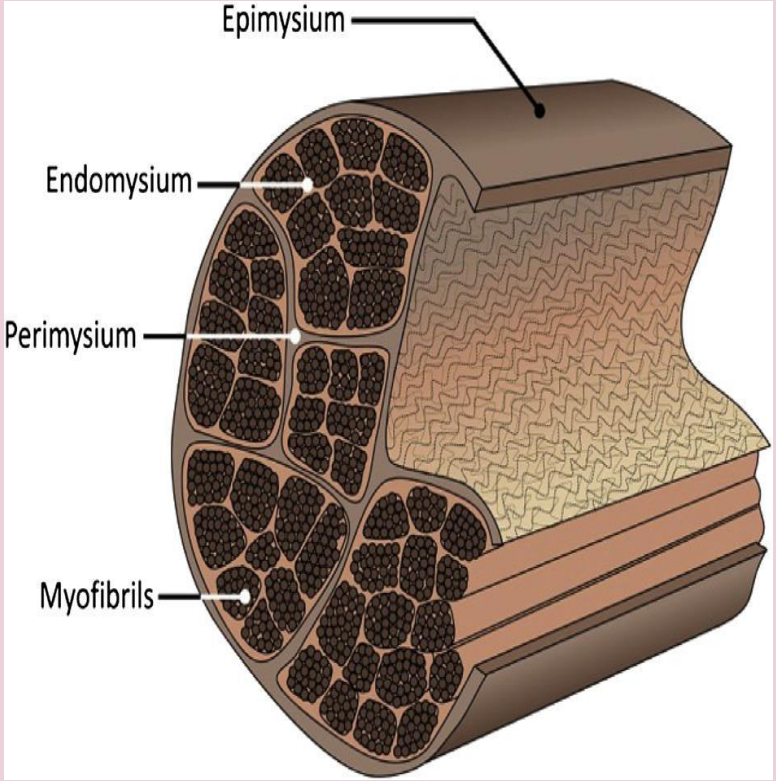
Connective Tissue Overview

Fascia: Latin root word for bundle, bandage, strap, binding together.

Fascia is a connective tissue that surrounds and connects every muscle and organ, forming continuity throughout the body. It is any dense irregular connective tissue sheet in the human body, including aponeuroses, ligaments, tendons, retinaculae, joint capsule, organ or vessel tunics, epineurium, meninges, periosteum, or muscular envelopes such as endo-, peri-, and epimysium (Langevin and Huijing 2009).

The intramuscular extracellular matrix is composed of the endomysium, perimysium, and epimysium. The epimysium surrounds each muscle and is continuous with tendons that attach muscles to bones. The perimysium divides the muscle into fascicles or muscle fibre bundles. The endomysium is a continuous network of connective tissue that covers individual muscle fibers.



Fascia is classified according to its distinct layer, anatomical location and function. The current classification system includes superficial fascia, deep (muscular) fascia, and visceral (parietal) fascia.

Superficial Fascia

- Lies just below the skin and is composed of loosely knit connective tissue combined with fat, vascular structures and nerve receptors
- Quite mobile and has potential for the accumulation of tissue fluids and metabolites

