remained pain free.

Discussion: The flank pain Ms. L. experienced was secondary to the flank herniated triggerpoint. This is obvious for two reasons:

1. Body language of pushing thumb into flank
2. Positive response to herniated triggerpoint therapy

The associated body language of pyelonephritis and renal colic is identical — either pushing thumb into flank HTP or making sweeping motion of fingers from flank inferiorly and anteriorly (flank triggerband). In the case of Ms. L. she exhibited the body language for the flank HTP (which is more common). And even though her infection resolved, the protruding tissue of the herniated triggerpoint was not reduced, so she continued to have pain.

Ms. L.'s symptoms were exacerbated when she leaned forward and over the bathtub, because this position physically forced the protruding tissues to protrude even more. Likewise, the positioning of the osteopathic manipulation also caused further protrusion (laying her on her side with the lumbar spine flexed and the thigh hanging). In contrast, HTP renal colic patients exhibit just the opposite motion — they push their thumb into the flank AND extend their lumbar spine. This action and position done together physically reduce the protrusion (to a certain extent) and therefore decrease the amount of discomfort.

GALL BLADDER ATTACKS

Acute biliary pain from a gallstone in the bile duct may respond to fascial distortion techniques. In the FDM, gall bladder attacks have a similar mechanism to that of renal colic (i.e., the bile duct is being partially constricted by a fascial distortion). When the distortion is corrected, the stone passes, alleviating the pain. Clinically, biliary colic presents as several herniated triggerpoints in the region of the gall bladder. They are particularly tender to the touch but otherwise behave much the same as other types of herniated triggerpoints. Gall bladder HTP's are reduced by holding firm pressure with the thumb directly into the distortion until it completely releases. The time it takes before the release begins is variable, depending upon how easily the thumb is able to focus directly into the distortion. Again it may be helpful to milk the HTP during its release (this eases the tissue back below the fascial plane).

Some biliary colic patients present with triggerbands rather than herniated triggerpoints. These patients are treated by first palpating the distortion near the gall bladder and then *pulling the triggerband twist away from the gall bladder and out into the mid-abdomen*. From there it is corrected along its course to the xiphoid process where the pathway terminates. Note that fascial distortion treatments are not designed to be a substitute for medical and/or surgical assessment. Instead they are intended to reduce or eliminate pain, which is of primary concern to the patient.

Abdominal and Pelvic Pain

Fascial distortion techniques in the abdomen consist of herniated triggerpoint therapy and triggerband technique. These two modalities can at times be quite helpful for eliminating or reducing pain from a wide variety of ailments such as painful ovulation and pancreatitis. Caution must be exercised when interpreting the results of abdominal FDM therapies because the success of the treatments may mask the seriousness of an acute surgical condition. So before FDM treatments are initiated, the medical ramifications of the therapy must be contemplated.

In acute abdominal pain, herniated triggerpoints are generally treated before triggerbands (if both are present). For some patients, one HTP will be the sole cause of pain; while in others, three or four may exist. In chronic abdominal pain, dozens of HTP's and triggerbands with adhesions are expected. The treatment of abdominal HTP's includes applying firm pressure deep into the abdomen and palpating the distortion. Be sure that during the procedure the discomfort is maximized and the treating thumb has the proper direction of force. Hold the HTP firmly and milk it as it releases.

Abdominal triggerbands are located in the same fashion as abdominal HTP's, that is with the tip of the thumb. The thumb must *worm* its way through the layers of tissue until the distortion is palpated. Then the triggerband twist is pushed into the direction that increases pain. In this manner, the twist is *dug out* of the abdomen and forced either to the sternum or to the pelvis where the fibers terminate. Note that soreness and bruising from the treatment are common.

Clinical Example: Acute Abdominal Pain in a 62 Year Old Woman

History: This generally healthy woman, who was driving through town on vacation, presented to the Emergency Department with a complaint of several hours of progressing abdominal pain. The evening before there was no indication of illness. But at 0400 she was awakened with mid-back pain and shortly thereafter experienced nausea and epigastric discomfort. Later that morning she took 800 mg of ibuprofen and continued on her travels. However, she was soon forced by the pain to seek help at the nearest emergency department.

Review of Symptoms: Denies fever, shortness of breath, chest pain, or diarrhea. Her last bowel movement was well formed and occurred the morning that her symptoms began. Ms. P. states she exercises regularly and "watches" her diet.

Past Medical History: Tonsillectomy and adenoidectomy as a child. She is a Gravida 4 Para 4 with four vaginal deliveries. Only surgery was dilation and curettage many years before. Denies hypertension, diabetes, cancer, heart disease, or other illnesses.

Social History: She works as a nurse. Negative use of tobacco or illicit drugs. Alcohol intake is two mixed drinks per night with perhaps twice that consumed the past week. Ms. P. lives with her husband.

Physical Exam: Well-developed and well-nourished white female who appeared to be uncomfortable from her abdominal pain (rocking back and forth in bed). Alert and oriented times four. Skin is dry. No rash is visualized. Tongue is moist. No alcohol noticed on breath. Neck is not stiff. No scleral icterus. Heart is regular; lungs clear with unlabored respiration. Abdomen: soft, normal bowel sounds, no rebound or guarding, diffuse tenderness noted with localized points of pain deep in the abdominal cavity. Kidney punch is bilaterally negative.

Plan: Blood drawn and x-rays taken. Herniated triggerpoint therapy of the abdomen was performed with nearly complete elimination of pain. Ms. P. remained comfortable during her Emergency Room stay, so much so that she requested to be allowed to resume her travels. However, laboratory and x-rays demonstrated the following:

UA: Clear, negative glucose, +100 protein, 0-2 WBC's,
specific gravity 1.025
CBC: WBC = 11,400; H/H= 15.4 / 45.4; MCV = 96.4
Glucose = 156 **Elytes** = normal **GOT** = 392
Total bili = 0.7 **GPT** =263 **Alk Phos** = 113 **LDH** = 409
Cholesterol = 196 **Amylase** = 3048
X-rays = No obvious obstruction or abnormal gas pattern

Medical Diagnosis: Gallstone pancreatitis
Cholecystitis, cholelithiasis

Hospital Course: Ms. P. was admitted to the hospital with acute pancreatitis and was discharged eight days later. Ultrasound of the abdomen revealed an abnormal gallbladder with sludge and suspected gallstones. During her hospital stay she again developed abdominal pain and became febrile with a left shift. HIDA scan showed an open cystic duct with delayed emptying of the common duct. ERCP suggested clear common duct. Clinical impression by her physicians was that a gallstone had obstructed the duct and then passed. Several days before discharge a laparoscopic cholecystectomy was performed without complications. Patient was discharged in good condition, afebrile, eating well, and fully ambulatory.

Discussion: The high level of amylase (3048 with normal being 15-125) was strongly suggestive of pancreatitis. In the Emergency Room, herniated triggerpoint therapy was initiated as an adjunct medical treatment to relieve pain. However, it is possible that the treatment itself may have alleviated the obstruction by dislodging a stone (amylase the following day was 984 and three days later it dropped to 57).

Rib Injuries and Chest Wall Strain

Most sore ribs from a traumatic event can be classified into four categories:

- Strain
- Fracture
- Slipping rib syndrome
- Flail chest

Rib strains are generally comprised of continuum distortions or triggerbands which can be differentiated from each other by the characteristic body languages (continuum = pointing to spot(s) of tenderness or pain, triggerband = sweeping motion of fingers along painful rib). Note that the star folding rib strain is discussed in the Neck & Back Chapter.

Rib fractures typically present almost identically to that of rib strains, but are distinguished from them by a positive x-ray. However, since the FDM treatment is identical for fractures as it is for strains, radiological confirmation does not change the therapeutic course and is therefore considered to be optional (providing there is no suspicion of pneumothorax or other emergent condition).

Treatment of continuum rib strain/fracture:

- Patient seated as thorax is guided into position of maximum discomfort
- Firm pressure is applied with thumb into most intense spot(s) of pain and held until release

Treatment of triggerband rib strain/fracture:

- Patient seated as thorax is guided into position of maximum discomfort
- Starting point is appreciated as most tender portion of pain that pulls along rib
- Thumb is pushed into starting point and forces triggerband twist to move
- Twisted fascial fibers are *ironed out* along entire pathway (generally 3-6")

As you can imagine, both continuum and triggerband techniques for sore ribs are painful. However, it must be remembered how much pain these patients are already experiencing. Some complain of *biting* pain with each breath, and others live in fear of coughing or sneezing. For these people the traditional approach of medicating and waiting weeks for the discomfort to slowly dissipate on its own, is an unacceptable option.

Slipping rib syndrome is a condition in which the lower anterior ribs overlap. Symptoms include a gripping but intermittent pain that is so severe that some patients are forced to sleep in a reclining chair. Treatment: place the patient supine, first refold and then forcefully unfold the intercostal membrane of the overlapping ribs.

Flail chest is a medical emergency in which there is an unstable chest wall due to multiple rib fractures. It is often associated with dyspnea, accelerated respiratory rate, hypoxia, and biting pain with inspiration. Although medical interventions generally involve oxygen, sedation, analgesics, and intubation, some of these responses can be avoided if the level of pain can be functionally reduced. Fortunately, correcting peristernal continuum distortions and triggerbands often substantially lessens the sharp discomfort of inspiration. The reduction in pain allows the patient to take deeper and slower breaths, which decrease the respiratory rate, increase PO_2, and diminish the need for intubation.

In contrast to flail chest is simple chest wall strain, which results from a single activity such as swinging a baseball bat. These injuries are again broken down into their fascial distortion components (triggerbands and continuums are most common) and treated with the appropriate fascial distortion technique.

Rheumatoid Knots

In the FDM, rheumatoid arthritis is considered to be a clinical syndrome composed of global fascial distortions secondary to some form of not yet identified fascial fluid metabolic deficiency. Therefore, those afflicted with RA present with massive numbers of distorted fascial bands, ligaments, and tendons. The constant pull of triggerbands eventually shifts the transition zone in the affected ligaments into the bony configuration. Over time this alters the original shape of the bones and gives the classic rheumatoid presentation to the joints (particularly ulnar deviation of hand and wrist).

Although treatment of hand triggerbands and continuum distortions is often successful in reducing pain, it is still not clear if there is a corresponding reduction or slowing of the pathological process of the disease. However, one area in particular in which FDM treatments offer substantial benefit is in the treatment of *rheumatoid knots*. These very tender clumps of soft tissue most commonly present on the upper arms, are painful, restrict motion, and often keep patients awake at night. They respond well to vigorous triggerband technique (particularly of the anterior shoulder pathway). Substantial bruising is expected from the first several treatments.

Non-otitis Ear Pain

Since ear pain is one of the most common medical complaints, one important, often overlooked type (non-otitis) is discussed here. The history often includes unsuccessful treatments for various lengths of time with antibiotics and decongestants. On exam the auricle, external auditory canal, and tympanic membrane look normal and the TMJ is not tender. The pain is easily reproduced with palpation and magnified by applying pressure to the area posterior to the angle of the jaw near the mastoid. In this small fossa sits the rim of the atlas where continuum distortions are common. Treatment with continuum technique is done by applying firm pressure with tip of thumb into fossa (patient's head should be slightly side-bent with mouth partly open and jaw relaxed). Firm pressure is increased until release (care should be taken in treating elderly or osteoporotic patients). Even in those patients who have had ear pain for some time, one treatment is usually sufficient to correct the problem.

Another fairly common ear complaint is that the ear *needs to pop*. This statement indicates that tectonic fixations of the middle ear bones are present. Correction is made with a thrusting manipulation of the auricle (grasp it and give a quick yank). When done properly, three pops are heard.

TEMPOROMANDIBULAR JOINT PAIN

The most common TMJ distortions are triggerbands, continuum distortions, and folding distortions. Triggerband subtypes found along the TMJ are either twists or grains of salt (meaning they are very tiny) and give the sensation of pulling on the mandible or temporal area. The pathway is determined by knowing from where the pain pulls (most patients have a clear concept of this), and then palpating the distortion. Many of these tiny triggerbands originate on the jaw or temporalis muscle and the patient can point to where the pain begins. The distortion can then be engaged with the tip of the treating thumb. Once found, it is ironed out along its entire pathway by force from the physician's thumb. If the twist is felt in the temporal area, treat by pushing it down and across the TMJ to the base of the mastoid. If instead it is palpated on the jaw, the pathway will course from the mandible up and across the TMJ. From there it continues upward and posteriorly so that it traverses above and around the ear to the mastoid.

Continuum distortions of the TMJ are tiny and require a good deal of specific force to correct. In many cases, a continuum distortion is being held in place by a nearby triggerband. If so, treat the triggerband first. TMJ continuum distortions are treated by first palpating the exact point of most intense discomfort and then holding firm pressure until release. Often continuum distortions of the TMJ occur deep within the joint, so precise direction and force are necessary for a successful treatment.

Although folding TMJ complaints include aching deep in the joint, unfolding and refolding distortions should be distinguished so the corrective technique can be specifically selected. Patients with unfolding injuries feel as if their jaw doesn't close all the way (treatment is traction/thrusting), whereas patients with refolding injuries feel as if the jaw doesn't open fully (treatment is compression/thrusting). In either case the patient is positioned supine with the doctor at the head-end of the table. The physician's fingers are interlaced around the chin and the palms of the hands cradle the ears. With the mouth slightly open, either an unfolding or refolding thrusting manipulation is directed along the line of the mandible. If the treatment is successful a small pop should be heard or felt.

Section Three

FDM Treatment of Musculoskeletal Injuries

Chapter 12

FDM Treatment of Neck and Back Pain

Cervical Strains

The most common neck complaints with their associated fascial distortions include:

Complaint		Distortion
Pulling pain from mid-upper back to neck	—	Star triggerband
Pulling pain from shoulder to neck	—	Upper trapezius triggerband
Deep ache in supraclavicular fossa	—	SCHTP
Spot(s) of pain	—	Continuum distortion
Ache deep in spine	—	Folding distortion
Spasm or generalized discomfort	—	Cylinder distortion
Stiffness and tightness of joints	—	Facet tectonic fixation

Triggerband Cervical Strains

"Pulling" or "burning" pain in the neck is a strong indication that a triggerband is present. The two most frequently encountered neck triggerbands are the *star* and the *upper trapezius* (also known as the *shoulder to mastoid*) triggerbands.

The star triggerband is the most common triggerband found in the human body and particularly in women, is frequently a culprit in neck aches, upper back pain, and sore shoulders. Its symptoms of pain deep under the occiput with a burning or pulling pain from the upper back to the neck is directly attributable to its pathway. It begins halfway between the medial border of the scapula and the thoracic spine at the T_6 level and ends at the ipsilateral mastoid.

Triggerband technique of the star can be performed with the patient either sitting or prone. The treatment itself consists of using the physician's thumb to iron out the wrinkled fascial fibers along the entire triggerband pathway from the starting point to the mastoid. The vector of force from the thumb is initially deep into the tissue, but once the triggerband is coaxed to *move* the force becomes both anterior and superior. Note that *movement* of the triggerband means that the twist of the separated fibers is changing locations along the pathway as the fibers are physically re-approximated (re-zipping the Ziploc® bag).

As the treatment continues, the distorted fascial band is palpably followed along its pathway upward to the base of the neck to the ipsilateral mastoid. If you are uncertain if you are on the pathway, ask the patient, "Am I still on it?" Most people will give a clear and unambiguous answer that will help guide the treatment. At the base of the occiput, the fascial fibers dive deep below the edge of the skull. To follow the triggerband through this area, be sure that your thumb applies strong and deep pressure.

Figure 12-1. Treatment of Star Triggerband

The burning or pulling sensation that so many patients complain of from the tip of the shoulder to the mastoid (on the same side) is caused by the upper trapezius triggerband. It is treated with triggerband technique along its entire pathway with particularly strong force applied along the margin of the superior lateral neck.

Figure 12-2. Treatment of Upper Trapezius (Shoulder to Mastoid) Triggerband

SCHTP Cervical Strains

Neck aches in which the head is tilted to the side of pain are often the result of the supraclavicular herniated triggerpoint (SCHTP). Note that the SCHTP has two main presentations:

1. In an SCHTP *sore shoulder* there is typically an associated loss of shoulder internal rotation or abduction
2. In an SCHTP *neck ache* the clinical finding is altered cervical rotation

The treatment of the SCHTP is discussed in Chapter 4. Note that the goal of the technique is to have the treating thumb apply sufficient pressure directly into the supraclavicular fossa to push the protruding tissue below the fascial plane.

Continuum Cervical Strains

Continuum distortions in the neck generally hurt at the origin and insertion of the cervical ligaments. The most common cause of continuum cervical strain is an auto accident in which there is a jolt to the neck and the ligaments connecting the transverse processes become injured. Some accidents result in continuum distortions at each vertebral level, which upon palpation seem to line up like a *stack of coins*.

Continuum technique in the neck is best done in the seated position. The doctor stands to the side and palpates the cervical spine with one hand and uses the other hand for the forehead to rest on. The palpating hand cradles the neck so that the thumb is on one side and the fingers on the other. The cervical vertebrae are rocked back and forth between the physician's thumb and middle finger until the continuum distortion is isolated. Then the thumb-tip is focused into the distortion and substantial pressure is held until the release occurs (transition zone shifts).

Figure 12-3. Treatment of Two Cervical Continuum Distortions

In a whiplash injury, inverted distortions are more common than everted distortions, but either are possible. As discussed in Chapter 5, treated inverted distortions may seem to spontaneously regenerate hours later when the transition zone shifts again and the symptoms redevelop. This reoccurrence can often be prevented by delivering thrusting manipulation directly into the treated inverted continuum distortion. However, please note that everted distortions are made worse by thrusting, so if you are unable to distinguish between the two, initially treat only with continuum technique. If the next day there is still pain, treat again with continuum technique followed by thrusting manipulation. If instead the neck feels tight or the joints feel stiff (these symptoms signify a concurrent facet tectonic fixation), treat only with neutral thrust.

Folding Cervical Strains

Accidents that cause the cervical spine fascia to unfold and torque result in unfolding distortions. The mechanism of injury is often a motor vehicle accident in which the head is thrown forward when the car is struck from behind. The shoulder harness holds the thorax with the trunk slightly flexed as the neck is propelled in the direction of the windshield. The fascia unfolds (and rotates because the force is practically never perfectly centered, nor is the head) and then snaps back into the refolded position contorted.

Refolding distortions occur in a similar manner. The difference is that the neck is restricted from unfolding so the cervical spine is compressed instead of elongated. This injury occurs frequently in car accidents in which the shoulder harness is either loose or absent and the head strikes the windshield. The main symptom of cervical folding injuries is aching deep in the spine. Treatment of unfolding injuries involves traction of the neck, whereas refolding injuries are corrected with compression. In either case, folding techniques are accompanied with thrusting manipulation (see Figure 6-3).

Cylinder Cervical Strains

Neck spasms are a sure sign of cylinder distortions and are best treated with double thumb cylinder technique directly over the symptomatic area. Treatment sequence of each layer consists of three steps:

1. Thumbs are placed side-by-side and 1/2 to 1 inch apart
2. Traction is maintained on the skin to pull the cylinder coils apart
3. Release is felt (coils untangle)

Treat the deep layer first by positioning the thumbs medial and lateral to the spasm. Traction and hold until the release, then treat the superficial layer. This is done in the same manner except that the thumbs are positioned above and below the spasm. Remember that the release of a cylinder distortion is small and the palpatory sensation subtle. If the results are less than anticipated, change the treatment to double thumb compression cylinder variant.

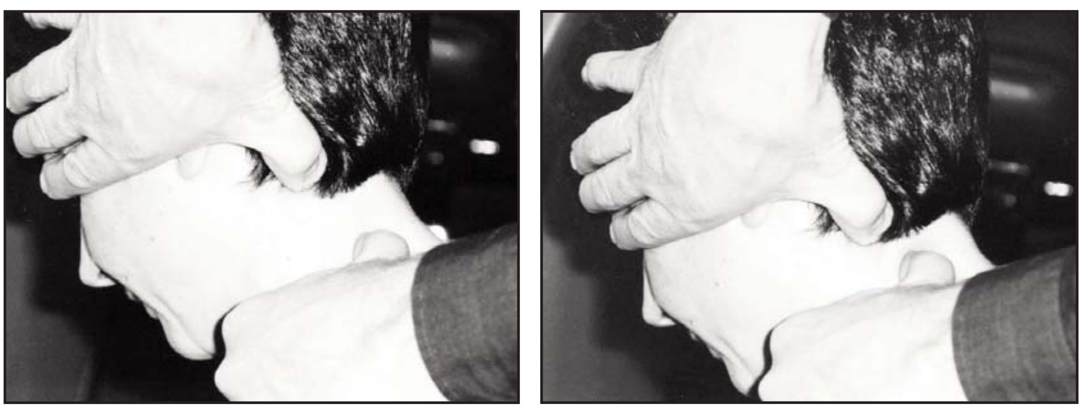


Figure 12-4. Double Thumb Compression Cylinder Variant of Superficial Layer of Cervical Cylinder Fascia

If the description of the discomfort is vague, diffuse, difficult to locate, bizarre, or jumps from one area to another, this also indicates that a cylinder distortion is involved. Treatment for these cylinder symptoms is squeegee technique. Use the palm of your hand and plenty of force to slide along the symptomatic areas.

Tectonic Cervical Strains

Tectonic fixations of the facet joints can be either chronic (i.e., secondary to triggerbands with adhesions) or acute. If the injury is chronic, use triggerband technique to fracture the adhesions and forcibly re-approximate the separated portions of the fascial fibers. Then deliver a neutral (no traction or compression) thrusting manipulation directly into the fixated facet joint. If the tectonic fixation is acute (i.e., there are no triggerbands with adhesions) then a neutral thrust manipulation is all that is necessary. Be aware that acute facet tectonic fixations occur during whiplash injuries if the surrounding joint fluid is forced aside by the facet joints being rammed together.

THORACIC STRAINS

The most common upper back complaints and associated fascial distortions include:

Complaint	Distortion
Pulling pain from mid-upper back to neck	— Star triggerband
Pulling pain from shoulder to neck	— Upper trapezius triggerband
Pulling pain medial to lateral across upper back	— Posterior shoulder triggerband pathway
Deep ache in supraclavicular fossa	— SCHTP
Spot(s) of pain	— Continuum distortion
Aching deep in spine	— Folding distortion
Aching in mid-upper back just medial to scapula	— Star folding
Tightness between first and second ribs	— First rib refolding distortion
Spasm or generalized discomfort	— Cylinder distortion
Stiffness or tightness of joints	— Facet tectonic fixation

Triggerband Thoracic Strains

There are three triggerbands found commonly in thoracic strain:

1. Star
2. Upper trapezius (shoulder to mastoid)
3. Posterior shoulder pathway

The star and upper trapezius triggerbands are discussed under the section on cervical strain. Note that some patients with the upper trapezius or star triggerband will have neck pain while others will have upper back pain. This is because a distorted fascial band can cause symptoms anywhere along its pathway. Regardless of where the symptoms are, the treatment is the same — correct the triggerband along its entire pathway.

The posterior shoulder pathway also can be a cause of thoracic strain. These patients commonly complain of a burning pain across their upper back. The associated body language is a sweeping motion with the hand from the posterior shoulder to the base of the contralateral neck or mastoid. (If the complaint is of a sore shoulder instead of upper back pain, then the body language is a sweeping motion along the posterior shoulder or back of upper arm.)

The posterior shoulder pathway is corrected by triggerband technique from the starting point (proximal/posterior forearm) superiorly up the lateral arm, over the shoulder, across the back, and to the contralateral mastoid. Anatomically, there is individual variance in the thoracic course of this triggerband, so as the fibers traverse the spine they may do so at any level between T_1 and T_4.

Figure 12-5. Treatment of Posterior Shoulder Triggerband Pathway

SCHTP Thoracic Strains

The SCHTP can be the culprit in thoracic pain as well as cervical strains and sore shoulders. It is discussed in most detail in Chapter 4. However, if there are concurrent distortions in cervical, thoracic, or shoulder strains, the SCHTP is treated first.

Continuum Thoracic Strains

Continuum distortions hurt in spots on the transverse processes, the spinous processes, or the ribs. Treatment is with continuum technique, i.e., guiding the vertebra or rib into the position in which the distortion can be most directly palpated, placing the thumb-tip on the distortion, and applying firm pressure until the release (transition zone shifts). Since most of the distortions are inverted, thrusting manipulation can be used as an adjunct modality.

Folding Thoracic Strains

In the upper back there are three common folding distortions:

1. Paravertebral
2. Star
3. First rib

Thoracic paravertebral folding distortions occur as a result of accidents similar to those which produce cervical paravertebral folding distortions — that is, from the spine being thrust forward causing the fascia to unfold, torque and refold in a contorted way (unfolding); or the fascia is compressed in a contorted way and can't unfold completely (refolding). Uncorrected folding distortions of the thoracic and lumbar spine are the number one cause of so-called chronic back pain.

FDM treatments include (see Chapter 6):

- Upper thoracic unfolding – hallelujah maneuver
- Upper thoracic refolding – chair technique
- Lower thoracic unfolding – wall technique
- Lower thoracic refolding – chair technique

The star folding distortion is located at the star triggerband starting point (intercostal membrane lateral to T_6) and should be treated (if present) after the star triggerband is corrected. Since it is an unfolding injury, the manipulative treatment is traction/thrusting. With the patient prone, one treating hand is placed above the superior rib and the other below the inferior rib. Traction is maintained for several seconds followed by a horizontal thrust with each hand to unfold the intercostal membrane. If done properly, a pop will be heard as the intercostal membrane unfolds.

Figure 12-6. Star Unfolding (left) and First-Rib Refolding (right) Manipulations

In the FDM, the first-rib lesion is generally a refolding distortion which causes tightness along the margin of the upper ribs. There are several corrective thrusting modalities to choose from, but ideally each should force the superior rib to push the intercostal membrane against the second rib so that it can snap apart as it unfolds. Perhaps the most effective first-rib refolding manipulation is performed with the patient prone and one arm at the side of the body, and the other arm (side of the rib to be treated) abducted (swimmer's position). Compression is applied to the first rib with the palmar aspect of the physician's hand (left hand if treating the left first rib) as right palm cradles the ear. A scissors-like traction is maintained between the rib and neck followed by a thrust into the rib. When the procedure is successful, a pop (or several pops) will be heard and felt.

Cylinder Thoracic Strains

Just as with cylinder cervical strains, spasm in the thoracic area signifies a cylinder distortion is present. Small areas of spasm can be treated with double thumb cylinder technique. Large or diffuse areas may respond to the squeegee approach, however, the preferred treatment is cupping-with-movement. In either case, it is almost always necessary to treat both the left and right sides of the upper back.

Tectonic Thoracic Strains

Two basic facet tectonic fixations occur and identify themselves by direction (horizontal and vertical) based on how they respond to treatment. Horizontal tectonics are treated with the patient positioned either supine or prone (see Figure 8-6):

Supine – Kirksville crunch (known as *dog technique* in some parts of Europe)
Prone – Double pisiform thrust

Vertical tectonics are treated with neutral thrust chair technique.

Low Back Pain

Acute lumbar sprain patients commonly present with one of eight clinical patterns (see *Body Language and Treatments for Low Back Pain*). From their complaints and body language each injury can be differentiated into its fascial distortion types and treated with the corresponding fascial distortion techniques.

Triggerbands

If there is a pulling pain down the thigh, a triggerband is strongly suspected and triggerband technique should be initiated along the course of discomfort. The most common pathway responsible for these symptoms is the *posterior thigh triggerband*. It begins 2-3 inches above the knee on back of thigh and courses up over the mid-buttock, past the iliac crest, and onto the low back. It then veers medially between the transverse processes of L_1 and L_5 where it loops downward past the sacral base and finally ends at the sacrococcygeal junction.

An almost equally common pathway is the *lateral thigh triggerband*. Its starting point is on the lateral thigh one to two inches above the knee. From there it journeys superiorly along the iliotibial tract to the sacroiliac joint. At the SI joint the pathway snakes medially and slightly inferiorly until its fibers reach the sacrum where the pathway terminates.

Herniated Triggerpoints of Buttocks

The *bull's-eye herniated triggerpoint* (see glossary term) is also a cause of what many people call "low back pain." However, when asked to show where they feel the pain, almost all will take a thumb or knuckle and push it into the mid-section of the affected lateral buttock. The bull's-eye HTP is treated with herniated triggerpoint therapy, i.e., the protruding tissue is driven below the fascial plane by force from the physician's thumb .

However, some patients have the added misfortune of a concurrent everted continuum distortion present just under the HTP. If that is the case, treat the HTP first and then use continuum technique on the continuum distortion. It should be noted that the gluteal continuum distortion is deep below the muscles and against the bone so an extraordinary amount of force is required for correction.

Low Back Pain Table

Symptom	Body Language	Distortion	Treatment
Pulling pain down back of thigh	Sweeping fingers up and down posterior thigh	Triggerband	Triggerband technique of posterior thigh triggerband
Pulling pain down lateral thigh	Sweeping fingers up and down iliotibial band	Triggerband	Triggerband technique of lateral thigh triggerband
Ache in buttock	Pushing thumb forcefully into gluteal muscle	Herniated Triggerpoint	Herniated triggerpoint therapy of gluteal bull's-eye
Pain in one spot over SI joint	Pointing with one finger to PSIS	Inverted Continuum Distortion	Continuum technique followed by thrusting manipulation (scissors technique)
Ache deep in spine	Placing back of hand against lumbar vertebrae or pushing fist onto lumbar vertebrae	Folding Distortion	Chair technique with compression or traction
Squeezing pain or spasm across low back	Squeezing low back muscles with hands or fingers	Cylinder Distortion	Double thumb cylinder technique or cupping-with-movement
Pain at base of spine	Placing hands over iliac crest	Tectonic Fixation	Frogleg and reverse frogleg tectonic techniques
Back feels tight/ Needs to pop	Twisting or jerking of torso	Tectonic Fixation	Neutral thrust chair technique

Sacroiliac Joint Continuum Distortions

Another common presentation of "low back pain" is when the patient complains of discomfort in one or several spots over the sacroiliac joint. Since these symptoms signify the presence of inverted continuum distortions, the most successful treatment is continuum technique followed by thrusting manipulation. However, either of these approaches may be quite successful on its own.

Continuum technique is performed with the patient standing, bent at the waist and leaning forward over a counter. The physician pushes his/her thumb-tip directly into the most palpably tender tissue in proximity to the posterior superior iliac spine (PSIS) and holds that force until the distortion releases (i.e., the transition zone shifts).

Thrusting manipulation of the sacroiliac joint can be performed in several different fashions depending on the preference of the treating physician. One particularly effective method has the nickname of *scissors technique*. For the scissors, patient is placed on the table in the lateral recumbent position with the head resting on a pillow. When treating left SI joint, patient lies on his/her right side with bottom leg and hip extended and top hip flexed with knee extended so that foot drops off table. The patient's head should be rotated to face the ceiling before thrusting is directed into SI joint.

The physician is positioned standing beside table behind patient and if right SI joint is to be manipulated, left hand of physician clasps left hand of patient (just like shaking hands). Next, the doctor's right hand is placed over the sacroiliac joint so that palm is against the PSIS.

Correction is made with a firm thrusting force delivered through the palm of the treating hand into the sacroiliac joint. During the thrust, the non-thrusting hand simultaneously pulls the patient's hand toward the physician. These two concurrent motions, of *pushing* the SI joint and *pulling* the patient's hand, create a scissors-like action. When the treatment is successful a large pop is heard.

Folding Distortions of the Lumbar Spine

Patients who complain of a deep ache in the low back and shove the back of their hand or fist onto the lumbar vertebrae are signaling that there is a folding lumbar strain. Treatment consists of sitting folding technique in which the patient straddles a chair. For unfolding injuries traction/thrusting manipulation is performed (see Figure 6-5). Refolding lumbar strains are less common, and are also treated with chair technique. The difference is that compression is utilized rather than traction. Note that for correction of stubborn folding injuries, inversion therapy is required (see Chapter 9 – *Role of Physical Therapy in Fascial Distortion Medicine* and Figures 6-6 and 6-7).

Cylinder Lumbar Strains

Cylinder distortions in the lumbar area present as spasm across the low back and tend to be bilateral. Body language suggestive of a cylinder injury is squeezing of the paravertebral muscles with the fingers of both hands. Double thumb approach is typically the first technique employed (squeegee is another option). First the deeper layer is corrected by having one thumb traction medially and the other laterally. Then the more superficial layer is treated by traction from the thumbs so that one is pulling superiorly and the other inferiorly. Generally, both the left and right sides are treated with cylinder technique. Treat the most painful side first, and then treat the opposite side. Start with the fascia lateral to L_1, then treat lateral to L_3, and finally lateral to L_5.

In those patients with spasm that doesn't respond to double thumb traction, use the double thumb compression cylinder variant. This treatment is performed in a similar manner except that the two thumbs force the cylinder coils together rather than pull them apart, compression is held until there is release (small but perceptible lessening in tissue tautness). However, the most successful technique of all for treating lumbar cylinder distortions is cupping-with-movement. Four to six cups are suctioned onto the para-lumbar skin and the patient is instructed to side-bend, rotate and twist lumbar spine. This is done continuously for 5-10 minutes.

Tectonic Fixations of Hip

Long-standing "low back pain" which presents as a deep ache at the base of the spine is commonly caused by a tectonic fixation of the hip. The body language of wrapping the hands around the iliac crest with the thumbs touching the sacroiliac joint is typical. Treatment consists of first correcting any other distortions (particularly triggerbands) and then performing frogleg and reverse frogleg manipulations (see Figure 8-5).

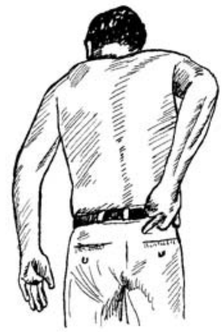
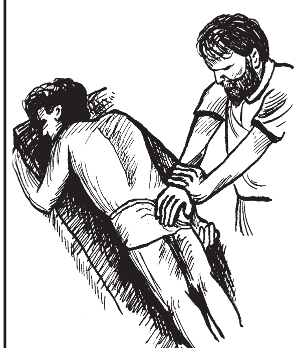
Facet Tectonic Fixations

When they describe their discomfort, patients with facet tectonic fixations complain that their low back is stiff and needs to pop. The associated body language is twisting, or jerking the torso (as if they are attempting to make their back *crack*) . Treatment is with neutral thrust chair technique (or lumbar roll). Note that this is the number one fascial distortion successfully treated by chiropractors.

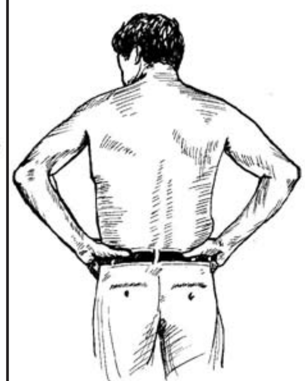
Chronic Low Back Pain

As is the case with other types of chronic pain, treatment of non-organic chronic low back pain (LBP) begins by first breaking fascial adhesions (to make injury acute) and then correcting the acute injury. Therefore, on every chronic LBP patient, the first one or two treatment sessions should include triggerband technique. Once the fascial adhesions have been either greatly reduced or eliminated, the patient is re-evaluated and the back injury

Body Language and Treatments

	Triggerband	Triggerband	Herniated Triggerpoint	Continuum Distortion
Body Language	 Sweeping fingers up and down posterior thigh	 Sweeping fingers up and down lateral thigh	 Pushing thumb or fist forcefully into gluteal muscle	 Pointing with one finger to SI joint
Treatments	 Triggerband technique of posterior thigh triggerband	 Triggerband technique of lateral thigh triggerband	 Herniated triggerpoint therapy of gluteal bull's-eye	 Continuum technique  Scissors technique

For Low Back Pain

Folding Distortion	Cylinder Distortion	Tectonic Fixation	Facet Tectonic
 Pushing fist or back of hand onto lumbar vertebrae	 Squeezing low back muscles	 Placing hands over iliac crest	 Twisting or jerking torso
 Chair technique (traction or compression thrust)	 Double thumb cylinder technique   Cupping-with-movement	 Frogleg tectonic technique  Reverse frogleg tectonic technique	 Chair technique (neutral thrust)

is broken down into its fascial distortion components and treated with the appropriate FDM techniques. Note once again that many cases of so-called chronic low back pain (and chronic upper back pain) are anatomically the result of long-standing uncorrected folding distortions, which can be corrected with chair technique (traction or compression), wall technique, hallelujah maneuver, and inversion therapy.

Chapter 13

FDM Treatment of the Sore Shoulder

Although wading through the myriad of sore shoulder complaints may seem perplexing, each particular injury can be broken down into its fascial distortion components and treated with fascial distortion techniques. For this reason, it is anticipated that virtually every sore shoulder, from acutely sprained to chronically frozen, will make good progress when treated with Typaldos manual therapy.

In contrast to the orthopedic approach which focuses on entrapment, swelling, and tears (i.e., impingement, inflammation, and rotator cuff injuries), the FDM approach views the injured shoulder as being the result of one or more fascial distortions which can be manually corrected. This difference in perspective can be illustrated by looking at a specific example, such as a sore shoulder in which the pain is along the bicipital groove. The traditional diagnosis would likely be bicipital tendonitis (i.e., inflammation of the bicipital tendon), whereas the FDM diagnosis is *triggerband sore shoulder*.

The terminology chosen in describing this condition (and all sore shoulders) is more than just an issue of semantics — it ultimately influences treatment choices. For instance, in the example of bicipital groove shoulder pain, the diagnosis of tendonitis typically leads to a cascade of treatment options to fight inflammation (anti-inflammatory medicines, resting, steroid injections, etc.). In contrast, the diagnosis of triggerbands leads to treating with triggerband technique.

Sore Shoulder Body Language

In order to select the appropriate FDM clinical approach, the orthopedist must be able to differentiate (and appreciate) each of the six principal fascial distortion types which commonly cause sore shoulders. Although subjective complaints, mechanisms of injury, and objective findings are utilized in the diagnostic process, the initial impression of body language is the most reliable single indicator of the underlying fascial pathology. In the sore shoulder there are eleven typical presentations, which with practice can be instantly recognized (see Figure 13-1).

Figure 13-1. Sore Shoulder Body Language

Eleven sore shoulder body language signals: 1. Squeezes upper arm (cylinder distortion), 2. Sweeping fingers from mid-back to mastoid (star triggerband), 3. Rubs finger laterally across humeral neck (refolding distortion), 4. Pointing to spot of pain with one finger (continuum distortion), 5. Sweeping fingers along anterior shoulder (anterior shoulder triggerband pathway), 6. Fingers pressing into supraclavicular fossa (SCHTP).

7. Inability of shoulder to contact table in prone swimmers position (tectonic fixation), 8. Inability to abduct shoulder without concurrent forward flexion (tectonic fixation), 9. Sweeping fingers along posterior arm and shoulder (posterior shoulder triggerband pathway), 10. Places palm on shoulder (unfolding or refolding distortion), 11. Sweeping fingers from shoulder to mastoid (upper trapezius triggerband).

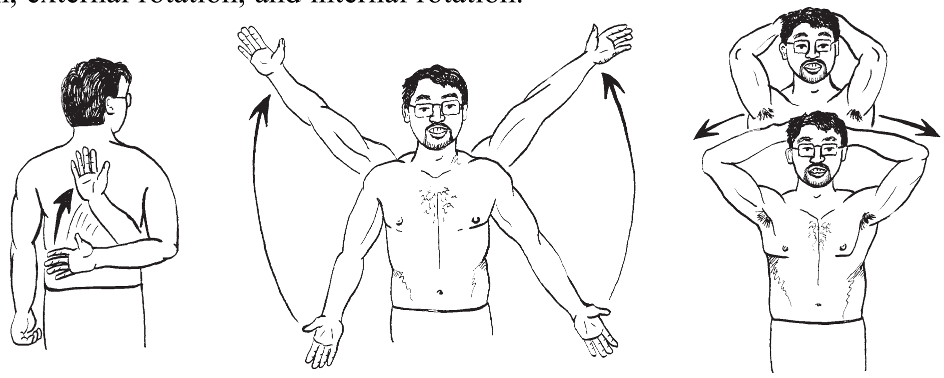
Verbal Descriptions of Shoulder Pain

Despite the apparent complexity of verbal shoulder complaints, there are key words and descriptions which patients make that can be correlated to the specific underlying fascial distortions.

