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

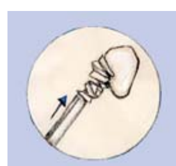
FOLDING DISTORTIONS: These injuries are similar to what happens to a road map that unfolds and then refolds in a contorted condition. Folding distortions hurt deep in the joint.
TREATMENT: Unfolding injuries – traction joint to allow folding fascia to unfold and then refold less contorted
Refolding injuries – 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		Extremities: cupping joint with hand Back: 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		Shoulder: anterior rotation with abduction Hip: placing hands on iliac crest Low Back: 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.

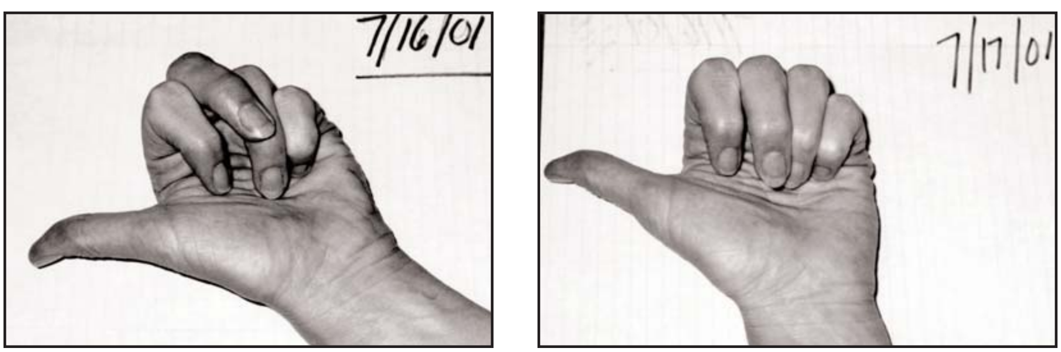


Figure 1-4. Before and After FDM Treatment of Long-Standing Finger Injury
(Photos by Michael Knox)

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

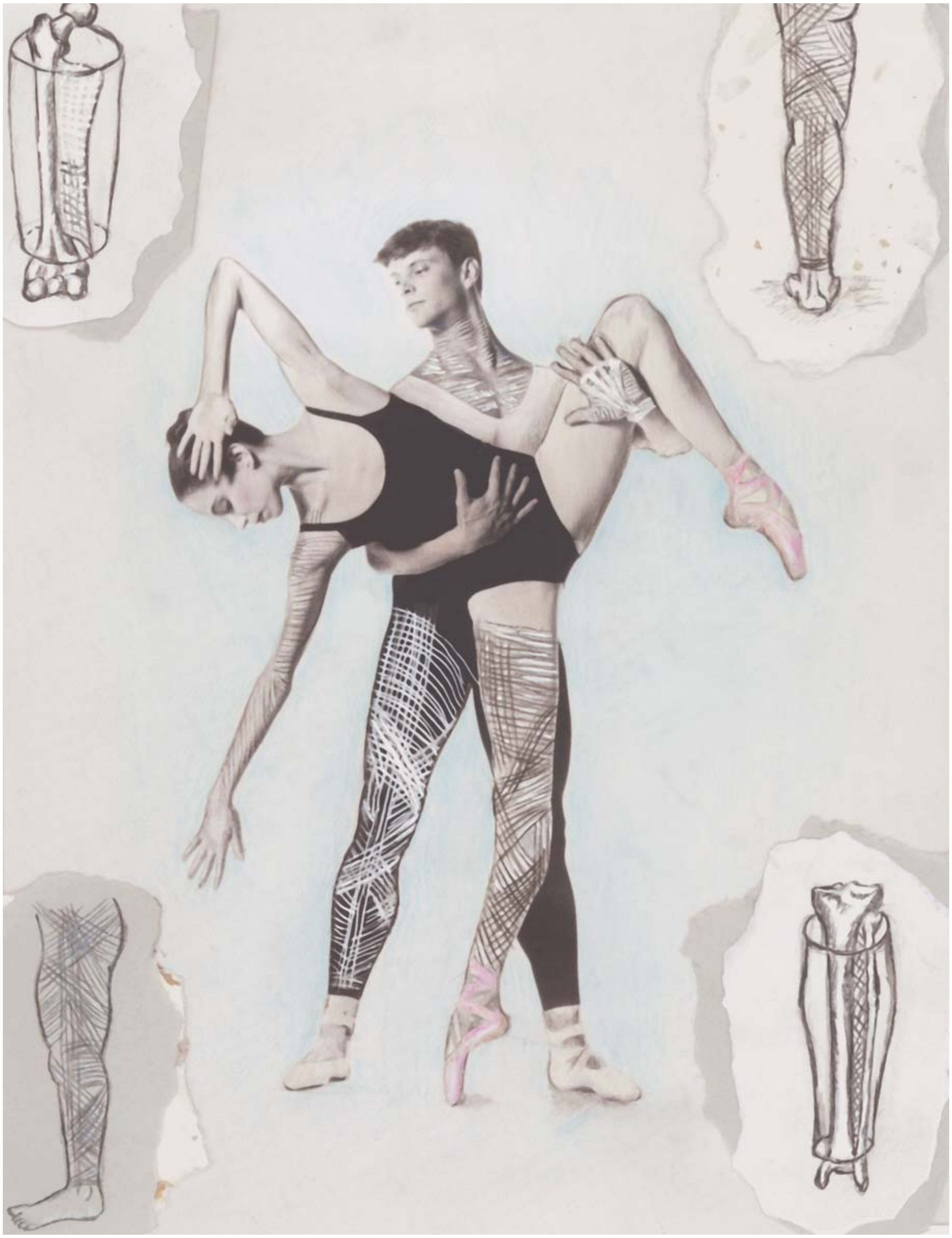


Figure 1-5. Banded and Coiled Fascia

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.

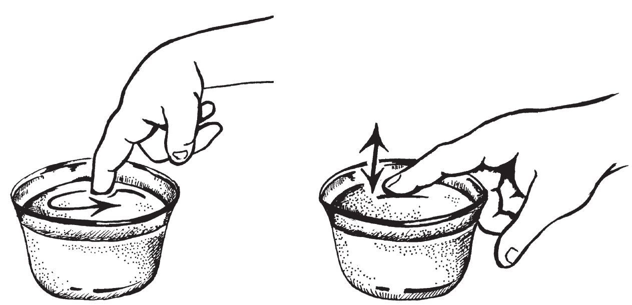


Figure 1-7. Cornstarch/Water Phenomenon

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