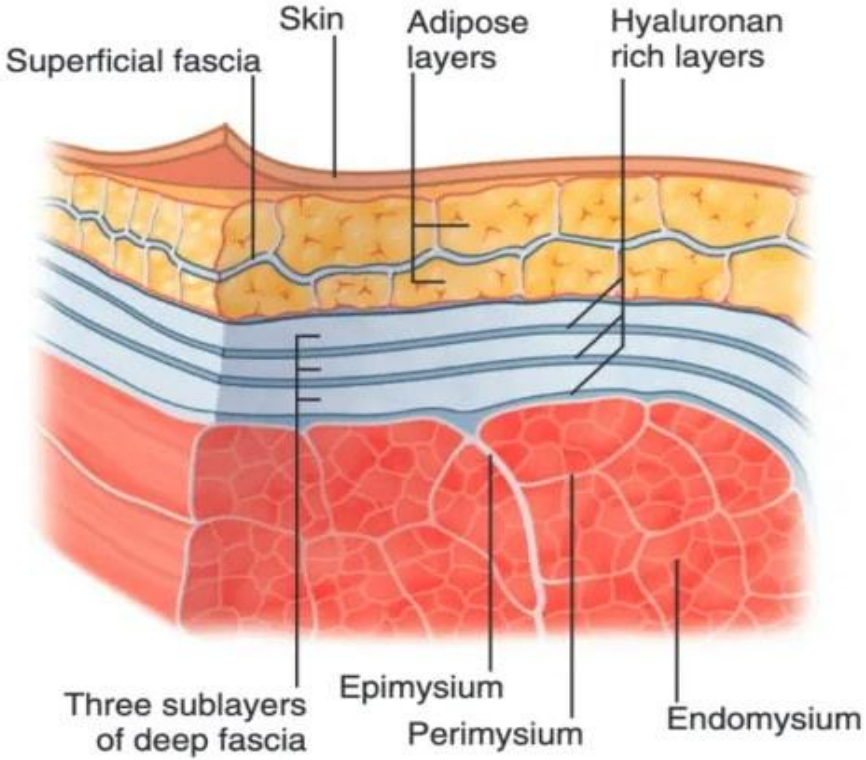
Deep Fascia

- It is denser, tougher and tighter
- It compartmentalizes the body and surrounds the muscles and viscera, contributing to the body's contour and function

Subserous Fascia

- Is a loose areolar tissue that covers viscera

Fascial tissues are seen as one interconnected tensional network that adapts its fiber arrangement and density according to local tensional demands.



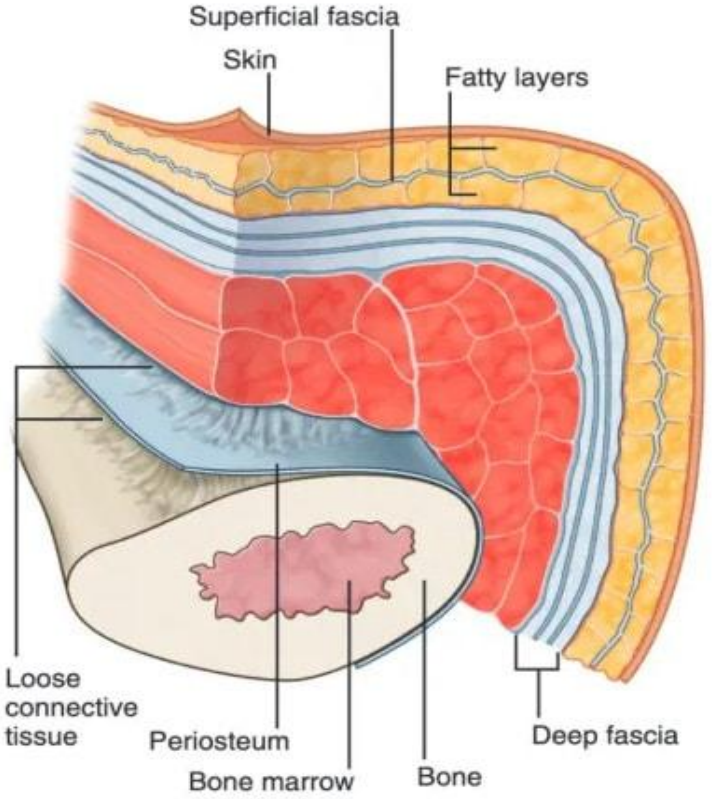


Figure from Luomala, T. & Pihlman, M. (2017). Anatomy of the Fascia from the Clinical Point of View, A Practical Guide to Fascial Manipulation

Fascial History: First described by Andrew Taylor Still MD (1828-1917) an American Physician and the founder of osteopathic medicine. In the 1940's Janet G. Travell first started using the term "Myofascial" in reference to musculoskeletal pain syndromes and "trigger points". Elizabeth Dicke developed the first form of connective tissue massage techniques (Bindegewebsmassage) in 1929. Ida P. Rolf developed a holistic system of soft tissue manipulation and movement in the 1950's that has evolved over time into a system now known as "Structural Integration". Fascial exploration continues in such arenas as the International Fascial Research Congress, meeting for the 4th time in 2015. The intent behind the Congresses is to make information on fascia research more accessible to scientist and clinician alike.