Triggerbands	—	Pulling or burning pain on front of arm (anterior shoulder pathway)
	—	Pulling or burning pain down back of arm (posterior shoulder pathway)
	—	Pulling or burning pain from shoulder to mastoid (upper trapezius triggerband)
	—	Pulling or burning pain from upper back to neck (star triggerband)
Herniated Triggerpoints (SCHTP)	—	Achy-tightness over shoulder
Continuum Distortions	—	Spot(s) of pain
Folding Distortions	—	Aching deep in joint
Cylinder Distortions	—	Pain (tightness, spasm, or ache) in upper arm
Tectonic Fixations	—	Stiffness in shoulder, shoulder joint is "dry" or "needs to be lubricated"

Evaluating Motion of the Sore Shoulder

In the shoulder, all six principal fascial distortion types are possible. In order to be able to understand their presentations so that they can be adequately differentiated and treated, it is advisable to know which motions each distortion type might affect. Fortunately, there are typically only three shoulder motions which are clinically relevant. These are abduction, external rotation, and internal rotation.



Internal Rotation   Abduction   External Rotation

Figure 13-2. Three Important Shoulder Motions

Abduction is the motion in which the hands are brought from the sides of the body up and over the head with the elbows extended. Note that the hands are allowed to rotate so that the palms begin flat against the thighs and end flat against each other above the head. External rotation is the motion that places the elbows posteriorly at the level of the neck. The fingers of each hand are intertwined and the elbows are pushed backwards. Clinically, internal rotation is the most sensitive of all the shoulder motions and is considered to be the ability to place the back of the hand against the back of the body. Loss of internal rotation is the most common physical sign of a sore shoulder (and the most overlooked).

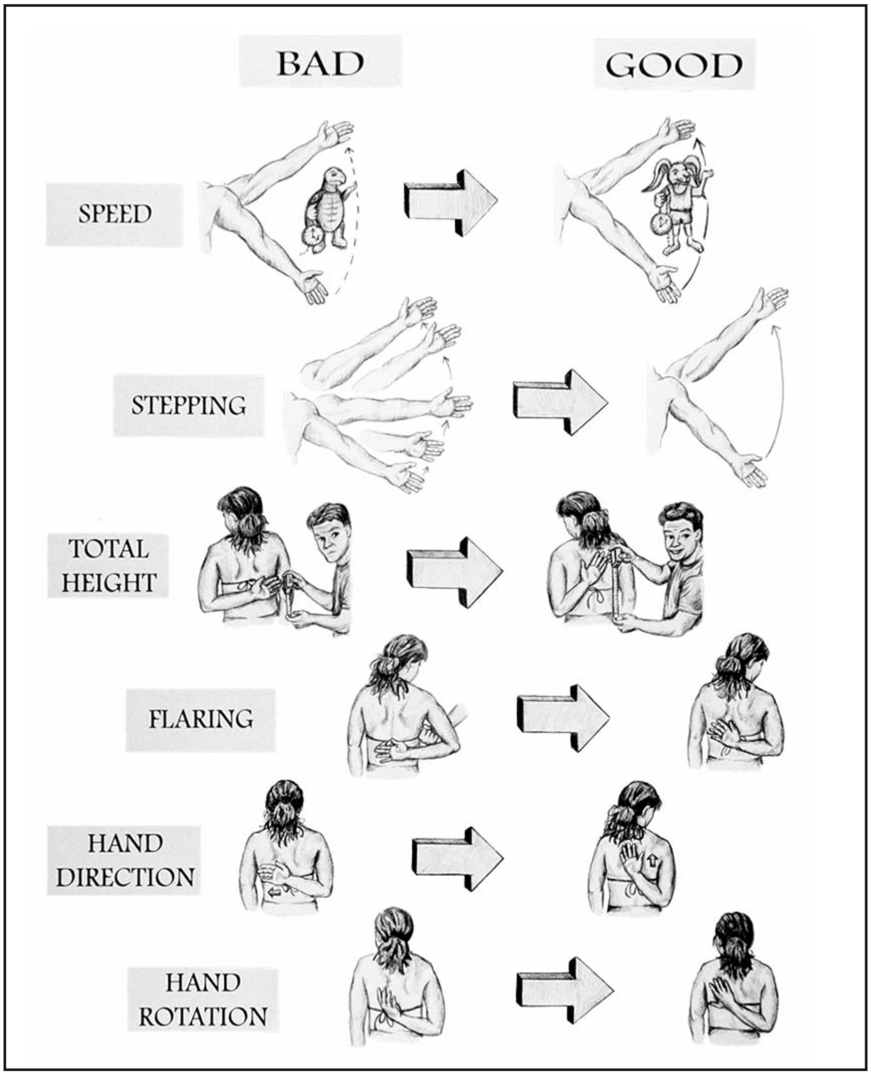
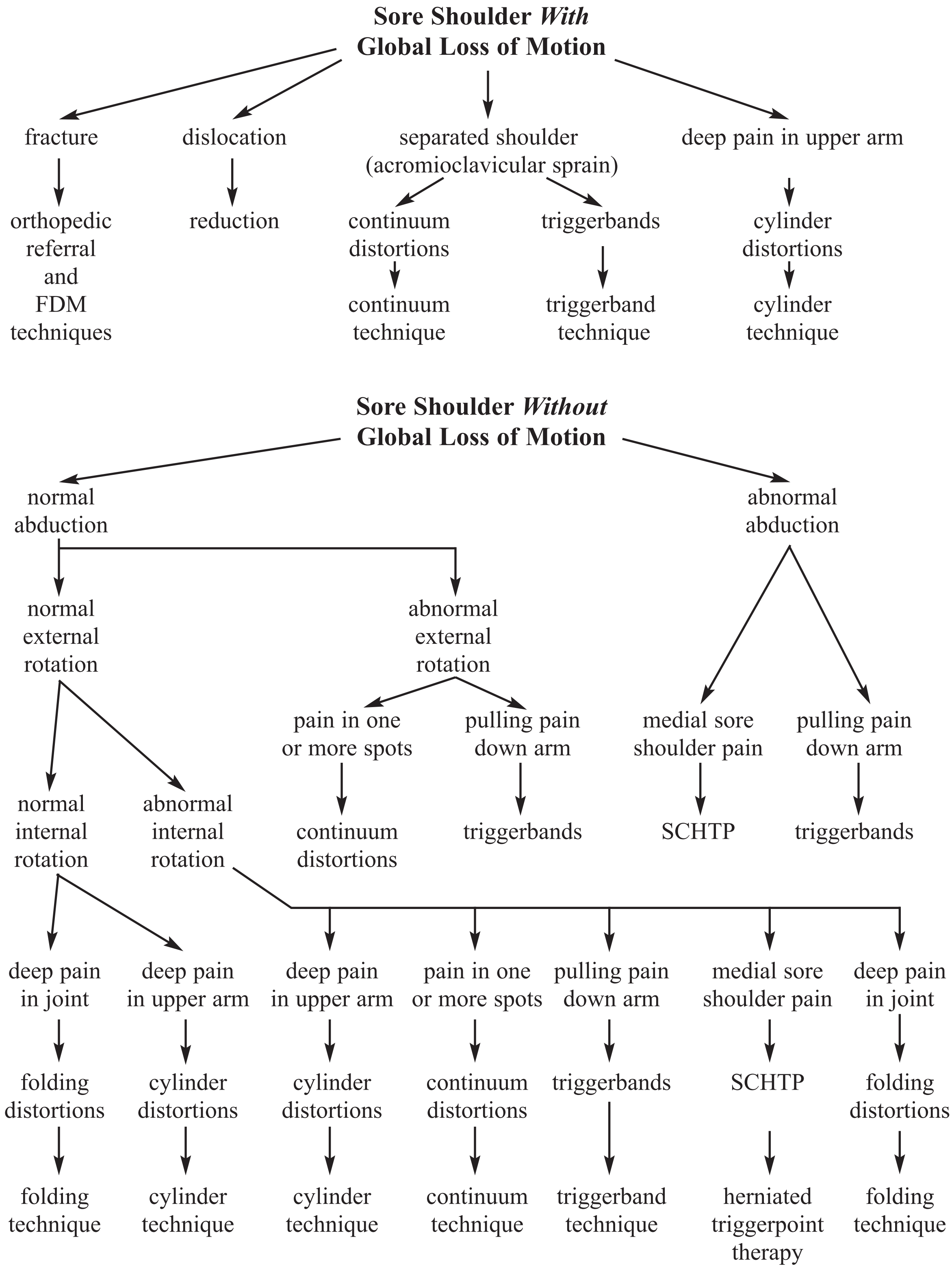


Figure 13-3. Subtle Shoulder Motions

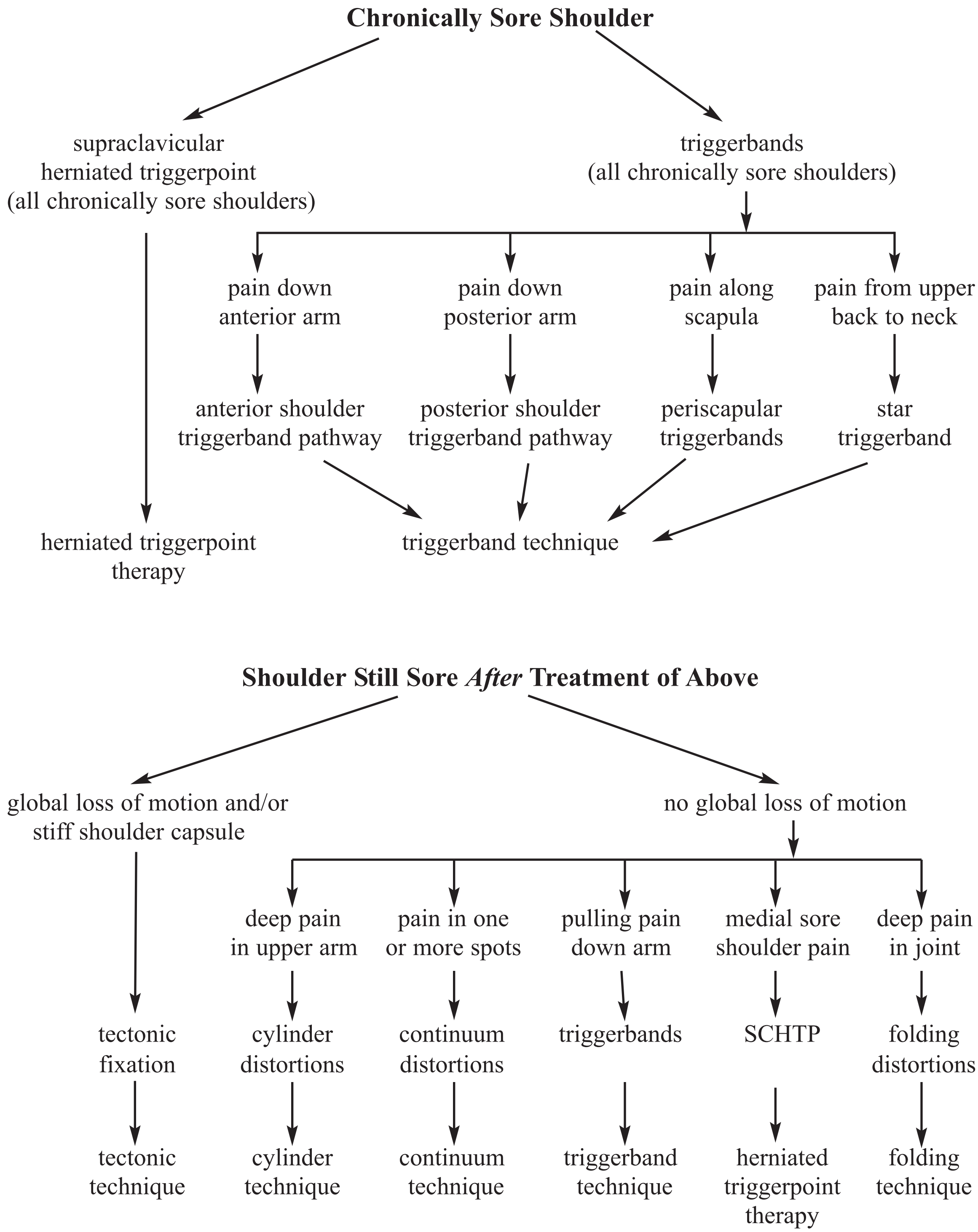
In addition to gross loss of abduction, external, and internal rotation, there are subtle signs of motion which indicate that a fascial distortion is present and that the shoulder is injured. Look for:

- Speed – amount of time it takes to abduct or internally rotate or externally rotate
- Stepping – small jerking motions seen with movement
- Total height – distance above waist line that fingers can reach during internal rotation (use measuring tape and record number of inches or centimeters)
- Flaring – space between elbow and body with sub-optimal internal rotation (record number of fingers or fist that can fit through the hole)
- Hand direction – optimal internal rotation includes fingers pointing straight up toward ceiling
- Hand rotation – ability to place palm of hand flat against back of body

FDM Flow Chart of the Acutely Sore Shoulder



FDM Flow Chart of the Chronically Sore Shoulder



Loss of shoulder motion, whether it is grossly visible (such as inability to raise the arm) or subtle (such as sluggishness of hand rotation during internal rotation) are physical signs of shoulder dysfunction. Each particular distortion type generally affects shoulder motion in specific ways that can be measured and evaluated. The preceding flow chart matches the fascial distortions with their typical clinical presentations. Please note that any of the principal fascial distortion types can cause loss of internal rotation.

Acutely Sore Shoulders

Acutely sore shoulders can be clinically divided into two groups: those with global loss of motion (i.e., impairment in all three primary shoulder motions – abduction, external rotation, and internal rotation), and those without global loss of motion. See *FDM Flow Chart of the Acutely Sore Shoulder*.

Acutely sore shoulders with global loss of motion generally have four etiologies:

1. Fracture
2. Dislocation
3. Separated shoulder (subluxation or dislocation of acromioclavicular joint)
4. Upper arm cylinder distortion

Acutely Sore Shoulders with Global Loss of Motion

Fractures (Humeral)

Fractures of the shoulder are most likely to be humeral head or neck and are most common in post-menopausal women. These individuals initially present with sudden onset of substantial pain in the upper arm following a specific incident such as a fall. The typical orthopedic treatment for closed and non-serious fractures is symptomatic (ice and pain medications) with immobilization (sling). The expected outcome of this approach is a gradual diminishing of pain over several months. The orthopedist familiar with the fascial distortion model, in contrast, supplements the medical regimen with FDM techniques which are meant to immediately diminish pain, decrease healing time, and allow for earlier mobilization (which lessens the opportunity for tectonic fixations to form). The typical sequence of corrections is:

1. SCHTP (if present)
2. Upper trapezius triggerband (if present)
3. Folding distortions (always present)
4. Continuum distortions (always present)
5. Cylinder distortions (commonly present)

The SCHTP does not occur with every fracture, but if it is present it should be corrected with the patient sitting, not lying. The reason for this is that these patients are unable to tolerate the supine or prone positions. Triggerbands, like the SCHTP are only minor components of the total fracture/fascial distortion complex, but also should be treated (if they are present).

The two major fascial distortion components of every humeral fracture are folding and continuum distortions. Folding distortions should be addressed before continuum distortions and occur in two radiological varieties:

1. Those with separated fractured segments
2. Those with compression fractures

The FDM treatment approach is gentle unfolding for those with separated segments, and gentle refolding for those with osseous compression. In either case, the procedure requires little brawn, much finesse, and no thrust. Continuum distortions are found in every fracture along the fracture site itself, so continuum technique should be considered for appropriate patients and applied to the most exquisitely tender spots of pain. However, the orthopedist should be aware that this particular procedure is painful, poorly tolerated, and runs the risk of inducing vasovagal responses.

Cylinder distortions are yet another complicating factor in humeral fractures, but fortunately are not found in every case. Treatment consists of either double thumb cylinder technique or double thumb compression cylinder variant (CCV).

Fractures (Clavicular)

Broken collar bones can also cause acute global loss of motion. The typical treatment sequence includes correcting the SCHTP followed by continuum technique of the fracture sites (providing there is no open wound, vascular or nerve impairment, or risk of pneumothorax).

Dislocations (Gleno-humeral)

Dislocations of the gleno-humeral joint are a common condition seen in the Emergency Department. The orthopedic approach is traction (i.e., unfolding technique). Adding finesse to the brawn of this therapy means consciously directing the contorted fascia through the process (i.e., unfolding the fascia and allowing it to pull the head of the humerus back into the glenoid fossa) followed by guided refolding (controlled cessation of traction). Envisioning the correction in this manner often results in a relatively smooth reduction that requires little or no pharmaceutical support.

Separated Shoulders (Acromioclavicular Sprains)

Subluxations and/or dislocations of the acromioclavicular joint clinically present with triggerbands and/or continuum distortions. The body language of triggerband separated shoulders is a sweeping motion of the fingers along portions of the lateral clavicle. In contrast, the body language of continuum distortions consists of pointing with one finger to the spots of pain. Triggerband separated shoulders are obviously treated with triggerband technique (follow the triggerband along the clavicle and correct it over its entire pathway), whereas continuum distortions are treated with continuum technique (apply precise pressure to the small spots of tenderness and hold until the osseous portion of the transition zone shifts). Separated shoulders generally respond well to FDM techniques and the expected result is an immediate reduction in pain and normalization of motion.

Three clinical considerations:

1. Triggerbands and continuum distortions commonly occur in the same injury
2. Ice is an adjunct therapy
3. Re-treatment should be performed the following day to correct residual distortions

Cylinder Distortions (Upper Arm Sprains)

Surprisingly, upper arm cylinder distortions (see Figure 7-1) that cause global loss of motion are perhaps the most painful of all the shoulder injuries (including fractures). Clinically they mimic fractures in severity of pain and extent of loss of motion, but can be distinguished from them by a negative x-ray, and history of insidious onset (as opposed to a specific incident which is characteristic of fractures). And in those patients that have retained at least some abduction, cylinder distortions are notorious for eliciting biting pain during adduction.

Cylinder shoulder sprains (also known as cylinder acutely frozen shoulders and cylinder upper arm sprains) are treated in the following manner:

1. Ice massage (with real ice applied directly to skin) – this is especially critical for those patients who unwisely applied a heating pad or warm wash cloth to arm or shoulder prior to being seen
2. Double thumb cylinder technique
3. Cupping-with-movement (see Figure 14-3) if #2 is unsuccessful
4. Narcotic pain medicines (appropriate patients only)
5. Ice massage at home every several hours (No heat!)
6. Recheck next day. Re-treat with double thumb cylinder technique (consider compression cylinder variant, squeegee technique, and cupping-with-movement, and do not use Indian burn)

Although the primary concern of patients with a cylinder distortion is pain, he/she should be made aware that self-imposed immobility leads to stiffness (i.e., formation of tectonic fixations).

Acutely Sore Shoulders Without Global Loss of Motion

This group of sore shoulders has two distinct histories: those that had global loss of motion and are being treated, and those that never had global loss of motion. In either case, the FDM approach is the same:

- Synthesize body language, description of pain, mechanism of injury, and physical findings to make FDM diagnosis
- Correct corresponding fascial distortions

Impaired Abduction in the Acutely Sore Shoulder

The supraclavicular herniated triggerpoint (SCHTP) and the anterior and posterior shoulder triggerband pathways are far and away the most likely culprits responsible for loss of abduction. Fortunately, these patients often have an immediate and impressive response to an aggressive treatment of herniated triggerpoint therapy and/or triggerband technique. Clinically, this rapid and often complete restoration of motion and strength (as well as reduction or elimination of pain) is possible (and expected) even in patients with MRI suggested rotator cuff tears.

Considering body language and verbal description of discomfort, if patient complains of tightness or achiness in the supraclavicular fossa (particularly if it is accompanied with the body language of pushing the fingers into the supraclavicular fossa), treat the SCHTP. If instead there is a pulling pain down the anterior arm, with the associated sweeping motion of the fingers along the bicipital groove — treat the anterior shoulder pathway. Or if the pulling pain is down the back of the arm and includes a sweeping motion of the fingers along that course — treat the posterior pathway.

If the exact distortion responsible for loss of abduction is uncertain, treat in this order (recheck abduction after each step):
1. SCHTP
2. Anterior shoulder pathway
3. Posterior shoulder pathway

If abduction is not completely restored, repeat the sequence with more force. Note that the anterior pathway begins on the anterior proximal forearm and courses up through the bicipital groove, across the clavicle, and up the neck to the ipsilateral mastoid (see Figure 3-3). The posterior pathway, in contrast, has its starting point on the posterior proximal forearm and follows a course that hooks around the posterior elbow, up the lateral arm, across the posterior shoulder, over the thoracic spine (T_1-T_4), and finally up the opposite side of the neck to the contralateral mastoid (see Figure 12-5).

Impaired External Rotation in the Acutely Sore Shoulder

Impairment of external rotation is almost certainly due to the presence of either triggerbands or continuum distortions. If triggerbands are involved, the patient will make a sweeping motion with fingers along the specified pathway (anterior and posterior shoulder triggerbands are most common). If instead, continuum distortions are to blame, then the patient will point to the spot(s) of pain with one finger.

Impaired Internal Rotation in the Acutely Sore Shoulder

In general, the measurement of internal rotation is the most objective finding to be made in a sore shoulder. Not only can it be physically quantified with a tape measure and compared to the opposite shoulder, but as the motion objectively improves with treatment, symptoms correspondingly diminish.

Although any of the principal types of fascial distortions (including tectonic fixations, which in the shoulder are chronic) can cause loss of internal rotation, triggerbands and the SCHTP are the most common culprits (see *FDM Flow Chart of the Acutely Sore Shoulder*).

Normal Motion — But the Shoulder Hurts

These rare injuries are always acute by definition and never involve triggerbands or adhesions. Instead the fascial etiology is a folding distortion of the shoulder (generally unfolding) or cylinder distortion of the upper arm. The treatment is first with traction/thrust or compression/thrust of the shoulder in multiple directions, followed by lateral unfolding manipulation of the shoulder. If this is ineffective, follow with double thumb cylinder technique, compression cylinder variant, or cupping-with-movement on the upper arm.

Normal Motion — and the Shoulder Doesn't Hurt

In the treatment of sore shoulders there are four possible clinical results:

1. Shoulder hurts and has impaired motion
2. Shoulder hurts but has normal motion
3. Shoulder doesn't hurt but has impaired motion
4. Shoulder doesn't hurt and has normal motion

When the shoulder is asymptomatic and there is normal motion, then that shoulder is considered to be uninjured. Although this category may seem obvious, it is important to remember that this is the condition we wish every sore shoulder to attain. The desired outcome of every FDM treatment is therefore a shoulder with normal motion that doesn't hurt.

NON-SHOULDER FASCIAL DISTORTIONS

In addition to correcting the injured shoulder, the physician should also consider the effect of the instigating injury on adjacent structures. In particular the following fascial distortions tend to accompany shoulder injuries and should be treated if present:

- Cervical folding distortions
- Cervical facet tectonic fixations
- Upper thoracic folding distortions
- Thoracic facet tectonic fixations
- Star triggerband
- Star folding
- First-rib folding

Treatment of these injuries is generally with thrusting manipulations (with the exception of the star triggerband), and is discussed in preceding chapters.

CHRONICALLY SORE SHOULDERS

All chronically sore shoulders, frozen or not, clinically exhibit triggerbands with adhesions and the supraclavicular herniated triggerpoint. Therefore the approach in treating is three-fold:

1. Anatomically eliminate the SCHTP
2. Fix triggerbands and break adhesions to make injury acute
3. Correct remaining distortions

Correction of the SCHTP should be the first objective in treating every chronically sore shoulder. The next goal is to iron out the affected triggerbands (particularly the star, upper trapezius, and anterior and posterior pathways). Note that the upper trapezius triggerband (and in some cases the posterior pathway) has fibers which traverse the posterior margin of the supraclavicular fossa. The adhesions of these triggerbands *cement* onto the SCHTP and keep it from releasing, while at the same time the SCHTP is distorting the fascial fibers, causing triggerbands. This combination of herniated triggerpoints and triggerbands with adhesions is clinically demonstrated by the need to re-treat the SCHTP and triggerbands over several sessions.

Once the SCHTP and triggerbands (and tectonic fixations if they were also present) are corrected, the injury is considered to be acute. The same treatment plan is utilized for these previously chronic sore shoulders as is employed on acutely sore shoulders. Again, the thrust of the process is to determine the residual fascial distortions present and apply the corresponding fascial distortion techniques. Associated regional fascial injuries should also be treated (such as thoracic facet tectonic fixations and first-rib refolding distortions).

Tectonic Frozen Shoulders

If the shoulder had global loss of motion before the initiation of the treatment discussed above and still does so afterwards, then the primary unresolved distortion is a tectonic fixation. Note that these patients have:

1. Stiff shoulders that during abduction exhibit anterior rotation and flexion
2. A fist of space or more between the surface of the table and the shoulder joint when laid prone in the swimmers position (see Figure 13-1)

Tectonic fixations are generally the most difficult of all the distortions to correct in a chronically frozen shoulder. The primary reason for this is that in addition to the attractive magnetic field suctioning the joint surfaces together, there is the added physical problem of thickened synovial fluid inhibiting joint sliding. *The key to success is to emphasize slow tectonic pump!* Note that patients should be seen every 2-3 days and range of motion should be reassessed at each office visit. Treatment sessions are terminated when the shoulder has regained normal and non-painful motion.

The order in which the three primary shoulder motions return is:

1. Abduction
2. External rotation
3. Internal rotation

Internal rotation generally returns in this order:

1. Total height
2. Hand direction
3. Speed
4. Fluidity
5. Hand rotation

Typical Steps in Treating a Tectonic Frozen Shoulder

FIRST OFFICE VISIT — Treat/do the following:

1. SCHTP
2. Anterior and posterior shoulder triggerband pathways
3. Star and upper trapezius triggerbands
4. Slow tectonic pump in sitting position

SECOND OFFICE VISIT — Treat/do the following:

1. SCHTP
2. Anterior and posterior shoulder triggerband pathways
3. Star and upper trapezius triggerbands
4. Slow tectonic pump in sitting position
5. Slow tectonic pump in supine position
6. Hallelujah maneuver — focus traction force into shoulder (often unsuccessful until after several more treatments)

THIRD OFFICE VISIT — Do the following:

1. Slow tectonic pump in sitting position
2. Slow tectonic pump in supine position
3. Hallelujah maneuver
4. Slow tectonic pump of scapula followed by brute force maneuver of scapula
5. Brute force maneuver of shoulder
6. Slow tectonic pump in sitting position
7. Refolding manipulation of upper ribs
8. Unfolding manipulation of neck and cervical spine
9. Whip technique of shoulder
10. Lateral unfolding manipulation of shoulder (see Figure 13-7, top left)

FOURTH OFFICE VISIT — Do the following:

1-10. Same as office visit #3
11. Refolding technique of shoulder
12. Slow tectonic pump of shoulder in sitting position
13. Frogleg and reverse frogleg manipulations

FIFTH OFFICE VISIT — Do the following:

1-13. Same as office visit #4

14. Intermuscular septal folding manipulation of upper arm (if upper arm pain), see Upper Extremity Chapter

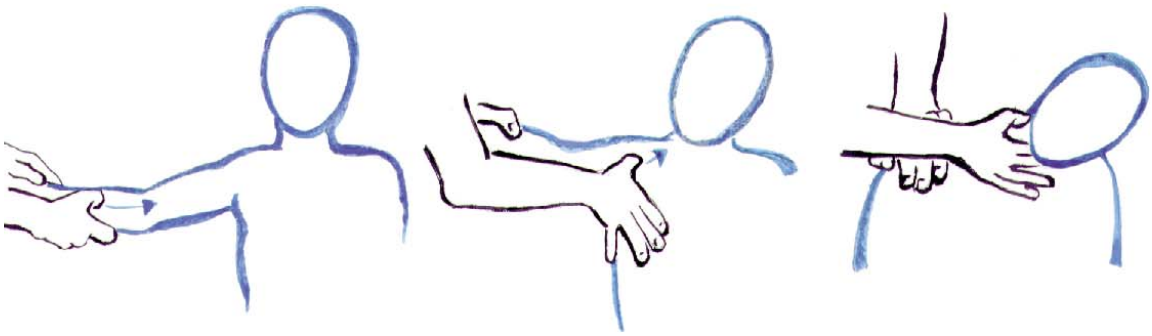
15. Double thumb or cupping-with-movement cylinder techniques (if upper arm pain)

SUBSEQUENT OFFICE VISITS — Do the following:

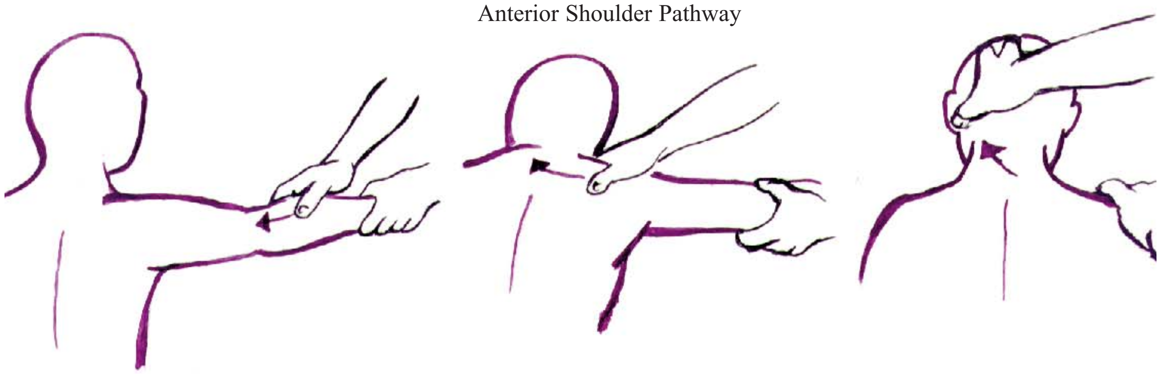
1-15. Same as office visit #5

- Emphasize slow tectonic pump in supine position
- Consider prone tectonic technique of shoulder (see glossary term)

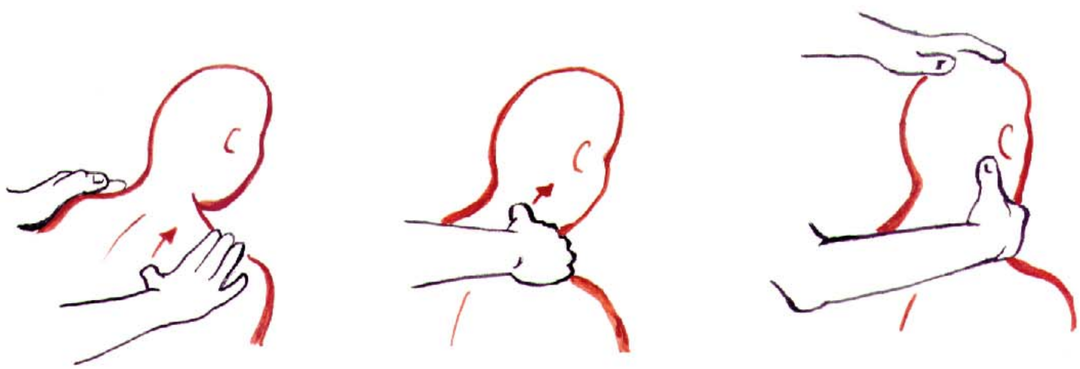
Figure 13-4. Common Shoulder Triggerband Pathways and Treatments



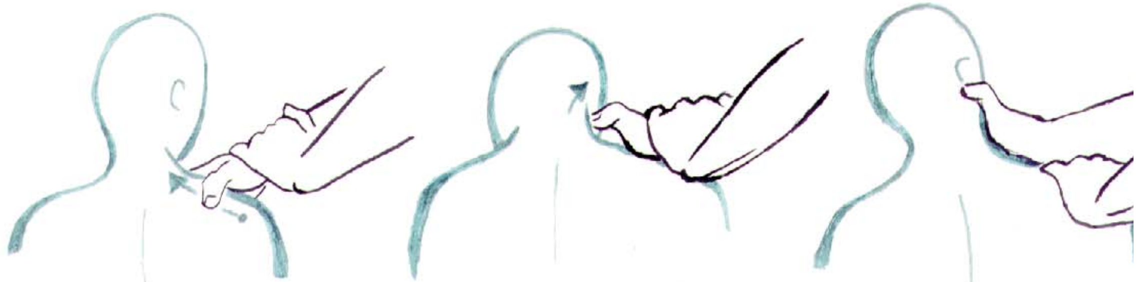
Anterior Shoulder Pathway



Posterior Shoulder Pathway

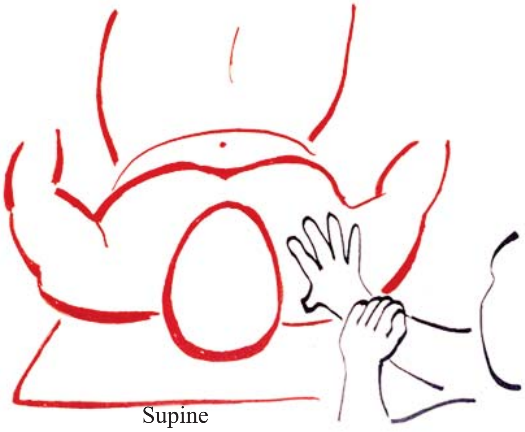


Star



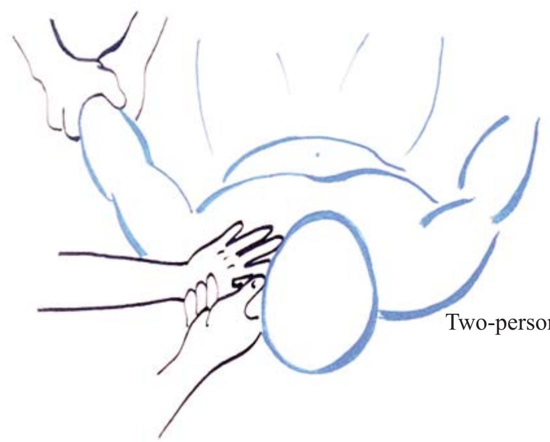
Shoulder to Mastoid (upper trapezius)

Figure 13-5. Treatment of Supraclavicular Herniated Triggerpoint



Supine

Sitting



Two-person Supine

Figure 13-6. Continuum Technique of Shoulder

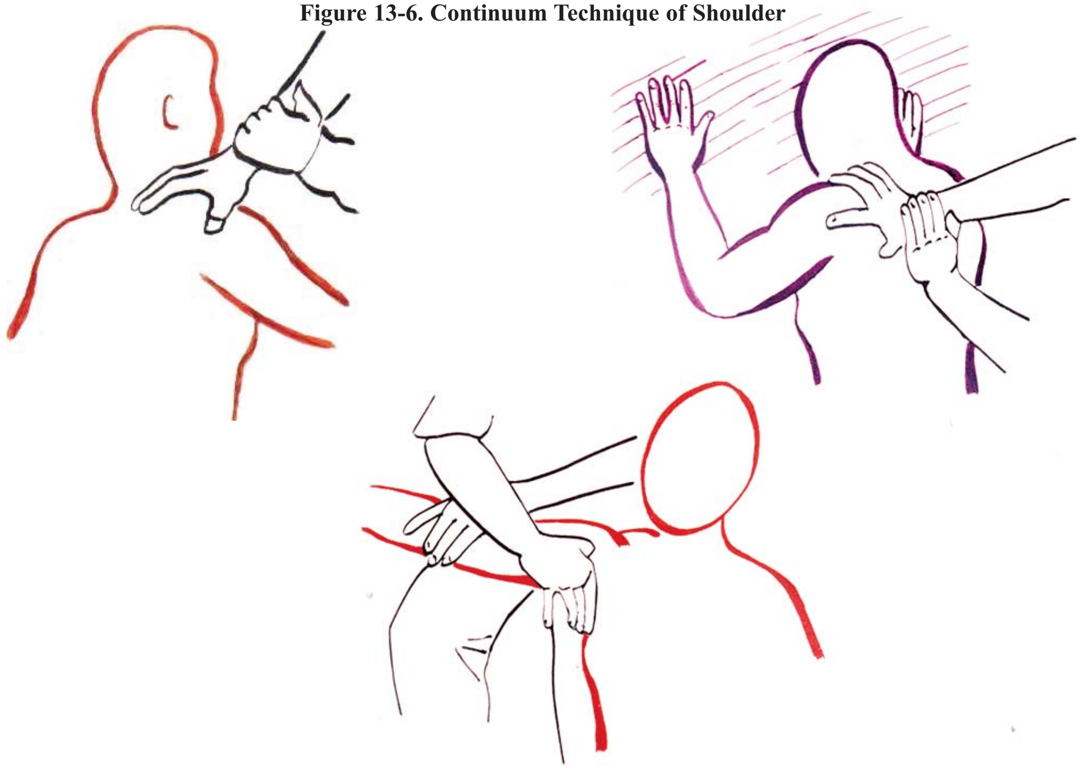
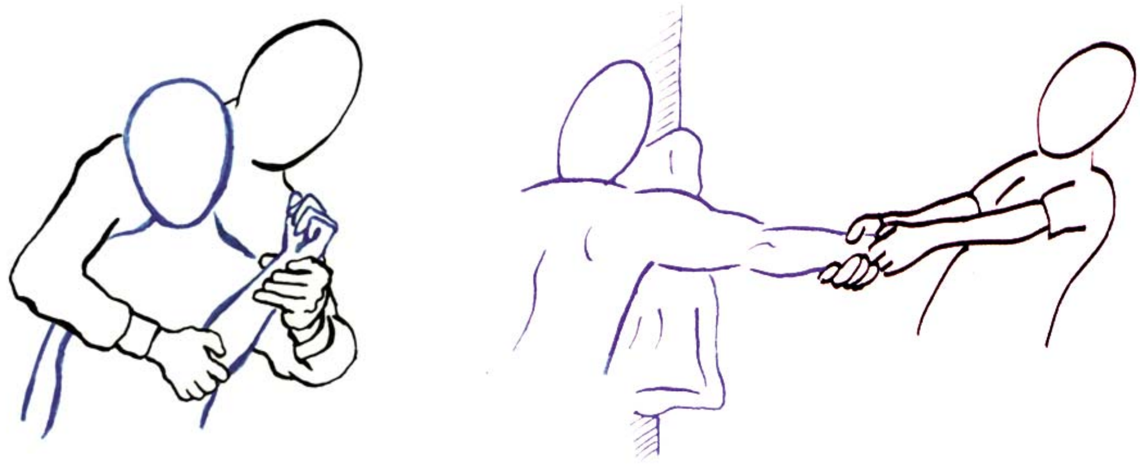
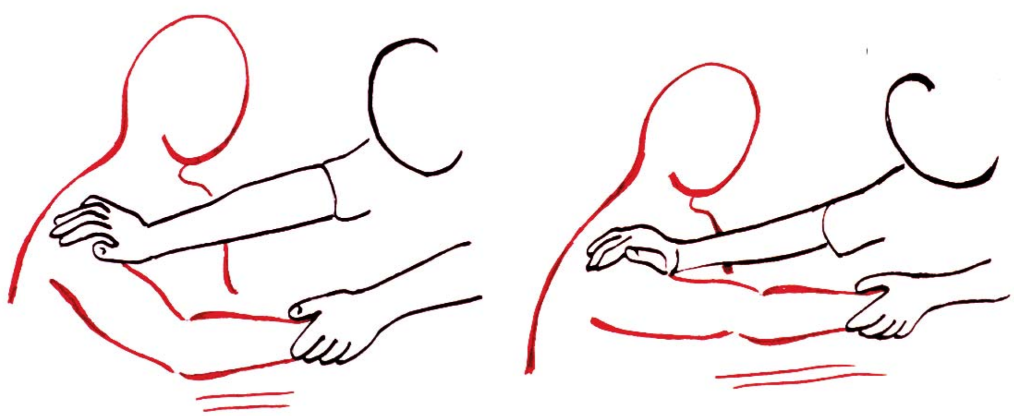


