Fascial Palpation

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Some form of connective tissue matrix is everywhere within the body except the open lumens of the respiratory and digestive tubing, so we cannot palpate anywhere without contacting at least some corner of this unitary body-wide network. (Myers 2008) The same is true of the neural and circulatory syncitia, and epithelia are everywhere as well.
With the caveat that no tissue can be truly isolated or separated, this chapter points to some salient and prominent fascial or connective tissue features within this overall net.
We will explore these features within the myofasciae of the locomotor system - as opposed to the organic ligaments or meninges within the dorsal and ventral cavities - in terms of the myofasial meridians known as the *Anatomy Trains* (3rd ed. Elsevier, 2014)

Before we begin this systematic process, a word about fascial layering: Although the fascial net takes its first form around the end of the second week of embryonic development, as a single three-dimensional cobweb of fine reticular fibers surrounding and investing the entire simple trilaminar embryo, the subsequent origami of embryonic development folds the original fascial net into recognizable layers. (Schultz 1996)

- In the mature phenotype (that would be us), picking up the skin anywhere in the body brings with it the first layer of fascial sheeting, the dermis, a tough but elastic layer that acts as the backing for the carpet of the skin.

- The next layer (although we are at pains to note that each of these layers is incompletely separate from its neighbors as each layer is always connected to the next by variable fuzzy or gluey connections) is known as the areolar or adipose layer. This fascinating system (for it exists in most places in the body that must slide, and thus merits consideration as part of the articular system) is filled with a mixture of cells, including white blood cells and various types of fibroblasts, suspended in viscous proteoglycans that shift and change their connections easily in response to shifting forces, including rotating acupuncture needles (Guimberteau 2003, Langevin et al 2004, Langevin et al 2006)

- Below the areolar layer is the deep investing fascia, ‘fascia profundis’, which forms a ‘unitard’ around the musculoskeletal system. This tougher layer, known as the crural fascia in the leg and the fascia lata in the thigh, etc. is again actually one systemic layer that holds us into our inner shape, and provides a leathery protection that neither the elastic dermis or soft areolar layer can provide.

- Around each muscle we can find a thin but tough epimysial layer, with smaller organizing endomysial layers surrounding smaller bundles of muscles. In between groups of muscles, we find the tough intermuscular septa, which will feature in our palpations, since binding or

shortening in these tough walls have definite structural and functional consequences. Continuous with these septa, but close to the bone under the deepest musculature, we find the periosteum as a cling wrap coating around the bone, and finally the bone, which is itself a connective tissue.

The arrangement of these layers, of course, differs from place to place, but the general order of the layers from superficial to deep applies. Since the front of your thigh is probably available to you just under this book, let us use that area as a place to palpate these layers.

- Pick up the skin and roll it between your thumb and forefinger. You can feel the elastic layer on the back of the skin that holds the delicate skin cells together.

- Slide the skin back and forth to feel the easy gliding of the areolar layer on the layers underneath. No matter what direction you slide the skin, the areolar layer will allow a certain amount of sliding before the movement is checked. Move your exploring fingers down to the front of your tibia and try to lift the skin off this bone to see how limited the movement becomes when the areolar layer is very thin, as it is over this bone. (see chapter 4)

- Extend your knee to tighten the muscle under your fingers; the investing layer is like a thin but strong leotard between the loose, slippery superficial fascia and the muscle.

The density of the fascia within the muscle varies with your age, nutrition, genetics, and most of all with your training, but muscle cells themselves are very *gloopy* when relaxed, so it is the fascia (along with turgor and neurological tone) that is giving your leg its feeling of organized structure.

- Slide your fingers to the lateral part of your thigh to feel the iliotibial tract (ITT) as a distinct fascial sheet running down the outside of the thigh. Although this is not strictly an intermuscular septum (and we will be introducing others as we move through the body), it will serve as an example of a similar heavy fascial sheet, albeit one that is easily accessible from the surface. You may also be able to feel the difference between the superficial muscle on the front of your thigh – the rectus femoris – and the denser, deeper muscle beneath it, the vastus intermedius. Between these two is another fascial plane, also an intermuscular septum.

The periosteum is very difficult to feel as a separate layer, as it is adherent to the bone, although you feel it very distinctly when you bark your shin on a stair, since the periosteum is very well innervated – and therefore more sharply painful when injured than either bone itself or muscle. (see chapter 5 for discussion of periosteal pain points)

- Palpation of the bone itself is most easily done, of course, where the bone emerges near the surface – at the patella or shin bone in your leg.