Fascial Assessment

Assessment is of the fascia is done to determine the presence of fascial shortening, adhesions or restrictions due to trauma, surgery, pathology, or postural imbalances. Prior to treatment the clinician should first determine the locations and extent of the fascial restrictions and imbalances. Assessment methods include…

Skin Rolling

- Any restriction in the superficial fascia are noted
- Areas of thickening, tenderness, hyperirritability can indicate fascial restrictions and sometimes locate trigger points

Positional Testing

- The limb or body part is passively moved through its range until a barrier to motion is encountered
- The barrier could be subtle or obvious
- A fascial barrier occurs before a ligamentous or joint capsule barrier
- The layer of fascia involved influences the quality and direction of the restriction of motion

Fascial Glide

- Therapist hands contact the clients skin and move or glide over the deep structures
- The skin is moved in the cardinal planes, “around the clock”
- The pressure and direction of the glide vary depending on the fascia to be assessed
- Lighter pressure is used to assess more superficial fascia
- Areas and direction of the greatest restrictions are noted

Fascial Techniques: Fascial techniques generally fall under the two main categories of passive (patient stays completely relaxed) or active (patient provides resistance as necessary), with direct and indirect techniques used in each.

A variety of direct fascial techniques are described by Rattray on page 46-48. These include: skin rolling, crossed-hands fascial stretch, fascial spreading, cutting technique, fascial torquing, s-bowing and c-bowing, and j-strokes. No lubricant is used with fascial techniques. Direct myofascial release is an attempt to bring about changes in the myofascial structures by stretching or elongation of the fascia, or via mobilizing restrictions palpated in the superficial and deep structures.

Indirect fascial techniques move the connective tissue in the direction of ease as opposed to the direction of restriction. The slack is taken out of the tissue and then held at the barrier to further movement. As the fascia releases, further slack will be palpated and taken up by the therapist without pushing. This cycle continues for generally 1-2 minutes. The pressure is light and the rate is slow.

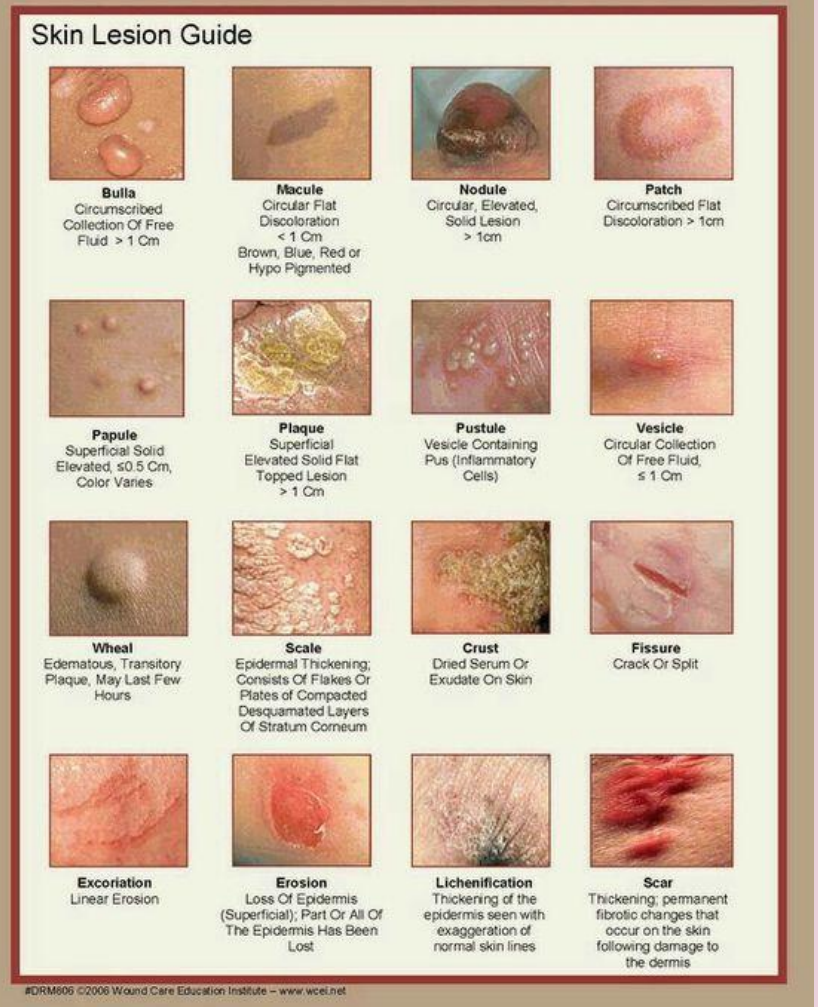
Myofascial Release is a relatively "new" form of treatment that originated in the osteopathic tradition. Dr. Andrew Taylor Still (1828-1917) is credited for the development of Osteopathy, an alternative method of treating human dysfunction and disease with manual manipulations of the body. He described fascia as a covering, and believed that many different tissues were all originating from a fascial system, a concept that we are only now discovering to be true. Currently myofascial release techniques and combinations of Craniosacral therapy, visceral manipulation, and muscle energy techniques are becoming increasingly popular and available.