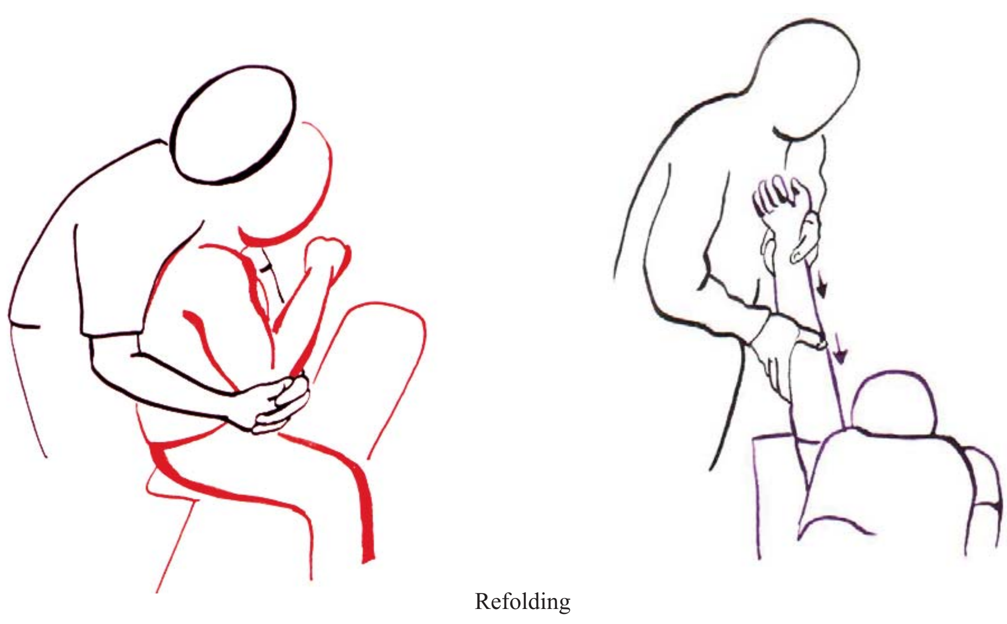
Figure 13-7. Folding Techniques of Shoulder



Unfolding



Unfolding (Whip)



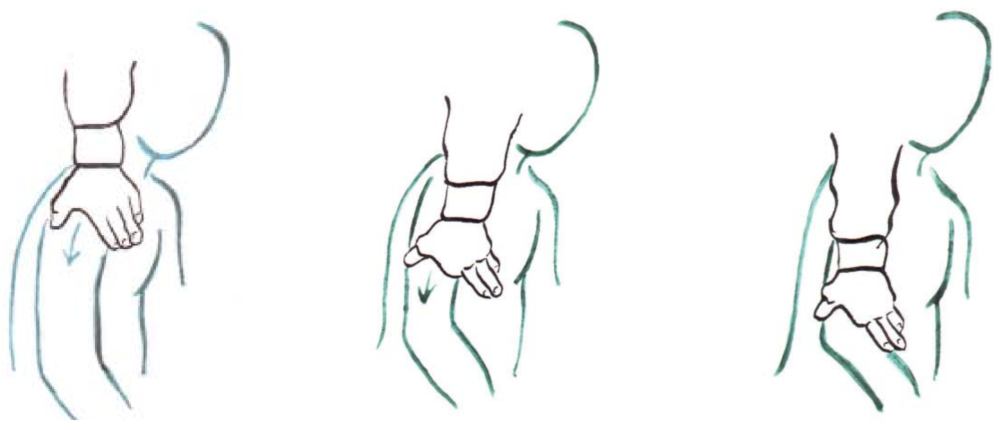
Refolding

Figure 13-8. Cylinder Techniques of Upper Arm

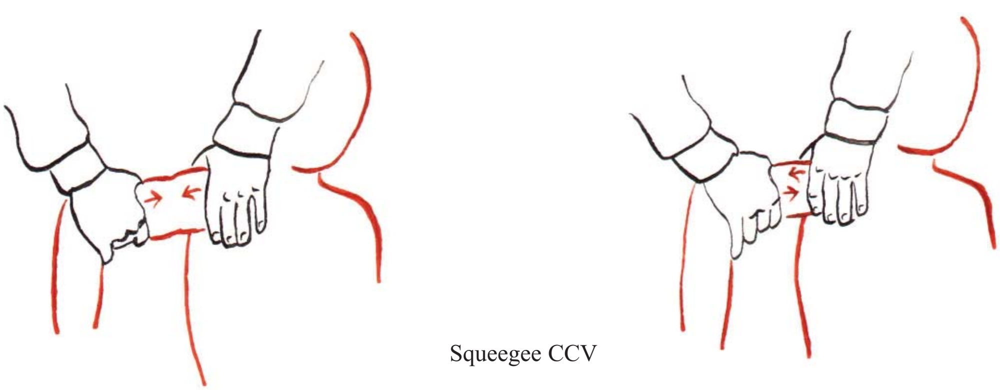
Double Thumb
(deep layer)

Double Thumb
(superficial layer)

Double Thumb CCV

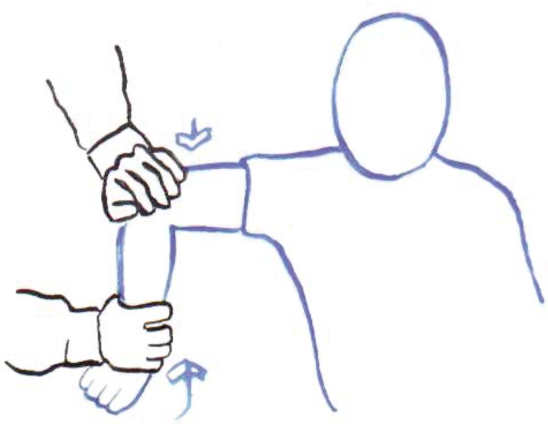


Squeegee

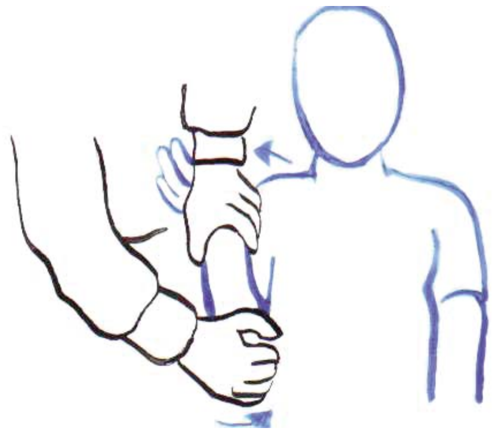


Squeegee CCV

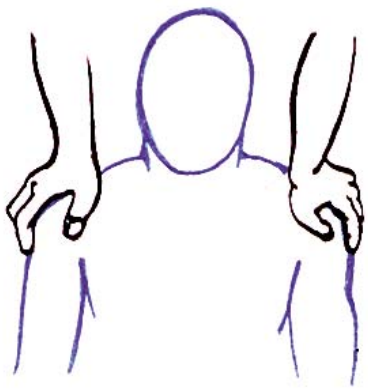
Figure 13-9. Tectonic Techniques of Shoulder



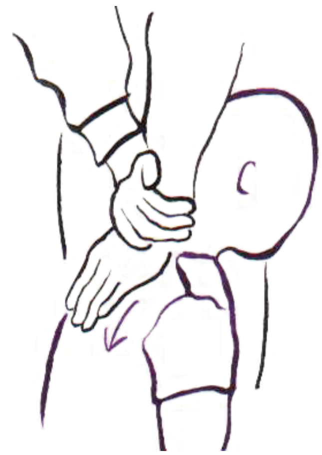
Frogleg



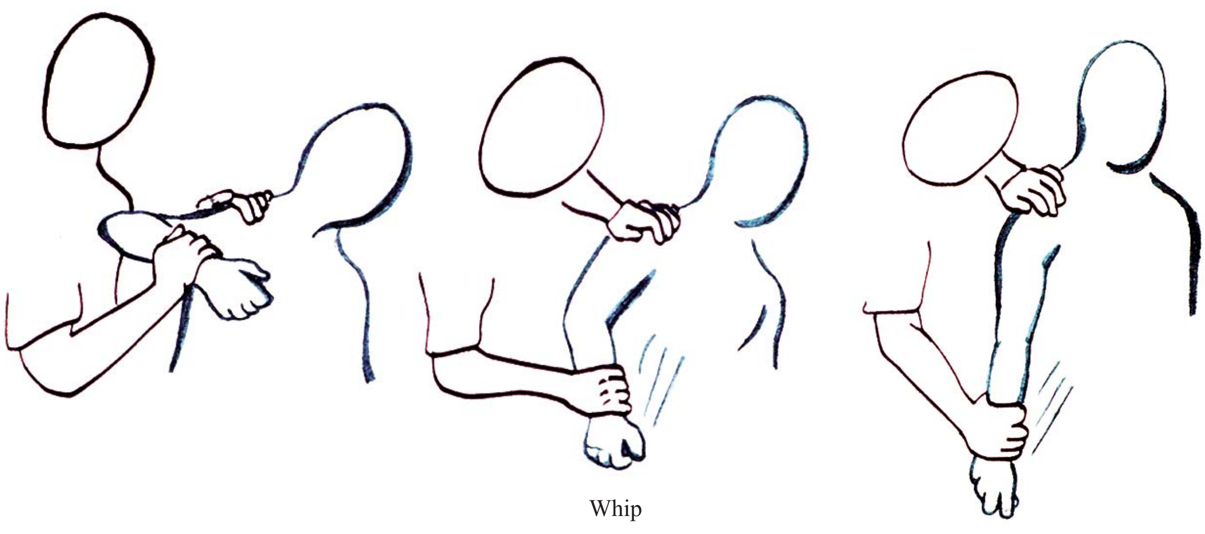
Reverse Frogleg



Brute Force Maneuver
(shoulder)



Brute Force Maneuver
(scapula)



Whip

Chapter 14

Upper Extremity Complaints

Upper Arm Pain

Most patients with upper arm pain complain "My *shoulder* hurts," and show one of three body languages (see Figure 13-1):

1. Sweeping fingers along anterior arm (anterior shoulder triggerband pathway)[1]
2. Sweeping fingers along posterior arm (posterior shoulder triggerband pathway)[2]
3. Repetitively squeezing upper arm with opposite hand (cylinder distortion)[3]

In those patients who actually state "My *arm* hurts," the same three body languages as shown above are also commonly present. However, other body languages observed include:

4. Pushing one or two fingers into lateral arm soft tissue (herniated triggerpoint)
5. Pushing with one fingertip into spot of pain *on the bone* (continuum distortion)
6. Shoving fingers into medial or lateral intermuscular septum (folding distortion)
7. Sweeping motion with palm down arm (cylinder distortion)

Herniated Triggerpoints

Herniated triggerpoints of the upper arm are exceedingly uncommon and are found only in substantially obese people or those who have had previous upper arm soft tissue surgery or penetrating wound. Unlike the SCHTP (which is generally almond-like in shape and size), HTP's of the upper arm are typically circular in shape and are smaller than a U.S. dime (coin). Treatment is with herniated triggerpoint therapy (thumb physically forces protruding tissue below fascial plane). Unfortunately, since they often occur secondary to underlying tissue trauma, they tend to reoccur. To some extent modifying herniated triggerpoint therapy can prevent reoccurrence. This is done by giving an additional sideways push to the 'cow' (protruding tissue) once it has been 'shoved through the barn door' (driven below fascial plane).

Surgical herniated triggerpoint treatment is an option for those people who fail manipulative herniated triggerpoint therapy. In this approach the skin is sterilized and numbed with an injection of 2% Xylocaine and a linear incision is made over the underlying HTP (and should extend at least 1/4 inch past the palpable edge of each side). The incision is then sutured together making sure that the fascial layer is tightly re-approximated.

[1]See Chapter 3 [2]See Chapter 12 [3]Also see Chapter 13

Continuum Distortions

Continuum distortions of the upper arm occur secondary to traumatic injuries in which the humerus has been struck by a blunt object. Medically these injuries are often called *bony contusions*. In the FDM, exquisitely painful spots of osseous tenderness are anatomically considered to be continuum distortions. Treatment consists of application of firm pressure from physician's thumb-tip directly into the spot of most intense discomfort. Force is held until the transition zone shifts which is sensed by the physician as a release. Since upper arm continuum distortions tend to be of the inverted subtype, re-treatment may be necessary.

Folding Distortions

The medial and lateral intermuscular septa divide the upper arm flexors from extensors, and because shearing forces are introduced during strenuous activities, folding distortions commonly form. Thus, along with cylinder distortions, they are a primary cause of upper arm aching. The body language associated with intermuscular septal folding distortions is pushing of the index, middle, and ring fingers (and sometimes also the little finger) into the medial or lateral intermuscular septum.

The most specific medial intermuscular septum treatment is:

1. Clasp anterior arm muscles with one hand
2. Clasp posterior arm muscles with other hand
3. Introduce repetitive shearing forces into medial intermuscular septum by alternately holding one group of muscles and thrusting the other

The most specific lateral intermuscular septum treatment is:

1. Clasp anterior inferior arm muscles with one hand
2. Clasp anterior superior arm muscles with other hand
3. Introduce repetitive shearing thrusts into lateral intermuscular septum by alternately pushing and pulling one hand medial and the other lateral

Figure 14-1. Treatment of Medial (left) and Lateral (right) Intermuscular Septa

Although the two techniques shown are the most specific, manipulating both medial and lateral intermuscular septa at the same time is more efficient. This is done by one of the following two folding techniques. (Note that the patient's position is the only variable). Just as with the individual medial and lateral techniques, they correct both unfolding and refolding distortions.

Sitting chicken-wing technique: with patient seated and physician standing behind, right arm intermuscular septa are manipulated in the following fashion:

1. Treating left hand firmly grasps proximal anterior upper arm muscle belly
2. Treating right hand grasps patient's forearm
3. Shearing motion is introduced into intermuscular septa by pulling forearm posteriorly and thrusting muscle belly anteriorly

Prone chicken-wing technique: with patient prone and physician standing to patient's left, left arm intermuscular septa are manipulated in following fashion:

1. Treating right hand firmly grasps proximal anterior upper arm muscle belly
2. Treating left hand grasps patient's forearm or wrist
3. Shearing motion is introduced into intermuscular septa by pulling forearm posteriorly and thrusting muscle belly anteriorly

Figure 14-2. Chicken-Wing Intermuscular Septal Folding Techniques – Sitting (left) and Prone (right)

A successful result of any intermuscular septal folding manipulation is clinically appreciated when either a small *pop* or *click* is heard. The *pop* occurs as the mal-folded intermuscular septum unfolds and then refolds, whereas the *click* is heard as the mal-folded septum refolds and then unfolds.

Cylinder Distortions

Currently the most efficacious cylinder technique for any upper arm cylinder distortion is cupping-with-movement. In this approach one or two cups are suctioned above the area of discomfort and one or two cups below it. Exact placement appears to be clinically irrelevant since any combination seems to achieve the desired clinical effect. To treat, leave cups on five to ten minutes and have patient slowly abduct, adduct, externally rotate, internally rotate, and flex shoulder. Do not be concerned if cups fall off, just re-suction them on again. Re-treat the following day if there is still pain, but reposition cups so they are not on the bruises from the previous treatment. Cupping-with-movement anatomically works in the following fashion:

1. Pulls coils off of underlying muscles (reduces tourniquet effect)
2. Pulls coils apart (uncoils coils)
3. Untangles coils (varying muscle contractions rotates coils thus giving a three-dimensional force to untangling)

Figure 14-3. Cupping-with-Movement

Non-cupping treatments are also potentially effective and include double thumb, squeegee, and squeegee and double thumb CCV. Note that Indian burn should not be used on the upper arm. Double thumb is best utilized for focal injuries (as evident in those patients that squeeze a single section of the upper arm repetitively). Treat the deep layer first by locating area of most discomfort and placing tip of one thumb lateral and one thumb medial to the distortion; medial thumb applies firm pressure and pulls medially while lateral thumb pulls laterally. Hold thumbs in this position until release is felt (diminishing in tautness of the tissues). Repeat process with thumbs pulling proximally and distally to treat superficial layer of cylinder fascia.

Figure 14-4. Cylinder Technique of Brachial Fascia with Double Thumb (left) and CCV (right)

When patients sweep palm of opposite hand from proximal upper arm distally, this indicates an anatomically more extensive tangling of cylinder coils — meaning that a broader cylinder technique should be chosen. If the body language observed is pushing palm along entire upper arm, then squeegee technique should be performed along the length of the upper arm. If instead, the body language is limited to a sweeping or pushing of the palm along the proximal half of the upper arm, then a half-squeegee should be done (begin proximally and squeegee distally, but stop at upper arm midpoint).

Figure 14-5. Squeegee Cylinder Technique

Note that squeegee compression cylinder variant is reserved for those patients that display a body language in which the opposite palm first makes a sweeping motion along the proximal upper arm, followed by a squeezing or pushing motion just proximal to the elbow.

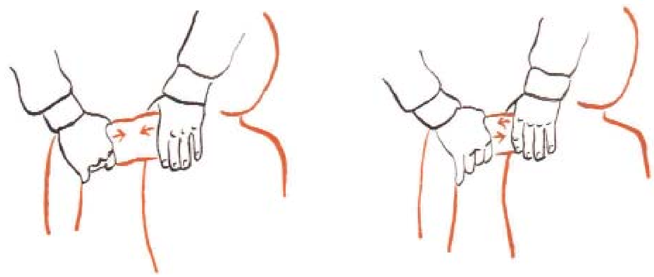


Figure 14-6. Squeegee CCV

ELBOW PAIN

In the fascial distortion model, epicondylitis, a.k.a. tennis elbow, is viewed as being caused by either triggerbands or continuum distortions. Triggerband elbow strains produce a pulling pain down the medial or lateral forearm. Treatment consists of first finding the triggerband starting point (the sorest spot on the elbow) and then correcting the fascial band along its entire pathway from elbow onto forearm. Note that most medial elbow triggerbands have a pathway along the medial forearm, and most lateral triggerbands maintain a lateral course. Continuum distortions of the elbow hurt in one or more spots. Treatment consists of flexing the elbow, locating exact point of maximum discomfort with tip of treating thumb, and then applying pressure until transition zone shifts back into its uninjured configuration. Since medial or lateral epicondyle continuum distortions occur almost exclusively as the inverted subtype, following continuum technique frogleg and reverse frogleg manipulations of the elbow can be performed. Re-treatment may be necessary. Patients with true *tennis elbow* (i.e., medial or lateral epicondylitis secondary to playing tennis) should be treated and then told to play tennis the next day. Re-treat as needed.

Cylinder distortions also occur in the elbow. Patients with these injuries say, “The elbow hurts all over.” The discomfort feels superficial but can’t be localized. The mechanism of injury responsible for elbow cylinder distortion formation is typically a pulling or twisting of the involved extremity. These also occur from tightly applying and torquing arm bands, ace wraps, splints, or elastic supports. On physical exam, elbow motion is grossly normal (shoulder internal rotation may be slow or hesitant) and there are no spots of tenderness which, when palpated, magnify the discomfort. Treatment of choice is Indian burn cylinder technique in which one hand is placed several inches above the elbow, while the other hand is placed several inches below it. Traction is instigated so that the proximal hand pulls toward the shoulder and the distal hand pulls toward the wrist. Once traction is achieved, the upper hand initiates rotation in a clockwise direction, at the same time the lower hand rotates in a counterclockwise direction. The traction and torque are held until the tautness of the tissue diminishes. If the result is less than acceptable, repeat the procedure with direction of rotation reversed.

Folding distortions are yet another source of elbow pain and hurt deep in the joint. Unfoldings result from a pulling injury (for instance from throwing a bowling ball), whereas refoldings occur from a compression injury (such as falling on an outstretched hand). Treatment consists of traction/thrusting for unfoldings and compression/thrusting for refoldings. There are various folding techniques which can be applied to the elbow, however, the treating doctor should attempt to determine the exact position of elbow at time of injury and then reproduce those exact forces. For stubborn unfolding distortions in which mechanism of injury is unknown, the patient can go bowling and/or hang from a monkey bar before coming to the office for treatment (unfolds elbow capsule in several different directions). To treat stubborn refolding distortions in which mechanism of injury is unknown, instruct patient to bounce on hands and knees on a trampoline so that some of the force of gravity is absorbed through the elbow. (Patients with stubborn shoulder folding distortions can be given same instructions).

Tectonic fixations of the elbow generally lead to the verbal assertion that "the elbow needs to pop." This is the *green light* for employing frogleg and reverse frogleg manipulations. The technique is performed essentially the same as for the shoulder, and when successful, the elbow manipulates with a large pop or clunk.

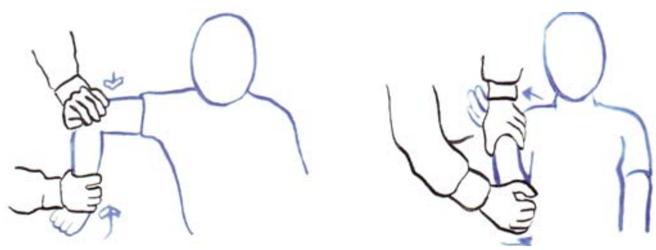


Figure 14-7. Frogleg and Reverse Frogleg Tectonic Technique of Elbow

FOREARM PAIN

Most people with forearm discomfort inadvertently demonstrate one or more of the following body languages:

1. Sweeping fingers from proximal aspect of bicipital aponeurosis superiorly (anterior shoulder triggerband pathway)
2. Sweeping fingers from mid-posterior forearm superiorly (posterior shoulder triggerband pathway)
3. Sweeping fingers proximal to distal or distal to proximal along anterior forearm (anterior forearm triggerband pathway)
4. Sweeping fingers proximal to distal or distal to proximal along posterior forearm (posterior forearm triggerband pathway)
5. Pointing with tip of finger to spot(s) of pain (continuum distortion)

6. Opposite hand forcefully shoving fingertips into forearm (interosseous membrane folding distortion)
7. Opposite hand grasping muscles while pushing fingertips into intermuscular septum (intermuscular septum folding distortion)
8. Repetitively squeezing various portions of forearm (cylinder distortion)
9. Sweeping motion of palm over forearm (cylinder distortion)

Triggerbands

The most common triggerbands of the forearm include:

1. Anterior shoulder pathway (see Figure 3-3)
2. Posterior shoulder pathway (see Figure 12-5)
3. Anterior forearm pathway (See Figure 14-10)
   Starting point: distal edge of bicipital aponeurosis
   End point: flexor retinaculum of wrist
4. Posterior forearm pathway
   Starting point: proximal 1/3 of posterior forearm
   End point: extensor retinaculum of wrist

Continuum Distortions

Continuum distortions in the forearm tend to be located in two specific areas:

1. Origin or insertion of flexor and extensor muscle tendons
2. Attachment of the interosseous membrane on radius or ulna

Treatment is, of course, with continuum technique, i.e., firm pressure directed into most exquisite spot of pain and held until transition zone shifts.

Folding Distortions

Patients with folding distortions of the radio-ulnar interosseous membrane typically complain of an aching discomfort deep in the forearm. Since it is currently not clear how to distinguish between an unfolding and a refolding distortion, treatment is first with unfolding technique followed by refolding technique. To treat right forearm:

1. With patient seated, doctor stands on right side of patient (so they are both facing same direction), and places his/her left foot on chair or footstool
2. Forearm is gently rested on doctor's thigh with butt of doctor's left hand contacting proximal radius while right hand grasps distal forearm
3. Left palm introduces several short shearing thrusts into radius at 45° angle to axis of forearm (away from ulna)
4. Thrusts are repeated as left hand marches inferiorly (this engages different portions of membrane)
5. Angle of thrust is changed to 135° and another series of shearing thrusts are introduced

6. Doctor's left foot is taken off chair or footstool and replaced with right foot
7. Forearm is rested on doctor's right thigh and butt of doctor's right hand contacts proximal radius while left hand grasps distal forearm. Shearing thrusting forces are introduced into interosseous membrane at a 45° angle – this time by right hand.
8. Right hand is marched down forearm, thrusting as it goes to engage different portions of membrane
9. Angle of thrust is changed to 135° and thrusting procedure repeated
10. Refolding interosseous membrane manipulations are performed by thrusting radius and ulna together in a scissors-like fashion. This can be done in several ways. One is described here:
    A. With patient seated, elbow is extended as forearm is brought upwards
    B. Short thrusts of force are made through butts of treating doctor's palms into radius and ulna (and thus into radio-ulnar interosseous membrane)

Note that a successful interosseous membrane unfolding manipulation is appreciated by the generation of audible single or multiple small or large pops, while a successful refolding manipulation is evident when a click or series of clicks are heard.

Figure 14-8. Unfolding (left), Refolding (middle) Manipulations of Interosseous Membrane, and Folding Manipulation of Intermuscular Septum (right)

The presence of intermuscular septal folding distortions is suspected when patients complain of an achiness in the posterior forearm that is magnified with extension of third or fourth fingers. To treat right forearm, physician stands to right of patient. He/she holds pronated distal forearm firmly with right hand and grasps extensor muscles of forearm with palm and fingers of left hand. Thrust is made with the left hand. Note that in this procedure (unlike manipulation of the interosseous membrane) it is the muscle that is thrusted, not the bones. A small click or pop indicates a successful manipulation.

Cylinder Distortions

In patients who repetitively squeeze the forearm, treatment of choice is Indian burn cylinder technique. For those patients that make a sweeping motion with the palm of their opposite hand along the forearm, preferred corrective technique is squeegee. Squeegee technique of the forearm is performed with either one hand or two. If one hand is used, first treat the anterior antebrachial fascia by applying a squeegee motion from proximal to distal. Next treat posterior antebrachial fascia in the same manner. If two hands are used, one hand encircles half the circumference while the other hand encircles other half. In this way the entire forearm can be treated in one clean sweep.

Since circular fascial coils have fibers which connect into both the intermuscular septa and interosseous membrane, folding distortions of these structures unevenly pull and eventually tangle superficial cylinder fascia. Therefore, a successful treatment of forearm cylinder distortions is often contingent on first correcting intermuscular septal and interosseous membrane folding distortions.

Carpal Tunnel Syndrome

In the fascial distortion model, the wide array of signs and symptoms which most physicians collectively refer to as carpal tunnel syndrome (CTS) are divided into two distinct categories: true carpal tunnel syndrome (TCTS) and carpal tunnel-like syndrome (CTLS).

True Carpal Tunnel Syndrome vs. Carpal Tunnel-Like Syndrome

If the classic signs and symptoms of median nerve impingement are present, the diagnosis of true carpal tunnel syndrome can be made. These subjective and objective findings include:

1. Continuous paresthesias and/or numbness of volar aspect of palm and thumb, entire index and middle fingers and radial half of ring finger
2. Body language – squeezes wrist and makes sweeping motion with opposite palm along radial aspect of affected anterior wrist and palm (cylinder distortions of flexor retinaculum), followed by squeezing or twisting of thumb, index, middle or ring finger (cylinder distortions of thumb, hand or finger fascia)
3. Positive Tinel's sign (magnification of paresthesias with tapping of wrist flexor retinaculum)
4. Positive EMG (corroborating finding)
5. Atrophy of thenar eminence (evidence of long-standing median nerve impingement)

In carpal tunnel-like syndrome signs and symptoms include:

1. Paresthesias and/or numbness of forearm, dorsal hand, all fingers and thumb (both volar and dorsal aspects) with geographical location of most symptomatic areas varying from day to day
2. Body languages (2 possibilities):
   A. Sweeping motion of fingers from proximal to distal along anterior forearm (triggerband of antebrachial banded fascia) followed by squeezing and twisting of affected hand, thumb, and fingers (cylinder distortions of hand and finger fascia)

B. Repetitive squeezing of different portions of forearm (cylinder distortions of cylindrical antebrachial fascia) followed by squeezing and twisting of affected hand, thumb and fingers (cylinder distortions of hand, thumb, and finger fascia)
3. Negative Tinel's sign
4. Normal EMG
5. No muscle atrophy even in long-standing cases

Treatment of True Carpal Tunnel Syndrome

Goal of treatment: Stop median nerve impingement by untangling cylinder distortions of wrist flexor retinaculum and correct hand and finger cylinder distortions. Note that carpal tunnel surgery may be necessary in recalcitrant cases to obliterate cylinder distortions of the retinaculum.

Three steps of FDM treatment:
1. Double thumb cylinder technique of flexor retinaculum
2. Double thumb cylinder technique of palm
3. Indian burn cylinder technique of thumb and fingers

To treat the flexor retinaculum, locate area of most discomfort and place tip of one thumb laterally and one thumb medially on the anterior wrist. The medial thumb applies firm pressure and pulls the retinaculum medially while, at the same time, the lateral thumb pulls laterally. Hold thumbs in this position as long as possible or until release is felt (characterized as a diminishing in tautness of tissues as overlapping fascial coils untangle). Next, change position of thumbs so that one pulls retinaculum proximally and the other pulls it distally. Hold tension until there is a release. Note that it may be beneficial to treat multiple areas of the retinaculum.

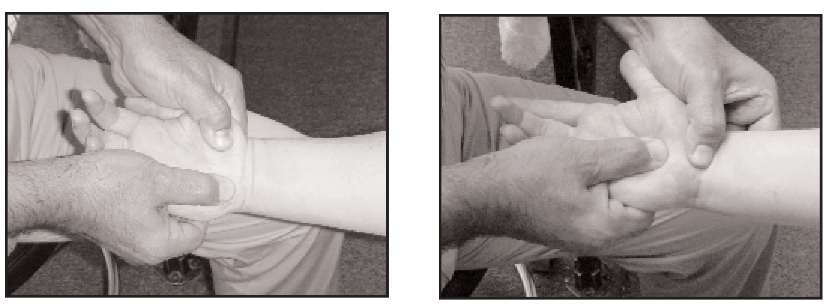


Figure 14-9. Double Thumb Technique of Deep (left) and Superficial (right) Layers of Wrist Flexor Retinaculum

Palmar cylinder distortions are also treated with double thumb cylinder technique in a similar manner as the retinaculum (in particular, the thenar eminence should be given special consideration). Note that in patients unresponsive to this approach, double thumb CCV of the thenar eminence is another option. Finger cylinder distortions are treated with Indian burn technique, which is discussed under the subheading *Thumb and Finger Pain*.

Treatment of Carpal Tunnel-Like Syndrome

Goal of treatment:

1. Identify and correct associated regional fascial distortions
2. Correct forearm fascial distortions
3. Correct wrist, hand, thumb and finger cylinder distortions

Note that carpal tunnel surgery is unlikely to be effective in eliminating symptoms of carpal tunnel-like syndrome because cylinder distortions of the flexor retinaculum are only a minor clinical consideration.

In CTLS most of the symptoms are not generated from a solitary localized distortion (such as the wrist flexor retinaculum) but involve other far-extending fascial connections as well. It is for this reason that the shoulder should be examined first and loss of internal rotation should be suspected. If that is the case, then that structural problem should be dealt with (particularly the SCHTP and anterior and posterior shoulder triggerband pathways).

Folding distortions of the radio-ulnar interosseous membrane, forearm intermuscular septum, and of the interphalangeal joints are other types of distortions common in CTLS (and TCTS). They are so common that folding technique should be performed on these joints regardless of whether there is evidence of folding distortions. If the distortion is present, the treatment will be corrective; and if not, then the fascia will simply unfold and then refold, or refold and then unfold, back to its resting state.

In CTLS, ascertaining whether the principal underlying distortion is a triggerband or cylinder distortion is essential in directing the focus of treatment. Body language again helps — sweeping motion of fingers along the anterior forearm means triggerband component to syndrome, whereas sweeping motion of palm over forearm or repetitive squeezing of forearm means injury is primarily cylinder in nature. Clinically, cylinder CTLS is more common (approximately 90% of cases).

Triggerband CTLS is treated first with triggerband technique along the course of the anterior forearm. The starting point is at the distal edge of the bicipital aponeurosis and the pathway of treatment follows the course delineated by the patient's body language (terminating at flexor retinaculum).

Figure 14-10. Treatment of Triggerband CTLS (Anterior Forearm Triggerband Pathway)

Cylinder CTLS is treated first with Indian burn cylinder technique of the forearm. One hand is placed above the elbow and the other below it. Maximum traction is applied so that the proximally placed hand pulls proximally while the distally placed hand tractions distally. Once full traction is attained, the proximal hand rotates clockwise while the distal hand rotates counterclockwise. Traction and torquing are held until there is a release (lessening in the tautness of the tissues). Once the release occurs the forces are slowly terminated.

The hands are then repositioned more distally and the procedure repeated. Following that release the hands are again repositioned still more distally and the procedure is once more repeated. In this process the entire cylinder antebrachial fascia is *marched down* and engaged with Indian burn technique. If the clinical result is less than expected (i.e., there is no change in the patient's paresthesias) or there is a failure to achieve the subtle but perceptible release (overlapping coils untangling) the direction of hand torque is reversed and the entire procedure repeated. It should be noted that to correct extensively tangled forearm cylinder fascia, multiple treatment sessions may be necessary.

Figure 14-11. Marching Down Forearm with Indian Burn Cylinder Technique

Paresthesias of the following areas are then treated with the appropriate cylinder techniques:

Wrist	Double thumb of retinaculum
Hand	Double thumb of thenar or hypothenar eminence
Fingers	Indian burn of symptomatic phalanges

Carpal Tunnel Syndrome Treatment Expectations

Normally multiple treatment sessions are needed for resolution of carpal tunnel syndrome. Positive indicators of a successful treatment include not only absence of paresthesias and other symptoms, but a negative Tinel's sign and EMG (if they were positive prior to treatment). Failures of manipulative intervention occur because:

1. Diagnosis was incorrect and ineffective treatment choices were initiated
2. Applied techniques were not properly performed
3. Extent of pathology was too great to be corrected with current manipulative procedures

From a surgical perspective, distinguishing true carpal tunnel syndrome from carpal tunnel-like syndrome is critical. In one, the chance of operative success is high (TCTS), whereas in the other (CTLS), it is low. Everyone who treats carpal tunnel patients should note that a single individual may in the same forearm, wrist, and hand harbor both TCTS (median nerve impingement) and CTLS (more obscure symptoms). If that is the case, and there is failure of the manipulative treatments, then surgical intervention is expected to alleviate only some of the symptoms.

Note that cupping-with-movement techniques are showing promise in the treatment of both TCTS and CTLS, but the technicalities for consistent successful outcomes are still uncertain. (Particularly troublesome is getting the cups to maintain suction.)

Wrist Pain

Common wrist complaints that present to the orthopedic office include:

1. Pulling pain along tendons – particularly abductor and extensor pollicis longus (triggerbands)
2. Spot(s) of pain on bony prominence – most frequent locations include ulnar or radial styloid processes (continuum distortions)
3. Ache deep in wrist joint with sensation that it "hurts so good" with forced extension (refolding distortion)
4. Ache deep in joint which hurts with forced extension (unfolding distortion)
5. "Stuck" or "frozen wrist" – opposite hand grasps radius or ulna and initiates small jerking motions (tectonic fixation of wrist plus folding distortion of radio-ulnar interosseous membrane)

Triggerbands

Body language for wrist tendon triggerbands is a sweeping motion along axis of painful tendon with either index or middle finger. Typically, the sweeping motion is repeated several times with a fair amount of pressure applied directly onto the tendon.

Since tendon triggerbands are much more fibrous than most other banded fascial tissues, maximum force by the treating thumb is applied during triggerband technique. The direction of treatment is from distal to proximal and should follow along the course of the tendon. In long-standing cases, especially those exhibiting calcified tendonitis, multiple treatment sessions may be needed. Do not be concerned about using too much force!

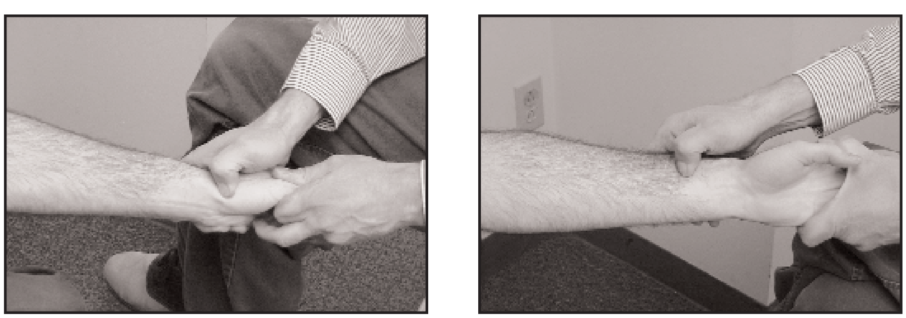


Figure 14-12. Treatment of Wrist Tendon Triggerband

Continuum Distortions

Radial and ulnar styloid continuum distortions are often a painful accompanying complaint of patients with wrist tendon triggerbands. If both are present in the same wrist, treat the triggerband first and then the continuum distortion.

In treating the radial styloid continuum distortion, it is best to first adduct the wrist to place the thumb onto the distortion, and then to abduct the wrist during the process of continuum technique. In treating the ulnar styloid continuum distortion, it is best to abduct the wrist to localize the distortion and then adduct it during continuum technique. Note that wrist continuum distortions (with the exception of greenstick fractures of the long bones) tend to be of the inverted subtype, meaning they may need to be re-treated several times.

Folding Distortions

Refolding and unfolding distortions of the wrist both present with an aching deep in the joint. However, they can be distinguished from each other by asking the seated patient to lift himself/herself up off the exam table with his/her wrists extended. Those patients that say, "It hurts, but somehow feels good" have refolding distortions, while those patients that flinch and/or refuse to comply with the request have unfolding distortions.

Refolding distortions are treated with compression/thrusting manipulations. The wrist is extended and repetitive quick compression thrusts are directed into different portions of the wrist joint. A successful treatment occurs when:

1. A click or series of clicks are heard
2. There is diminished pain and increased strength while lifting off exam table with wrists extended

Unfolding distortions are treated with either whip technique (wrist is tractioned distally and suddenly snapped into flexion or extension), or traction/extension method (wrist is tractioned, then fully extended while maintaining traction, followed by a smooth distally directed thrust). A successful treatment is evident when:

1. Pop or several pops are heard or felt
2. Biting pain is gone when lifting off exam table with wrists extended

Tectonic Fixations

Following orthopedic treatment of a Colles' fracture, many patients are left with diminished pronation and supination. This is because of:

1. Folding distortions of radio-ulnar interosseous membrane (see Figure 9-1)
2. Tectonic fixations of radial/carpal, ulnar/carpal, and carpal/carpal articular capsules

Left uncorrected, this life-long wrist stiffness becomes what is commonly referred to by patients as a *frozen wrist*.