Under the presumption that muscles and bones are well-covered elsewhere in this volume (see chapters 5 and 8), let us proceed to some of the salient connective tissue structures we can feel within the unity of the body's fascial system.

This series of explorations is arranged longitudinally, so that the front of the lower leg will be presented along with the front of the thigh and trunk, the side of the lower leg along with the rest of the side of the body, the calf with the hamstrings and the rest of the back, etc.
This will be frustrating to the reader who wants all the palpations for the lower leg gathered in one place, but this longitudinal approach has logic in terms of how these fascial structures relate to each other in real human functioning and stability. Labeling of each section will assist the reader who wants to quickly gather in the palpation guides for a given region.

Much more complete information on each of the myofascial meridians named below is given in the *Anatomy Trains* book, supporting videos, and website: www.AnatomyTrains.com.

EXERCISE 6.1

Palpation of the Superficial Front Line

Foot and lower leg

- With your model supine, use one hand to hold the toes down into flexion while the model lifts them up against your pressure.
- The other hand can explore the tendons of both the short and long toe extensors, which jump up through the skin as soon as the muscles are contracted.
- The short extensors angle off toward the lateral aspect of the foot; the long toe extensors pass under our first port-of-call, the extensor retinaculae.
- The most prominent tendon on the medial side is that of the tibialis anterior.

In anatomy atlases, the extensor retinaculae are distinct structures, looking like gauze bandages over the tendons. In reality, those sharp distinctions are made by the dissector's scalpel, while to the therapist's palpating hand, they are widely variable in both their thickness and their extent up the shin and down the foot.

- Keeping the muscles tight by having the model continue to extend her toes against your resistance, pass your lightly touching fingers up those tendons where they cross the ankle to feel the retinaculae between these tendons and the skin.
- Depending on your model, they may be almost impossible to feel as distinct structures, or you may be able to feel the upper and lower sections as distinctly as they are often portrayed in the books.
- In any case, please note that the retinaculae are not really separate structures in themselves, but thickenings of the crural fascia the surrounds the whole lower leg like a support stocking.

- Move up onto the front of the shin and move the skin over the flat surface of the tibia. How much does it move over the bone?
- This can vary from model to model. Can you feel the distinct layer of deep investing fascia (crural fascia) between the easily moving skin and the immoveable bone?
- This investing layer can be 'opened' or 'moved' on the bone, and usually, in our experience, wants lifting cranially for best results.

Thigh

At the knee, you will find the sub-patellar tendon just between the tibial tuberosity and the kneecap.

- Have your model extend her knee to bring this tendon (or ligament, depending on your preference) into sharp relief.
- This tendon on the sagittal midline is the strongest element within a complex 'bridle' that attaches the patella to the knee joint and the tibial plateau.
- Have your model keep her knee extended while you explore the area below and beside the patella; see if you can feel some of the restraining bands within this 'bridle'.
- Again, they vary widely in their thickness and arrangement depending on use, but the practicing athlete will usually show palpable lines of thickening within this complex.
- Have the model relax the knee extension to feel the connections of the four quadriceps into the superior side of the patella. These strong fascial connections are obviously extensions of the muscles.

To the lateral side, one can sometimes feel the anterior edge of the ITT covering the vastus lateralis, but we will take this structure up when we palpate the Lateral Line. On the medial side, the sartorius covers the medial intermuscular septum we will take up when we palpate the Deep Front Line.

- At the top of the thigh, find the anterior superior iliac spine (ASIS).
- Four structures come from below into this nexus of forces: the tensor fasciae latae (TFL), the rectus femoris, the sartorius, and the inguinal ligament.
- The TFL attachment is palpable just lateral and inferior to the ASIS if you have your model strongly medially rotate her leg.
- The sartorius attachment is palpable just medial and inferior to the ASIS, most easily palpable when the model laterally rotates her leg against the resistance you supply with your other hand.

The rectus femoris is listed as going to the anterior inferior iliac spine, so in between the two muscles discussed above, you will find the rectus femoris tendon, often in a little 'pocket' between sartorius and TFL, diving into the body toward the AIIS.
In a certain percentage of people, though, there will be an extension of the rectus femoris up to the ASIS, known affectionately in our school as the 'Morrison ligament', after its discoverer.

The inguinal ligament (which is misnamed – it is really the free but rolled up end of the layers of abdominal fasciae and not really a ligament) runs in a straight line from the pubic tubercle on the side of the public bone up to the ASIS.