Effects

- Increase the excursion and flexibility of fascia by moving it towards and then beyond the restrictions
- Reduce pain and hypertonicity
- Increase local circulation

Contraindications

- Acute injury
- Hypotonic or atonic muscle
- Fragile skin
- Skin lesions
- Recent incisions
- Acutely painful conditions
- Anticoagulant medications



TYPES OF DIRECT TECHNIQUES (pg 47)

- **Skin Rollling**:
  - Thumbs are placed on the skin next to each other while the fingers grasp the skin forming a line.
  - Pull fingers towards the thumbs, lifting the skin from the underlying layer
  - The fingertips start “walking over the skin, gathering it up ahead of the thumbs and maintaining the raised roll of skin as the thumbs push forwards
  - Move slow, and in long sweeps. (If lotion is used, it is considered to be petrissage)

- **Crossed-hands fascial stretch:**
  - Therapist forearms held parallel to each other with elbows at 90 degrees of flexion
  - Palms of hands contact client's skin with hands positioned so the fingers are pointing away from each other. The heels of hands are a few inches apart
  - Appropriate depth is used to engage the fascia
  - Slack is taken out of the tissue by moving your hands apart.
  - You do NOT want the hands to slide over the skin. Once the tissue is engaged, the stretch is held until the tissue releases

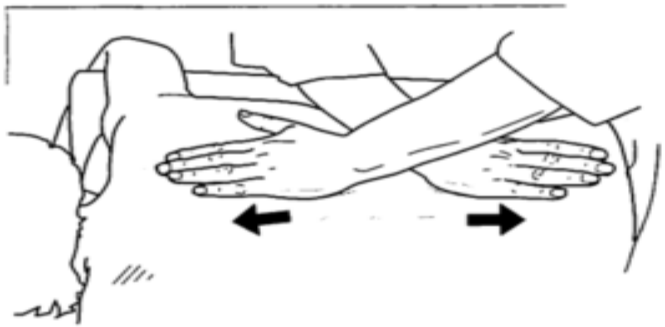


Figure 4.10
Direct fascial techniques: Crossed-hands fascial stretch.

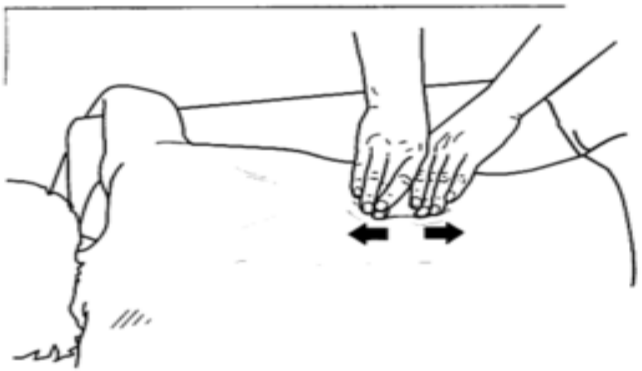
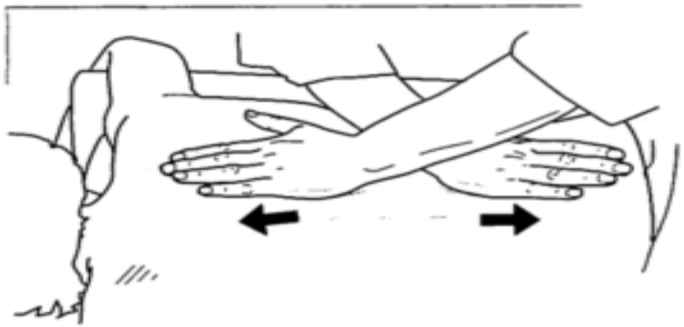


Figure 4.11
Direct fascial techniques: Fascial spreading using fingertips.