Tectonic fixations of the articular capsules occur secondary to casting which inhibits synovial fluid circulation. Body language of tugging or jerking at the wrist is indicative of its presence. Treatment consists of:

1. Correcting radio-ulnar interosseous membrane folding distortions
2. Slow tectonic pump of wrist (multiple directions)
3. Shearing manipulative thrust of distal radius and/or ulna on carpal bones (tectonic technique)

Slow tectonic pump is performed by slowly and deliberately forcing the wrist through a semi-circular range of motion (flexion, extension, abduction, adduction, supination, and pronation) with firm compression force focused into wrist. Ten cycles or so should be completed in each position. Tectonic manipulation of the wrist articular capsules is accomplished with a shearing compression/thrusting of the distal radius and ulna into the hand. When successful, a slide/clunk will be heard as the capsule glides and synovial fluid floods between the previously poorly lubricated surfaces. Note that a wet heating compress applied prior to tectonic technique facilitates synovial fluid circulation. Objectively, the results of FDM technique is restoration of supination and pronation. Following manipulative correction of a frozen wrist, exercises are prescribed – not to increase muscle strength but to enhance synovial fluid circulation and to keep the articular capsule from becoming stuck again. Several aggressive treatment sessions are generally necessary for complete resolution.

Hand Pain

Treatment sequence for hand pain includes:

1. Differentiating injury into principal distortion components
2. Correcting distortions *one by one* with appropriate techniques

Triggerbands of the hand are common, short (some as tiny as one-half inch long), and originate and terminate in the hand itself (although some continue onto fingers). Please note that palmar triggerbands occur deep within the fascia so the application of maximum force is generally necessary for a successful result. Continuum distortions are palpated under and along the carpal bones and just as with triggerband technique, maximum force is often necessary for correction.

Aching deep in the hand is indicative that folding distortions are present. Since in this compact area of the body it is often difficult to distinguish between unfolding and refolding distortions, both unfolding and refolding techniques should be applied if a folding distortion is suspected. Typical folding treatment steps include:

1. Compress and thrust carpal bones together - physician wraps fingers and thumb around patient's wrist and repetitive quick squeezing thrusts are made. Note that the direction of thrusts should be varied to engage different joints (treating hand can be thought of as a nutcracker!)

2. Compress and then thrust metacarpal bones together in a similar fashion
3. Compress and thrust metacarpal-phalangeal joints (the knuckles) together as described above
4. Treating hands grasp patient's hand so thumbs are on dorsum (touching together at the first metacarpal-phalangeal joint) as fingers wrap around to palm. Quick and repetitive shearing thrusts are made to force selected metacarpal bone away from adjacent metacarpal bone (non-thrusting hand stabilizes, i.e., holds adjacent metacarpal bone from moving during procedure). Direction of thrust is varied to unfold or refold deep and superficial palmar interosseous membranes and articular surfaces of wrist and hand.
5. Place treating thenar eminences over patient's thenar and hypothenar eminences. Wrap fingers around to dorsum of hand. Fingers and non-thrusting palm stabilize adjacent metacarpal bone. Thrust from treating hand is focused into targeted metacarpal bone to force it into or away from adjacent metacarpal bone (refolds or unfolds interosseous membrane)

Cylinder distortions are clinically suspected when patients complain of *tingling*, and are often associated with the following body language — squeezing of hand with opposite thumb and middle finger, followed immediately by sweeping motion of thumb along either the palm or dorsum of hand. Treatment is with double thumb cylinder or double thumb CCV technique.

Hand tectonic fixations often occur following casting and feel to the patient as if the hand is *stiff* and *needs to crack*. Treatments include rocking the stiffened joints back and forth several times (slow tectonic pump) followed by shearing thrusting manipulations (many are similar to folding thrusting techniques). One example is described here for left fourth or fifth metacarpal tectonic fixation (when manipulation is successful a pop is heard):

1. Thenar eminence of doctor's right hand is placed over dorsum of patient's left hand
2. Treating fingers reach around hand and grasp palm so that fourth or fifth metacarpal bone is firmly held
3. Thrust is made by doctor's wrist quickly adducting (snapping movement)

Thumb and Finger Pain

Sprains of the thumb generally involve triggerbands of the thenar eminence. First treat those that inhibit extension, then treat those affecting flexion. Continuum distortions of the thumb are typically found at the first metacarpal-phalangeal joint. To access the affected ligamental transition zone, the afflicted thumb should be placed into either abduction and/or extension (this allows space for the treating thumb tip) while performing continuum technique.

Another injury to the thumb is called *triggerband thumb*. This is a refolding injury that occurs at the first metacarpal-phalangeal or trapezium-first metacarpal joint secondary to performing triggerband technique. Treatment is refolding technique (repetitive compression/thrusting into first metacarpal-phalangeal joint) or continue to treat patients with triggerband technique (refolds capsule in the position in which it was injured!).

Tectonic fixations of the trapezium-first metacarpal joint often occur secondary to immobilization (particularly from wearing thumb-spica splint) or even from holding the thumb in one prolonged position, such as from driving a car for long periods of time. To patients, the thumb feels *stuck* or *needs to pop*. If the joint aches, this means there is a concurrent refolding distortion also present. Treatment for both tectonic fixations and refolding distortions is by adducting doctor's wrist to introduce a compression/shearing force into the dorsum of the trapezium-first metacarpal joint (see photo below). Note that a successful treatment results when the joint slides and a pop or clunk is heard.

Figure 14-13. Tectonic/Refolding Technique of "Stuck Thumb"

Anatomically, finger triggerbands tend to wrap around the digit several times before terminating at the distal tuft; so for an effective treatment the twist must be palpated and corrected along its entire winding course. Stubbed fingers have two etiologies: continuum distortions and refoldings (which are more common). Continuum finger sprains are treated with continuum technique in which the most distal aspect of the thumb-tip is used to make the correction. Folding distortions are treated with either compression/thrusting (refolding distortions) or traction/thrusting (unfolding distortions) manipulations. If uncertain which is present, first refold then unfold the affected joints.

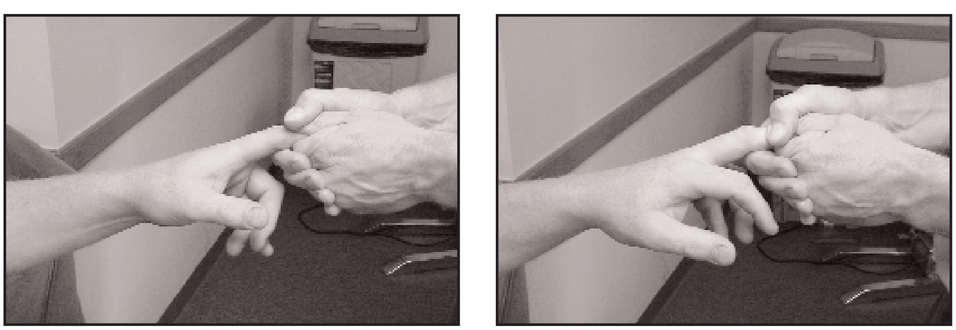


Figure 14-14. Unfolding Manipulation of Fingers

Cylinder distortions of finger and thumb (symptoms include numbness and tingling) are commonly associated with TCTS and CTLS and are treated with Indian burn cylinder technique. To treat, doctor's fingers of one hand firmly grasp distal portion of symptomatic segment, as fingers of other hand firmly grasp proximal portion. Traction is initiated, i.e., proximal hand pulls proximally and distal hand pulls distally. One hand then twists finger clockwise, while other hand twists it counter-clockwise. Force is held until release. If symptoms persist, apply traction again and reverse direction of twisting.

Figure 14-15. Indian Burn Cylinder Technique of Finger

Tectonic fixations of the metacarpal-phalangeal and interphalangeal joints are clinically appreciated when patient complains that their finger joints are *stiff*. Treatment is with a neutral thrust manipulation in which the phalanx is grasped and rocked back and forth until the joint *pops* or *cracks*.

Osteoarthritis of the fingers is treated in the following fashion:

1. Triggerband technique along lateral and medial aspects of affected fingers
2. Gentle refolding manipulation of interphalangeal joints
3. Gentle unfolding manipulation of interphalangeal joints
4. Continuum technique on spot(s) of pain

Triggerfinger is a condition in which a finger joint (usually the proximal interphalangeal) becomes stuck in the flexed position. Often the patient must pry the finger into extension with the opposite hand. This is not only a cumbersome condition but a painful one as well. FDM etiology is:

1. Triggerbands of flexor tendons within palm of hand
2. Folding distortions of metacarpal-phalangeal joints, proximal interphalangeal joints, and distal interphalangeal joints

Treatment of triggerfinger consists of:

1. Vigorous and deep triggerband technique from proximal to distal along involved palmar flexor tendons
2. Refolding manipulations of metacarpal-phalangeal and interphalangeal joints
3. Quick and aggressive unfolding manipulations of metacarpal-phalangeal and interphalangeal joints

Chapter 15

LOWER EXTREMITY COMPLAINTS

HIP PAIN

Fractured hips generally respond well to orthopedic treatment (surgical pinning or hip replacement), so the discussion here will center on non-traumatic, non-infectious, and non-malignant hip pain seen commonly in the office setting. Often these patients are diagnosed with *bursitis*, *arthritis*, or just plain old *hip pain* or *hip strain*[1] and typically respond poorly (or not at all) to standard treatments (physical therapy, anti-inflammatory drugs, steroid injections, rest, and exercise).

The majority of run-of-the-mill hip pain patients have the following presentations:[2]

1. Pain or pulling along greater trochanter (triggerbands)
2. Pulling pain from sacroiliac joint inferiorly (triggerbands)
3. Ache or pain in middle of buttock (herniated triggerpoint)
4. Pain in spot(s) on lateral hip (continuum distortions)
5. Sharp pain on sacroiliac joint (continuum distortions)
6. Spot(s) of tenderness on sacrum (continuum distortions)
7. Aching deep in hip joint (folding distortions)
8. Aching of sacrum (folding distortions)
9. Pinching or squeezing discomfort at gluteal/posterior thigh junction (cylinder distortions)
10. Hip feels stuck or tight (tectonic fixations)

Triggerband Hip and Sacral Pain

Triggerbands along the greater trochanter are short and deeply situated and respond well to a vigorous and deep application of triggerband technique. Body language consists of:

1. Index and middle fingers forcefully shoved into the proximal lateral thigh, and
2. Fingers make short, repetitive, sweeping motion proximal to distal and distal to proximal along lateral proximal hip[3]

[1]If diagnosis is *iliotibial band strain*, see *Thigh Pain*; if *spinal stenosis,* see Chapter 10.

[2]Note that since patients tend to call *sacral* pain *hip* pain, it is included in this section.

[3]If body language consists of sweeping fingers along entire lateral thigh, this indicates the lateral thigh (iliotibial band) triggerband is involved. See *Thigh Pain*.

During treatment patient is standing sideways to physician, with his/her low back bent away from physician. Patient's elbow is flexed and forearm leans on counter or table top for comfort and support. Treating thumb applies force directly onto most superior aspect of triggerband (as determined by patient body language) and fibers are corrected in a proximal to distal direction. Several sweeps are generally necessary and several office visits are typically required for complete resolution.

Sacral triggerbands have a pathway that runs from the PSIS (posterior superior iliac spine) along the sacrum to the coccyx. Treatment is with patient standing, bent forward and elbows flexed and resting on a counter or table top. Physician stands directly behind patient and force is applied with thumb to the PSIS and dragged inferiorly and medially to sacrum or coccyx.

Figure 15-1. Treatment of Sacral Triggerband

Hip Herniated Triggerpoints

The only herniated triggerpoint of the hip currently recognized is the gluteal bull's-eye. It is found in the center of the buttock (or slightly inferior or lateral) and its presence is appreciated by a distinct body language — thumb or several fingers pushing deep into the gluteal muscles (see *Body Language and Treatments for Low Back Pain*). Please note that about half the patients with this distortion complain of hip pain while the other half say they have low back pain.

Treatment is with herniated triggerpoint therapy, i.e., treating thumb physically drives underlying protruding tissue back below fascial plane. The gluteal bull's-eye HTP can be corrected with the patient either prone or standing. If treatment is performed standing, patient is positioned leaning over counter with doctor standing behind (see glossary term *Bull's-Eye Herniated Triggerpoint*). If treatment is done prone, then table should be lowered so that physician can lean directly over gluteal area with elbows locked in extension (non-treating hand cradles treating hand to help push). In either position a large amount of force is necessary for correction. As the protruding tissue is reduced, remember to milk it during release.

Hip and Sacral Continuum Distortions

Body language of hip and sacral continuum distortions is obvious — pointing with one finger to spot or spots of pain. Hip continuum distortions tend to be centered either on the lateral hip (greater trochanter) or on the iliac crest. Sacroiliac joint continuum distortions form right on the PSIS, whereas sacral body continuum distortions generally occur over the lateral or median crest.

Treatment of hip and sacral continuum distortions is essentially the same as with all other continuum distortions, i.e., firm force from thumb is directed into most exquisite points of tenderness and held until stuck portion of transition zone shifts. When successful, patient expresses an immediate and appreciable reduction in discomfort. Preferred treatment position is patient standing and flexed over a counter with bent elbows supporting weight (see *Body Language and Treatments for Low Back Pain*). Less desirable positioning is with patient prone. Since sacroiliac joint continuum distortions are of the inverted subtype, following continuum technique thrusting manipulation with scissors technique is advised. Scissors technique is an adjunct therapy to continuum technique since it helps keep the newly shifted zone from becoming stuck again. In addition it corrects tectonic fixations which have formed as a result of limited movement secondary to continuum distortions (or triggerbands).

Hip and Sacral Folding Distortions

Sacral folding distortions should be suspected if a patient complains of an achy discomfort in his/her hip or low back and then places the back of the hand or fist over the sacrum. Treatment is with modified scissors technique. The thrusting hand is placed over the mid-lateral sacrum (as opposed to being directly on the sacroiliac joint) and the thrust is directed laterally AND inferiorly. A successful manipulation is evident when each of the four sacral segments are manipulated (i.e., unfolds) and the accompanying *pops* are heard.

Hip joint (femoral-acetabular) folding distortions are particularly common, result in a high degree of morbidity, and are a leading cause of non-fracture hip replacement surgery. The articular capsule and pericapsular fascia provide a great deal of stability and shock absorption for the hip, but through the years must endure a tremendous number of multi-directional and occasional extreme forces. Therefore these tissues tend, over time, to become injured by traction or compression forces and develop unfolding or refolding distortions . . . either of which, left uncorrected, tend to be permanent.

To treat, first differentiate the folding distortion into either unfolding or refolding. This is done by three methods:

1. Mechanism of injury (MOI)
2. Heightened awareness of pain (HAP)
3. Reproduction or magnification of pain on exam

The following chart illustrates these three points:

Differentiating Characteristics	Unfolding	Refolding
MOI	Traction force (hip was pulled)	Compression force (femoral head jammed into acetabulum)
HAP	Feels best in morning Aches most in afternoon and evening	Stiffest in morning Less aching in PM
Pain on Exam	Traction feels good Compression aggravates pain	Compression feels good Traction hurts

Unfolding hip distortions are treated in the following fashion:

1. Unfolding manual manipulative techniques
2. Unfolding inversion therapy techniques for stubborn (i.e., anatomically more involved) distortions

Refolding hip distortions are treated with :

1. Refolding manual manipulative techniques
2. Repetitive compression forces (e.g., jumping on trampoline)

From a manipulative perspective either of these subtypes of hip folding distortions is physically draining to correct because the leg and thigh must be lifted to direct forces into the femoral head/acetabular joint. In unfolding treatments, traction is followed by a quick traction/thrusting manipulation. When successful a loud pop is heard and felt. Refolding techniques are done so that the hip is pushed into the pelvis. Compression is initiated followed by a thrusting of the femur into the acetabulum. A successful result occurs when a click or crack is heard.

Figure 15-2. Hip Unfolding Manipulation

Stubborn unfolding distortions (i.e., those that won't unfold with manual manipulation) are best treated with inversion therapy followed by thrusting manipulation. Inversion therapy is done by a physical therapist who is skilled and experienced with this method. In this procedure the patient is first slowly inverted (providing there are no contraindications) and the hip is rocked forward and back by the therapist. Whole body rotation (both assisted and resisted) is introduced while patient hangs two-legged. Over several treatment sessions the inversion process progresses until patient tolerates hanging by one leg. The hip is then gently or vigorously rocked as he/she dangles. For this procedure to be successful, it is critical for the therapist to understand that the anatomical purpose of the treatment is to untorque and unfold the pericapsular tissue.

Clinically, inversion therapy allows for sustained unfolding of the hip joint and augments traction/thrusting unfolding manipulation — but does not replace it. So, to maximize the unfolding process, following inversion therapy, the patient should (immediately or at least in the next two hours) be manipulated by the physician with aggressive traction/thrusting technique.

Stubborn refolding hip distortions may respond to 10 to 15 minutes daily jumping on a trampoline. Bouncing should be modified to include landing on feet, knees, and buttocks so that different portions of the hip joint are engaged. Note that following bouncing is the best time to reinitiate thrusting refolding techniques, and again, a positive result is appreciated when there is a click or clunk.

Gluteal/Posterior Thigh Junction Cylinder Distortions

Cylinder distortions of the hip itself are rare and can be treated with double thumb cylinder technique or cupping-with-movement. However, gluteal/posterior thigh junction cylinder distortions are much more common and are prevalent in running athletes and the elderly. Most patients use the verbal description of *pinching* and show a body language of a sweeping motion back and forth by the index or middle fingers along the gluteal/posterior thigh junction.

Treatment is with one of three methods:
1. Double thumb cylinder technique
2. CCV double thumb cylinder technique
3. Cupping-with-movement

For reasons still not clear, elderly persons seem to respond best to double thumb cylinder technique (i.e., with traction of the coils) whereas younger people (particularly athletes) tend to respond to CCV double thumb cylinder technique (see Figure 7-7). In either case, force is held with treating thumbs until there is a release (i.e., the coils untangle). Note that several sessions may be needed and patients should not be over treated (don't attempt to make them perfect in one office visit because the treatment itself may further tangle the coils).

In those patients who fail double thumb technique, apply it a second time with more force. If treatment fails again, then use CCV technique. In patients who are first treated unsuccessfully with CCV, treat again with more force. Should that fail, then use traction double thumb.

If both double thumb and CCV double thumb techniques are unsuccessful, then cupping-with-movement is the next option. In this approach plastic cups are suctioned onto the gluteal/posterior thigh junction so that one or two cups are placed on the inferior gluteal area and one or two cups are positioned on the proximal posterior thigh. The cups are left on five to ten minutes and patient is instructed to move the hip repetitively through its range of motion.

Tectonic Fixations of Hip and Sacrum

Sacral tectonic fixations are poorly verbalized by patients but the word *stuck* is usually in the description somewhere. In addition, a body language of pushing or pulling on the sacrum with one or both hands is often observed as they attempt to describe their discomfort. If a sacral tectonic fixation is suspected but its presence is only questionable, treatment should still be instigated. This is done with scissors technique (see *Body Language and Treatments for Low Back Pain*) modified so that both thenar and hypothenar eminences of the thrusting hand are placed against the mid-sacrum and the thrust is directed laterally across the sacrum. A successful manipulation is obvious because at the termination of thrust three or four loud pops or clunks will be heard.

Tectonic fixations of the femoral/acetabular joint are also described by patients as the hip feeling *stuck*. These come in two varieties:

1. Subjective hip tectonic fixations (SHTF)
2. Objective hip tectonic fixations (OHTF)

Patients with SHTF have no loss of range of motion and only feel stuck. Patients with OHTF not only feel stuck, but have obvious loss of range of motion.

Treatment of SHTF is first with frogleg and then reverse frogleg manipulation (see Figure 8-5). OHTF are also treated with frogleg and reverse frogleg tectonic techniques but FIRST slow tectonic technique of the hip must be done. This is accomplished by placing patient in frogleg position and slowly circumducting the head of the femur in the femoral/acetabular joint. Once physician is sufficiently fatigued then patient is placed into reverse frogleg position and slow circular motions with compression are done. Following reverse frogleg slow tectonic pump, frogleg slow tectonic pump is reinitiated and followed again with reverse frogleg slow tectonic pump.

Slow tectonic pump is therefore repeated until there is doctor fatigue. Note that having a second or third doctor present is helpful since each can take turns. Once a sufficient amount of pumping is thought to have occurred, frogleg and reverse frogleg thrusting manipulations are attempted. Again a successful result is evident when a pop or slide clunk is heard or felt. And as with all severe tectonic fixations, correction is hampered because of thickened synovial fluid, meaning that multiple treatment sessions are necessary for resolution.

A theoretical treatment involves injecting either artificial synovial fluid[4] or the patient's own synovial fluid from a non-affected joint into the affected hip joint. Should this be done it would be prudent to first extract whatever fluid possible from the tectonic joint (since it is thicker and inhibiting fluid circulation) before replacing it with new fluid. During the procedure and immediately thereafter, it is recommended that slow tectonic pump be performed.

Thigh Pain

Most cases of non-osseous, non-malignant thigh pain are orthopedically relegated to the following classifications:

1. Muscle strains (pulled muscles)
2. Radicular pain
3. Spinal stenosis

Note that radicular pain (under *Sciatica*) and spinal stenosis are discussed in Chapter 10.

Muscle strains or *pulled muscles*, in the FDM, are considered to be soft tissue injuries which can be differentiated into separate and distinct pathological categories so that effective and specific treatment choices can be initiated. In thigh pain the most common clinical presentations include:

1. Pulling pain along anterior thigh (triggerbands)
2. Pulling pain along lateral thigh (triggerbands)
3. Pulling pain along posterior thigh (triggerbands)
4. Pulling pain just above patella (triggerbands)
5. Aching deep in portion of thigh musculature (folding distortions)
6. Jumping and/or diffuse aching pain in thigh (cylinder distortions)

Thigh Triggerbands

Clinically, triggerbands are the most frequently diagnosed fascial distortion in patients who complain of thigh pain. All are treated essentially the same way — that is with triggerband technique. The body language is of significance in determining the pathway involved and also the direction of treatment. For optimal results, during treatment the patient is placed into position of pain, which allows the physician to anatomically correct as many distorted fascial fibers as possible. For instance if he/she can solicit maximum magnification of pain by standing with hip flexed, knee extended, and foot resting on a chair; then this position should be duplicated during treatment.

[4]Viscosupplementation injectables include Hylan G-F 20 and Sodium Hyaluronate

Body language also indicates direction of treatment. For instance, if while describing the discomfort the patient's fingers make a sweeping motion from proximal to distal, this indicates that triggerband technique should begin proximally and worked distally. If, on the other hand, sweeping motion is from distal to proximal, then treatment should begin distally and pathway followed proximally. If, however, both a proximal to distal and distal to proximal body language are shown, then the first motion demonstrated is the preferred direction of treatment.

Anterior thigh triggerbands are often the cause of what so many athletes call *quadriceps pull*. The course of the pathway is down the center of the thigh and treatment is generally from superior to inferior. Starting point is approximately two to three inches below the innominate bone and ends two to three inches above the patella (on the quadriceps femoris tendon). It should be noted that unlike posterior and lateral thigh triggerbands, the anterior pathway is deeply situated anatomically, meaning that a good deal of force is needed for correction.

The lateral thigh triggerband, also known as the iliotibial band triggerband, like the posterior thigh pathway, plays a major role in both thigh pain and low back pain. In addition, since fibers of the iliotibial band are a structural component of the mechanical sensory system, they are involved in proprioception and balance (see Chapter 10, *Post-Stroke Spastic Paralysis* section).

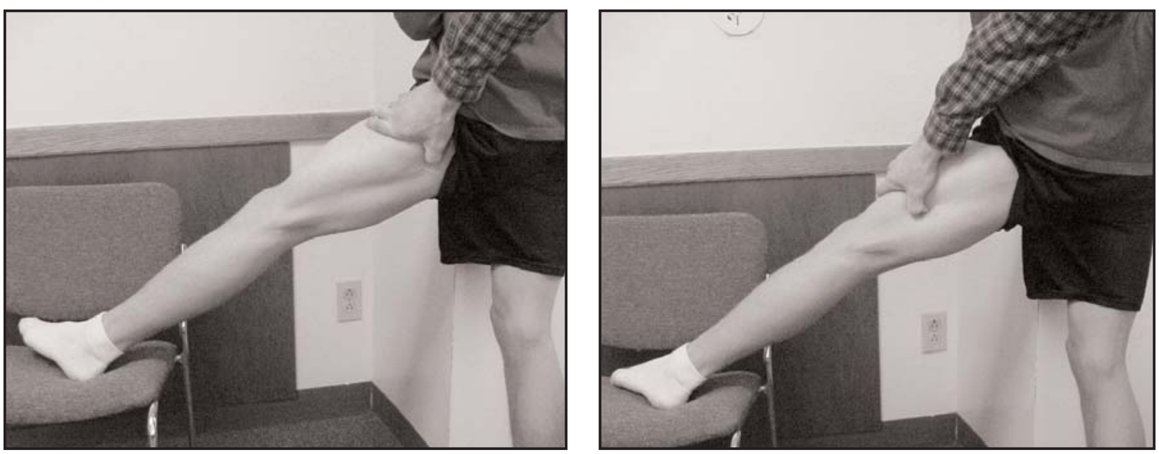


Figure 15-3. Treatment of Lateral Thigh Triggerband from Superior to Inferior with Thigh in Position of Pain

The lateral pathway extends from the proximal lateral leg (2" below knee) and courses superiorly, following along the iliotibial band to the sacroiliac joint. From there it veers medially to the lateral edge of the sacrum and finally dives inferiorly to the coccyx. Treatment consists of beginning either at the lateral leg or on the lateral edge of the sacrum (depending on patient body language). Firm force is used as pathway is followed along its entire course. It should be noted that this is perhaps the longest triggerband in the body and thus is easily palpated. Triggerband technique is performed with patient prone or standing and leaning sideways against a counter (preferred position – see *Body Language and Treatments for Low Back Pain*).

The posterior thigh triggerband (like the lateral pathway) is responsible for a large amount of so-called back pain (see Chapter 12) and sciatica (see Chapter 10) but it also is a frequent cause of just plain old thigh pain and what athletes often call a *hamstring pull*.

Treatment is along entire pathway which begins two to three inches above the popliteal fossa and progresses superiorly to the sacroiliac joint. From there (just like the lateral thigh pathway) it veers medially to the sacrum and then dives inferiorly along the lateral sacral border to the coccyx. However, this pathway has variability, and with some injuries affected fibers involve those that progress both medially AND superiorly from the sacroiliac joint up onto the low back before diving down to the coccyx. Which fibers are twisted is obvious from both patient body language and palpatory finding (like the lateral pathway, the triggerbands are large). Treatment is performed with patient either standing (preferred) or prone.

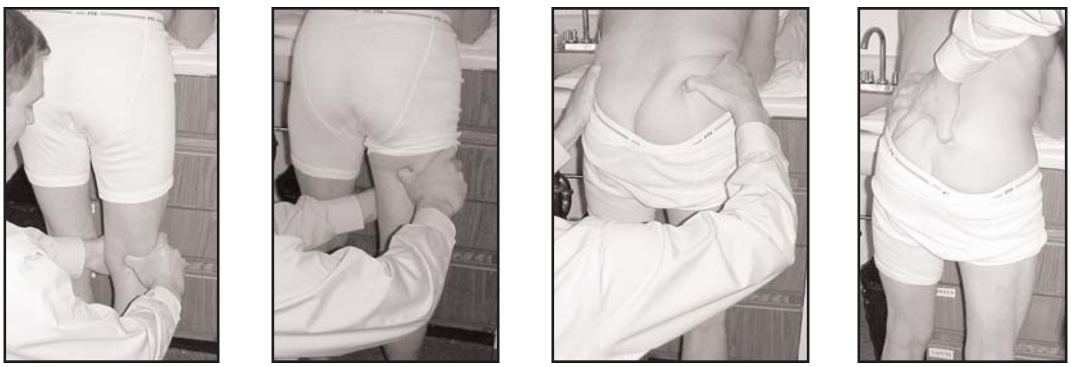


Figure 15-4. Treatment of Posterior Thigh Triggerband

The supra-patellar triggerband is short and its pathway follows along the quadriceps tendon. Body language for it consists of sweeping fingers proximally to distally (or vice versa) along the distal anterior thigh. Treatment is again with triggerband technique and can be done seated, standing, or supine (preferred position).

Thigh Folding Distortions

Body language of shoving three or four fingers into the lateral or posterior thigh and rocking them back and forth is the quintessential sign of an intermuscular septal folding distortion. The diagnosis also can be made from the verbal description of aching pain deep in a portion (but not all) of the thigh. Not only do thigh intermuscular septum folding distortions inhibit athletic performance, they also cause aching that interferes with sleeping.

Treatment is with folding technique in which patient is prone, the painful thigh is crossed over opposite thigh, and a shearing force is introduced into the intermuscular septum. A successful manipulation is evident when a pop or click is felt or heard coming from what seems like the thigh muscles. It should be noted that this is often a difficult manipulation since the forces must be perfectly directed into the septum — meaning many attempts are often necessary and the angle of thrust should be slightly altered following each unsuccessful effort.

Figure 15-5. Thigh Intermuscular Septal Folding Manipulation

Thigh Cylinder Distortions

Any time patients say the pain is *jumping* from one area of the thigh to another, this indicates without doubt, a cylinder distortion is present. However, cylinder distortions can have many presentations and in a large muscular area such as the thigh, they are responsible for:

- Diffuse aching throughout entire thigh (patient repetitively squeezes thigh)
- Aching in a broad area of thigh (palm sweeps over involved area)
- Tingling, paresthesia or numbness

Treatment of diffuse thigh cylinder distortions has in the past been with Indian burn or squeegee cylinder techniques, whereas more focally involved distortions were treated with double thumb or double thumb CCV techniques. However, recently it has been shown that cupping-with-movement is the most effective approach. The details of cup placement are still uncertain but it is thought that suctioning one or two cups above the distortion and one or two below it with accompanying movement (such as walking and repetitively flexing and extending the thigh) forces overlapping coils to untangle. Note that cups should be left on five to ten minutes and several sessions may be required.

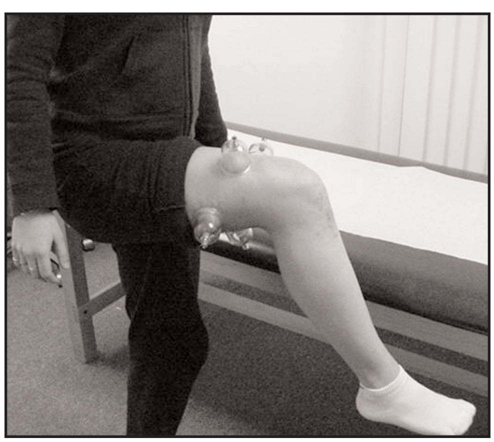


Figure 15-6. Cupping-With-Movement

KNEE SPRAINS

Patients who present with a traumatic injury to the knee (but no fracture or dislocation present) can be thought of as having *knee sprains*. Familiar orthopedic terms used to describe this injury include:

- Strain (mild soft tissue injury)
- Sprain (more extensive soft tissue injury)
- Ligamental tear (instability of joint)
- Meniscal tear (instability of joint)

In FDM, all of the above can be thought of as fascial injuries which potentially can be manually corrected.

In so-called *strains* the knee is rarely swollen. Pain typically occurs in the following patterns:

1. Sharp pain in one or more spots on anterior/medial or anterior/lateral border of knee
2. Along a well demarcated line (on either anterior/medial knee or anterior/lateral knee)

Body language of pointing with one finger to source of pain is indicative that the underlying pathology is a continuum distortion, whereas a sweeping motion of a finger or two along the medial or lateral knee means a triggerband is present. To treat, knee should be partially flexed and treating thumb brought directly into contact with the fascial distortion. Either continuum or triggerband technique is then done depending on the distortion involved. Since knee ligaments are particularly fibrous, copious force is required for success.

From a practical point of view, knee *sprains* are considered to be similar to knee *strains* except that swelling is present. If swelling is one-sided, it is likely that the underlying distortion is either a triggerband and/or a continuum distortion, since both occur in about equal numbers. Although swelling is generally thought to imply a greater degree of underlying pathology, clinically this is not the case. Treatment of one-sided swollen sprains is identical to that described for triggerband or continuum knee strains. If, however, swelling is *prominent* and involves both the lateral and medial aspects of the knee, this indicates that an unfolding distortion is present. Treatment of these injuries consists of traction/thrusting of knee in the direction that it was injured. Note that a large amount of force should be used and a successful treatment is appreciated when a pop is heard at the instant of thrust. It should be made clear that this procedure should not be painful. If it is painful, that means that there are triggerbands and/or continuum distortions concurrently present that need to be corrected before folding technique is initiated.

Injured knees in which there is instability or about which patients say “it gives out” or “feels like it’s going to give out” are, within the FDM, considered to be unfolding distortions of knee capsule or pericapsular fascia. The reason the knee feels *weak* or that it is going to *give out* is that the capsule has been unfolded and contorted and can't refold completely. Therefore, the injured knee is anatomically in a state of near-dislocation and any motion that tractions the joint causes it to unfold past the point of normal unfolding (i.e., almost dislocates). Treatment is with vigorous unfolding/thrusting manipulation in the direction of injury (unfold and untorque the contorted fascial tissue — think of the *road map analogy*).

A successful unfolding/thrusting manipulation is immediate and obvious:
1. There is a large *pop* at instant of correction
2. Subjectively knee feels stronger
3. Objectively knee is stable (negative drawer, McMurray, and Lachman's tests)

It should be noted that some patients with knee folding distortions present only with an ache deep in the joint (there is no swelling, no sensation of weakness, and it doesn't feel as if it is going to *give out*). These injures can be either from unfolding or refolding distortions. They are differentiated from each other by:

1.	Mechanism of injury –	traction = unfolding injury
		compression = refolding injury
2.	Reproduction of pain –	pain with compression = unfolding injury
		pain with traction = refolding injury

Aching unfolding injuries (like other unfolding knee injuries) occur when the foot or leg becomes caught or bound and the knee tractions, twists and hyperextends. Treatment is similar to that described above except several office visits (or inversion therapy, including hanging by one leg for stubborn distortions) may be needed to completely unfold the capsule. Correction of the underlying pathology is considered complete when:
1. There is an audible pop from the knee during the treatment, and
2. Aching (particularly at night) no longer occurs

Refolding knee injuries occur when the knee is jammed (such as from jumping off a ladder) and the capsule refolds contorted and can't fully unfold. Treatment is with refolding technique, i.e., compression/thrusting techniques. The preferred method is with the patient supine and the joint bent at a 60° angle. The physician cradles the heel with his/her hands and interlaces the fingers around the plantar aspect of the foot. The knee is simultaneously stabilized by the doctor's chest and a compression thrust is made on the heel superiorly towards the knee. A successful treatment is appreciated when a click or clunk is heard. (See Figure 16-7 for similar refolding technique of ankle.)

Finally, cylinder knee sprains are less common than triggerband, continuum, or folding injuries and occur only when the knee and leg are held firmly in place (by a brace or tight wrap) and a rotating force is introduced. In contrast to folding patients who complain of aching or pain "deep in the joint," cylinder patients complain of diffuse discomfort "all over." Swelling may or may not occur, but can be impressive if present. Treatment is with either aggressive Indian burn or cupping-with-movement cylinder technique.

Frozen Knees

Knees in which flexion (and to a lesser extent extension) has been lost can be thought of as *frozen*. Those with loose bodies (joint mice) likely require surgery, but the rest typically do well with aggressive FDM treatments which eliminate the physical restrictions that are keeping the knee from bending.

Before beginning treatment it is helpful to determine the degree of restriction. This is done either by measuring the angle of maximum flexion with calipers or by looking at the functional movement. Progress of therapy can then be ascertained by comparing before and after abilities. Functional movements to consider include:

1. Knee to chest
2. Heel to buttock
3. Ability to squat

Knee to chest is the least specific of the three motions and requires that the person be able to stand and balance on opposite foot without falling. The foot is raised off the floor, knee is flexed, both hands grab the knee (fingers interlaced) and pull it towards the chest. A normal knee bends well beyond 90° and some individuals will be able to touch their knee to the chest. Comparison with opposite (and assumed non-injured) knee is helpful to appreciate how much loss of motion has occurred.

Heel to buttock is the most specific and most important of the functional tests. Although it also requires that a person be able to stand alone on the opposite foot, the opposite hand can reach out and grab onto a wall or other nearby structure for support. A normal knee will flex quickly during this motion and the heel can easily be brought up to touch the buttock. However, in a severely frozen knee the joint will not flex enough for the hand to even reach down and grab the ankle. The amount of motion loss can be assessed by a measuring tape or more easily by the number of fingers or fists shy it is of touching the buttock. (In this way it is obvious that a knee that is two finger breadths shy is not nearly as frozen as one that is two fists shy.)

Also, it is worthwhile to grade the speed of knee to buttock on a scale of zero to four and to watch for *lateral kick*. Normal motion allows the knee to flex so that the foot moves in a straight line from floor to buttock. However, if the knee is being physically restricted it instead is forced laterally half way through the heel to buttock motion (sometimes profoundly so).

Altered ability (or inability) to squat is yet another sign that the knee is not flexing properly and that fascial distortions are impeding motion. Watch closely the speed of squatting (compare right to left), but also look to see if the knee is forced laterally during the squatting motion (another example of lateral kick).

Acutely Frozen Knees

Acutely frozen knees are obviously easier to treat than chronically frozen knees since they lack triggerbands with adhesions and tectonic fixations. The types of fascial distortions present in acutely frozen knees are determined by mechanism of injury, verbal description of pain, and body language. Triggerbands, continuum distortions, and folding distortions are commonly found with these injuries and often all originate from a single event (no wonder the knee is frozen!). Typically the following distortions are treated in this order:

1. Popliteal continuum distortions
2. Popliteal triggerbands
3. Medial and lateral knee triggerbands
4. Unfolding distortions of knee joint

Popliteal continuum distortions and triggerbands are treated with patient prone. Both occur deep in the popliteal fossa and firm force is needed for correction. There will be little doubt on the patient's part when the continuum distortion is engaged by the treating thumb. To find the precise location, the thumb should be wormed through the tissue until it abuts against the popliteal surface of the femur. Small rotating or pivoting movements of the thumb-tip will bring it into contact with the distortion. Force is held until release (shifting of stuck transition zone). Popliteal triggerbands are located in a similar fashion and are treated by ironing out the wrinkled fibers of the oblique popliteal ligament.

Figure 15-7. Continuum Technique of Popliteal Continuum Distortion

In an acutely frozen knee, medial and lateral knee triggerbands are found in one or more of several ligaments surrounding the lateral and medial aspects of the joint. Treatment is directed by body language and should be firm (note that this is a a painful procedure). Functional testing is suggested afterwards to demonstrate objective improvement (i.e., it shows treatment is working).

Once continuum distortions and triggerbands have been corrected, folding technique is initiated. Although the exact direction of thrust is determined by the mechanism of injury (should be applied at the same angle in which the knee was hurt) this angle is often not known. If such is the case, the most likely unfolding manipulation to be successful is the one performed from the frogleg position. In this procedure the patient is supine with the knee bent. The physician tucks the thrusting hand in the popliteal fossa while the non-thrusting hand clasps the ankle. Once the knee is fully relaxed a traction/thrusting force is quickly introduced into the knee from the posterior to anterior direction (which, depending on the position of the physician, can be either laterally or toward the ceiling). A successful manipulation results in a popping noise as the pericapsular tissue unfolds. (See Figure 15-2, note traction/thrusting forces can be focused into either hip or knee.)