- It can be palpated as a string you can gently strum about 1 cm. or 1/2" above the fold between the leg and the trunk.
- Take care not to press hard on the neurovascular bundle that passes under this ligament between the pectineus and the iliopsoas.

The Abdomen

The intrepid palpator can find the round lower attachments of the rectus abdominis on the superior side of the pubic bone.

- As this is generally a touchy area for your model, it is suggested that you have your supine model flex her knees fully, and then gently drop your fingers into the belly of your model halfway between the pubic bone and the navel, pushing past any accumulated fat well into the abdominal cavity.
- This should not be painful, and is contraindicated if it is.

Then turn your fingertips down toward the pubic bone and resting there, let the model bring the pubic bone to your fingertips, by pushing on her feet and rolling the pelvis into a posterior tilt, rather than you pressing down toward the pubic bone with your own power.

- A model with a full bladder is a definite disadvantage in this palpation, and be sure to let the model bring their pubic bone to you, rather than pushing your way to the bone.
- Do not palpate heavily to the side of the pubic tubercles, as there is a weakness in the fascial walls here, especially for the male of the species, and over-working here could predispose toward an inguinal hernia.

Once found, the attachments of the rectus are round and spaced a couple of centimeters apart. In between is the small but important adjustor of the pyramidalis muscle. Just lateral to the rectus is the lateral edge of the rectus sheath.

The rectus abdominis arranges itself as a series of muscles, separated by tendinous inscriptions readily felt in the athlete, or Pilates devotee, as the familiar element in 'six-pack abs'.
More importantly, the rectus is wrapped in a sheath of fascia that is continuous with the other abdominal sheets of muscle. Where the rectus sheath meets these other muscles just lateral to the muscle is a very important fascial raphé for abdominal tone and stability.

- To feel this fascial structure, explore along the edge of the rectus abdominis, which widens as it rises toward the ribs.
- The fascial raphé is just between the medial edge of the obliques and transversus and the lateral edge of the rectus, and extends from the pubic bone all the up and out to the sub-costal arch.
- This fascial 'pillar' has connections into the diaphragm, as well as onto the ribs, and constitutes part of the Front Functional Line, as well as this Superficial Front Line.

Above the costal arch at the level of the 5th rib, you can feel a distinct horizontal fascial band between the top of the rectus and the lower edge of the pectoralis major. This 'strap', which has no name in the atlases but is commonly called the 'Schultz band' after its describer, the late Dr. Louis Schultz, is very important when too short or bound, in restricting breathing, upward movement of the chest, and free movement of the arms.

- Despite its power to limit movement, this band is fairly superficial, and can usually be moved up and down over the underlying sternum and ribs.
- It invites widening and lifting to loosen its grip on the model's movement.
- The sternal fascia – actually a portion of the deep investing 'leotard' of pectoral fascia – can be moved on the sternum, and additional fascial buildup can often be felt on the raised structures of the sternochondral joints on either side of the sternal 'valley' at the midline.

The sternocleidomastoid (SCM) will be familiar to most palpators, easily seen and palpated by having the model turn her head to the side and lift it ceiling-ward against your resistance.

- The fascial element of this palpation comes at the superior end of the muscle.
- The muscle tissue itself ends at the mastoid process, but its fascial extension can be felt another inch or two (3-5 cm) up toward the asterion (where the parietal, temporal, and occipital bones meet, and a strong attachment point for the tentorium cerebelli on the inside).
- Have your model turn her head to the side, place your fingers on and above the mastoid, and have her lift her head to feel this fascia tighten.

EXERCISE 6.2

Palpation of the the Superficial Back Line

Foot and lower leg

The front line is complemented by a line running up the back of the body.

- The first and familiar fascial feature within this line is the plantar aponeurosis, readily palpable when it is tightened by extending the toes.
- As wide as all five toes at the ball of the foot, its edges are readily palpable (and sometimes tender) passing back along the sole narrowing as it goes to the width of only 3/4" (2 cm) as it blends into the periosteum, at the front of the heel.
- A branch of this fascia, the lateral band, can be felt between the outer, lower edge of the calcaneus and the prominent base of the 5th metatarsal bone.
- This fascia is a major stabilizer of the lateral arch, and is recommended for treatment in both pronated and supinated feet.

The plantar fascia blends into a 'bridle' of fascia around the heel that continues into the Achilles tendon.

- Follow this tendon up the calf to feel it thin as it spreads wide over the posterior surface of the soleus.
- At the popliteal fossa of the knee, there is a fascial connection between the heads of the gastrocnemius and the hamstring tendons linking around them.