- **Fascial Spreading:**
  - Fingertips or thumbs or both may be used for this
  - It is important to hold the fingers of one hand together for support.
  - The Fingertips are placed on the skin at a required depth, then moved apart to take up the slack
  - The fingers continue to move apart, stretching the fascia between them
  - The stroke may be short or long, the hands are moved away from each other, or away from the therapist



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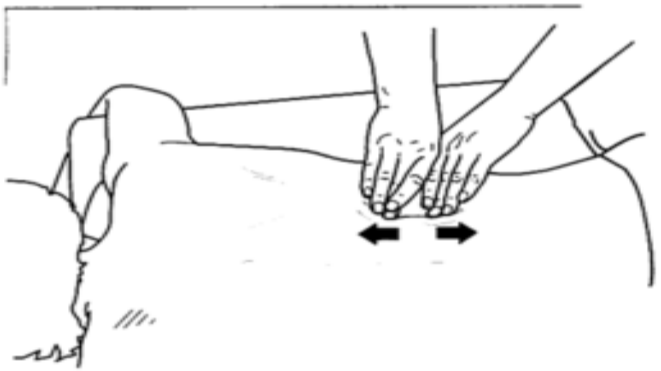

Figure 4.11
Direct fascial techniques: Fascial spreading using fingertips.

- **Cutting Technique:**
  - Therapist fingers are held together for support, then placed on the skin at required depth
  - Terminal phalanges are slightly flexed; tissue is engaged by pulling towards the therapist.
  - To treat, fingertips (esp. the middle fingertip), are pulled through the tissue towards the therapist in a cutting motion
  - Muscles may be outlined using progressively deeper strokes to the client's tolerance; then the fascia covering the muscles is loosened using oblique strokes

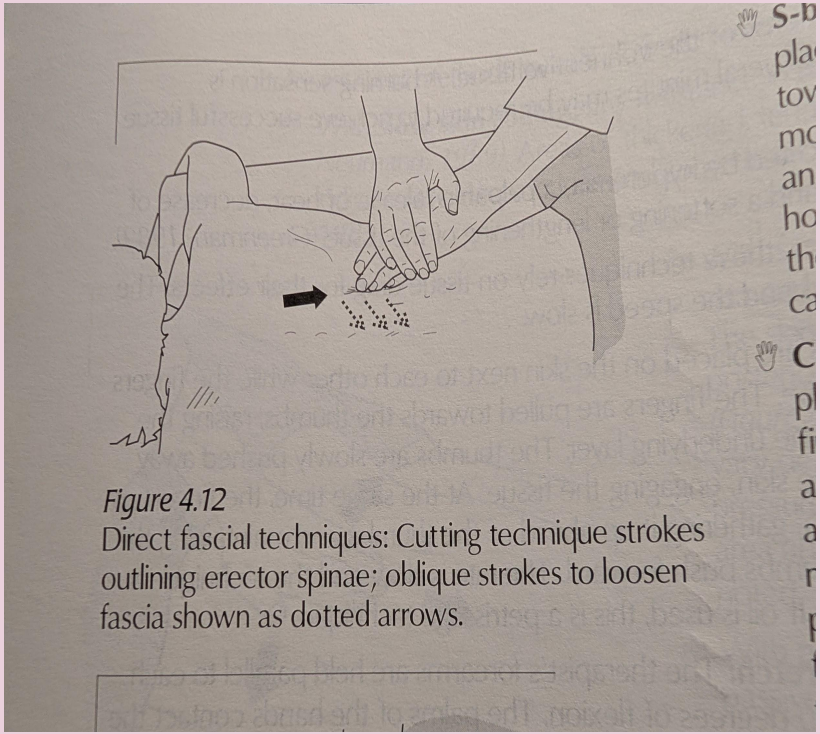

Figure 4.12
Direct fascial techniques: Cutting technique strokes outlining erector spinae; oblique strokes to loosen fascia shown as dotted arrows.