Chronically Frozen Knees

Treatment of chronically frozen knees is similar to that of acutely frozen knees except that slow tectonic pump must be done and many treatment sessions are needed. A typical treatment protocol is shown below:

First visit — measure motion and treat:
1. Popliteal continuum distortions
2. Popliteal triggerbands
3. Medial and lateral knee triggerbands

Second visit — measure motion and treat/do:
1. Medial and lateral triggerbands
2. Slow tectonic pump of knee

Third visit — measure motion and do:
1. Slow tectonic pump of knee
2. Modified frogleg and reverse frogleg manipulations of knee (see Figure 8-5)
3. Refolding manipulation (from modified frogleg position)
4. Unfolding manipulation (modify treatment shown in Figure 15-2)

Fourth and subsequent visits — repeat actions of third visit

Should the knee remain frozen despite the above treatment, this means there are underlying folding distortions that have not been corrected and are keeping the tectonic fixations from resolving. In these stubborn injuries inversion therapy should be instigated by a physical therapist who is knowledgeable about the fascial distortion model and has experience with inversion therapy. Providing there are no contraindications, the patient is slowly hung upside down by the ankles and according to tolerance gradually progressed to hanging one-legged. Following inversion therapy, patient is sent back to the physician (preferably within an hour) for unfolding or refolding manipulative treatment.

Osgood-Schlatter Disease

Pain at the junction of the patellar tendon and the tibial tuberosity in an adolescent is the distinguishing characteristic of Osgood-Schlatter disease. Although orthopedically its etiology is unclear, in FDM it has two primary pathologic components: triggerbands and continuum distortions.

In the FDM, the formation of OSD results when physical forces cause micro-tears in the fibers of the patellar tendon (i.e., triggerband forms). The separated fibers are also twisted, which inhibits the flow of osseous material from the tibial tuberosity through the patellar tendon (roadblock effect). Since the pathway is blockaded, calcium and other bony materials become deposited within the tendon and ossification eventually becomes significant enough to be appreciated on x-ray and palpation.

Treatment of OSD is with both continuum technique (since the enlarged and deformed tibial tuberosity can be thought of as the *ultimate continuum distortion*) and triggerband technique. Triggerband technique should be applied first and directed onto the patellar tendon. Begin at the junction of the tendon with the tibial tuberosity and push the fibers back together in a distal to proximal direction.

Following triggerband technique, patient is asked to show where the knee still hurts. If he (or she) makes a sweeping motion along the tendon, triggerband technique should be repeated. If instead a finger is pointed to a spot of pain, then continuum technique should be done.

In either triggerband or continuum technique, optimum positioning for patient is either supine with knee bent at 60° angle or seated and knee flexed 90°. Note that several sessions are often necessary for complete alleviation of symptoms. If a splint or cast had been worn prior to treatment, frogleg and reverse frogleg tectonic technique of the knee is suggested before triggerband or continuum technique is initiated.

Leg Pain

Most lower leg complaints which don't involve fractures, tumors, or other organic etiology, can be classified in the following fashion:

1. Shin splints (triggerbands and continuum distortions)
2. Pulled muscles (triggerbands)
3. Bony contusions (continuum distortions)
4. Achy legs (folding and cylinder distortions)
5. Jumping pain (cylinder distortions)
6. Paresthesias or numbness (cylinder distortions)

Shin Splints

Shin splints come in two varieties: triggerbands and continuum distortions (triggerbands are more common). The two are differentiated by the patient's description of pain and body language. Triggerbands pull up (or down) the leg while continuum distortions hurt in specific spots. Note that a sweeping motion of fingers means triggerbands are present, while pointing with one finger to spot(s) of pain indicates the etiology is continuum distortions. Triggerband shin splints occur along the medial or lateral border of the tibia with the entire pathway contained within the leg itself. Treatment consists of finding the triggerband and correcting it along its course. Continuum distortions of the tibia or fibula rarely occur alone, and often are found in pairs or trios. As with other continuum distortions, treatment consists of guiding the limb into position of pain, applying direct pressure with treating thumb into point of maximum tenderness, and holding force until transition zone shifts.

Figure 15-8. Triggerband Treatment of Shin Splints

Pulled Muscles

Clinically, what most patients call "pulled muscles" are anatomically considered to be triggerbands (see Figure 9-4) and can be effectively treated with triggerband technique. This approach is of particular interest to running athletes since it negates the need for rest and gets them back into competition immediately. The most common leg triggerband pathways are:

1. Medial head gastrocnemius
2. Lateral head gastrocnemius
3. Medial calf
4. Lateral ankle
5. Medial ankle

Runners tend to get the first three and are treated standing with deep triggerband technique in a superior to inferior direction. The lateral ankle triggerband pathway is discussed in more detail in the Chapter 16 and rarely occurs in the absence of a sprained ankle. Interestingly, the medial ankle pathway rarely presents as a pulled muscle, but instead is found in fractured or sprained ankles in which the ankle is pinned, and during injury is kept from buckling medially. Starting point is at the sock level on the medial leg and its pathway courses inferiorly down the leg, around the medial malleolus, then along the medial foot to the great toe.

Bony Contusions

In the fascial distortion model bony contusions are considered to be inverted continuum distortions of the periosteum. In the leg they tend to occur from broad trauma, so continuum distortions are either multiple or cover a sizable portion of the tibia or fibula. In addition, ecchymosis and soft tissue trauma usually accompany bony injury. Treatment is with continuum technique directed into the most exquisitely sensitive portions of the injury. Note that several sessions are suggested if the area of contusion is large.

Achy Legs

Three distortions are responsible for so-called *achy legs*:

1. Intermuscular septal folding distortions
2. Interosseous membrane folding distortions
3. Superficial cylinder distortions (see Jumping Pain)

Although these are all distinct distortions, in the leg they have anatomical similarities because the superficial cylinder coils connect with the fibers of the intermuscular septa, which in turn connect with some fibers of the interosseous membrane. Therefore, patients often use the same verbal description for all three conditions (i.e., "achy leg pain"). However, each can be delineated by body language:

- IMS folding distortion – grasps medial or lateral head of gastrocnemius muscle and pushes fingers between muscle bellies
- IOM folding distortion – shoves three or four fingers into lateral leg and rocks fingers back and forth
- Cylinder distortion – repetitively squeezes leg

Since these distortions are anatomically related, they commonly occur together. If that is the case, all three body languages will be observed and all three distortions should be treated.

Treatment of the IMS folding distortion is with folding technique and resembles the thigh IMS folding technique except that instead of the thighs crossed, the legs are crossed (affected leg is placed on top of opposite leg). The physician stands to the side of the patient (who is prone). The hand closest to the foot grasps the ankle while the hand closest to the knee grasps the gastrocnemius muscle. A quick, scissors-like shearing motion is introduced into the membrane. A successful treatment is realized when a pop is felt or heard coming from what seems like the gastrocnemius muscle.

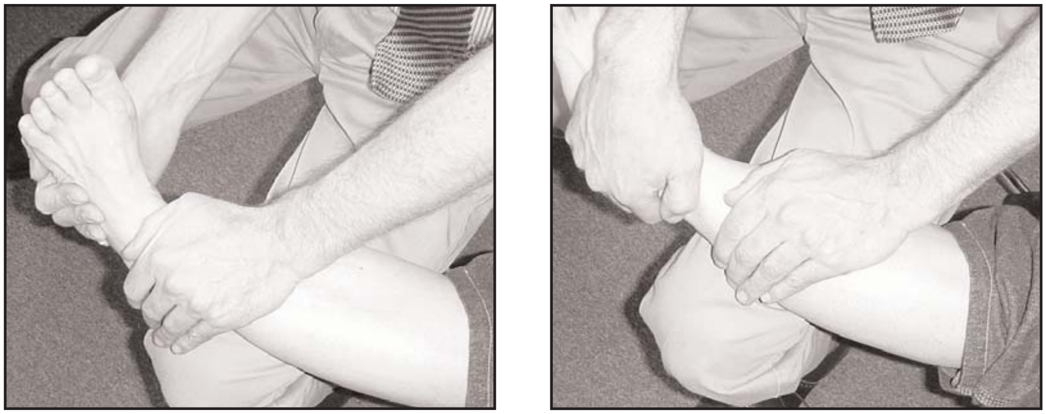


Figure 15-9. Interosseous Membrane (IOM) Unfolding Treatment (shown sitting)

Treatment of the tibiofibular interosseous membrane is also with the patient prone but the legs are not crossed. The knee is flexed and again the physician stands beside the table so that the lower hand grasps the ankle. The upper hand is abutted against the lateral margin of the proximal tibia. Quick, short thrusts are delivered at 45° and 120° angles into the tibia (forces tibia away from fibula and thus unfolds the IOM). The upper hand is then marched down or up the leg engaging each portion of the interosseous membrane. Once this is done, the physician moves to the opposite side of the table and repeats the process . . . only this time driving the fibula away from the tibia. Several pops indicate the treatment was productive. Alternate methods include patient supine and knee bent, or sitting with treated leg resting on physician's knee or thigh (See Figure 15-9).

To fully correct the IOM, refolding manipulations should also be done. In this method, the leg is cradled with the treating hands and the bones are forced together with a quick thrusting motion (like a nut cracker). A successful result is appreciated when a crack or series of cracks or clicks are heard.

Jumping Pain

Any discomfort that randomly changes its geographical location in a non-linear manner is classified in FDM as jumping pain. Since jumping is caused by overlapping cylinder coils rotating and throwing the tangle to a non-adjacent area, the goal of treatment is to locate the tangle and untangle it. The most specific approach is with double thumb cylinder technique. Double thumb CCV, squeegee, and Indian burn techniques are also possible choices. However, cupping-with-movement is perhaps the best of all possible treatments — but just as with thigh cylinder distortions, the precise locations of cup placement are still not known. And be aware that because of the narrowness of the leg (compared to the thigh) the cups are less likely to stay attached.

Paresthesias or Numbness

The symptoms of paresthesias and numbness are indications that a cylinder distortion is present. If area of complaint is focal, double thumb or double thumb CCV are treatments of choice, but, if symptoms are diffuse, then Indian burn or squeegee techniques should be utilized. However, cupping-with-movement is the most likely therapy to be curative. Cylinder distortions in the leg can be much more than just a nuisance. In some elderly individuals the tissue can become so entangled as to cut off lymph flow resulting in peripheral edema and subsequent cellulitis.

Ankle Sprains — see Chapter 16

Ankle Fractures

With the exception of talar dome fractures, non-displaced (or minimally displaced) stable ankle fractures (i.e., those that don't require surgical interventions) respond well to fascial distortion techniques. Just as in ankle sprains, the body language, verbal description of pain, and mechanism of injury direct the treatment. Note that dorsiflexion is almost always affected, and therefore the first step in treating is to correct the AACD (anterior ankle continuum distortion). It is suggested that dorsiflexion be quantified before and after continuum technique — this demonstrates to the patient a positive result has occurred and reassures him/her that appropriate care is being rendered.

Once dorsiflexion is restored, the next step is to correct folding distortions. Since the amount of force required to have fractured the tibia or fibula was significant, folding distortions of the ankle capsule are expected. If the fracture resulted secondary to a twisting motion in which the leg or foot was held stationary, an unfolding capsular folding distortion is suspected. If however, a jamming force broke the ankle (such as from landing flat-footed after falling off a roof) then a refolding distortion is likely.

In those injuries with capsular unfolding distortions, treatment is with traction and traction/thrusting manipulations (see similar technique in Figure 16-6). With patient supine, physician grasps foot with fingers interlaced over its dorsum (be careful not to squeeze foot too firmly). The patient is instructed to relax the foot and ankle, and to grab hold of the table (keeps him/her from sliding toward the physician when traction is applied). Traction is then slowly introduced into the ankle to patient tolerance. Once maximum traction is obtained a small traction/thrusting force is focused into the capsule. If successful, a *pop* will be heard as the capsule unfolds.

Please note that if there is pain deep in the ankle joint with traction, this signifies that there is a refolding component to the injury. If this is the case, then refolding technique should be performed. To treat the refolding injury, compression is administered into the ankle joint followed by a short and quick compression/thrusting force. To do this the patient is positioned supine or prone (see Figure 16-7 for similar techniques). In either case the amount of force is individualized for each particular injury. A positive result is noted when a *click* is obtained at the time of thrust or immediately following the thrust (as capsule unfolds after refolding).

Should refolding technique be painful, this indicates that an unfolding component still exists in the capsule that has not been corrected. Therefore, if both unfolding and refolding distortions are present in the same injury, refolding and unfolding techniques are gently applied one after the other in alternating fashion (begin with refolding) until neither is painful or until a pop or a click is heard or felt.

Folding distortions of the tibiofibular interosseous membrane are likely to be present in ankle fractures. Treatment is with gentle sustained traction of the tibia away from the fibula (this feels good to the patient!). Traction is held for up to thirty seconds or until physician tires. A small gentle thrust of the tibia away from the fibula may also be introduced at the termination of traction.

Following correction of folding distortions, most fractured ankle patients are now capable of bearing some weight. However, they are still likely to have a significant amount of pain on or around the lateral or medial malleolus. This peri-malleolar pain is due to two factors:

1. Continuum distortions (always present)
2. Triggerbands (likely present)

Continuum distortions in ankle fractures are treated exactly the same way as they are in ankle sprains, that is, the distortions are located and corrected with firm force from the physician's thumb directed into spots of most intense pain. To determine exactly where on the tibia or fibula the continuum distortions are located the orthopedist can:

1. Look at x-ray for fracture site
2. Instruct patient to point to spot(s) of pain
3. Palpate ankle for most severely tender spots

Once located, continuum distortions are corrected. However, be advised that since the distortions are typically present not only around the fracture site but actually in it, this is a painful treatment. Even so, since it is such a quick and dramatically effective procedure most patients show an amazing tolerance for it.

Finally, triggerbands often occur in fractured ankles and their presence is assured when the patient exhibits the typical body language of sweeping fingers from sock line inferiorly to ankle and around malleolus. Unlike sprained ankles in which the presence of the medial ankle triggerband is rare, in ankle fractures the medial and lateral ankle pathways are equally common. Both are treated the same way, that is with triggerband technique starting at the sock line and following the entire pathway (to either the distal medial or distal lateral foot).

After all the above fascial distortions are corrected, the expectation is that the ankle is able to bear full weight. In fact, following treatment some patients will even walk without a limp. At this point it is the orthopedist's prerogative whether to cast, apply a splint, or to restrict weight bearing.

Foot Sprains

Foot sprains consist of either triggerbands, continuum distortions, folding distortions, or cylinder distortions. Triggerbands in the foot generally are treated from proximal to distal, and terminate at the end of the foot or one of the toes. Both everted and inverted continuum distortions occur in foot sprains and both are treated with continuum technique.

Patients with a folding foot sprain typically exhibit swelling and complain of pain deep between the bones. In unfolding treatments, both hands are used to pull the metatarsal bones apart. This allows the intermetatarsal ligaments to unfold and then refold uncontorted.

Refolding foot sprains occur secondary to: 1. crushing type force, or 2. when toes are stubbed. Therefore the most common mechanisms of injury for refolding foot sprains are having the foot stepped on and kicking (such as in martial arts). Treatment is with compression/thrusting manipulation in the direction that initially caused the injury. In the case of the foot being stepped on, the thrust is administered in the dorsal to plantar direction. To accomplish this, one hand is placed below the foot and the other above and quick and repetitive thrusts are delivered into the foot. The exact angle of thrust can be varied by slightly altering the position of hand placement. Success is noted when a click or series of clicks are felt or heard. Injuries from kicking (or by other blunt forces to the toes or ball of foot) are treated by compressing the toe bones into the foot. A quick thrust in the proper direction will often refold the interphalangeal, metatarsal-phalangeal, and/or metatarsal-tarsal joints all at once. In this way refolding distortions deep in the foot can be addressed. Again a successful procedure is evident by the accompanying audible cracks or clicks as the interphalangeal joint capsules or tarsometatarsal ligaments refold and then unfold less contorted.

Cylinder distortions cause a vague sensation of deep pain in the foot. Treatment consists of the double thumb method in which first the deeper layer is treated and then the more superficial layer. The deeper layer is corrected by having one thumb maintain traction in a medial direction while the other thumb does so in a lateral direction. The superficial layer is then corrected by having the proximal thumb pull proximally while the distal thumb pulls distally. In either case, traction is held until tissue tautness diminishes.

Foot Fractures

Stable fractures of the foot contain the following fascial distortions: triggerbands, continuum distortions, and folding distortions. Together these pathological entities are clinically responsible for the pain, loss of motion, and inability to bear weight that is normally attributed to the fracture. Correction of them therefore enables most patients (even those with multiple metatarsal fractures) to walk without crutches immediately following the first treatment.

Fascial distortions of acute foot fractures include:

- Continuum distortions (found in and around fracture site)
- Triggerbands (follow along axis of fractured bones)
- Folding distortions (involve joint capsules, intermetatarsal or tarsometatarsal ligaments)

Continuum distortions are always found in foot fractures (and all fractures for that matter) and obviously are treated with continuum technique. Surprisingly, they tend to respond to lighter force than those found in foot sprains and are thus easier to correct.

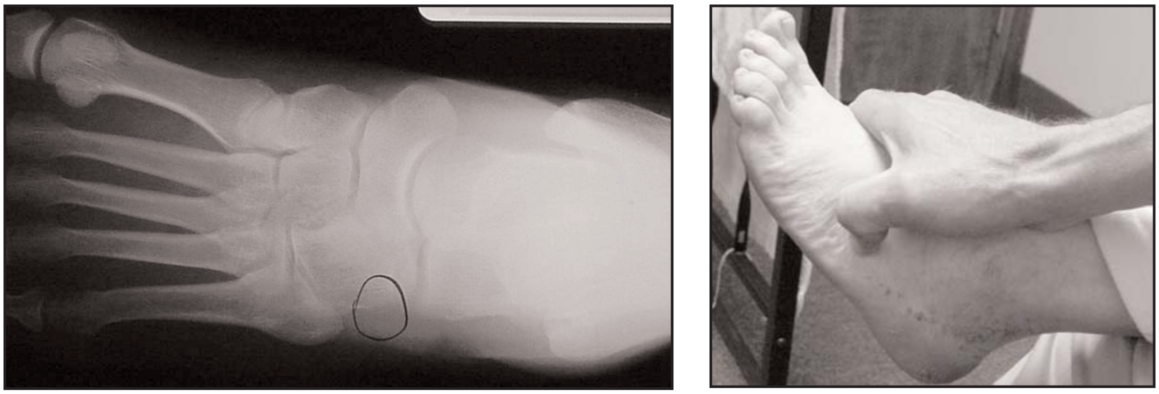


Figure 15-10. Continuum Technique Applied Directly Into Foot Fracture Site

Triggerbands are not present in every foot fracture but are suspected when the patient demonstrates a body language of sweeping fingers along the foot from proximal to distal (or vice versa). Treatment is with triggerband technique of pathway identified by body language. The amount of force needed to be successful for this injury is also often less than for foot sprains.

Folding distortions are common in foot fractures and, just like foot sprains, come in two varieties: unfolding and refolding. Treatment is similar to that described in the section on foot sprains. However, in foot fractures the intermetatarsal and tarsometatarsal ligaments are generally profoundly contorted because of the substantial forces involved in the accident itself AND, if the fracture is complete, from the loss of supporting structure secondary to twisting of attached fractured bony segments. However, since the tissue is often grossly mal-folded even a small external force from a gentle traction or compression thrust will have an anatomical effect and thus result in significant reduction of pain.

Plantar Fasciitis

In the fascial distortion model, plantar pain comes in three presentations, each of which is of equal occurrence:

1. Triggerband plantar fasciitis
2. Continuum plantar fasciitis
3. Combination plantar fasciitis

In plantar fasciitis caused by triggerbands, patients complain of a pulling pain along the bottom of the foot. This verbal description of discomfort is always accompanied by the body language of a sweeping motion with one or two fingers (particularly the tip of the middle finger) along the plantar fascia in a proximal to distal or distal to proximal direction.

Treatment is with vigorous triggerband technique along the involved fibers (usually from plantar aspect of calcaneus to second or third metatarsal-phalangeal joint). Note that since plantar fascia is one of the thickest and most fibrous structures in the body, correction of triggerbands in it is perhaps the most energy intensive of all the FDM treatments and requires both thumb strength and stamina to be successful.

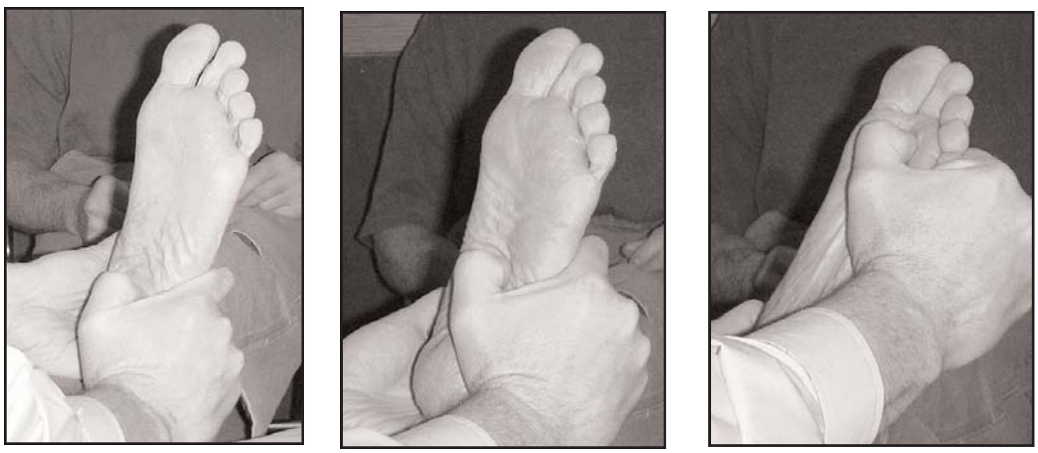


Figure 15-11. Treatment of Triggerband Plantar Fasciitis

In continuum plantar fasciitis there is typically one, two or three spot(s) of exquisite tenderness on the plantar surface of the calcaneus. The associated body language consists of pointing to these spots with a single fingertip. Treatment is with continuum technique directed precisely onto the distortion. To find the continuum distortion, thumb-tip is wormed through the thick plantar fascia until it abuts against the surface of the calcaneus. It is then rocked back and forth or partially rotated until it contacts the continuum distortion. Force is firmly applied and held until there is release (i.e., the stuck transition zone shifts).

With mixed plantar fasciitis, patients exhibit two complaints: pulling along bottom of foot and spots of pain on calcaneus. Treatment strategy is to first correct triggerbands and then continuum distortions. These injuries are also noted for often exhibiting heel spurs on x-ray. The spur forms secondary to the osseous components from the calcaneus being shifted into the plantar fascia secondary to the constant pull of the triggerband (shortened fascial fibers). Since the fascial transportation highway is blocked by the twisted fibers, osseous components accumulate in the fascia, and when a certain threshold is attained become radio-opaque.

Toe Sprains and Fractures

Although the typical orthopedic treatment of toe sprains and non-surgical toe fractures is *buddy-taping* (the injured toe is bandaged to the toe next to it), this does not anatomically resolve the injury. In fascial distortion medicine, both sprains and fractures are treated the same way — by first determining what distortions are present and then correcting them.

Continuum distortions are expected in toe fractures and are very common in toe sprains. They are treated by grasping the toe with the thumb and index finger, and focusing force into point of discomfort and maintaining pressure. Force is applied by the thumb tip into point of maximum tenderness and held until release (easily appreciated by patient). Note that the function of the index finger is to stabilize the toe and give a solid surface for the thumb to push against.

Triggerbands may occur as well in toe sprains or fractures and course from the fracture site or sprained joint along the toe to either its base or its tip. The body language is often obscure (since the toe has such a small surface) and may go undetected. Should continuum technique fail then it's possible the reason is because the distortion was actually a triggerband being ineffectively treated. And just as with continuum technique, when applying triggerband technique the toe is squeezed between the thumb tip and index finger.

Folding distortions of toe fractures and sprains involve any of the following joints: metatarsal-phalangeal, proximal interphalangeal or distal interphalangeal (note that the great toe has only two joints: metatarsal-phalangeal and interphalangeal). For a treatment to be successful, the injured joint must be identified and the appropriate corrective force introduced into it.

Figure 15-12. Unfolding Manipulation of Toes

However, as can be imagined, a pulling injury to a toe typically causes unfolding distortions in every one of the joints of the toe, whereas a kicking injury causes refolding distortions in every toe joint. So when applying either traction/thrusting or compression/thrusting this should be taken into consideration and often a well done procedure results in an audible pop or click from every joint of the toe.

The expected result of TMT intervention for toe fractures or sprains is for the patient to be able to walk without a limp immediately following the treatment. However, some patients will do better and be able to stand on their toes — while yet others will even be able to squat without difficulty. Since squatting is the most painful of all pre-treatment movements, non-painful squatting signifies that the correction is complete and no follow-up visits are indicated.

Chapter 16

FDM Treatment of Ankle Sprains

Orthopedically, sprained ankles are categorized by the amount of tearing of the involved ligament, which from the FDM perspective is considered to be clinically irrelevant since it neither influences the treatment choices nor is indicative of the anatomical distortion. Although the traditional treatment regimen of wrapping, splinting, crutches, resting, and medicating may reduce discomfort by making the ankle non-functional, the anatomical injury is still present. Take away the crutches, splints, wraps, and medicines and you have the same injured ankle.

In the fascial distortion model, acutely sprained ankles are differentiated into four kinds: continuum, triggerband, unfolding and refolding. All four of these ankle sprain types may initially appear to be identical (i.e., they all present with swelling, ecchymosis, tenderness, loss of dorsiflexion, pain with motion, limping gait or inability to bear weight). However, there are objective differences between them which are highly predictive in determining the success of specific treatment options.

Mechanism of Injury

Every sprained ankle patient will, with proper prodding, reveal a history of injury that is consistent with one of four general mechanisms. The first is eversion of the ankle (with accompanying inversion of the foot). These patients relate that the ankle suddenly buckled outward and they experienced immediate pain. This is the most common history associated with an ankle sprain and is clinically consistent with the physical findings of a *continuum sprained ankle*. An easy way to remember this mechanism of injury is by imagining the most common specific history that is given, which is stepping off the curb and forcefully supinating the foot. For this reason continuum sprained ankles can be thought of as *stepped-off-the-curb-wrong ankle sprains*.

The next most common mechanism of injury encountered in a sprained ankle is that of twisting the ankle as the person falls to the same side. As the ankle is everted and the leg is torqued, triggerbands form from the ankle up into the calf. A common specific history that frequently results in *triggerband sprained ankles* is from falling down the stairs. To help envision these sprained ankles, they can be thought of as *tripped-down-the-stairs ankle sprains*.

The third mechanism of injury that results in a sprained ankle occurs when the foot is held in place while the ankle is suddenly everted or twisted. These forces cause the fascial tissue to unfold and then refold in a contorted condition. The most common history given by patients with *unfolding sprained ankles* is that someone was standing on their foot when the ankle was hurt. Because of this, unfolding sprained ankles can be thought of as *stepped-on-the-foot ankle sprains*.

The fourth way an ankle gets sprained is when a person comes down hard on it, such as from missing a step on a stairway. Therefore, refolding sprained ankles can be thought of as *missed-a-step ankle sprains*.

Figure 16-1. Four Types of Ankle Sprains

Continuum Sprained Ankle (Stepped-off-the-curb-wrong) | Triggerband Sprained Ankle (Tripped-down-the-stairs) | Unfolding Sprained Ankle (Stepped-on-the-foot) | Refolding Sprained Ankle (Missed-a-step)

Patients' Description of Pain

Initially an ankle sprain victim may say that the *whole ankle hurts*. But when detail is insisted upon he or she can give a more specific description of pain that helps determine the general ankle sprain type. The three ways in which patients typically express their discomfort are:

1. Pointing with one finger to specific locations of pain and saying, "The ankle hurts in one (or more) spot(s)"
2. The hand is brought from the ankle up the leg with a sweeping motion – this may be verbalized as, "It pulls into the calf"
3. "It hurts deep in the joint"– watch for the body language of gently wrapping the fingers around injured ankle, distal leg, or foot

Those patients who complain of pain in one or more spots are describing a continuum sprained ankle. Those who have a pulling pain up the calf will clinically be found to have a triggerband sprained ankle. And those who say they have pain deep in the joint possess either an unfolding or refolding sprained ankle.

Comparing FDM Ankle Sprain Types

Comparative Category	Continuum	Triggerband	Unfolding	Refolding
Mechanism of Injury	Eversion of ankle	Eversion of ankle with leg twisting	Eversion or twisting of ankle with foot held in place	Compression of ankle
Common Hx of Injury	Stepped off curb wrong	Tripped down stairs	Fell with someone standing on foot	Missed a step on stairway
Description of Pain	Pain in one or more spots	Pulling pain up calf	Pain deep in joint	Pain deep in joint
Body Language	Points with finger to spot(s) of pain	Sweeping fingers along lateral leg and ankle	Grasps ankle with hand	Grasps ankle with hand; rubs finger across ankle(50%)
Typical Location of Swelling	Lateral ankle	Lateral ankle	Lateral and medial ankle	Lateral and medial ankle (less than unfolding)
Frequency	Most common	Less common	Less common	Least common
Primary Etiology	Continuum Distortions	Triggerbands	Unfolding Distortions	Refolding Distortions
Treatment	Continuum Technique	Triggerband Technique	Unfolding Technique	Refolding Technique

Physical Findings of Ankle Sprains

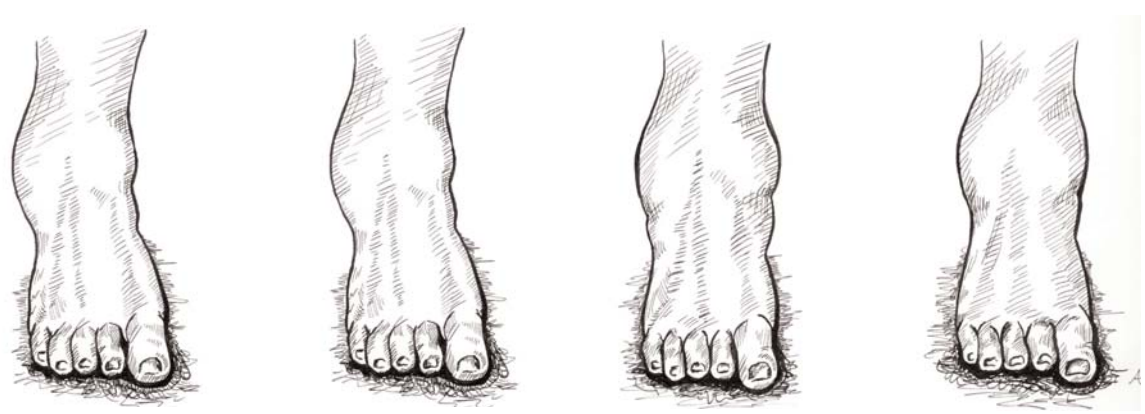
All sprained ankles present with swelling, pain, and loss of motion. Some patients can walk, some can't. Of those that can walk, few can walk without a limp and very few can run without pain. And sprained ankles of every type contain a continuum distortion in the anterior ankle at the origin or insertion of the anterior tibiofibular ligament. This fascial distortion is the primary cause of diminished dorsiflexion, and because it occurs in every ankle sprain, every sprained ankle should initially receive continuum technique. Once the anterior ankle continuum distortion has been corrected, the ankle sprain is differentiated into its general FDM type and the appropriate treatment technique is selected.

On physical exam, continuum ankle sprains have tender spots on the lateral ankle. These are continuum distortions of the calcaneofibular or anterior talofibular ligaments. Other locations of injury are also possible. However, from a treatment perspective, the particular names are unimportant. What is clinically relevant is the exact palpatory location of each continuum distortion.

Triggerband sprained ankles present with a lateral ankle as sore as in a continuum sprained ankle, but the pain pulls into the calf and there are no exact spots of discomfort. Although on palpation a large tender triggerband can be palpated along the lateral leg, few patients are aware of its existence until it is brought to their attention. To locate the lateral ankle triggerband pathway, feel for it along the lateral leg with its starting point at the sock line.

Folding sprained ankles feel tight and have a generalized tenderness. On clinical exam, they exhibit swelling over both the lateral and the medial malleolus. Note that unfolding sprained ankles tend to have more swelling than refolding sprained ankles. Be aware medial ankle swelling in and of itself (in other words, without lateral swelling) is often indicative of an ankle fracture.

Figure 16-2. Typical Swelling Patterns in Ankle Sprain Types



Continuum Sprained Ankle (lateral swelling) | Triggerband Sprained Ankle (lateral swelling) | Unfolding Sprained Ankle (lateral & medial swelling) | Refolding Sprained Ankle (lateral & medial swelling)

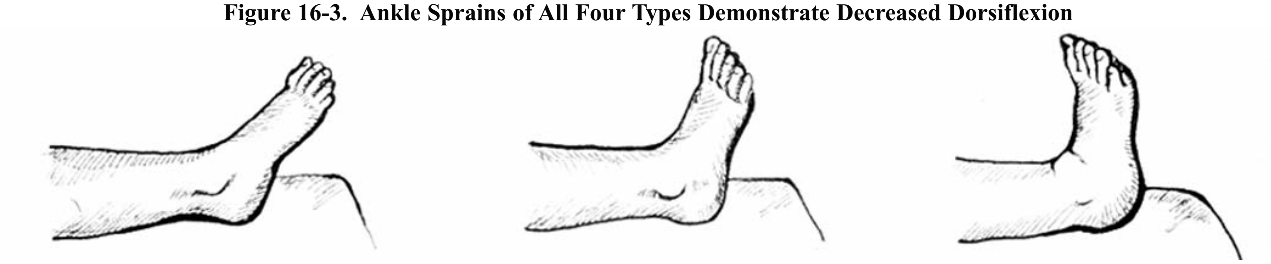
TREATING ANKLE SPRAINS

As stated earlier, the anterior ankle continuum distortion is the first distortion to be treated in every sprained ankle. However, before the actual treatment begins, there are certain assessments that should be made. The first is an orthopedic evaluation to determine the neurovascular supply and the amount of swelling and instability. In addition, the knee, foot, leg, and any other pertinent areas should be carefully examined. This is especially true if there has been a serious incident in which there is the potential for global injuries, such as from a motorcycle accident.

Once satisfied with the initial physical exam, an x-ray should be considered. If it is negative, then the ankle is evaluated according to the fascial distortion model, and the amount of disability and loss of motion quantified. It is clinically useful to record the amount of dorsiflexion, eversion, and inversion the ankle has, and whether the patient can walk without a limp, stand alone on the injured foot, or walk on the toes or heels. Determine if he/she can bear weight or ambulate on the lateral foot (i.e., walk on the sides of the feet). Can he or she jump or run? Documenting motions and ambulatory abilities (or inabilities) before and after the treatment gives clear and conclusive evidence of a successful (or unsuccessful) treatment outcome.

To assist in evaluating the injured ankle, a grading system can be used to quantify motion and speed. For instance, if dorsiflexion of the injured ankle is one-fourth total motion compared to the opposite ankle, it is graded a *one*. If the speed of dorsiflexion is one-half compared to the other ankle, this is graded a *two*. If the ankle can't dorsiflex at all, it is a *zero*, and if it is the same as the uninjured ankle, it is a *four*. By the same token, three-fourths motion is judged a *three*. If after correcting the anterior ankle continuum distortion, the dorsiflexion has improved from zero to a two, then the treatment was incomplete and strongly suggests a second anterior ankle continuum distortion is present. If this is the case, then it should also be treated.

Figure 16-3. Ankle Sprains of All Four Types Demonstrate Decreased Dorsiflexion



Neutral position — Deficient dorsiflexion — Normal dorsiflexion

The anterior ankle continuum distortion is always the first distortion treated in every sprained ankle. The reason for this is that virtually every sprained ankle has loss of dorsiflexion from this particular distortion. During the ankle exam, this deficit of motion should be brought to the attention of the patient and its ramifications emphasized. It is helpful to explain that loss of dorsiflexion means the ankle can't bend properly, and therefore they can't walk normally.

Before treating the anterior ankle continuum distortion, you may wish to discuss the treatment with the patient and express that it will induce a temporary but significant amount of discomfort. Or you may consider the *quick victory strategy* in which the correction is made so rapidly that the patient believes it is still part of the exam. Be sure to check dorsiflexion immediately after this initial procedure so that the patient can appreciate the change. Typically the results are so dramatically impressive that he or she will be eagerly encouraging you to continue on to fix the entire injury.

The anterior ankle continuum distortion is palpated in the front of the ankle just where the ankle bends (see Figure 16-4 and glossary term *Anterior Ankle Continuum Distortion*) is normally quite tender and almost feels like a small vitamin gel-cap, (i.e., it is firm, but has some give to it). The patient is best positioned for the treatment lying supine with the toes pointed toward the ceiling. (An alternate position is seated with the foot resting on the floor.) The non-treating hand is used to hold the ankle in a position of slight dorsiflexion as the tip of the treating thumb palpates the continuum distortion.

Once the distortion is clearly identified, the direction of force is determined by either palpation or by asking the patient if the thumb has found the spot of most intense discomfort. If the thumb is slightly to the side of the distortion, the firmness will not be centralized below it. To the patient it will feel as if *you're off it*, or *you're next to it*.

Continuum technique is performed by applying a focused force directly into the center of the continuum distortion with the tip of the treating thumb. The force from the thumb is constant and should maximize the patient's discomfort. Pressure is held until the release, which is felt as a sudden lessening of pain by the patient, and as a sudden lessening in firmness of the periosteum by the physician (think of the button-slipping-into-the-buttonhole analogy).

The release of a continuum distortion occurs as the osseous components that were stuck in the transition zone between ligament and bone suddenly shift back into the bone. With experience, the entire time involved in treating this distortion may be only five seconds, but for those learning continuum technique, it may take several minutes to properly palpate and align the forces. As with all continuum distortions, the success of the treatment is all-or-none. If it released, the correction was made. If it didn't release, nothing happened. If you are not sure the correction was made, recheck dorsiflexion. Restoration of this motion is strongly suggestive of a successful procedure.

Not uncommonly, two anterior ankle continuum distortions are present. This is clinically appreciated when the distortion is treated but dorsiflexion is only partially improved. If that is the case, then the second distortion should be palpated and corrected in the same fashion.

Once the anterior ankle continuum distortion is corrected and dorsiflexion is restored, then other distortions are addressed. Note that it is advisable to have already made a decision as to which ankle sprain type is present, otherwise the wrong technique will be utilized with no possibility of a successful outcome.

FDM Flow Chart of the Acutely Sprained Ankle

Sprained Ankle

↓

Loss of dorsiflexion (all sprained ankles)

↓

Anterior ankle continuum distortion

↓

Treat anterior ankle continuum distortion with continuum technique

- Lateral ankle swelling with pain in one or more spots along lateral ankle
  ↓
  Continuum Sprained Ankle
  ↓
  Treat with Continuum Technique
  ↓
  No thrusting manipulation of ankle in first 24 hours after treatment

- Lateral ankle swelling with pulling pain up leg
  ↓
  Triggerband Sprained Ankle
  ↓
  Treat with Triggerband Technique
  ↓
  Consider traction/thrusting manipulation of ankle if patient feels it *needs to pop*

- Lateral and medial ankle swelling with pain deep in joint
  ↓
  Folding Sprained Ankle
  - Pain with Compression
    ↓
    Treat with Unfolding Technique
    ↓
    Perform traction/ thrusting manipulation of ankle
  - Pain with Traction
    ↓
    Treat with Refolding Technique
    ↓
    Perform Compression/ thrusting manipulation of ankle

Note that if at the end of the treatment there is diffuse pain over the ankle or foot and patient has worn a splint or wrap, consider cylinder technique.