Thigh

Here the division between the medial and lateral hamstrings is clear.

- Palpate up from here and see how far up toward the ischial tuberosity the hamstrings can be easily separated.
- In runners, the medial and lateral hamstrings can be bound fascially together so that they cannot be separated more than a few inches above the knee.
- This limits the differential movement between these two, which is required in football, say, or skiing.
- With your model prone and knee flexed to 90 degrees, put your fingertips in this septum between the hamstrings, and have them rotate the lower leg strongly medially and laterally – you will feel

how easily you can sink toward the femur and how far superior the separation between medial and lateral hamstrings can be detected.

Pelvis

- At the upper end of the hamstrings, you can track the fascial continuity onto the sacrotuberous ligament, a tough, almost bony-feeling strip between the ischial tuberosity along the medial edge of the gluteus maximus to the lower edge of the sacrum.
- The sacral and thoraco-lumbar fascia is a vast expanse of many fascial layers laid over the sacrum and lumbars in a diamond shape.

Back

The erector spinae fill in the space between the spinous processes and the angle of the ribs.

- Between the lower ribs and the posterior iliac crest, on the outer edge of the iliocostalis lumborum, you can find the lateral raphé, a fascial band that complements the band running along the outside of the rectus abdominis in front.
- This thick fascial structure lies at the confluence of the erector fascia, the posterior limit of the abdominal fascia, and near the outer edge of the quadratus lumborum.

Head

Though the erector spinae are quite fascial, as muscles go, the next directly fascial structure on the Superficial Back Line is the epicranial fascia that traverses the head from the nuchal line to the brow ridge.

- If the person carries a head forward posture, the epicranial fascia thickens in response to the changing angle of pull from the erectors.
- The back of the skull is relatively smooth.
- If you can feel bumps, waves, or furrows as you palpate beneath the hair on the back of the head, this is the thickening and extra fibrous tissue in the epicranial fascia.
- Part of setting the head back up on top of the body is to ease this fascia out and down, until the skull feels smooth once again.

EXERCISE 6.3

Palpation of the Lateral Line

Foot and lower leg

Turning to the fascial continuity running up the side of the body, we can palpate the tendons of fibularis longus and brevis (peroneals) just inferior to the fibular malleolus. The fibularii run up the side of the lower leg to the lateral side of the fibula.

- If you have your model point her toes (strongly plantarflex), these muscles will be readily palpable between the bulge of the soleus and the tibialis anterior.

On either side of these muscles are intermuscular septa that divide this lateral compartment from its neighbors. These compartment walls are often shortened and tight in compartment syndrome, and are well connected to the crural fascia that surrounds the lower leg. Relief of compartment syndrome symptoms will often result from deep release work on the crural fascia over the fibularii, as well as work into these intercompartmental septa.

- The anterior septum, between the tibialis anterior and the peroneals, can be found by palpating up from the fibular malleolus, tracking the small 'valley' between these muscles, ending just in front of the fibular head.
- The posterior septum can be tracked by starting in the space between the Achilles tendon and the back of the ankle, running in front of the soleus and ending just behind the fibular head.
- In the ideal, these 'valleys' should be easily accessed down to the fibula; in many cases, however, they are so bound that differential movement or any valley at all is difficult to feel.
- This is an indication for spreading work to open the valleys.

Thigh and Pelvis

The iliotibial tract is a well-known fascial structure of the thigh, comprised of a strong band of vertical fibers that interweave with the fascia lata that surrounds the thigh (continuous with the crural fascia below via the anterior ligament of the head of the fibula at the anterior superior corner of the head of the fibula).

The iliotibial tract runs from a strong, rounded, tendon-like structure easily felt just above the knee on the lateral side, which widens as it passes up the thigh and over the greater trochanter to join with the gluteus maximus, medius, and tensor fasciae latae muscles. Between the tensor and the medius, an extension of the iliotibial tract can be felt running up to the coronal centerpoint of the iliac crest.

This structure should be strong and tight, as it is an essential support for transfer of weight from the pelvis to the femur, although excess tightness can restrict ab- and adduction movements at the hip. The tract fades into the fascia lata anteriorly, but thickens posteriorly to create the lateral intermuscular septum between the vastus lateralis and the biceps femoris.