- **Fascial Torquing:**
  - The tissue is raised between fingertips and thumbs of both hands to take up slack, then pulled further off the underlying surface and twisted to engage it

- **S-Bowing fascial technique:**
  - The thumbs are placed on the skin parallel to, and pointing towards each other, so when the thumbs are moved towards each other, the fascia distorts in an S-Shape.
  - The usual concepts of engaging then holding the technique to release are followed. (If the same thumb position is used on a tendon, it is called S-bowing golgi tendon organ release)

- **C-Bowing fascial technique:**
  - Thumbs are placed on the skin next to each other while the fingers grasp the skin forming a line.
  - The fingers are pulled towards the therapist, with the little and ring fingers moving more than the index and middle fingers; at the same time the thumbs are pushed away from the therapist.
  - This distorts the fascia into a C-shape, which is engaged and held to release. (If the same finger and thumb positions are used on a tendon, it is called C-Bowing Golgi tendon organ release)
  - An alternative position has one hand placed on the skin, thumb abducted so the hand is in a c-shape; the fingertips of the other hand engage the skin so they point into the web between thumb and index finger on the first hand. The tissue between the hands is distorted into a C-shape.

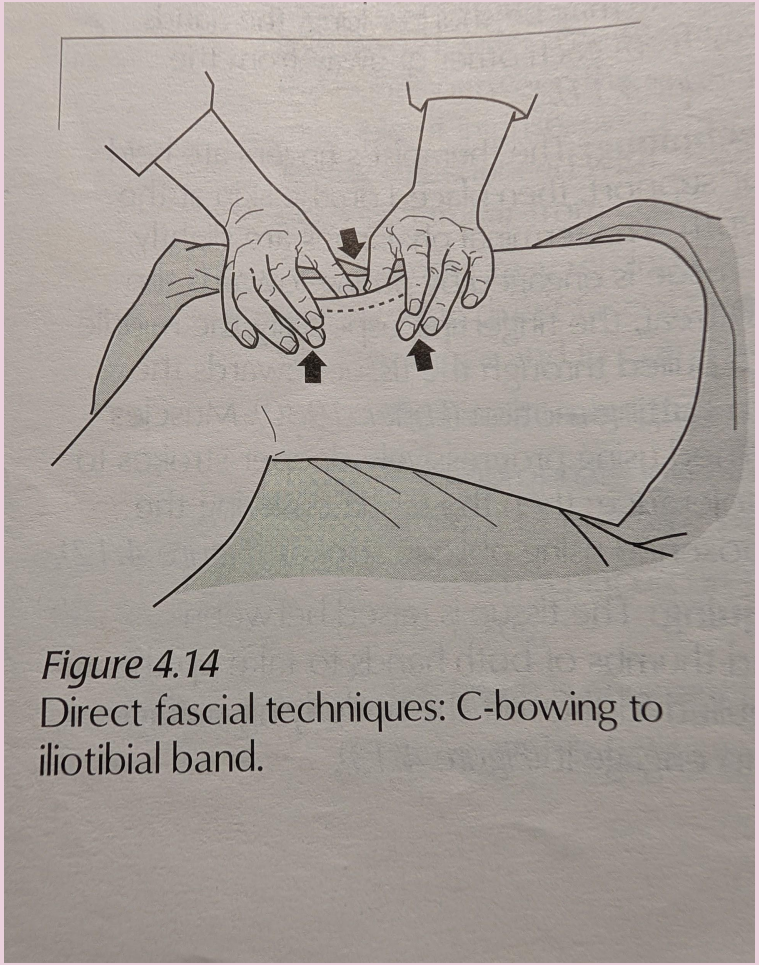

Figure 4.14
Direct fascial techniques: C-bowing to iliotibial band.

- **J-Stroke:**
  - This is the deepest, most destructive direct fascial technique.
  - It is used selectively after more superficial fascial techniques have been used, applied in an organized manner in lines or rows.
  - Therapist makes a fist and places it on the tissue with the proximal phalanges contacting the tissue.
  - Appropriate depth is reached. The proximal interphalangeal joint of the index finger performs the technique, which is essentially drawing the knuckles towards the therapist to take up the slack, engaging the tissue, then making a small, J-Shaped pull through the tissue.
  - The proximal phalanges of the other fingers provide the distraction of pressure distributed over a wider area than just the knuckle of the index finger, making the technique more tolerable.