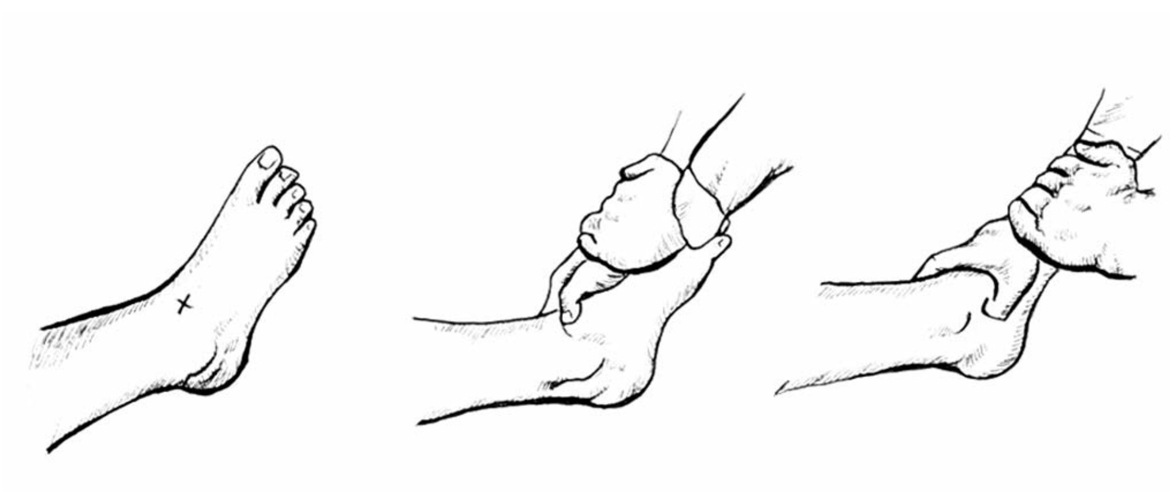
CONTINUUM SPRAINED ANKLES

Continuum ankle sprains are always of the everted subtype and are the most common of the four ankle sprain types. As stated previously, they have spots of pain that are mostly present on the lateral ankle. Treatment consists of first correcting the anterior ankle continuum distortion to restore dorsiflexion, and then correcting the lateral ankle continuum distortions (there may be anywhere from one to five).

Lateral ankle continuum distortions are treated the same way as any other continuum distortions, i.e., painful joint is gently glided into the position in which it was originally hurt and force equal to that which caused the injury is applied into the distorted transition zone. In the ankle, this means gently everting the ankle and applying focused force with the treating thumb into spots of discomfort and holding until release. The most common locations of lateral ankle continuum distortions are the origin and insertion of the talofibular and calcaneofibular ligaments, but other sites do commonly occur.

Once all of the continuum distortions are corrected, the patient is expected to be able to walk without a limp and to have little or no pain. (Note that some patients will be able to run without pain but this is not considered to be the goal of the initial treatment.) Following continuum treatment ice soaks are optional and re-check the next day is recommended for those patients with an incomplete result or those who waited more than three days to seek care.

Figure 16-4. Continuum Technique of the Ankle



Location of anterior ankle continuum distortion (AACD)

Treatment of AACD

Treatment of lateral ankle continuum distortion

Typical Steps in Treating a Continuum Sprained Ankle

1. Physical examination – record range of motion (passively and actively measure dorsiflexion, eversion and inversion) and check for ligamental instability and vascular compromise.

2. X-ray ankle to rule out fracture (optional).

3. Explain to patient that treatment will cause a temporary increase in discomfort.

4. Restore dorsiflexion by treating the anterior ankle continuum distortion. This is best done with patient supine and foot slightly dorsiflexed. Recheck dorsiflexion after treatment.

5. Ask patient to show with his/her fingers where ankle hurts. (Expected response is pointing to spot(s) of pain with one finger.)

6. Treat lateral ankle continuum distortions with continuum technique. Do this by gently rotating ankle into position in which it was injured (evert ankle by rolling it laterally), and with tip of thumb, palpate lateral continuum distortions. Select most painful distortion. Apply constant and increasing force and hold until it releases.

7. Recheck eversion and inversion. If there is not a dramatic improvement, then palpate for a second or third lateral continuum distortion. Gently guide ankle into position of pain (usually eversion), palpate for most painful spot, and feel for the distortion. Treat with continuum technique, then recheck passive and active eversion and inversion. Repeat sequence until patient reports only a diffuse sensation of generalized tenderness or has no pain.

8. Ask patient to stand and point to where ankle still hurts. With patient standing, correct distortion in same manner as previously described. Repeat this step until he/she can stand with little or no pain.

9. Next have patient walk and identify what movement induces pain. Hold ankle in that position and correct the distortion.

10. Once range of motion has been restored and patient can walk without a limp, the treatment is complete. At home ice/water soaks are optional and heat (including hot showers or baths) is to be avoided. Crutches, splints, and pain medicines are typically unnecessary.

11. Follow-up next day is advisable for those patients with residual discomfort.

With competing athletes, walking without pain and being limp-free may not be good enough since they often need to be back in the game either that day or soon thereafter. If so, the treatment can be taken one step further by having him or her run, and then treating the ankle in the exact position that elicits pain. This process of running, stopping and treating in the position of pain should be repeated until the athlete can run without pain.

Note that residual continuum distortions may occur in other portions of the ankle, or on the bottom of the foot, so watch the body language, and treat them if present. If after all that, the athlete still can't run without pain, look for other fascial distortion types or re-treat in 24 hours.

TRIGGERBAND SPRAINED ANKLES

Triggerband sprained ankles appear clinically to be almost identical to continuum sprained ankles in that there is loss of dorsiflexion, lateral ankle swelling, ecchymosis, pain, and limping gait (if the patient can walk at all). The differences between the two are, of course, mechanism of injury, body language, physical palpatory findings, and the success of using triggerband technique rather than continuum technique. This final difference between the two cannot be stressed enough — these are two distinct etiologies of ankle sprains and using the wrong technique will always result in failure.

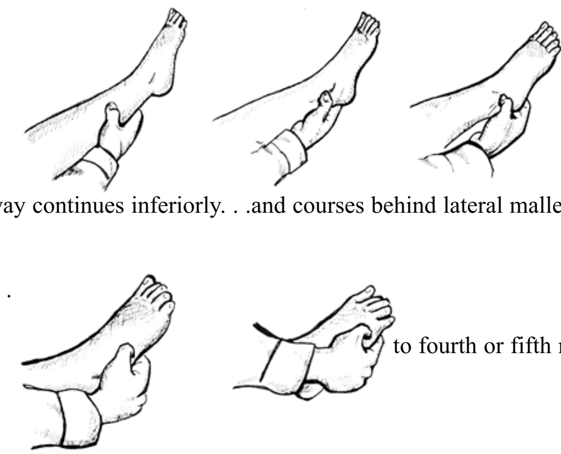
As stated earlier, triggerband ankle sprains are less common than their continuum counterparts. Still, they make up a large enough portion of the total number of ankle sprains that they are commonly encountered in the emergency room setting or in a busy sports medicine practice. And fortunately, the dramatic treatment results that so often occur with continuum ankle sprains also are expected with triggerband ankle sprains. In treating triggerband sprained ankles, the initial evaluation is identical to continuum sprained ankles. Just as with continuum injuries, the anterior ankle continuum distortion is treated first. Once this is corrected, the involved triggerbands are located and treated.

The most important ankle sprain triggerband of all is found on the lateral lower leg with its starting point at the sock level. It is treated by having the thumb push inferiorly (down the leg), to the ankle, then around and below the lateral malleolus, onto the dorsal foot, and finally to either a distal metatarsal or to the end of one of the toes (fourth and fifth are most common). Note that this pathway is present in virtually every triggerband sprained ankle.

This *lateral ankle triggerband* is, at times, a teaching workshop for the entire triggerband concept. For it is here, along this pathway, that so often the patient's pain can be *moved* from one location to another. If, for instance, the orthopedist pushes the twist down the ankle and leaves it on the foot, the patient will complain of foot pain. If the twist is moved back behind the lateral malleolus, he or she will have ankle pain, and if the twist is forced into the calf, the complaint is of calf pain. Wherever the twist is moved to is where the patient will have pain. For this reason, it is necessary to correct the triggerband along its entire course from lateral leg, around the ankle, onto the foot, and to the end of the foot.

Although not every patient with a triggerband sprained ankle will demonstrate this movement of pain so clearly, it is a common clinical finding and is pathognomonic of a triggerband sprained ankle.

Figure 16-5. Triggerband Technique of Lateral Ankle Pathway



In most treatments, the direction of triggerband technique should be inferior (i.e., toward the foot), but a small number of patients benefit little from this direction. If the technique was properly applied and the diagnosis is relatively certain, and yet the treatment was only partially effective, consider changing directions and pushing the triggerband from the foot up into the calf to the sock line (think of the Ziploc® bag being zipped closed).

Even though the lateral ankle triggerband pathway is the most common ankle triggerband, several other pathways may also be present in the same patient. These triggerbands run parallel to the lateral ankle triggerband but are either more anterior or posterior. If they are present, treat them as well.

One big difference between a completed triggerband sprained ankle treatment and a continuum sprained ankle treatment is the sensation of tightness the patient may still have in the ankle. Triggerband sprained ankle patients may say something to the effect that the ankle *feels like it needs to pop*, meaning that there is a small unfolding distortion present in the ankle capsule. Even though this person may have had an excruciatingly tender ankle only a few minutes before, it is okay to perform traction/thrusting manipulation of the ankle. To unfold the ankle, patient is placed in the supine position and holds onto the head end of the exam table with his or her outstretched hands (so he/she isn't pulled during the treatment). The ankle is dorsiflexed and traction is maintained. Then a smooth but swift pulling force is introduced into the ankle. When done properly, a pop is felt or heard. This procedure should not be painful! If it is, a refolding distortion is present and should be treated with refolding technique rather than unfolding technique.

However, it should be made clear — never manipulate a continuum sprained ankle on the initial treatment because you will reverse all of the hard work that you have done and the patient will act as if the ankle has been suddenly re-sprained!

Typical Steps in Treating a Triggerband Sprained Ankle

1. Physical examination – record passive and active range of motion and check for ligamental instability and vascular compromise.

2. X-ray ankle to rule out fracture (optional).

3. Ask patient to show with his/her hand where ankle hurts. Note that he/she typically will make a sweeping motion with his or her fingers along triggerband pathway from calf onto the foot.

4. Explain there will be a temporary increase in discomfort.

5. Emphasize loss of dorsiflexion, then treat anterior ankle continuum distortion with continuum technique. Check motion again so that he/she appreciates improvement.

6. Palpate along sock line for starting point of lateral ankle triggerband pathway. Once found, treat triggerband from superior to inferior. Note that it ends at or near the base of the toes (fourth and fifth are most common). Before and after treatment, check eversion and inversion.

7. If motion is not improved, either re-treat same pathway, search for other pathways, or consider reversing direction of triggerband technique.

8. Once dorsiflexion, inversion, and eversion are normalized, have patient stand and determine areas of pain. Find remaining triggerbands and treat with patient standing.

9. Once patient can stand pain-free, have him/her walk. If there is still pain, locate and treat residual triggerbands. (Stop gait in position of pain and administer treatment standing.)

10. If he/she feels as if ankle needs to be popped (most have very strong feelings on this), perform traction/thrusting manipulation.

11. If traction elicits pain, then perform compression/thrusting manipulation (refolding) instead of traction/thrusting manipulation (unfolding).

12. Ice/water soaks are optional, and splints and crutches should be unnecessary. Recheck is advised the next day for those with residual discomfort.

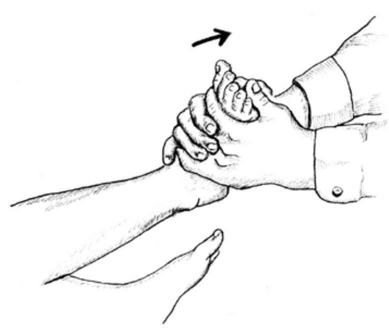
UNFOLDING SPRAINED ANKLES

Unfolding ankle sprains are less common than continuum or triggerband sprained ankles, however, in certain athletic events such as hockey and basketball, they abound. Hockey and basketball not only produce many ankle injuries, but also have more than their share of ankle sprains with someone standing or falling on the foot during the accident.

Note that in both unfolding and refolding ankle sprains, lateral ankle swelling is always present and medial swelling is *almost always* present. It should be remembered that as a general rule, medial ankle swelling is indicative of either a folding sprained ankle or an ankle fracture. And as with the other types, loss of dorsiflexion is the result of the anterior ankle continuum distortion and is always treated first. Once dorsiflexion is restored, the focus of the treatment then centers on eliminating unfolding distortions.

To treat the mis-folded fascial tissue of the ankle, the ankle itself must be tractioned. To apply traction, patient is placed supine on the exam table with the knee extended. The physician, who is standing at the foot of the table, introduces gentle dorsiflexion into the ankle. The treating hands are wrapped around the midfoot and the fingers are intertwined. The foot is slowly lifted up off the table at a 10° to 30° angle as traction is introduced into the joint capsule (this is best done by having the physician extend the elbows and roll back on his/her heels). Traction is steadily increased until a *pop* is heard.

Figure 16-6. Unfolding Technique of the Ankle



If no pop is obtained with traction alone (i.e., the articular capsule did not unfold), then re-initiate traction with accompanying swift thrusting of the foot away from the ankle. A large pop indicates a successful manipulation. After unfolding technique is finished, ankle motion is rechecked and compared to its pre-treatment status. If the result is satisfactory, patient is instructed to stand. If there is pain with standing, this means that residual unfolding distortions remain and need to be treated. Unfolding technique is then re-instigated with the patient again in the supine position. This time, the direction of traction/thrusting is changed to focus the pulling forces into the fascial plane that hasn't completely unfolded. Note that an alternate position for ankle unfolding technique is with the patient seated and the knee fully extended.

Typical Steps in Treating an Unfolding Sprained Ankle

1. Physical examination – record passive and active range of motion and check for instability and vascular compromise.

2. X-ray ankle to rule out fracture (strongly advised).

3. Ask patient to show with his/her hand where ankle hurts. (Expected response is patient placing palm gently over ankle, foot, or distal leg.)

4. Explain that first portion of treatment will be uncomfortable.

5. Treat anterior ankle continuum distortion. Compare dorsiflexion before and after.

6. Apply traction to ankle with patient supine – intertwine fingers around midfoot and extend elbows as you lean back on your heels to allow the weight of your body to pull the ankle towards you. Constant steady force will help unfold the distorted fascia and allow it to refold into its uninjured configuration.

7. Repeat step 6, but slightly alter the direction of traction so that corrective force can be focused into residual painful areas.

8. Perform traction/thrusting manipulation. This procedure is done in much the same manner as unfolding traction, except that a quick pulling thrust is initiated to more forcefully unfold the ankle capsule. When successful, a *clunk* or *pop* is heard.

9. Have patient stand to determine residual painful areas. Treat again in supine position.

10. Have patient walk to determine residual painful areas. Treat again in supine position.

11. Once patient can walk without limping and has little or no discomfort, treatment is considered to be completed.

12. Ice/water soaks are optional, crutches and splints should be unnecessary. Recheck in 24 hours and re-treat if needed.

Refolding Sprained Ankles

Refolding sprained ankles are less common than unfolding sprained ankles and occur when the ankle is jammed or compressed against the ground or other structure. They generally present in much the same manner as unfolding sprained ankles in that there is bi-malleolar swelling accompanied with the verbal description of discomfort of aching deep in the joint. And just as with unfolding sprained ankles, the corresponding body language tends to be a gentle wrapping of the fingers around the distal leg, ankle, or foot. However, refoldings differ from unfoldings in four important ways:

1. Mechanism of injury
2. Additional body language (half the time) – rubs fingers back and forth across anterior ankle
3. Generally less swollen
4. Treatment – compression/thrusting of ankle

Typical Steps in Treating a Refolding Sprained Ankle

1. Physical examination – record passive and active range of motion and check for instability and vascular compromise.

2. X-ray ankle to rule out fracture (strongly advised).

3. Ask patient to show with his or her hand where ankle hurts. (Expected response is patient placing palm gently over ankle, foot, or distal leg. Note that half the patients will demonstrate an additional body language of rubbing fingers back and forth across anterior ankle.)

4. Explain that first portion of treatment will be uncomfortable.

5. Treat anterior ankle continuum distortion. Compare dorsiflexion before and after.

6. Apply compression to ankle with patient prone – intertwine fingers around midfoot and lean chest onto hands to help compress ankle. Constant steady force will help refold the distorted fascia and allow it to unfold into its uninjured configuration.

7. Repeat step 6, but slightly alter the direction of force so that the correction can be focused into residual painful areas.

8. Perform compression/thrusting manipulation. This procedure is done in much the same manner as refolding compression, except that a quick pushing thrust is initiated to more forcefully refold the ankle capsule. When successful, a *click* is heard.

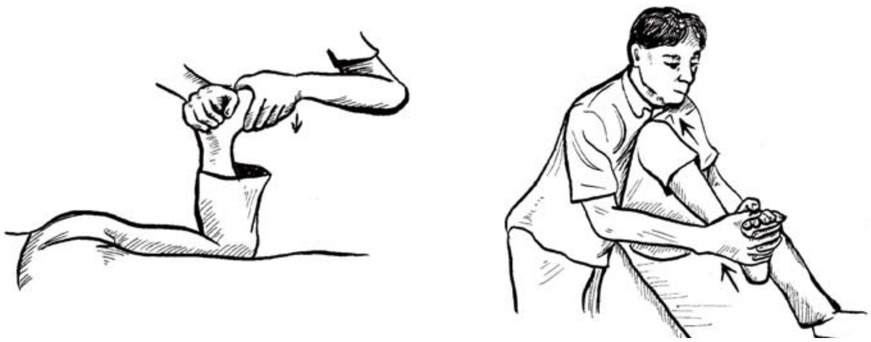
9. Have patient stand to determine residual painful areas. Treat again in prone position.

10. Have patient walk to determine residual painful areas. Treat again in prone position. If unsuccessful, treat in supine position. (Hip, knee, and ankle flexed to 90°, doctor stands on same side of table, foot is held with fingers intertwined around plantar aspect, knee is stabilized by physician's chest, thrust is made with hands into chest.)

11. Once patient can walk without limping and has little or no discomfort, treatment is considered to be completed.

12. Ice/water soaks are optional, crutches and splints should be unnecessary. Recheck in 24 hours and re-treat if needed.

Figure 16-7. Refolding Ankle Sprain Treatment



COMBINATION SPRAINED ANKLES

Although most ankle sprains can be broken down into the four categories of continuum, triggerband, unfolding and refolding, some patients present with injuries containing two or all three principal fascial distortion types (i.e., lateral ankle continuum distortions, lateral ankle triggerbands, and joint capsule folding distortions). The treatment of *combination sprained ankles* is essentially the same as previously described. First, treat the anterior ankle continuum distortion to restore dorsiflexion, then treat either the folding distortion or the lateral ankle triggerband. And finally treat the lateral ankle continuum distortions. (There may be some palpatory confusion in distinguishing between triggerbands and continuum distortions; but remember triggerbands move and continuum distortions release.) Do not manipulate the joint on the initial treatment. Note that combination injuries occur when the ankle encounters a combination of forces at the time of injury, and typically respond just as well to FDM treatments as non-combination ankle sprains.

CYLINDER SPRAINED ANKLES

Although cylinder distortions are commonly found in foot sprains (along with triggerbands, continuum distortions, and folding distortions), they are rarely diagnosed in ankle sprains. And when involved, they are practically never caused by the accident itself, but instead are the result of splinting or wrapping. It seems that the longer an ankle splint or wrap is worn, the more likely it is that a cylinder distortion occurs. The best approach to cylinder ankle sprains is prevention. This is done by avoiding the use of ankle splints and wraps altogether. However, if another doctor has already applied a splint or wrap, or if for whatever reason their use seemed appropriate, then the length of time it is worn should be minimized.

Clinically, treatment of cylinder distortions in the ankle is initiated after all the other fascial distortions have been corrected. Double thumb cylinder technique is the preferred method. (Don't use Indian burn technique on the foot or ankle because in those areas it has a tendency to create more cylinder distortions than it corrects!)

In cylinder distortions of the ankle, symptomatic areas are treated with firm but gentle opposing traction from the physician's thumbs. The deep layer is treated first so that the traction is perpendicular to the bones (one thumb is pulling laterally while the other is pulling medially). Then the superficial layer is treated (thumb traction is then parallel to the bones, so one thumb pulls up and the other down).

Remember that cylinder distortions are notorious for the pain *jumping* from one area to another, so don't be frustrated if this occurs. Treat each tangled coil one at a time and recheck the next day.

Treatment Failures

Of all the injuries treated with the FDM approach, ankle sprains indubitably have the highest success rate. This is because the anatomy in the ankle is easy to palpate and the distortions are literally right at the treating orthopedist's fingertips. Another positive contributing factor is that most ankle sprain patients are highly motivated to accept the FDM treatment because the orthopedic alternative of splinting and crutches is generally considered to be undesirable. Unfortunately, inexperienced doctors will at first have failures or partial successes. The reasons are shown below in decreasing order of likelihood:

1. *Failure to properly diagnose* FDM type of ankle sprain. When this occurs treatment will fail because proper technique was not employed.

2. *Failure to use adequate force* – an ankle sprain is a painful injury and some physicians hesitate in applying necessary force (especially critical in treating continuum sprained ankles).

3. *Application of heat* – prior to being seen, patient has taken a warm shower or soaked ankle in hot water. This will negate the subjective benefit of the treatment and result in a much more painful therapy.

4. A *fracture* exists that wasn't appreciated on x-ray.

To become skilled in the FDM treatment of ankle sprains requires the physician to be strongly motivated to succeed. But in addition to that, he or she must be willing to experience and experiment, and to take responsibility for treatment failures as well as successes. Perhaps in no other injury treated with fascial distortion techniques is the difference between success and failure so strongly demarcated.

Long-Standing Ankle Pain

Some patients complain of "chronic ankle sprains" meaning that months or years after an ankle injury (fracture or folding ankle sprain) they have persistent pain and continuous or intermittent swelling. Since folding distortions of the articular fold of the ankle capsule left uncorrected tend to be permanent, if a careful history is obtained of the long ago mechanism of injury, it always involved either traction or compression. And the body language observed with these so-called *chronic ankle sprains* is:

1. Gently placing hand over ankle and wrapping fingers around foot or distal leg
2. Medial to lateral (or lateral to medial) sweeping motion of one or two fingers across anterior ankle

Differentiating long-standing unfolding and refolding ankle injuries is not difficult.

	Unfolding	**Refolding**
Swelling amount	Moderate	Little or none
Time of day with most pain or stiffness	Afternoon or evening	Morning
Pain magnified with	Compression	Traction
Mechanism of injury	Traction	Compression
Body Language	#1 above	#1 above (50%) #1 & #2 above (50%)

Treatment of either injury is essentially the same as that previously described for folding ankle sprains. However, several sessions are often required for complete unfolding or refolding of the involved tissue.

Section Four

Case Histories

Neck Pain in a 27 Year Old Woman

Ms. M. presented to the office on March 22, 2002 with a complaint of neck tightness and pain for the past six months. There was no known injury. Prior diagnostic work-up included an x-ray, and previous treatments consisted of OMT (osteopathic manipulation) and physical therapy. In addition, she had faithfully performed the exercises as instructed by her therapist and had taken the various medications prescribed by her physician. However, there was no reduction in her discomfort.

On physical exam, neck rotation to the right was 80° and half speed with stepping noted. Rotation to the left was likewise slow with stepping, but went to a full 90°. Cervical extension and flexion were both 50% speed with stepping present. The thoracic fascia was palpated as tight (particularly along the posterior rim of the supraclavicular fossa). Abduction and external rotation of the shoulders were normal. Internal rotation was also normal (bilaterally equal with a total height of 15 inches, and no subtle pathological signs of stepping, flaring, hesitation, or loss of speed were appreciated).

FDM Impression: Neck strain secondary to the SCHTP

Ms. M. was treated with herniated triggerpoint therapy of the SCHTP (which was abutted bilaterally against C_7 and T_1). This improved cervical motion so that immediately there was normal flexion, extension, and rotation (i.e., there was normal speed, no stepping, and she was able to rotate past 90° bilaterally).

Discussion: Anatomical Location of SCHTP – Clinically, the findings of altered neck motion (particularly cervical rotation and subtle signs of stepping and loss of speed) but normal shoulder abduction and internal rotation, are indicative of a medial location of the SCHTP within the supraclavicular fossa. Conversely, loss of shoulder abduction or internal rotation with normal neck motion is suggestive of a lateral location of the SCHTP.

Low Back Pain in a 37 Year Old Man

For the past 12 years Mr. K. has complained of an ache deep in his lumbar spine. It started suddenly but there was no known injury. Over the years he has seen a number of physicians, etc. which included six chiropractors, two neurologists, a neurosurgeon, a couple of rheumatologists and several other specialists he can't recall. Diagnostic workup consisted of x-rays, MRI's, and a bone scan. For treatments he received attempted manipulation ("no one can crack my back . . . I'm too big"), medications, injections, physical therapy (four different treatment centers), and pain clinic protocols twice. Despite the efforts of his doctors and therapists, there was no reduction in his discomfort.

Mr. K. was first orthopathically evaluated on 1/29/02 and found to be 6'2" and 350lbs. His lumbar range of motion was normal. There was no point tenderness, kidney punch was negative, and patellar reflexes were normal. He showed a body language of first placing his right fist on his low back followed by placing the dorsum of his left hand over the low back.

FDM Impression: Long-standing low back pain secondary to folding distortions

Discussion: The mechanism of injury is not known, but the verbal complaint of aching deep in the spine and the body language of fist or back of hand placed on low back are clinically indicative of lumbar folding distortions. Mr. K. was treated with unfolding chair technique as well as wall technique and hallelujah maneuver.[1] After the fourth treatment he noted that his back was "substantially better" and after the sixth treatment (3/19/02) he stated that "this is the best I've felt in 12 years." At office visit on 3/29/02, he said he was feeling "great" and expressed that he was pain free.

Prior attempts at manipulation by his chiropractors were unsuccessful not because of his huge size (which was a factor) but because the direction of thrust employed with lumbar roll was lateral and therefore did not engage the folding tissue of his lumbar spine. Likewise, since none of his other treatments were directed at resolving his anatomical injury, his symptoms remained unchanged.

[1]Note that inversion therapy is an adjunct treatment reserved for those patients with stubborn folding back injuries that fail to make subjective or objective progress on two consecutive office visits in which folding/thrusting manipulation is employed.

Sacroiliac Pain in a 68 Year Old Man

Mr. R. was seen in the office on March 19, 2002 with a five day history of right "low back pain." He denies any injury and says he woke up one morning with pain and it has been getting worse ever since. In particular, his discomfort is aggravated by bending forward and raising from a supine position to standing.

Past Medical History: Positive for Marie-Charcot-Tooth Muscular Dystrophy for forty five years

Body Language: Points with one finger to right sacroiliac joint

Physical Exam: Normal rotation, extension, and side bending of lumbar spine
Lumbar flexion is 50% speed, painful and to 60°
Mild point tenderness over right SI joint
No lumbar spasm
Negative straight leg raising test
Patellar reflexes are 0/4

FDM Impression: Continuum sacroiliac strain

Discussion: Although the patient complaint was of *low back pain*, pointing with one finger to the spot of pain on the sacroiliac joint is the quintessential sign of continuum sacroiliac strain. He was therefore treated with continuum technique — in this case, in the standing position, leaning forward with his hands resting on the counter. The thumb palpated the distortion and force was held until the transition zone shifted. (Mr. R. easily appreciated this as a *melting* sensation as his pain dissipated and then ceased.)

After continuum technique, the right SI joint was manipulated with scissors technique. At time of discharge Mr. R. had normal motion and no pain.

Upper Back Pain in a 21 Year Old Woman

Outline of Events: Motor vehicle accident four months prior to FDM exam
No obvious initial injuries
Upper back pain started one hour later
Seen by family doctor 2 days later
Treated by two chiropractors (13 visits)
Twenty physical therapy sessions
Still complains of upper back pain

Orthopedic Diagnosis: Thoracic strain

FDM Approach:
1. Review events of accident and consider anatomical ramifications
2. Observe body language
3. Decipher verbal complaints
4. Physical examination
5. FDM diagnosis
6. Treat (correct involved fascial distortions)

Motor Vehicle Accident:
Patient driver of car stopped at signal
Rear-ended by another vehicle of unknown speed
At instant of impact she was reaching downward with right hand to change radio station, right shoulder was forward with forearm supinated
Seat belt and shoulder harness fastened
Shoulder harness lax prior to collision
No air bag

Body Language:
1. Grasps right supraclavicular area with left hand and pushes fingers into fossa
2. Tugs superiorly on upper thoracic spinous processes with fingers

Verbal Complaints:
1. Burning pain along right shoulder blade that pulls into neck
2. Denies shoulder complaints
3. "Tingling" in right upper extremity following prolonged sitting (last two weeks only)

Relevant Findings:
Normal neuro exam
Normal x-rays
Normal neck and thoracic exam
5" deficit on internal rotation of right shoulder compared to left

FDM Diagnosis:

Shoulder strain secondary to:

1. SCHTP
2. Star triggerband
3. Folding distortions of upper back
4. Cylinder distortion of right upper extremity.

Discussion: Mechanism of injury provides insight into the formation of fascial distortions. In this case, the initial distortions formed at impact as the thorax was rammed forward (because she was flexed at the waist the force is directed anatomically superiorly) while the harness restrained the shoulder. This combination of pushing the thorax forward (i.e., superiorly) coupled with immobilization of the shoulder, widened the supraclavicular fossa and physically forced underlying tissue through the fascial plane (formation of SCHTP).

The twisted thorax and restrained shoulder also introduced uneven forces into the horizontal plane and sheared apart fascial fibers along the star triggerband pathway.

During the collision, the car and driver were thrust forward, unfolding the thoracic paravertebral fascia superiorly (since she was bent forward), which then refolded contorted (since she was also twisted).

The delayed complaint of tingling throughout the entire upper extremity is, within the FDM, the result of cylinder distortions. In her case the cylinder coils of the upper extremity tangled from the uneven tugging effect caused by the functional shortening of fibers associated with pre-existing fascial distortions.

Low Back Pain in a 43 Year Old Woman with Multiple Compression Fractures

Chief Complaint: Low back pain x 20 years

History: Ms. H. was injured in a horseback riding accident, and sustained compression fractures of all five lumbar vertebrae. She spent three weeks in the hospital and gradually her symptoms began to diminish. In 1996 there were two exacerbations of her back pain after lifting household items. Because of her continuing pain, Ms. H. sought an opinion from a neurosurgeon who, according to the patient, recommended surgery.

Symptoms: Aching deep in spine
Pulling pain from L_1 to L_5

Body Language: Sweeping fingers from L_1 to L_5
Shoving fist into lumbar vertebrae

FDM Impression: Chronic low back pain secondary to compression fractures

Discussion: Ms. H.'s symptoms are considered to originate from two sources: triggerbands with adhesions (making it chronic), and folding distortions of the lumbar spine. Therefore the initial office visit consisted of triggerband technique and folding manipulation in the chair. Since compression fractures can be thought of as refolding injuries of the osseous matrix, a compression force was applied during chair technique.

Then hallelujah maneuver (standing lift technique) was done. This was initiated to correct the associated unfolding distortions that occurred both when she fell off the horse (but before she hit the ground) and from the two bending-forward injuries she had at home.

Over the next two months Ms. H. was treated seven more times in the office but also received inversion therapy (both inversion traction and ball therapy) to correct the array of multidirectional unfolding and refolding distortions. At time of discharge and in follow-up inquiries, she remained pain free.

Right Shoulder Pain in a 32 Year Old Woman

Ms. A. complained of pain in her right shoulder for the past ten days. Her discomfort began on March 1, 2002 after lifting a 190 lb. quadriplegic (she is his caretaker). Her symptoms were:

1. Deep ache in shoulder
2. Pulling pain along upper back
3. Aching in supraclavicular fossa

Her body language consisted of:

1. Placing opposite palm on top of shoulder
2. Sweeping fingers from tip of shoulder to same-side mastoid process
3. Shoving four fingers into supraclavicular fossa

On physical exam, Ms. A. could fully abduct the right shoulder but at only 25% speed. External rotation was normal (90° with normal speed). Internal rotation total height was 6" above pant line (seven inch deficit compared to left shoulder) with 50% speed and pain.

Discussion: Body language is strongly suggestive of folding distortion (palm over shoulder), upper trapezius triggerband (sweeping motion of fingers along upper back), and SCHTP (shoving fingers into supraclavicular fossa). Her objective physical (but subtle) signs of shoulder strain secondary to fascial distortions include:

1. Slow abduction
2. Slow internal rotation
3. Loss of total height on internal rotation

In the fascial distortion model, loss of abduction (including loss of speed) in an acutely sore shoulder is secondary to the SCHTP and/or the anterior and posterior shoulder triggerbands. In her case, since there was no body language suggestive of either the anterior or posterior pathways, they were not treated. Correction of the SCHTP resulted in complete restoration of speed of abduction and also restored half the total height on internal rotation (but did not restore all of it, nor did it improve the slowness of motion).

The upper trapezius triggerband was treated next, but there was no gain in internal rotation (although there was a subjective diminishing in upper back pain). Note that while any of the five acute principal distortion types can cause loss of internal rotation, among triggerbands it is only the posterior and anterior shoulder pathways (and not the upper trapezius) that affect this motion.

Since total height remained diminished and internal rotation speed was still slow, this meant that at least one other distortion remained uncorrected. Therefore an unfolding manipulation was done to the shoulder which completely restored total height and speed. At discharge, patient had bilaterally equal motion of the shoulders and was pain free. Follow-up two days later found Ms. A. to have remained pain free and with normal shoulder motion.

Acutely Frozen Shoulder in an 18 Year Old Woman

Ms. S. is an 18 year old young woman who, on January 23, 2002, injured her right shoulder in a fall at work. As she initially stumbled, her right hand reached forward and grabbed hold of the sink counter; this caused her to twist and fall to the floor still holding onto the counter. Ms. S. had immediate pain and inability to abduct her shoulder so she went to the emergency room. No x-ray or other studies were done and no treatment was given. Shortly thereafter she was seen at her doctor's office and a one month program of physical therapy was initiated ("didn't do anything"). Next she was seen by an orthopedist (who had previously performed an arthroscopic surgery of the same shoulder in October 2001) who felt, according to patient, she should wait six weeks and "let it rest."

On March 11, 2002 (five days after her orthopedic exam) she was evaluated according to the FDM. Her verbal description of discomfort was as follows:

1. Ache deep in joint
2. Pulling pain on collar bone
3. Point pain on front of shoulder
4. Aching on top of shoulder
5. Pulling pain in armpit

Body language observed included:

1. Opposite palm placed on top of shoulder
2. Sweeping fingers along clavicle
3. Pointing with one finger to acromioclavicular joint
4. Pushing fingers into supraclavicular fossa
5. Sweeping fingers from scapula to axilla

Range of motion before and after first treatment:

	Before	After
Abduction	90°	180°
Speed of abduction	50%	80%
External rotation	couldn't get in position	80°
Internal rotation	waist line	8" above waist line

Treatment: Loss of abduction was restored with correction of the SCHTP. However internal and external rotation were only slightly improved by this. Then unfolding technique was successful in the inferior direction which improved internal rotation by 4". Next unfolding technique was successful in the superior direction which improved internal rotation by 4 more inches. However, external rotation was still slow and painful. Full painless external rotation was then achieved after correcting two triggerbands (clavicular and axillary), and one continuum distortion (at the acromioclavicular joint). Patient was treated the following day, repeating the procedures of the previous office visit. At discharge she had normal abduction, external and internal rotation (11" above pant line) with normal speed.

Discussion: Most patients with acute global loss of shoulder motion present with one of the following: fracture, dislocation, separated shoulder or massive upper arm cylinder distortions. However, a combination of several fascial distortions can have the same effect. In this case her injury consisted of:

1. SCHTP – inhibited abduction
2. Triggerbands and continuum distortion – limited external rotation
3. Unfolding distortions (two in glenohumeral fascia) restricted internal rotation. Note that one folding distortion formed when she lunged with her right hand to grab onto the sink. The other occurred as she fell onto her back (twisting her body so that the arm, still holding the edge of the sink, was pulled above her head).

Shoulder Pain in a 50 Year Old Woman

Chief Complaint: Left shoulder pain x 2 days

History: This pharmaceutical representative injured her left shoulder stocking a shelf with drug samples. As the arm stretched upwards and backwards, Ms. F. felt an excruciating pain deep in the shoulder. Over the next several hours a severe new pain developed in the upper arm along with loss of shoulder motion.

Symptoms: Severe pain deep in shoulder
Severe pain deep in upper arm
Weakness
Loss of motion

Physical Exam:

Abduction	R = 180°	L = 90°
External rotation	R = 90°	L = 60° (slow)
Internal rotation	R = 12" above waist line	L = 3" below waist line

No point tenderness, no palpable fracture
Body language: squeezes upper arm repetitively

X-ray: Not done

Orthopedic Diagnosis: Acutely frozen shoulder

FDM Diagnosis: Acutely frozen shoulder secondary to folding and cylinder distortions

Discussion: Ms. F. sustained an injury that resulted in global loss of motion (i.e., loss of abduction, external, and internal rotation). In FDM Flow Chart of the Acutely Sore Shoulder it can be seen there are four possibilities listed: fracture, dislocation, separated shoulder, and cylinder distortion. Taking these one by one:

1. Fracture is unlikely because:
   No point tenderness
   No swelling
   No deformity
   No open wound
   No audible crack
   No traumatic history
   Global loss of motion was not immediate

2. Dislocation is unlikely because:
   No palpable dislocation
   Doesn't explain pain in upper arm
   Global loss of motion was not immediate

3. Separated shoulder is unlikely because:
   Pain is not over the acromioclavicular joint
   No traumatic history
   Global loss of motion was not immediate

4. Cylinder distortion is likely because:
   Severe pain in upper arm
   Mechanism of injury
   Delay in global loss of motion is typical of cylinder injury

Although in this instance a cylinder distortion is overwhelmingly the most likely culprit for the manifestation of global loss of motion, if there is any concern, an x-ray should be taken to rule out a fracture, dislocation, or separated shoulder. And although a cylinder distortion of the upper arm is clinically consistent with global loss of motion, pain in the upper arm, and body language of repetitively squeezing the biceps or triceps muscle — the diagnosis does not explain the pain deep in the shoulder joint. From an FDM perspective, the contorted periarticular folding fascia developed first, and then unequally pulled on the superficial circular fascia and tangled it.

In this case Ms. F. was treated first by unfolding technique (i.e., placing the shoulder into the exact position of injury and reproducing the forces that caused the injury) and then by cylinder technique of the upper arm. She did well on the first treatment with restoration of abduction and external rotation. However, two more visits were required to completely restore internal rotation.

Shoulder Pain in a 42 Year Old Woman

Chief Complaint: Pain deep in right shoulder x 3 months

History: Ms. M. injured her right shoulder three months earlier from slipping on a deodorant container that had inadvertently fallen in the aisle of a large department store. On impact the right shoulder and elbow were tucked against her side and took the brunt of the force from the fall. Immediately thereafter, she felt somewhat disheveled but continued on with her day until it became apparent at lunch that there was a problem — she couldn't lift a coffee cup to her mouth.

The following day Ms. M. was sent by her doctor's physician assistant for evaluation by an orthopedic surgeon. Unfortunately, the MRI he ordered could not be performed because of the patient's claustrophobia. So instead, an injection was made into the shoulder which relieved a significant amount of the discomfort, suggesting to the orthopedist (according to Ms. M.) that there was an impingement syndrome. After three months of conservative care with no subjective or objective improvement, Ms. M. was scheduled for surgical excision of the lateral portion of her right clavicle.