- To palpate and assess the iliotibial tract, lay your hand along the thigh of your side-lying model, fingers pointing down the thigh to the knee.
- Where is the iliotibial band the tightest – in the front, in the middle, or on the posterior edge?
- In most people, the back edge feels thicker and tighter, but with practice, you can assess whether the anterior or middle part of the band is carrying an excess of tension.
- Tension in the anterior part of the band often accompanies an anterior tilt of the pelvis, while excess tension in the posterior part accompanies a posterior tilt or an anterior shift.
- Once assessed, you can adjust your work to emphasize the part most in need of attention.

Trunk

The Lateral Line passes up the trunk in a series of muscular 'X's formed by the lateral abdominal obliques and intercostal muscles. Palpation of these is covered in Chapter 5. A deeper structure with more fascial volume is the fascia running parallel to the outer edge of the quadratus lumborum.

- To find this fascia, which runs from the lateral iliac crest to the outer end of the 12th rib, hook your finger onto the inside edge of the iliac crest of your side-lying model.
- "Walk' your fingers back from the ASIS toward the back. At the lateral midline or just posterior, you will find a sharpish edge of a fascial band that sweeps up and medial toward the 12th rib (which is quite variable in length).
- This fascia is frequently short in lordotic or compressed lumbar patterns, and its release is a central part of relieving such patterns.

Neck

Although the sternocleidomastoid (SCM) and splenius muscles form the neck portion of the Lateral Line, the 'skirt' of the scalenes form a deeper, more fascial part of this line.

- Readily palpable as a hard group behind the trailing edge of the SCM, these muscles act as a 'quadratus lumborum of the neck', in controlling side-to-side movement of the neck.
- They are also secondary breathing muscles, supporting the ribs and lungs from above.
- Unfortunately, they can also serve to pull the lower cervicals into flexion, 'turtling' the neck into the torso.

An unusual but effective access to the scalene fascia can be made via the axilla.

- With your model side-lying, with no pillow, and with you standing behind her shoulders, pick up her head and side bend it toward you (away from the table).
- Lay your other hand comfortably in her axilla, fingers pointing toward her head.
- Slide your fingers into the axillary space, parallel to the ribs, letting her shoulder to fall upward toward the head to allow you access to the highest ribs possible without discomfort.
- Press your fingerpads gently but firmly down toward the ribs, and then slowly lower her head down toward the table.
- You will feel the extension of the scalene fascia pulling along under your fingers.
- Repeat with more pressure to turn this palpation into a treatment for shortened scalene fascia.

Palpation of the Spiral Line

The double helix of the Spiral Line winds in and out of all the lines previously described. All the fascial features of the spiral line are covered elsewhere in this chapter.

EXERCISE 6.4

Palpation of the Shoulders and Arm Lines

Many of the muscles of the shoulders and arms are covered elsewhere in this book, so we will confine ourselves here to a few salient fascial features of the arms.

The Superficial Front Arm Line

The palmar aponeurosis covers the palm of the hand much as the plantar aponeurosis covers the sole of the foot.
It is tightened by the palmaris longus, whose tendon can be palpated and often seen above the flexor retinaculum when the wrist is strongly flexed.
When the fingers are extended, the palmar aponeurosis can be felt tightening like the head of a drum. The middle of this aponeurosis can be tightened in the pathology of *Dupuytren's* contracture.

- The flexor retinaculum can be felt just distal to the radiocarpal joint, running from the base of the thenar muscles of the thumb to the base of the hypothenar muscles of the little finger.
- This strong fascial band covers the carpal tunnel, whose flexor tendons can be felt sliding under the skin just proximal to the wrist if you 'play piano' with your fingers.
- In those with carpal tunnel syndrome, the retinaculum often presents as too short, creating an excessive 'arch' that crowds the carpal tunnel.

- The common flexor tendon can be felt just distal to the medial humeral epicondyle on the inside of the elbow. Just proximal to the epicondyle you can feel the medial intermuscular septum, sometimes presenting as a 'bass string' when it is overly tight.

- This septum, which divides the upper arm flexors from extensors, runs up the joint with the attachments of the latissimus dorsi and pectoralis major muscles on the medial side of the proximal humerus.

EXERCISE 6.5
Palpation of the Superficial Back Arm Line

- The extensor tendons can be easily felt along the back of the hand.
- The extensor retnaculum is much 'lighter' than its counterpart on the flexors, but can nonetheless be detected by sensitive fingers on the back of the wrist.

The common extensor tendon lies just distal to the lateral humeral epicondyle, where it frequently presents with tender spots. Just proximal to the epicondyle is the lateral intermuscular septum, which is a bit wider and less easily felt than its medial counterpart. This small septum runs between the brachialis and the triceps to the distal end of the deltoid, running deep to a small part of the brachialis that lies over it.