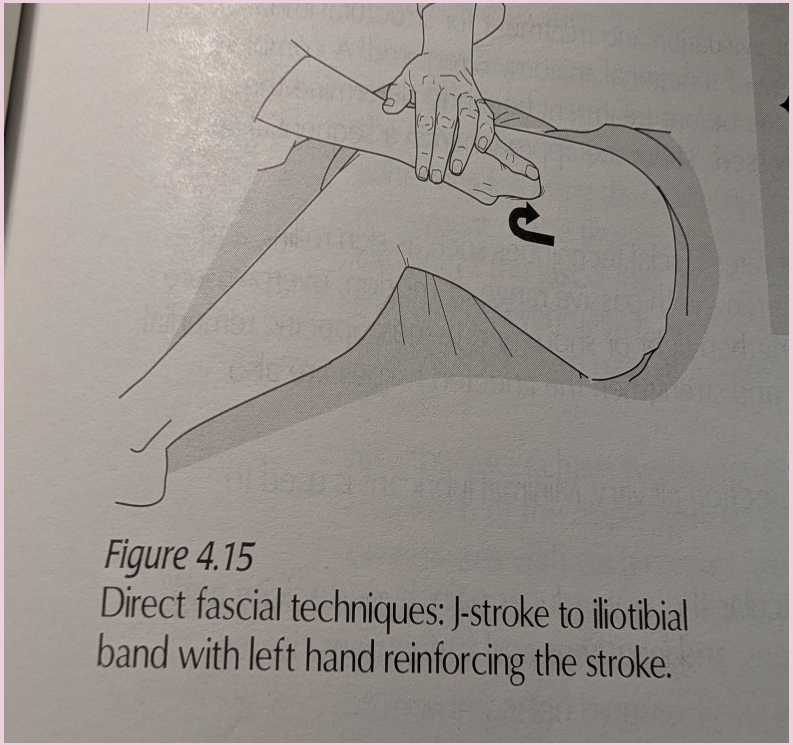

Figure 4.15
Direct fascial techniques: J-stroke to iliotibial band with left hand reinforcing the stroke.

CONNECTIVE TISSUE MASSAGE

- This type of direct fascial massage involves techniques such as *skin rolling* and *connective tissue cutting*.
- Restrictions in the fascia are assessed with one application of skin rolling, then treated with repeated skin rolling until the restriction is gone.
- Moderate to deep connective tissue cutting is also used to assess and treat restrictions.
- The therapist palpates for restrictions while outlining the various fascial compartments and muscles using the technique to stroke through the tissue
- Repeated stroking along the restriction is performed until a tissue release is felt; the pressure is then increased to the client's pain tolerance.

- Techniques are applied to the client's tolerance. Initially tenderness will be noted; however, continued connective tissue cutting lessens muscular hypertonicity and pain, and increases local circulation.
- The autonomic nervous system appears to be affected; connective tissue changes on the surface of the body may correspond to internal organ pathologies
- Rate, pressure and direction all vary; no lubricant is used

Effect

- Connective tissue techniques reduce pain and hypertonicity, and increase local circulation; the autonomic nervous system is also affected.

Contraindications

- Contraindications to connective tissue are the same for other direct fascial techniques.

INDIRECT FASCIAL TECHNIQUES

- Indirect techniques are thought to unhook the connective tissue. (Similar to releasing 2 bungee cords hooked together, one must first push them together, exaggerating the elastic tension of the cords, before they can be disengaged)
- The therapist applies pressure sufficient to contact the layer of fascia being treated; this pressure may be very light or moderately heavy.
- Therapist moves the tissue in the "direction of ease", or the direction the fascia will move most easily.
- This is usually the opposite direction of the restriction.
- The slack in the fascia is taken up. The fascia is then held in this position as the tissue attempts to return to its original position. Which is palpated as a subtle sense of movement in the tissue.
- As the tissue stops resisting the therapist's pressure, further slack will develop. The slack is taken up again, holding without pushing, until new slack develops. This is repeated through several cycles, until a tissue release is felt.
- The direction of perceived tissue motion may change but the therapist should not allow the tissue to return to the original position.
- The pressure is light to moderate and the rate is slow. No lubricant is used

Effects

- Indirect fascial techniques increase the excursion and flexibility of fascia by moving it in the direction of ease, usually opposite to the restriction

Contraindications

- Acute inflammation
- Undiagnosed lumps
- Recent head trauma
- Neurosurgery