Physical Exam:

	Before TMT Treatment	After 1st TMT Treatment
Abduction:	90° (50 % speed)	180° (normal speed)
External rotation:	awkward	normal
Internal rotation:	9" above waist line	12" above waist line (14" after 2nd treatment)

Discussion: The mechanism of accident and description of discomfort deep in the shoulder joint are strongly suggestive that the underlying fascial injury is a folding distortion. However, folding distortions on their own (with the exception of dislocations) don't cause significant loss of abduction. Therefore, there had to be another distortion (at least) involved to account for the loss of abduction. In her case, it was the supraclavicular herniated triggerpoint. Note that the following approach resulted in rapid recovery.

Treatment sequence and goals:

1. Restore abduction (treat SCHTP, and anterior and posterior shoulder triggerband pathways, if involved)
2. Restore speed of external rotation (treat anterior and posterior pathways and continuum distortions, if present)
3. Restore internal rotation and eliminate pain deep in shoulder (treat with refolding technique: accomplished by placing the shoulder and elbow in the same position as injury coupled with compression/thrusting manipulation)

Shoulder Pain in a 43 Year Old Woman

This woman complained of aching deep in the left shoulder "socket" for the past two days after being bucked off her horse and dragged on the ground by the reins. Pain was present with motion of the shoulder, but absent when the arm rested at her side.

Physical Exam:

Normal gross abduction, stepping present
Normal external rotation
Internal rotation – total height equal on left and right, speed 1/4 on left, hand direction 60° bilaterally
No point tenderness

FDM Impression: Unfolding shoulder strain (known by mechanism of injury and verbal description of pain)

Discussion: Although abduction, external rotation, and internal rotation were grossly equivalent to the opposite shoulder, the subtle signs of stepping, hand direction, and speed indicated that there were significant underlying anatomical restrictions.

Treatment #1:

Folding technique (unfolding) of left shoulder
Result: 6" gain in total height of internal rotation
Normal speed
No stepping
Vertical hand direction

Treatment #2:

Recheck (two days later): Restored motion retained
Slight pain in spot over anterior shoulder with extreme external rotation, treated with continuum technique

Note that following treatment the left shoulder had superior motion to the right; meaning that sometime in the past the right shoulder also had been injured.

Upper Arm Pain Following Flu Shot

Chief Complaint: Left upper arm pain x 2 days

History: Ms. S., a 46 year old woman who was being treated for bilateral carpal tunnel syndrome, mentioned that she had pain in her left upper arm from a flu shot she received the day before. When asked to show exactly where it hurt, she responded by squeezing her upper arm with her right index finger and thumb around the injection site.

Orthopedic Diagnosis: Muscle contusion (bruise)

Discussion: In the fascial distortion model the body language of squeezing or pinching the tissues is strongly suggestive of a cylinder distortion. Therefore, Ms. S. was treated with double thumb cylinder technique which eliminated her discomfort.

Often with injections (particularly tetanus shots) cylinder fascia becomes tangled; first by the needle which either severs or shoves the cylinder coils on top of one another, and then by the introduction of injected fluid whose volume physically displaces the coils from below.

In some instances, a tetanus shot may result in a person losing motion in the entire arm or shoulder. On the *FDM Flow Chart of the Acutely Sore Shoulder* it can be seen that when there is global loss of motion accompanied by pain in the upper arm, the underlying injury in the absence of trauma is a cylinder distortion. And since cylinder technique is designed to correct the anatomical cause of the injury, restoration of motion is expected with the treatment.

Elbow Pain in a 57 Year Old Man

Chief Complaint: Left elbow pain x 2 months
History: Mr. H. denies any known injury but thinks he could have strained his elbow pulling a boat onto a dock. His main complaint is tenderness of the lateral epicondyle where there is a specific point that if pushed on "makes me cry." In addition to point tenderness, he has tightness of the elbow joint, pulling pain along the proximal dorsal forearm, generalized weakness in forearm and diminished grip strength.
Physical Exam: No swelling
Normal range of motion
No redness
Tender spot of pain on lateral epicondyle
X-ray – not done
Orthopedic Impression: Lateral epicondylitis
TMT Treatment #1: Tectonic technique (modified frogleg and reverse frogleg) was done to force the joint to slide and to subjectively reduce joint tightness. This was followed by continuum technique on "that spot of pain." Together these two procedures eliminated the stiffness in the elbow and the point tenderness of the lateral epicondyle.
TMT Treatment #2: Although there were now no complaints of elbow stiffness or spots of tenderness, three symptoms remained:

1. Pulling pain along forearm
2. Forearm weakness
3. Diminished grip strength

Discussion: This gentleman had epicondylitis secondary to a continuum distortion of the lateral epicondyle, but also had a tectonic fixation of the elbow, and a triggerband of the forearm. However, after these distortions were treated, there was still an objective finding of diminished grip strength with an accompanying perception of forearm weakness. In the FDM, weakness of an extremity, particularly in the absence of pain, signifies the presence of cylinder distortions. Treatment #2 therefore, was expanded to include Indian burn technique of the forearm and elbow which normalized grip strength and eliminated the sensation of forearm weakness.

However, Mr. H. then immediately experienced an entirely new sensation — tingling of the distal phalanx of the index finger. In the FDM the symptom of tingling (especially when associated with *jumping*) is a common clinical presentation of cylinder distortions. Mr. H.'s finger was treated with Indian burn technique by wrapping small gauze bandages around the distal and middle phalanx (to give a better grip) and tractioning apart the cylinder coils with a twisting force introduced from the physician's fingers. Note that in this procedure the treating hands are positioned so that the fingers of one hand grip the distal phalanx and twist it in one direction at the same time as the fingers of the other hand grasp the middle phalanx and twist it in the opposite direction. The torquing force is held until the tissue tautness lessens. The anticipated subjective response is elimination of paresthesias, which was the case with Mr. H.

Rib Pain in a 32 Year Old Man

On 6/17/96 Mr. B. was injured at work as he was attempting to lift a 300 pound canister of chemicals. The actual incident occurred when he reached down with his left hand and then across the canister. There was immediate excruciating pain felt in his upper back between his ribs which kept Mr. B. from being able to stand fully erect (lasted a few hours).

Since that time Mr. B. has been disabled and in continuous pain which has the following manifestations:

1. Unrelenting ache between left posterior ribs 2" lateral to thoracic spinal segments T_6-T_7
2. Pulling pain from area of #1 superiorly to base of skull
3. Pulling pain along rib posteriorly to anteriorly

Body language observed:

1. Reaching with left hand over shoulder and tugging superiorly on the rib of T_6
2. Sweeping of fingers along linear pathway just medial to left scapula superiorly to base of neck
3. Sweeping of fingers along involved rib

Mr. B. has had an extensive work-up (bone scan, x-rays, MRI x 4) and has seen numerous therapists and a total of 24 physicians (neurosurgeons, osteopaths, physiatrists, three anesthesiologists, and five orthopedists). He has received physical therapy, osteopathic manipulation, acupuncture, "biologic medicine," "fascial tissue therapy," pain clinic protocols x 2, water therapy, epidurals x 4, and "70 to 100 other injections."

Despite the best efforts of his physicians and therapists there was no change in his pain and Mr. B. remained disabled. However, in February 2002, he was treated with triggerband technique by his doctor in Massachusetts and there was definite reduction in his pulling pain up his back and around his rib cage, but the aching pain remained unchanged.

Mr. B. was first examined in Maine on 3/05/02. In the next few weeks he received ten treatments which consisted primarily of unfolding and refolding manipulations of the star folding intercostal membrane. He had an excellent result and on office visit of 4/01/02 he reported that for the first time in almost six years, he was able to do the following without pain: sleep through the night, drive for 5 hours, sneeze, and change the oil in his car.

Discussion: The folding injury to the intercostal membrane at the star triggerband starting point occurred as Mr. B. reached down (unfolding the membrane) and around the canister (contorting the membrane). When he attempted to stand upright the membrane would not refold properly so he was stuck in a position of partial flexion. Since uncorrected folding injuries tend to be permanent, the continuous aching of that area would have been life long. The secondary complaints of pulling pain were from the star and rib triggerbands which also formed at the time of injury.

Mr. B.'s treatment in Maine consisted of very aggressive and specific thrusting/folding manipulations of the involved segment of the intercostal membrane. Since it was such a stubborn unfolding distortion, it did not respond completely to unfolding technique. Therefore, a series of manipulations were performed in which the intercostal membrane was unfolded and then refolded and then unfolded again. A successful result was evident not just by Mr. B. stating he felt better but by the large audible pop that was achieved as the membrane unfolded (meaning that both thrusting direction and force had been properly introduced into the distortion).

Currently, Mr. B. is making arrangements to be taken off permanent disability and is exploring employment opportunities.

Psoriatic Arthritis in a 43 Year Old Woman

Chief Complaint: Right hand pain and swelling

History: Ms. J. has a long history of psoriasis of the skin, but for a year has had an additional clinical manifestation of joint swelling and pain. The diagnosis of psoriatic arthritis was made by her rheumatologist who recommended treatment with methotrexate. However, because of the possible side effects, Ms. J. refused this option.

Minor Symptoms: Pain on bottom of foot
Left hand pain
Pain over medial aspect of right shoulder

Main Complaint: Swelling and pain of right hand, index and middle finger, with inability to make a fist, pick up coins, or use index and middle finger to button her blouse.

Physical Exam: Shoulders: bilateral normal abduction and external rotation. Internal rotation on left is normal speed, no flaring, with total height 12" above the waist. Internal rotation on right is 1/2 speed, three fingers of flaring, with total height 5" above the waist. Left hand makes normal grip, but there is erythema present at the tip of the distal phalanx of the third finger along with a noticeable deformity of the distal interphalangeal joint. The dorsum of right hand is markedly swollen particularly over the second and third metacarpal/phalangeal joints. The index and middle finger are unable to make a fist (index finger comes 1" from touching the thenar eminence; the middle finger is 2" shy). The middle finger has prominent swelling and tenderness in the proximal phalanx. The index finger is equally swollen. There is redness over distal posterior hand. Nails have pitting. Skin: patchy psoriatic lesions are noted on trunk.

Impression: 1. Psoriasis
2. Psoriatic arthritis
3. Right shoulder strain
4. Right hand pain and swelling secondary to psoriatic arthritis

Discussion: The pain and swelling of psoriatic arthritis is in many ways similar to the pain and swelling following a traumatic injury. On further questioning, Ms. J. gave a more detailed description of her right hand pain which included:

1. Diffuse vague discomfort on dorsum of hand
2. Deep aching in metacarpal/phalangeal and interphalangeal joints

Contemplating this presentation through the FDM, note:

1. Diffuse and non-specific pain is suggestive of cylinder distortions
2. Deep aching in joints, particularly associated with swelling extending to both sides of the joint, is suggestive of folding distortions

Therefore, the fascial pathology in this arthritic hand is considered to be cylinder and folding distortions.

Ms. J. was treated first with folding technique (unfolding manipulation) of the metacarpal/phalangeal joints (traction/thrusting finger away from hand) followed by double thumb cylinder technique of dorsum of hand, and Indian burn cylinder technique of forearm and fingers. At time of discharge:

1. Right index finger could touch thenar eminence
2. Flexion of middle finger was still 1/2" shy
3. Visible decrease in hand swelling

Also during that first office visit the right shoulder was treated with herniated triggerpoint therapy of the SCHTP. Her internal rotation total height improved 5 inches.

At recheck two days later Ms. J. could easily touch the thenar eminence with the index finger, but was still 1/2" away from doing so with the middle finger. Finger and hand swelling had decreased to "about half" what it had been prior to the initial office visit. The second treatment was similar to the first in that it consisted of folding and cylinder techniques. At discharge Ms. J. was able to make a non-painful fist with all her fingers. The change in finger and hand dexterity was most obvious to her as she buttoned her sweater and was able, for the first time in a year, to use her index and middle fingers in the process.

Note that the second visit did not involve the shoulder. Ms. J. felt that it was "back to normal" and another treatment "wasn't necessary." It is likely that the HTP of the shoulder was a separate injury unrelated to her psoriatic arthritis.

Pleurisy in a 27 Year Old Woman

Ms. M. developed a productive green cough and has had pain upon inspiration for the past two weeks. She was seen by her doctor and treated with antibiotics. (There was no fever, respiratory rate was normal, and no x-ray was taken.) Location of pain is deep in the left lateral, inferior, chest cavity. On exam the ribs are not tender and the pain can not be reproduced or magnified with palpation.

Impression: Bronchitis with pleuritis

FDM treatment of March 25, 2002: Unfolding/thrusting manipulation of the left shoulder was done with patient supine and direction of force superiorly. This treatment not only resulted in three large pops of the shoulder, but also unfolded the rib cage and pleura, as evident by three pops in the exact internal area of painful inspiration. Immediately Ms. M. was able to take a deep breath without pain and felt "back to normal."

Discussion: In the FDM pleurisy (a.k.a. pleuritis) is envisioned as a combination of two fascial injuries:

1. Folding distortions
2. Tectonic fixations

Folding distortions develop first when a forceful rogue sneeze or cough (see *Probability Repetitive Injury* discussion in Chapter 9) contorts the pleura. Since the membrane is comprised of smooth fascia (structural type), this injury typically resolves on its own when a subsequent sneeze or cough corrects the anatomical injury. However, if the initial contortion is extensive enough, the fascial fluid which circulates between the two layers (parietal and visceral) becomes inhibited and tectonic fixations form as the folded portions of the two membranes adhere to each other.

FDM treatment, therefore, is designed to anatomically focus an unfolding/shearing force into the adhered pleural membrane. In this case, a tractioning force from above reproduced the original mechanism of injury and unfolded what had become a *stuck* folding distortion (combination folding distortion/tectonic fixation).

Knee Aching in a 70 Year Old Woman Following Knee Replacement Surgery

After a long history of sharp right knee pain, Ms. V. had complete artificial joint replacement in October 2001. The surgery eliminated the sharp pain but a new aching pain developed immediately following the procedure. On March 13, 2002 (five months later) she was first evaluated orthopathically. The knee was swollen and Ms. V. showed a body language of placing the palm of the hand over the knee and squeezing, followed by moving the palm superiorly and then squeezing the distal anterior thigh.

Discussion: The body language of squeezing is indicative of cylinder distortions which were likely caused by surgical incision and wound closing of the superficial cylinder fascia. She was treated three times in the office with cupping-with-movement of the knee and distal thigh, and had a desirable outcome (i.e., she had far less aching and was able to walk up and down stairs with much greater ease). Note that in musculoskeletal injuries cylinder distortions typically affect non-jointed areas, but also are capable of occurring in the fascial coils that encircle joints.

Osteoarthritic Knee Pain in a 71 Year Old Woman

No known injury to this woman with debilitating pain in both of her knees secondary to severe osteoarthritis. Her orthopedist sent her for Typaldos manual therapy when she refused bilateral knee replacement surgery.

Symptoms: Aching deep in both knees
Knees feel weak and give out, falls frequently
Has to use cane

Body Language: Places palms on knees

Physical Exam: Walks slowly and awkwardly. Rises from chair with difficulty. Squatting ability is minimal. The knee joints themselves are enlarged and deformed. There is no point tenderness, no obvious swelling, redness, or warmth.

X-rays: Not reviewed

Orthopedic Diagnosis: Severe osteoarthritis of knees

Discussion: Although Ms. E.'s condition is orthopedically considered to be osteoarthritis, it can still be FDM assessed in the same manner as any other injury. In her case, the combination of an aching pain deep in the joint along with the body language of placing palms on knees is strongly suggestive of the presence of folding distortions.

Before Ms. E. was treated with folding technique, each of the knee joints were first compressed and then tractioned. It was determined that the pain could be magnified by pushing on the heel of the foot and driving the tibia into the distal femur. Likewise it was determined that pulling the foot and leg away from the knee decreased the discomfort. Because of these two findings, she was treated with an aggressive unfolding technique on each knee, which resulted in a significant decrease in symptoms, a normal gait, an improved ability to squat, and no need for the cane.

Heel Pain in an 11 Year Old Boy

Chief Complaint: Bilateral heel pain x 2 years

History: J. is a boy who complained of pain in both of his heels for two years. Despite taking anti-inflammatory medicines and refraining from running, he limped whenever he participated in any fast-paced ambulatory activities.

Body Language: Sweeping motion with index and middle finger from calcaneus along plantar fascia to base of toes

PE: Normal arch of foot, no limp with walking, no point tenderness

X-ray Interpretation: Normal (done previously)

Orthopedic Diagnosis: Plantar fasciitis

FDM Diagnosis: Triggerband plantar fasciitis

Discussion: J. was treated with triggerband technique from the triggerband starting point (at the junction of the calcaneus and plantar fascia) to the metatarsal/phalangeal joints. Since his injury was both acute (no adhesions) and superficial, the treatment itself was relatively painless. However, be aware that triggerbands of the plantar fascia can occur at varying depths with deeper layer distortions requiring great thumb strength to correct.

Following the first triggerband treatment each of the feet were manipulated. This corrected the tectonic fixations which occurred secondary to diminished fascial fluid circulation due to the restrictive effect of long-standing triggerbands. Immediately following the first treatment, J. was able to run without pain. Re-treatment was done in two days, and an inquiry two months later found him to be symptom-free and fully participating in sports (including all running activities).

Note that continuum distortions also can be the cause of plantar fasciitis. These present as spots of tenderness on the plantar aspect of the calcaneus. Body language consists of pointing to a spot of pain with one finger. Treatment is with continuum technique (i.e., application of direct pressure by the thumb into the most tender spot of discomfort and holding it until the transition zone shifts). And just as with triggerband technique, this treatment involves a great deal of thumb strength and stamina on the part of the doctor.

With plantar fasciitis involving both triggerbands and continuum distortions, triggerbands should be treated first.

Ankle Pain in a 57 Year Old Man

Mr. G. fell on icy cobblestone at his home on 12/26/00 and sustained a fracture to his left ankle that required surgery with placement of plates. The fracture healed well and the plates were removed (in late November 2001), but Mr. G. continued to have discomfort which caused him to limp. He also had to hold onto the hand railing when walking up or down stairs and complained of a dull ache deep in the joint. In addition his ankle frequently swelled.

Initial Physical Exam: (3/05/02) Well healed incisional scar. No swelling. No point tenderness. Normal dorsiflexion.

Body Language: Placed palm over ankle

FDM Impression: Long-standing ankle sprain secondary to folding distortion

Discussion: The diagnosis of ankle folding distortion was suspected for the following reasons:

1. Body language
2. Verbal description of discomfort
3. History of fracture
4. Long-standing nature of discomfort
   (left uncorrected, folding distortions tend to be permanent)
5. History of swelling

Treatment: On first office visit an unfolding/thrusting manipulation of the ankle capsule was successfully performed (as was evident by the accompanying large pop). Mr. G. immediately had a positive subjective result. That evening he noticed he was able to walk without a limp and go up and down stairs without holding onto the railing. Re-treatment was done twice in the next week and he was pain free in all his daily activities. On follow-up one month later, (4/05/02) Mr. G. said his ankle was “completely back to normal.”

Discussion: This long-standing, seemingly permanent, and commonly seen orthopedic condition is most often due to a single residual fascial distortion which can be corrected quickly with a simply applied manipulative procedure. The ankle swelling was intermittent, often everyday for weeks at a time. Whether sustained or intermittent, ankle swelling, particularly bi-malleolar, is characteristic of long-standing unfolding distortions.

Sprained Ankle in a 26 Year Old Woman

Chief Complaint: Left ankle pain x 7 days

History: Ms. S. is a nurse whose ankle buckled outward as she stepped part way off the edge of a porch. There was immediate pain and swelling. At the Emergency Department of the hospital where she works, an x-ray was taken (interpreted as negative), a "huge bandage" was applied, and she was put on crutches. The following day Ms. S was told by her physician to "stay off" the ankle and if not better to see an orthopedist.

Body Language: Points to the lateral aspect of the ankle with one finger to show source of pain, but also indicates with a sweeping motion that there is a pulling discomfort from the heel down along the lateral foot.

Physical Exam:

Lateral malleolar swelling and ecchymosis
No point tenderness
Unable to bear weight
Dorsiflexion = 1/4 with stepping
Diminished eversion and inversion

Orthopedic Diagnosis: Ankle sprain

FDM Diagnosis:
1. Continuum ankle sprain
2. Triggerband foot sprain

Discussion:
This ankle/foot sprain combination is best treated in this order:
1. Anterior ankle continuum distortion
2. Lateral ankle continuum distortions
3. Lateral foot triggerbands

Ms. S. was treated on a Friday and was immediately able to bear weight, stand on her toes, and to walk without a limp. By the time she returned to work later that afternoon almost all of the swelling was gone (re-establishment of the fascial fluid transport network). She was re-checked in the office on Monday and a gentle unfolding manipulation of the ankle was done. At the time of discharge she was completely asymptomatic.

Ankle Pain in a 41 Year Old Man

Chief Complaint: Right ankle pain x 31 years

History: Stepped in hole, twisted foot, and sustained a fracture to his ankle (no documentation available about type or severity of fracture)

Treatments: Casting
Surgery x 1 in 1978 with no change in symptoms
Multiple injections which "helped for a couple of days"

Physicians seen: "Dozens"

Symptoms:

- Daily bi-malleolar swelling (worse in afternoon, increased by standing on concrete floors or walking)
- Aching deep in ankle
- Stiffness of foot (worse in A.M.)
- Inability to place foot flat on floor
- Walking barefoot increases symptoms
- Increase in swelling and pain with even small excursions over irregular ground
- Ankle "tires easily" and has to be rested frequently (especially if walking on sandy beach)

Physical Exam: Decreased dorsiflexion
Mild bi-malleolar swelling
Small well-healed surgical scar present
Decreased and painful active and passive range of motion

X-ray Interpretation: Normal foot and ankle

Orthopedic Impression: Chronic ankle pain

FDM Diagnosis:
1. Long-standing acute ankle sprain of the folding type
2. Tectonic fixations of foot

Course of Treatment: Mr. S. was treated with TMT. At the conclusion of the initial visit he demonstrated improved inversion and eversion and while standing was able to pivot better on the ankle. After the second treatment he stated that he could now stand with the foot feeling as if it were flat on the floor. After the third session he walked for several miles at Sand Beach and the ankle and foot felt "great." Following the fourth treatment he had no more swelling, no symptoms, and he felt as if his foot and ankle were "almost normal again."

Discussion: Folding distortions of distal tibiofibular interosseous membrane and ankle capsule are expected with a fracture of the ankle and typically present with the clinical findings of:

1. Aching deep in joint
2. Bi-malleolar swelling
3. Loss of motion

Unfortunately for Mr. S., the folding distortion of the distal tibiofibular interosseous membrane was held in place by the application of a cast which limited the movement, i.e., unfolding and refolding of the membrane. With this limited motion, synovial fluid circulation was decreased and tectonic fixations of the ankle and foot joints formed.

The folding distortions also physically limited the shock-absorbing function of the capsule which caused the aching discomfort deep in the joint and the aggravation of symptoms when Mr. S. tried to walk on a soft or irregular surface. Note that correction of the folding distortion facilitated the re-absorption of interstitial swelling by restoring the fascial fluid transport network.

Although children tend to recover more completely than adults from fractures (secondary to the fascia's ability to anatomically minimize the shortening effect of the contorted tissue by growing) this was not the case in Mr. S.'s injury. In this instance the placing of the cast created tectonic fixations, which then cemented the ankle and leg folding distortions firmly in place and caused the stiffness of the foot.

Since there was no body language or physical findings suggestive of triggerbands with adhesions, the injury was considered to be a non-resolved acute sprain rather than a chronic condition. Supporting this conclusion was the rapid clinical response to treatment which is typical of an acute injury.

Ankle Pain in a 39 Year Old Woman

Chief Complaint: Left ankle pain x 33 years
History: Ankle fracture at age 6
No surgery
Frequent ankle sprains (approximately one per year)
Walks upstairs with limp
Bi-malleolar swelling following exertion
Aching deep in joint
Physical Exam: Pes planus bilaterally
Bi-malleolar swelling
Foot swelling
No point tenderness
Unable to stand on toes of left foot
Normal dorsiflexion
No obvious limp
Orthopedic Diagnosis: Chronic ankle pain

FDM Diagnosis: Long-standing acute folding ankle sprain

Treatment:
#1 Unfolding technique done — "I feel a lot better"
#2 (5 days later) No swelling
Patient says she's been "Beating on it," but no pain
Unfolding technique repeated
#3 (2 weeks later) "99% better"
Unfolding technique repeated

Phone Inquiry (15 months later) No swelling, no aching — "I can still walk on my toes, go up steps without pain. . . I don't think about it anymore"

Discussion: The body language of folding distortions of the ankle consists of:

Unfolding: Gently grasps the ankle, distal leg, or foot
Refolding: Same as above, plus 50% of time a sideways sweeping with fingers back and forth across top of ankle

FDM pathology of this particular injury was solely an unfolding distortion. The body language actually observed was cradling the ankle with the hand and giving it a slight squeeze with the fingers. Note that the fact that the injury was long-standing does not change the body language or slow the rate of response to the treatments. If the injury had been chronic, i.e., triggerbands with adhesions had formed, then for a successful outcome it would have been necessary to employ triggerband technique before utilizing folding technique.

Section Five

Addendum & Glossary

Summary of Common Conditions, Body Language, and FDM Treatments

Condition	Body Language/ Description of Discomfort	FDM Treatment
Headache/ Behind-the-Eye	Pushes thumb or finger tip into lacrimal bone	Triggerband technique from TMJ along the eyebrow to the lacrimal fossa, then gentle herniated triggerpoint therapy of tiny lacrimal HTP
Headache/ Occipital	Pushes and tugs on infra-occipital fascia with one or two fingers	Vigorous triggerband technique of peri-occipital fascia – treat from midline laterally
Headache/ Tension	1. Runs fingers along scalp	Triggerband technique along course of discomfort
	2. Pushes fingers into skull sutures	Refolding followed by unfolding technique
	3. Squeezes scalp	Double thumb cylinder technique of symptomatic scalp fascia
TMJ Pain	1. Rubs finger over TMJ	Triggerband technique along course of discomfort
	2. Points with finger to spot(s) of pain	Continuum technique
	3. Ache deep in joint, pain lessened with traction	Unfolding technique (doctor sits at end of table with patient supine, palms are placed over TMJ and the fingers are interlaced), traction/thrust force is directed anteriorly and inferiorly along line of mandible
	4. Ache deep in joint, pain worse with traction	Refolding technique – direct compression/ thrust of mandible superiorly and posteriorly into TMJ
	5. Stiffness	Neutral thrust tectonic manipulation of TMJ

Condition	Body Language/ Description of Discomfort	FDM Treatment
Shoulder Pain	Pulling pain on front of shoulder	Triggerband technique of anterior shoulder pathway
	Pulling pain along back of shoulder	Triggerband technique of posterior shoulder pathway
	Pulling pain from upper back to neck	Triggerband technique of star
	Pushes fingers into supraclavicular fossa	Herniated triggerpoint therapy of SCHTP
	Pain in spot(s)	Continuum technique
	Ache deep in joint, places opposite hand on top of shoulder, tugs on hand	Unfolding technique (i.e., traction/thrust) or lateral unfolding technique
	Ache deep in joint, places opposite hand on shoulder and rubs fingers across humeral head	Refolding technique (i.e., compression/ thrust)
	Squeezes upper arm with opposite hand	Double thumb cylinder technique or cupping-with-movement
	Stiffness with active motion, anterior rotation of shoulder with abduction	Slow tectonic pump followed by frogleg and reverse frogleg tectonic techniques
Upper Arm Pain	Sweeping fingers along anterior upper arm	Triggerband technique of anterior shoulder pathway
	Sweeping fingers along posterior upper arm	Triggerband technique of posterior shoulder pathway
	Squeezes localized portion of upper arm	Double thumb cylinder technique

Condition	Body Language/ Description of Discomfort	FDM Treatment
Upper Arm Pain	Repetitively squeezes multiple areas	Squeegee cylinder technique of entire upper arm or cupping-with-movement
	Pushes fingers into intermuscular septum	Folding/thrusting manipulation of IMS
Elbow Pain	Sweeping fingers over epicondyle	Triggerband technique
	Point tenderness on epicondyle	Continuum technique
	Ache deep in joint	Frogleg or reverse frogleg tectonic technique with compression force directed into elbow
	Elbow tightness with diminished internal rotation of shoulder	Indian burn cylinder technique
	Elbow feels stiff	Frogleg or reverse frogleg tectonic technique
Forearm Pain	Sweeping fingers up and down forearm	Triggerband technique
	Points with one finger to source of pain	Continuum technique
	Hand grasps dorsal forearm muscles	Folding technique of intermuscular septum
	Pushes thumb deep into anterior forearm or grasps tightly with fingers and tugs on radius or ulna	Folding technique of interosseous membrane

Condition	Body Language/ Description of Discomfort	FDM Treatment
Carpal Tunnel Syndrome	Tingling or *pins and needles* in median nerve distribution	Double thumb cylinder technique of flexor retinaculum
	Tingling or *pins and needles* throughout entire hand, wrist, and/or forearm	Indian burn cylinder technique of forearm followed by double thumb cylinder technique of retinaculum
	Tingling or *pins and needles* from shoulder down arm to wrist or hand	Squeegee cylinder technique of upper arm, Indian burn cylinder technique of forearm and wrist or cupping-with-movement
Hand Pain	Pushes thumb into thenar eminence	Triggerband technique
	Pushes thumb onto meta-carpal and locates spot(s) of pain	Continuum technique
	Diffuse pain deep in hand	Folding technique
	Boxer's fracture	Folding technique followed by continuum technique
Finger Pain	Fracture: Spiral	Triggerband technique
	Chip	Continuum technique
	Comminuted	Folding technique
	Pain deep in interphalangeal joint	Folding technique
	Stubbed fingers	Refolding followed by unfolding technique
	Osteoarthritis of fingers	Refolding technique, followed by unfolding technique, then continuum technique
	Diffuse finger pain	Indian burn cylinder technique
	Stiff fingers	Tectonic technique

Condition	Body Language/ Description of Discomfort	FDM Treatment
Neck Pain	Sweeping fingers along posterior neck	Triggerband technique of star triggerband
	Sweeping fingers along lateral neck	Triggerband technique of upper trapezius (shoulder to mastoid) triggerband
	Aching at base of neck or pushes on supraclavicular fossa	Herniated triggerpoint therapy of SCHTP
	Spot(s) of pain	Continuum technique and/or thrusting manipulation
	Pain behind ear/points with finger to rim of atlas	Continuum technique or thrusting manipulation of atlas
	Ache deep in neck, pain lessened with traction	Unfolding technique (i.e., traction/thrust)
	Ache deep in neck, pain increased with traction	Refolding technique (i.e., compression/thrust)
	Squeezes neck	Double thumb cylinder technique
	Tingling	Double thumb cylinder technique
	Stiffness	Neutral thrust tectonic manipulation
Wry Neck (torticollis)	Sweeping fingers along anterior neck	Herniated Triggerpoint Therapy of SCHTP Triggerband technique of sternocleido-mastoid muscle or anterior shoulder pathway
Upper Back Pain	Sweeping motion with fingers from transverse process of T6 up to neck or mastoid	Triggerband technique of star
	Sweeping fingers along upper trapezius muscle	Triggerband technique of shoulder to mastoid pathway
	Pushes with fingers into supraclavicular fossa	Herniated triggerpoint therapy of SCHTP

Condition	Body Language/ Description of Discomfort	FDM Treatment
Upper Back Pain	Hurts in spot(s)	Continuum technique and/or neutral thrust
	Motor vehicle accident – aches deep in spine	Chair technique with traction or compression
	Reaches over shoulder and tugs up on mid-posterior ribs with fingers	Star folding manipulation
	Tugs or pulls on spinous process of upper thoracic vertebrae	Hallelujah maneuver
	Ache deep in upper thoracic spine	Hallelujah maneuver (unfolding) Chair technique (unfolding or refolding)
	Ache deep in lower thoracic spine	Wall technique (unfolding) chair technique (unfolding or refolding)
	First rib tightness	Swimmers position for 1st rib refolding thrusting manipulation
	Hurts with traction or compression	Inversion therapy (combination unfolding and refolding therapy)
	Stiffness	Kirksville crunch (dog technique) or neutral chair technique
	Spasm	Double thumb cylinder technique or cupping-with-movement
Fibromyalgia	Multiple complaints	Treatment Steps: 1. SCHTP, then triggerbands: star, upper trapezius, posterior shoulder pathway, 2. Folding distortions: first rib (refolding), star, paravertebral (chair and wall techniques, hallelujah maneuver, and inversion therapy) 3. Tectonic fixations: shoulder (slow tectonic pump, frogleg and reverse frogleg manipulations), cervical (neutral thrust), thoracic (Kirksville crunch and chair technique), low back (chair technique)

Condition	Body Language/ Description of Discomfort	FDM Treatment
Fibromyalgia		4. Continuum distortions: continuum technique to affected areas 5. Cylinder distortions: squeegee technique for broad areas, double thumb for isolated spots, and Indian burn for forearm
Chest Wall Pain	Short sweeping strokes with fingers	Triggerband technique
	Points with one finger to source of pain	Continuum technique
	Tightness between ribs	Folding technique
Flank Pain	Sweeping fingers from flank to groin	Triggerband technique of flank triggerband
	Pushes thumb into flank	Herniated triggerpoint therapy of flank HTP
Abdominal Pain	Presses fingers into abdomen and makes slow, sweeping strokes along a short linear pathway	Deep triggerband technique
	Pushes thumb into abdomen	Deep herniated triggerpoint therapy
Low Back Pain	Sweeping fingers up and down posterior thigh	Triggerband technique of posterior thigh triggerband
	Sweeping fingers up and down iliotibial band	Triggerband technique of lateral thigh triggerband
	Pushes thumb forcefully into gluteal muscle	Herniated triggerpoint therapy of gluteal bull's-eye
	Points with one finger to PSIS	Continuum technique followed by thrusting manipulation (scissors technique)

Condition	Body Language/ Description of Discomfort	FDM Treatment
Low Back Pain	Back of hand or fist over lumbar vertebrae	Chair technique – traction/thrust (unfolding) or compression/thrust (refolding)
	Squeezes low back muscles with hands or fingers	Double thumb cylinder technique or cupping-with-movement
	Stiffness	Neutral thrust chair technique
	Places hands over iliac crest	Frogleg and reverse frogleg tectonic technique of hip
Hip Pain	Sweeping fingers along: 1. lateral thigh, 2. mid-gluteus, 3. sacrum, or 4. iliac crest	Triggerband technique
	Pushes fingers or knuckles into mid-lateral gluteus maximus (bull's-eye)	Herniated triggerpoint therapy followed by, if necessary, continuum technique
	Points with one finger into sacroiliac joint	Continuum technique followed by scissors technique
	Ache deep in hip	Unfolding technique – traction/thrust
	Ache deep in hip and pushes fingers across anterior femoral head	Refolding technique – compression/thrust
	Places hands over iliac crests	Frogleg and reverse frogleg tectonic techniques
	Spasm	Double thumb cylinder technique or cupping-with-movement
Thigh Pain	Pulled muscle	Triggerband technique
	Pulling or burning on posterior aspect	Triggerband technique of posterior thigh triggerband
	Sweeping fingers over lateral thigh	Triggerband technique of lateral thigh triggerband

Condition	Body Language/ Description of Discomfort	FDM Treatment
Thigh Pain	Diffuse discomfort, aching, or tingling	Indian burn cylinder technique or cupping-with-movement
	Squeezes or pinches small portion of thigh	Double thumb cylinder technique
	Sweeping palm or entire hand over broad area of anterior or lateral aspect of thigh	Squeegee cylinder technique or cupping-with-movement
	Ache deep in thigh	Folding manipulation of intermuscular septum
Knee Pain	Two inch sweeping motion with fingers from superior patella upwards	Triggerband technique
	Pushes fingers into popliteal fossa	Continuum or triggerband technique
	Point of pain, medial aspect	Continuum technique
	Osgood-Schlatter disease	Triggerband and continuum techniques
	Ache deep in joint, gently cups knee with hand, tugs on thigh	Unfolding technique
	Ache deep in joint, cups knee with hand and rubs fingers back and forth across inferior knee	Refolding technique
	Diffuse pain	Indian burn cylinder technique
	Small area of vague discomfort, exact location cannot be determined	Double thumb cylinder technique
	Feels like it needs to pop	Frogleg and reverse frogleg tectonic techniques

Condition	Body Language/ Description of Discomfort	FDM Treatment
Leg Pain	Shin splints, pain along anterior leg	Triggerband technique
	Shin splints, pain in spots	Continuum technique
	Deep ache in leg	Folding technique of interosseous membrane
	Aching pain between muscles	Folding manipulation of intermuscular septum
	Diffuse pain over entire leg, repetitively squeezes several portions of leg	Indian burn cylinder technique or cupping-with-movement
	Tourniquet sensation	Squeegee cylinder technique
Ankle Sprain	Pulling pain up calf	Triggerband technique
	Pain in one or more spots	Continuum technique
	Pain deep in joint, grasps ankle with hand, prominent bi-malleolar swelling	Traction/thrust (unfolding)
	Pain deep in joint, grasps ankle with hand then rubs finger across ankle	Compression/thrust (refolding)
	Diffuse pain on dorsal aspect of ankle	Double thumb cylinder technique
	Long-standing ankle stiffness	Frogleg and reverse frogleg tectonic techniques
Foot Sprain	Pain along linear pathway	Triggerband technique
	Point tenderness	Continuum technique
	Swelling/ache deep in foot between metatarsal bones	Folding technique

Condition	Body Language/ Description of Discomfort	FDM Treatment
Foot Sprain	Diffuse pain on dorsal aspect of foot with or without swelling, unable to localize area of discomfort	Double thumb cylinder technique
	Long-standing foot stiffness	Tectonic technique
Foot fracture	Pain in spot(s) with generalized aching	Gentle folding technique followed by continuum technique
Plantar Fasciitis	Sweeping fingers along bottom of foot	Triggerband technique
	Points to spot(s) of pain on calcaneus	Continuum technique
Toe Sprain	Pain along length of toe	Triggerband technique
	Spot of pain	Continuum technique
	Ache with swelling	Unfolding technique
	Stubbed toes	Refolding followed by unfolding technique
	Diffuse pain	Indian burn cylinder technique
Toe fracture		Gentle folding technique followed by continuum technique

FDM Abbreviations

AACD	Anterior Ankle Continuum Distortion
CCV	Compression Cylinder Variant
CD	Continuum Distortion
CT	Continuum Technique
CTLS	Carpal Tunnel-Like Syndrome
CTS	Carpal Tunnel Syndrome
CyD	Cylinder Distortion
CyT	Cylinder Technique
ECD	Everted Continuum Distortion
FD	Folding Distortion
FDM	Fascial Distortion Model and Fascial Distortion Medicine
FDT	Fascial Distortion Technique
FT	Folding Technique
HTP	Herniated Triggerpoint
HTPT	Herniated Triggerpoint Therapy
ICD	Inverted Continuum Distortion
IOM	Interosseous Membrane
IMS	Intermuscular Septum
LBP	Low Back Pain
OHTF	Objective Hip Tectonic Fixation
PSSP	Post-Stroke Spastic Paralysis
PSSPP	Post-Stroke Spastic Paralysis Patient
RFD	Refolding Distortion
RFT	Refolding Technique
SCHTP	Supraclavicular Herniated Triggerpoint
SHTF	Subjective Hip Tectonic Fixation
SI	Sacroiliac joint
SP	Starting Point
TB	Triggerband
TBT	Triggerband Technique
TCTS	True Carpal Tunnel Syndrome
TF	Tectonic Fixation
TMJ	Temporomandibular Joint
TMT	Typaldos Manual Therapy
TT	Tectonic Technique
TZ	Transition Zone
UFD	Unfolding Distortion
UFT	Unfolding Technique

Triggerband Subtypes

Subtype	Palpatory Sensation	Palpatory Dimension	Common Locations
Twist	Twisted ribbon edge	Suture to pencil width	Throughout the body
Crumple	Tingling sensation	1/8" to 1/4" wide	Between muscle layers
Knot	Knotted-up rubber band	Almond shape	Thoracic and lumbar areas
Pea	Cooked pea	Pea size	Neck, thighs upper arms
Grain of Salt	Firm with irregular edges (scraping sensation)	Salt grain size	Face, scalp, hands, feet
Wave	Wrinkling of tissue	Barely palpable	Near joints

Note that triggerband subtypes represent the clinical spectrum of triggerband palpatory findings. Peas are in essence a smaller and softer version of a knot, and crumples are larger forms of waves. As the triggerband is corrected with triggerband technique, the distorted fascial band may present along its course as several different subtypes. For instance, the star triggerband in the thoracic area typically is palpated as a knot. But during treatment as it passes along the neck, it may feel like a pea. And the same distortion just a few seconds later, when it is traced under the occiput or onto the mastoid process, palpates as a twist or even a grain of salt.

Herniated Triggerpoint Subtypes

Subtype	Etiology	Palpatory	Treatment
Non-banded	Protrusion of tissue through a non-banded fascial plane	Soft, almond-sized (or smaller) elevation in	Herniated triggerpoint therapy (i.e., protruding tissue driven below fascial plane with pressure from physician's thumb)
Banded	Protrusion of tissue through a fascial plane distorted by a triggerband	Same as above except that at completion of herniated triggerpoint therapy a triggerband is palpated	Herniated triggerpoint therapy followed by triggerband technique

Continuum Distortion Subtypes

Comparative Category	**Everted**	**Inverted**
Etiology	Portion of transition zone between ligament or tendon and bone stuck in *osseous* configuration	Portion of transition zone between ligament or tendon and bone stuck in *ligamentous* configuration
Size	*O* to *o*	*O* to *o*
Palpatory Sensation Analogy	Vitamin A or E soft-gel capsule, or the edge of eraser on end of pencil	Hole in trouser belt that buckle prong pierces
Most Specific Treatment	Continuum technique	Continuum technique and thrusting manipulation
Common Injuries	Ankle sprains, fractures, wrist sprains	Sacroiliac strains, bony contusions, whiplash injuries

Folding Distortion Subtypes

Comparative Category	**Unfolding**	**Refolding**
Mechanism Of Injury	Limb/vertebra pulled or jerked away from joint (traction force)	Limb/vertebra pushed or shoved into joint (compression force)
Pathology	Folding fascia stuck in partially unfolded position	Folding fascia stuck in partially refolded position
Structural Ramification	Folding fascia can't refold completely	Folding fascia can't unfold completely
What Makes It Hurt	Pushing limb/vertebra into joint (compression)	Traction of limb/vertebra away from joint (traction)
What Makes It Feel Better	Traction (pulling)	Compression (pushing)
Treatment	Unfolding technique (pulling, followed by traction/thrusting limb/vertebra away from joint)	Refolding technique (pushing, followed by compression/thrusting limb/vertebra into joint)

GLOSSARY

Abduction: Shoulder motion in which hands are brought from sides of body up and over the head with elbows extended.

Achy Legs: Condition caused by cylinder distortions, intermuscular septal, or interosseous membrane folding distortions in which patients complain of a diffuse dull pain, discomfort, or ache deep in their lower legs.

Acupuncture Points: Specific anatomical sites in which acupuncture needles are placed. These commonly match crossbands of triggerbands, and the acupuncture meridians often correspond to triggerband pathways.

Acute Injury: Musculoskeletal dysfunction in which no fascial adhesions have formed.

Adhesions: Fascial fibers (torn crosslinks) that aberrantly attach to other structures and result in dysfunction and restriction of those structures.

Adhesive Capsulitis: A severe form of tectonic fixation that is compounded with triggerbands and fascial adhesions.

Allopathic Medicine: Dominant form of medicine practiced in the United States. Graduates of these medical schools are designated as Doctor of Medicine and use the abbreviation M.D. Historically, allopaths treat diseases by producing a condition incompatible or antagonistic to the condition treated (basis of most current pharmaceutical therapies such as aspirin which is antagonistic to fever). In contrast to allopathy is *homeopathy* which prescribes minute doses of a substance to produce symptoms similar to the condition treated (basis of immunizations).

All-or-None Principle: Clinical phenomena that occurs during continuum technique in which either the transition zone shifts or it doesn't. Because of the all-or-none principle, a partial resolution is not possible with continuum technique.

Aneurysm: Herniated triggerpoint of blood vessel.

Angina: Temporary ischemic changes in the heart, perhaps brought on by a cylinder distortion or triggerband constricting a coronary artery.

Ankle Eversion: Motion in which the ankle buckles laterally.

Ankle Sprain: Soft tissue injury to ankle in which there is swelling, pain, and loss of motion, but no fracture. In the FDM, ankle sprains occur in four varieties: continuum, triggerband, unfolding and refolding.

Anterior Ankle Continuum Distortion: Continuum distortion present on the anterior aspect of every ankle sprain of every type. It is responsible for loss of foot dorsiflexion.

Anterior Shoulder Triggerband Pathway: Course of triggerband responsible for bicipital tendonitis, and pain and tightness in front of shoulder. Its starting point is on the proximal anterior forearm and its pathway courses superiorly through the bicipital groove up to the ipsilateral mastoid process.

Arteriosclerosis: Narrowing of blood vessel with plaque formation, perhaps secondary to a fascial distortion on the exterior of the vessel constricting the lumen.

Asthma: Sudden onset of bronchiole constriction which could be secondary to a simultaneous tightening of all fascial bands in the lung (see *Purse String Effect*).

Babst Board: Flat board with half-spheres beneath which is used by physical therapists as a form of teeter-totter to increase proprioception following an ankle sprain. In the FDM, theoretically rocking back and forth on the board gently untwists twisted fascial fibers in the ankle, leg, and thigh, thus restoring the normal ability of those fibers to function as an accessory mechanical sensory system. The rocking motion also unfolds and refolds the ankle capsule helping to correct folding distortions.

Ball Therapy: Therapy balls of assorted sizes and shapes are used in conjunction with both folding and tectonic techniques. The involved joint is placed over the ball during treatment and either a thrusting manipulation (tectonic technique), traction (unfolding technique), or compression (refolding technique) is initiated. During thrusting manipulation the ball indents and recoils which lubricates the joint at the moment of the thrust by pumping fluid directly between the fixated surfaces. In folding technique, the ball supports the joint comfortably in a wide variety of positions so that traction or compression can be focused into the restricted areas.

Banded: Theoretical fascial arrangement present on exterior of coronary arteries in which criss-crossing fascial bands are present.

Banded Herniated Triggerpoint: Subtype of herniated triggerpoint characterized by protrusion of tissue through a banded fascial plane that is distorted by a triggerband.

Banded Pseudo-Triggerpoint: Fascial distortion that occurs when two or more triggerbands overlap (common in fibromyalgia).

Behind-the-Eye Headache: Typical description of symptoms caused by a combination distortion of a triggerband and a lacrimal herniated triggerpoint.

Biliary Colic: Narrowing of bile duct from either a triggerband or a herniated triggerpoint which results in spasm as stone attempts to pass.

Body Language: Consistent subconscious motions or postures exhibited by patients with specific fascial distortions.

Brute Force Maneuver of the Scapula: Tectonic technique in which the palm of the treating hand is used to induce the scapula to slide.

Brute Force Maneuver of the Shoulder: Tectonic technique in which weight of physician is used to induce the capsule to slide. This is accomplished by having the physician transfer his/her weight onto patient's shoulders through his /her hands. Note that the doctor stands behind the patient, his/her right palm positioned on patient's right shoulder and doctor's left palm placed on patient's left shoulder – accompanying rocking motion pumps synovial fluid and helps budge capsule.

Bull's-Eye Herniated Triggerpoint: HTP of the gluteal area. It is often accompanied by a continuum distortion directly beneath it.

Bursitis: Painful area under a muscle that is tender to touch. Clinically most are either triggerbands or continuum distortions.

Button-Slipping-Into-the-Buttonhole Analogy: Sensation of both patient and physician at the moment of correction of a continuum distortion.

Cable Ligaments: Huge fascial bands along vertebrae of certain dinosaurs.

Carpal Tunnel Syndrome: Fascial distortions of the wrist retinaculum and fascia that result in symptoms of burning, numbness, tingling, or pain in the wrist, forearm, fingers, or hand. Cylinder distortions and triggerbands are the most common etiologies. Two subtypes – true carpal tunnel syndrome and carpal tunnel-like syndrome.

Carpal Tunnel-Like Syndrome (CTLS): Condition in which cylinder distortions (and to a lesser extent triggerbands) of the forearm, wrist, hand, and/or fingers cause paresthesias and/or numbness of involved areas.

Chair Technique: Sitting folding/thrusting manipulation of lumbar and thoracic spine. In the FDM when thrust is accompanied with traction it is an unfolding technique and when thrust is accompanied with compression it becomes a refolding technique. Note: A neutral thrust manipulation (no traction or compression) is utilized to treat facet tectonic fixations and inverted continuum distortions.

Chicken-Wing Technique: Sitting and prone intermuscular septa thrusting/folding techniques for the upper arm.

Chronic Injury: Musculoskeletal dysfunction in which fascial adhesions have formed.

Coiled: Theoretical fascial arrangement present on exterior of coronary arteries where cylinder fascia is present.

Comb Technique: Therapy in which a metal comb is raked across the skin to fracture fascial adhesions and to untangle cylinder fascia.

Combination Distortion: Injury comprised of two or more principal fascial distortion types (such as continuum distortion and triggerband).

Combination Sprained Ankle: Sprained ankle that clinically presents with two or three principal fascial distortion types.

Complex: Theoretical fascial arrangement present on exterior of coronary arteries when criss-crossing bands and coils are present.

Compression Cylinder Variant: Modification of cylinder technique (Indian burn, double thumb, and squeegee) in which fascial coils are pushed together rather than pulled apart.

Compression/Thrust: Manipulation in which a sustained pushing force is combined with a rapid pushing or rotational force to refold folding fascia.

Continuity Model of Anatomy: Anatomical perspective in which individual fascial fibers pass through other tissues and link all of those tissues together into a single structural unit. Any alteration of the fiber anywhere along its path is thought to cause dysfunction in every portion of that pathway. In addition, the fascial fibers are considered to be continuous with and become the fibers that make up bone, ligaments, and other connective tissues.

Continuum Distortion: Principal fascial distortion type that occurs when there is an alteration of the transition zone between two tissue types. This most commonly occurs at the origin or insertion of ligaments or tendons with bone.

Continuum Model of Anatomy: Anatomical perspective in which tissue types are viewed as being a continuum of each other. Depending on the intrinsic and extrinsic forces applied, tissues may take on characteristics of adjoining tissues through their common transition zone.

Continuum Technique: Manual modality to treat continuum distortions. Force is applied by physician's thumb directly into area of shifted continuum. It is held until transition zone is forced to shift (i.e., release).

Contusion (bony): Continuum distortion of periosteum.

Contusion (muscle): Cylinder distortion of superficial fascia overlying the affected muscle.

Cornstarch/Water Phenomenon: Simple laboratory demonstration in which cornstarch is mixed with water to show that the physical properties of this amorphous substance are determined by the external forces introduced into it. When stirred (i.e., forces from more than one direction are introduced at the same time) the cornstarch/water compound acts as a liquid, but when poked or tapped (i.e., force is directed into it from only one direction) it behaves as a solid. The transition zone between bone and ligament is thought to have a similar ability in that it is capable of instantaneously shifting back and forth between osseous and ligamental configurations depending on the external forces encountered.

Cortisone Injection of Joint: In the FDM the injected solution increases the volume of liquid in the joint and flushes stagnant synovial fluid out of the joint.

Cows-Through-the-Barn-Door Analogy: Comparison made between herding cows into the barn and correcting herniated triggerpoints.

Costochondritis: Chest wall pain resulting from a combination of triggerbands and continuum distortions.

Criss-Crossing Fascial Bands: Potential site for two triggerband twists to meet and become locked in place (postulated to be the cause of triggerband myocardial infarction).

Crossband: Fascial band found in the same plane and at a different angle to a triggerband. Crossbands are often the anatomical starting place for triggerband technique.

Crosslink: Single perpendicular fiber of a fascial band that holds the parallel fibers of the band together. When the crosslink is torn, the fascial fibers are then able to twist, separate and tear apart. When the injured crosslinks pathologically reattach to inappropriate structures (such as other fascial bands) they are called fascial adhesions.

Crumple: Distorted fascial band wedged between muscle layers – triggerband subtype.

Cumulative Repetitive Use Injuries (CRI): Accumulation of specific motions that physically distort the fascia. Patients with CRI complain of increasing musculoskeletal symptoms secondary to repeating a specific body movement.

Cupping-with-Movement: Method of treating cylinder distortions in which plastic cups are suctioned onto the skin and the underlying muscles are actively contracted.

Cylinder Distortion: Principal type of fascial distortion characterized as an alteration of circular fascia in which the cylindric coils have become tangled.

Cylinder Fascia: Fascia that encircles the extremities, trunk, thorax, blood vessels, and other structures.

Cylinder Myocardial Infarction: Heart attacks caused by coronary artery cylinder distortions (hypothetical).

Cylinder Shuffle: Characteristic gait associated with severe cylinder distortions of lower leg.

Cylinder Technique: Manual therapy designed to correct cylinder distortions. Five cylinder techniques currently in use: 1. Indian burn, 2. double thumb, 3. cupping-with-movement, 4. squeegee, and 5. compression cylinder variants.

Double Thumb Cylinder Technique: Manual method for correcting cylinder distortions in which overlapped and tangled cylindric fascial coils are tractioned apart by treating doctor's thumbs.

Double Twist: Triggerband distortion in which the fascial band is twisted twice. These are thought to be the cause of the headlight effect.

Everted Continuum Distortion: Subtype of continuum distortion in which a portion of the transition zone is stuck in the osseous configuration.

External Rotation: Shoulder motion in which hands are placed behind neck and fingers are intertwined. The elbows are then pushed posteriorly.

Fascia: Primary connective tissue of body that makes up tendons, ligaments, fascial bands, myofascia, adhesions, retinacula, and other tissues that surround and engulf muscles, bones, nerves, and organs.

Fascial Band: Collection of parallel fascial fibers.

Fascial Distortion: Pathological alteration of fascia that results in dysfunction of affected fascia and its associated structures.

Fascial Distortion Model: Anatomical perspective in which musculoskeletal injuries are envisioned as consisting of specific alterations in the body's fascia (see *Principal Types of Fascial Distortions*). As a model, the FDM is an abbreviated interpretation of the pathology of fascial injuries and contemplates the structural consequences of orthopedic, medical, surgical, and manipulative interventions.

Fascial Distortion Medicine: Term used to describe the clinical and theoretical application of the fascial distortion model within the practice of medicine and surgery.

Fascial Fiber: Collection of parallel collagen fibers.

Fascial Plane: Fascial tissue that is broad but has little thickness.

Fasciitis: 1. Infection of fascia, 2. a non-specific term used to describe a fascial distortion (example: plantar fasciitis).

Fibromyalgia: Multiple fascial distortions involving large areas of the body with excessive fascial adhesion formation.

Flank Herniated Triggerpoint: HTP associated with renal colic.

Flank Triggerband: Triggerband associated with renal colic.

Flaring: Amount of space between elbow and body during internal rotation of the shoulder.

Fluidity: Smoothness of motion.

Folding Distortion: Principal fascial distortion type that is the result of a three-dimensional alteration of the fascial plane. Two subtypes — unfolding and refolding.

Folding Fascia: Fascia that has ability to unfold during stress and refold when stress is removed.

Folding Technique: Modified traction approach which is designed to unfold distorted folding fascia and allow it to refold properly, or modified compression approach which refolds distorted folding fascia and allows it to unfold properly.

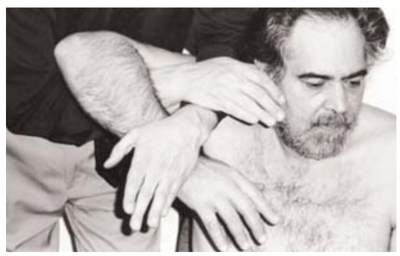
Folding/Thrusting Manipulation: 1. Combination of traction, which unfolds the fascia, and pulling-thrusting manipulation (traction/thrust unfolding technique), and 2. Combination of compression, which refolds the fascia, and pushing-thrusting manipulation (compression/thrust refolding technique).

Foot Drop: Inability to dorsiflex ankle secondary to formation of anterior ankle continuum distortion. In the FDM there are two etiologies – traumatic and neurologic.

Foot Inversion: Motion in which ankle buckles laterally (same as ankle eversion).

Foot Sprain: Injury to the soft tissue of the foot that involves continuum distortions, cylinder distortions, triggerbands, and/or folding distortions.

Forearm Cross: One thrusting technique for correcting shoulder capsule tectonic fixations. Also can be used as a position for slow tectonic pump.



Fracture: Extension of fascial distortions into osseous matrix.

Frogleg Tectonic Manipulations of the Hip and Shoulder: Treatment to correct tectonic fixations of either the femur in the acetabulum or the humerus in the glenoid fossa. In these procedures the affected limb is placed into an extreme Patrick-Fabere position and a thrust is made. When the frogleg manipulation is performed in the reverse Patrick-Fabere position it is called *reverse frogleg tectonic technique*. In addition to correcting tectonic fixations of the hip and shoulder, frogleg and reverse frogleg manipulations can be modified to correct tectonic fixations of the elbow, knee, and ankle. Note: “F-ab-er-e” is a mnemonic formula (“F” for flexion, “ab” for abduction, “er” for external rotation, and “e” for extension).

Frozen Shoulder: Any shoulder exhibiting reduction or loss of abduction, external rotation, internal rotation, or other motions.

Global Loss of Motion: Impairment in all three primary shoulder motions – abduction, external rotation, and internal rotation.

John Godman: Nineteenth century American physician and anatomist who stressed the importance of understanding fascia.

Grain of Salt: Triggerband subtype that is very small with irregular edges.

Groin Pull: Triggerband present in the groin.

Hallelujah Maneuver: Lifting unfolding/thrusting manipulation of upper thoracic spine that is performed either sitting or standing. Note that by simultaneously applying torque to the shoulder, force can be directed into the gleno-humeral joint.

Hand Direction: Orientation of hand during internal rotation of shoulder. Vertical direction (i.e., the fingers are pointing up) is optimal.

Hand Rotation: Ability to place palm flat against the back during internal rotation of shoulder.

Headlight Effect: The patient's awareness of the course of the triggerband pathway some distance ahead of the actual point of the triggerband treatment. The cause of this is thought to be a double twist in the fascial band (the second twist is pushed ahead by pressure being applied to the first twist).

Heel Spur Continuum Distortion: Continuum distortion palpated at junction of the plantar fascia and calcaneus that together with a triggerband is responsible for heel spurs associated with plantar fasciitis.

Herniated Triggerpoint: Principal fascial distortion type that results from tissue pathologically protruding through a fascial plane.

Herniated Triggerpoint Therapy: Technique used to correct herniated triggerpoints in which the physician's thumb pushes the protruding tissue below the fascial plane.

Hesitation: Decrease in speed of extremity during a portion of its motion.

High-Velocity Low-Amplitude Osteopathic Manipulation (HVLA): Vertebrae or other bones are forcefully manipulated so that the joint surfaces suddenly move. When this occurs an articular sound is audible. HVLA is useful in treating many injuries. It can direct a pulling force directly into an inverted continuum distortion, and when combined with traction or compression it can correct folding distortions. In addition, if done as a neutral thrust it can break tectonic fixations by directing a "sliding" force into joint capsules and facet joints. Because of these potential benefits, HVLA is a useful tool in the treatment of tectonic fixations and simple acute injuries secondary to inverted continuum or folding distortions. In chronic injuries HVLA is rarely successful until after the fascial adhesions have been fractured by triggerband technique.

Hit-By-Truck Effect: Dramatic subjective increase in the symptoms of a chronic pain patient following the first one or two triggerband technique treatments.

Hypertonicity: Increased muscle tone as the result of continuous electrical stimulation.

Ice/Slush/Water Analogy: Comparison of how external physical forces determine both the stages of water and the configurations of the transition zone between ligament or tendon and bone.

Indian Burn Cylinder Technique: Cylinder technique in which traction is maintained with both hands as rotation is applied so that one hand torques in a clockwise direction while the other hand does so in a counterclockwise direction. This technique should be avoided in the upper arm, foot, and ankle.

Internal Rotation: Shoulder motion in which the back of the hand can be placed against the back of the body.

Inversion Therapy: Correction of folding distortions of the spine or extremities with ball therapy or inversion traction. In either case, the patient is placed in a retracted but supported position and, with assistance from the physical therapist, uses his/her own weight and movement to elongate (and thus unfold) or compress (and refold) paravertebral fascia or capsule and pericapsular structures.

Inverted Continuum Distortion: Subtype of continuum distortion in which a portion of the transition zone is stuck in the ligamental configuration.

Jumping Phenomenon: (a.k.a. Jumping Pain) Focal area of achy pain abruptly changes its location to a non-contiguous but nearby portion of the same limb, appendage or trunk.

Karate-Chop Hand Arrangement: One possible hand position taken when treating a tectonic fixation of the shoulder capsule.

Key Bronchus Triggerband: Hypothetical triggerband that may be the initiator of the purse string effect.

Knot: Triggerband subtype that occurs when a portion of a fascial band has been ripped from its attachment and has knotted upon itself.

Lacrimal Herniated Triggerpoint: HTP near the lacrimal bone associated with behind-the-eye headaches.

Lateral Ankle Triggerband Pathway: Most common pathway present in a triggerband sprained ankle. It originates on the lateral ankle at the sock line and in treating with triggerband technique, it is followed inferiorly to behind the lateral malleolus and then along the lateral dorsal foot to the base of a toe (fourth and fifth are most common).

Lateral Recumbent Folding Technique of the Shoulder: Unfolding technique in which the patient is laid on the side (affected shoulder up) and traction/thrust is introduced into the shoulder with direction of force toward the elbow.

Lateral Unfolding Manipulation of Shoulder: Thrusting procedure in which shoulder capsule is unfolded in a lateral direction. This is done with doctor standing behind patient and grasping fully flexed elbow with one hand and wrist with the other. A scissors-like quick thrust is made to adduct the elbow while simultaneously the wrist is forcefully abducted.

Linea Coli: Large fascial band present on colon.

Loaded Ligamental Fibers: Uninjured ligamental fibers that straighten with extrinsic force.

Lunging: Slight increase in speed of motion of extremity following hesitation.

Massage: Treatment of myofascia that moves small triggerband twists away from the muscle. Massage may also help straighten ruffled cylinder fascia and break fascial adhesions.

McBurney's Point: Almond-sized tender area in right lower quadrant of abdomen that typically is associated with acute appendicitis. In the FDM, McBurney's point is anatomically a herniated triggerpoint which forms from the inflammation forcing adjacent tissue through the neighboring fascial plane.

Milking a Release: In herniated triggerpoint therapy and continuum technique, the thumb is gently rocked back and forth during the releasing process.

Missed-a-Step Ankle Sprain: Typical history of refolding ankle sprain injury.

Mixed Myocardial Infarction: Heart attacks caused by triggerbands and cylinder distortions (hypothetical).

Movement: Motion of a triggerband twist along its pathway during triggerband technique.

Muscle Energy Technique: Treatment modality in which muscle contractions are used to force a triggerband twist out of a muscle.

Myocardial Infarction: In the FDM, coronary artery triggerbands and cylinder distortions are speculated to be responsible for MI's.

Myofascial Release Technique: Treatment modality in which sustained manual traction is applied until a triggerband twist is pulled out of a muscle, a folding distortion is unfolded, or a cylinder distortion is untangled.

Myofascial Triggerpoint: See *Triggerpoint*.

Neutral Thrust: Purely rotational tectonic manipulation of a joint in which no traction or compression is utilized.

Non-Banded Herniated Triggerpoint: Herniated triggerpoint subtype that is characterized as a protrusion of tissue through a non-banded fascial plane.

Non-Banded/Non-Coiled: Theoretical fascial arrangement present on external coronary arteries in which criss-crossing fascial bands are present.

Orthopedics: Branch of surgery that focuses on the treatment of the skeletal system and associated structures.

Orthopedist: Orthopedic surgeon (either M.D. or D.O.).

Osgood-Schlatter Disease: Bony protuberance of tibial tuberosity secondary to long-standing shifting of the continuum between ligament and bone from triggerbands and continuum distortions.

Osteoarthritis: Condition in which distorted fascia in or near a joint has taken on characteristics of the adjoining bone.

Osteopath: One who practices osteopathy. In some countries osteopathic training focuses exclusively on osteopathy. In other countries, osteopathy is a form of advanced study for physicians and physical therapists. In the United States, osteopaths are graduates of four-year medical schools and have residency training in one or more of the dozens of fields of medicine such as orthopedics, general surgery, obstetrics, internal medicine, family practice, etc. These physicians are designated as Doctor of Osteopathy or Doctor of Osteopathic Medicine, and use the abbreviation D.O.

Osteopathic Medicine: Branch of the healing arts founded in 1874 by Andrew Taylor Still, M.D. that includes the full scope of medical and surgical practice integrated with manipulative concepts.

Osteopathy: Manual practice of osteopathic medicine which stresses the interrelationship and importance of the musculoskeletal system in disease and injury. Practitioners of osteopathy employ a wide variety of manipulative techniques in the treatment of somatic dysfunction (palpatory restrictions, misalignments, or other anatomical abnormalities of the human structure).

Osteoporosis: Condition in which osseous components have either been drained out of the bone or have not been properly replenished or revitalized.

Overshift: Pathological condition of a portion of the transition zone between ligament or tendon and bone in which an excessive amount of osseous components have been transferred. If the overshift occurs from bone to ligament, this results in an everted continuum distortion. If the overshift occurs from ligament to bone, this results in an inverted continuum distortion.

Pea: Triggerband subtype that is smaller and smoother than a knot.

Percussion Hammer: Treatment in which a vibratory hammer delivers rapid, intermittent pressure into a restricted joint or tissue. Through the FDM this approach is envisioned as affecting tectonic fixations (pumping synovial fluid through the joint and coaxing the capsule to slide), cylinder distortions (stretching the fascial coils), and refolding distortions (over-folding mis-folded fascia which then rebounds less contorted).

Pitch: Vibratory frequency of a fascial fiber.

Plantar Fasciitis: Triggerbands and/or continuum distortions of the plantar fascia.

Plunger Technique: Treatment utilizing suction to correct tectonic fixations by increasing circulation of stagnant synovial fluid. Shown below are standard sink plunger (left) and plunger hammer (right).

Posterior Shoulder Triggerband Pathway: Course of the triggerband responsible for posterior shoulder pain and some cases of upper back and neck tightness. Its starting point is on the posterior proximal forearm and it continues superiorly to the contralateral mastoid process.

Posterior Thigh Triggerband: (a.k.a., low back pain with thigh tightness triggerband) Triggerband that originates in the posterior thigh and courses superiorly over the buttock to the low back and then inferiorly to the sacrococcygeal junction. It is a common cause of low back, sacroiliac, and thigh pain.

Pressure Points: Small areas of the body that are tender to palpation. In the FDM, pressure points are non-differentiated fascial distortions (see *Triggerpoint*).

Principal Types of Fascial Distortions: Pathological alterations of fascia that have distinct etiologies. There are currently six described – triggerbands, herniated triggerpoints, continuum distortions, folding distortions, cylinder distortions, and tectonic fixations.

Probability Repetitive Use Injury (PRI): Musculoskeletal complaint that begins abruptly from one errant motion among hundreds, thousands, or even tens of thousands of seemingly similar repetitive motions.

Prone Tectonic Technique of the Shoulder: Tectonic technique of shoulder capsule in which the patient is positioned prone and elbow is flexed at a 90° angle. The correction is made by thrusting forearm posteriorly while upper arm is held against table.

Pseudo-Sciatica: Any one of several triggerband pathways that mimic the course of the sciatic nerve.

Pulled Muscle: Distorted fascial band stuck in the belly of a muscle at an angle to the axis of the muscle.

Purse String Effect: Analogy to illustrate that in asthma all of the fascial fibers of the affected lung may become suddenly tightened from a single source.

Quick Victory Strategy: Rapid correction of a fascial distortion to demonstrate objective efficacy of the treatment.

Refolding Distortion: Subtype of folding distortion in which fascia is over-compressed and can't unfold completely. Refolding injuries hurt deep in the joint, feel better with compression and worse with traction, and clinically respond to compression and/or compression/thrust manipulations (i.e., refolding techniques).

Release: Sensation experienced by both physician and patient at instant of correction of a continuum distortion, herniated triggerpoint, folding distortion, or cylinder distortion. In HTP's the release feels like a melting and lasts from five to fifteen seconds or more. The release of continuum technique is rapid (lasting only a few seconds) and to palpation is reminiscent of a button-slipping-through-buttonhole. Folding distortions release as a series of small clicks, and cylinder distortions have a very subtle release lasting only a few seconds that is perceived as a lessening in tissue tautness.

Renal Colic: Narrowing of the ureter secondary to a triggerband or herniated triggerpoint that results in spasm as a stone attempts to pass.

Repetitive Use Injuries: (a.k.a. overuse syndrome or cumulative trauma disorders) In the FDM these musculoskeletal complaints secondary to repeated movement of a body part present in two ways – *cumulative repetitive injuries* (CRI) and *probability repetitive injuries* (PRI).

Rheumatoid Knots: Large triggerband knots (subtype of triggerband) found predominantly in the upper arms of some patients with rheumatoid arthritis.

Road Map Analogy: Analogy comparing a common road map to folding fascia. Both are able to unfold and refold in the same manner, and both can become contorted if unfolded and twisted or over-compressed.

Rolfing: Manual treatment of fascia in which adhesions are broken.

Scissors Technique: Lateral recumbent manipulative approach utilized in the treatment of inverted continuum distortions of the sacroiliac joint. Note that by altering the direction of thrust the procedure can be modified to correct tectonic fixations and folding distortions of the SI joint, lumbar spine, sacral segments, and even the shoulder.

Sciatica: Condition in which there is irritation of the 5th lumbar spinal root and an accompanying sharp, electric-like shooting pain down the posterior thigh and leg (lasting seconds).

Sclerotherapy: In addition to facilitating adhesion formation, prolotherapy injections shift the transition zone from the neutral or ligamentous state into the osseous configuration. Thus, sclerotherapy can be envisioned as a chemical form of continuum technique.

Seizure: Disorderly discharge of electrical activity from the brain perhaps initiated by a triggerband in the corpus callosum or other neural banded tissue.

Shifting of the Continuum: Ability of the transition zone between two different tissue types to change into a configuration of either type.

Shin Splints: Condition in which the lower legs (particularly along the lateral edge of the tibia) are tender and painful secondary to triggerbands or continuum distortions.

Shoulder to Mastoid Triggerband: (a.k.a. upper trapezius triggerband) Common triggerband of the upper back and neck that has a pathway that originates on the top of the shoulder and follows the upper trapezius muscle to the ipsilateral mastoid.

Slide Clunk: Sensation experienced by the patient when a tectonic fixation is corrected.

Slinky Analogy: Metaphor comparing a cylinder distortion to a Slinky® toy in which the coils have become tangled.

Slipping Rib Syndrome: Folding distortion of the intercostal membrane which forces a rib to intermittently overlap the rib below it.

Slow Tectonic Pump: Exaggerated and deliberate flexing and extending, or abducting and adducting, or tractioning and compressing of limb or other body part to increase synovial fluid circulation in a fixated joint.

Spasm: 1. Sensation of muscles being squeezed (etiology - cylinder distortions)
2. Muscular activity from simultaneous but intermittent electrical stimulation of both flexors and extensors.

Speed: Amount of time it takes for an extremity to complete its motion. A grading scale of one to four quantifies this ability.

Spinal Stenosis: Narrowing of the spinal cord (in some cases) caused by a folding distortion of the paravertebral fascia. Common symptoms include buttock, thigh, and leg aching, as well as rapid fatigue when walking short distances.

Sprain: Unspecified fascial distortion of a joint involving swelling but no fracture.

Squeegee Cylinder Technique: Form of cylinder technique in which physician's hands wrap around a portion of the affected extremity and with a squeezing motion slide smoothly along the limb. Note squeegee can also be utilized to treat broad areas of tangled cylinder fascia on the trunk.

Staccato Manipulation: Series of small clicks felt or heard as a folding distortion is corrected with folding technique.

Star Folding Distortion: Folding distortion located between the ribs and beneath the star triggerband starting point. It is treated by first correcting the star triggerband (if present) followed by traction/thrust of the intercostal membrane.

Star Triggerband: Most common and most prominent triggerband of thoracic area. It has a course that begins halfway between shoulder blade and spine in the mid-scapular area. It is treated by ironing out the triggerband from the starting point upward to either ipsilateral or contralateral mastoid process. Star triggerbands often are palpated as knots.

Starting Point: Origin of a triggerband pathway and usual location to begin triggerband technique. Starting points are typically located at site where crossbands occur.

Stepped-Off-the-Curb-Wrong Ankle Sprain: Typical history of continuum ankle sprain injury.

Stepped-On-the-Foot Ankle Sprain: Typical history of unfolding ankle sprain injury.

Stepping: Small pathological jerks or hesitations during motion.

Strain: Unspecified fascial distortion less symptomatic than a sprain.

Stress Fracture: Abnormality of bone which occurs when a triggerband is pulled into bone/ligament transition zone and becomes stuck in osseous matrix – thus decreasing the density of that portion of bone.

Stroke: Ischemic event of brain caused by hemorrhage, thrombosis, or embolism. Fascial distortions on the outside of a blood vessel are postulated to narrow the lumen and disrupt the intima, thereby decreasing the vessel diameter (and thus blood flow), and increasing turbulence (and the risk of clots forming and dislodging). Also in the FDM the spastic paralysis following a stroke is considered to be the cumulative result of uncorrected fascial distortions within and around muscles that spill and scramble electrical impulses between muscle groups.

Sub-Bands: Individual fibers of a fascial band, ligament, tendon, or other banded fascial structure.

Supraclavicular Herniated Triggerpoint: Large herniated triggerpoint located between the clavicle and the superior margin of the scapula. The SCHTP is often irregularly shaped and protruding portions may occur either medially (i.e., next to the cervical vertebrae) or more laterally. Both medial and lateral protrusions may be present in the same individual.

Tectonic Fixation: Principal type of fascial distortion in which the fascial surface has lost its ability to glide.

Tectonic Technique: Manual methods for correcting tectonic fixations by 1. forcing stagnant synovial fluid to circulate through joint, 2. physically forcing fascial surfaces to slide. Slow tectonic pump and frogleg and reverse frogleg manipulations are examples of manual tectonic techniques. Non-manipulative tectonic treatments also exist and include plunger technique and steroid injections of joints. Future injection treatments are likely to involve flushing the joint with a synthetic solution, or trans-injecting synovial fluid from a different joint.

Tendonitis: Triggerband, or less commonly a continuum distortion, present in a tendon.

Tennis Elbow/Little Leaguer's Elbow: Tender area over lateral or medial epicondyle that is caused by either a triggerband or a continuum distortion.

Total Height: Highest vertebral level fingers can reach during internal rotation of shoulder.

Traction: Treatment modality in which a pulling force is applied to an injured area of the body. Unfolding distortions may respond to this treatment.

Traction/Thrust: Manipulation in which a sustained pulling force is combined with a rapid pulling or rotational force to unfold folding fascia.

Transition Zone: Intermediate area between two tissue types that contains characteristics of both tissue types. Of particular interest in the FDM is the transition zone between bone and ligament.

Tremor: Intermittent muscular activity caused by alternating spilling of electricity back and forth between flexors and extensors.

Triggerband: Principal fascial distortion type characterized as a distorted fascial band.

Triggerband Myocardial Infarction: Heart attacks caused by coronary artery triggerbands (hypothetical).

Triggerband Pathway: Anatomical course that a distorted fascial band is found to have during its correction with triggerband technique. Patients with the same symptoms tend to have the same anatomical pathways.

Triggerband Technique: Manual approach to treating distorted fascial bands in which the distortion is located and corrected along its entire pathway by physical force from the physician's thumb. During triggerband technique the distorted fascial band is untwisted and the separated fibers are forced back together. In chronic pain the adhesions are intentionally fractured with the treatment.

Triggerband Thumb: Sore and swollen treating thumb from attempting too many triggerband corrections before strength and stamina have developed. The underlying injury is a refolding distortion.

Triggerfinger: Injury in which finger joint becomes stuck in the flexed position. At times patient may have to pry the finger into extension with the opposite hand (often accompanied by a painful pop). In the FDM the etiology is considered to be a combination of triggerbands of the flexor tendons and folding distortions of the metacarpal-phalangeal and interphalangeal joints.

Triggerpoint: An undifferentiated fascial distortion. Upon palpation triggerpoints can be categorized into principal fascial distortion types. Those that can be induced to move during treatment are triggerbands (the triggerpoint is in fact the starting point for triggerband technique), those that are found at the junction of ligament or tendon with bone are continuum distortions, and those that protrude above the fascial plane are herniated triggerpoints.

Tripped-Down-the-Stairs Ankle Sprain: Typical history of a triggerband ankle sprain injury.

True Carpal Tunnel Syndrome (TCTS): Impingement of median nerve (by cylinder distortions) within wrist flexor retinaculum accompanied with numbness and/or paresthesias of palm, index, middle, and radial half of ring finger.

Twist: Triggerband subtype that occurs when a portion of fascial band becomes rotated on itself.

Twisted Shoulder Harness Analogy: Comparison made between a triggerband and a car shoulder harness to illustrate that a twisted fascial band becomes caught in the belly of the muscle in a similar manner as a twisted shoulder harness belt becomes caught in its harness holder.

Typaldos Manual Therapy: Manipulative application of fascial distortion medicine.

Unfolding Distortion: Subtype of folding distortion in which the fascia has unfolded contorted, and can't refold completely. Unfolding injuries hurt deep in the joint, feel better with traction and worse with compression, and are treated with traction and/or traction/thrust manipulations (i.e., unfolding techniques).

Unloaded Ligamental Fibers: Uninjured ligamental fibers in the resting or wavy configuration.

Ventricular Fibrillation: Chaotic and ineffective twitches and contractions of the cardiac ventricles. Within the FDM, ventricular fibrillation is hypothetically considered to be potentially beneficial in ridding a coronary artery of impingement (tourniquet effect) by a fascial distortion.

Wall Technique: Thrusting manipulation of lower thoracic spine to correct unfolding distortions of the paravertebral fascia. In this procedure the patient is standing and leaning against the wall with palms at shoulder level (or hands at sides). The physician applies traction via a double pisiform hand position with direction of thrust toward patient's chin.

Wave: Triggerband subtype that is palpated as a wrinkle in the fascia.

Wavy Floor Phenomenon: Experience following dismount from ball therapy in which the floor no longer feels flat.

Whiplash Injury: Painful neck strain resulting from sudden introduction of flexion or extension into the cervical spine. Fascial distortions typically associated with this injury are triggerbands, folding distortions, supraclavicular herniated triggerpoints, and continuum distortions.

Whip Technique: Method of treating unfolding distortions and tectonic fixations of the shoulder by repetitively forcing the elbow from flexion to extension.

Wry Neck: Acute restriction of the sternocleidomastoid muscle secondary to a triggerband.

Zip Lock Analogy: Comparison of a triggerband to a Ziploc® bag to emphasize that both have fibers which separate but can be manually re-approximated without any appreciable loss of function.

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