- Within the deltoid, you can feel the multripennate tendons, the largest of these running over the front of the humeral head.

EXERCISE 6.6

Palpation of the Deep Front Arm Line

- The radial collateral ligaments can be felt between the styloid process of the radius and the carpals at the base of the thumb.
- Near the proximal end of the radius, you can find both tendons of the biceps brachii.
- To feel the radial tendon, hold your arm against your belly with your elbow flexed, and put your index finger into the flesh just above the cubital fossa.
- The biceps tendon is an obvious large cord.
- Follow this cord down into the fossa, pronating and supinating the forearm to feel the tendon move around the radius.

- To find the other lower attachment of the biceps – the bicipital aponeurosis or tendon of Lacertus – laterally rotate the upper arm so your hand is away from your body, but with the elbow still adducted.

- Run your fingers down the near (medial) side of the tendon to feel the fascia spread and gradually disappear, blending into the myofascia of the flexor group.

This is a clear example of a 'muscle attaching to a muscle', and is used to reduce strain on the elbow when carrying a heavy load.

The short head of the biceps attaches to the coracoid process, which is the distal attachment of the important pectoralis minor. The pectoralis minor lies within a fascial sheet – the clavipectoral fascia - which lies deep to, and is almost as large as, the pectoralis major.
The clavipectoral fascia runs from the clavicle on the superior side to the inner border of the anterior axilla on its inferior edge. It is bilaminar, and includes the subclavius muscle within its layers, as well as the pectoralis minor.

- It can be felt by entering the axilla under the pectoralis major.
- The fascia may present as a tight sheet, or be loose enough so that the pectoralis minor is all that can be distinguished of this fascia.

The subclavius, found on the infraclavicular surface, is a very fascial muscle, acting as an adjustable ligament for the sternoclavicular joint. Just inferior to the subclavius, between it and the shortest head of the pectoralis minor, is a thickening of the clavipectoral fascia named the costocoracoid ligament.

- This band, running from the second rib to the coracoid process, can often be palpated through the overlying pectoralis major as a tougher band of fascia, which can feel like a slip of the pectoralis major, but if followed, will lead to the coracoid process.
- Each and all of these fasciae can restrict full shoulder movement from the front.

EXERCISE 6.7

Palpation of the Deep Back Arm Line

The ulnar collateral ligaments can be felt between the styloid process of the ulna and the carpals at the base of the little finger.
The fascia running over the ulna connects these ligaments to the olecranon, where the fascial tendon of the triceps can be palpated just proximal to the point of the elbow.

- The tendons of the rotator cuff can be palpated on the back of the humeral head by following the long head of the triceps to the teres minor on the lateral edge of the posterior scapula.
- Walk your fingers out the teres minor (about the size of your little finger and frequently tender) to the posterior aspect of the humeral head.
- Rotating the humerus will reveal where the teres and infraspinatus tendons blend with the glenohumeral joint capsule.

EXERCISE 6.8
Palpation of the Functional Lines

The rest of the arm line structures, and the myofasciae of the Functional Lines, are covered elsewhere in this chapter or in this book. We note only that in the front, the intrepid palpator can track the fascial connection from the adductor longus tendon on one side, through the pubic symphysis to the fascia on the outside of the rectus abominis on the other.

In the back, the more superficial laminae of the dense and easily-palpated diamond of lumbar fascia, carry the force from the latissimus dorsi on one side across the sacrolumbar junction to the inferior gluteus maximus on the other.

EXERCISE 6.9
Palpation of the Deep Front Line

The Deep Front Line (or 'core' line) runs through the more obscure parts of our anatomy, which makes some of its fascial features difficult to palpate, for biomechanical, client safety (endangerment sites), and social acceptability reasons. The following palpations come with appropriate precautions, but the general caveat for the less-experienced practitioner/student to explore these dynamic, important but literally and figuratively 'profound' structures with precision, a slow and sensitive pace, and in clear communication with your model .

The lower leg
One can find the distal end of the three tendons that comprise the lower end of this line on the medial side of the ankle.

- When the big toe is actively or passively extended, the flexor hallucis longus tendon can be palpated on the bottom of the foot running parallel to the inner edge of the plantar aponeurosis.

- At the ankle, this tendon can be felt by putting one's thumb or fingertip in the medial space just in front of the Achilles tendon and behind the medial malleolus.
- Be careful of the tibial nerve, but one can feel, when the model flexes and extends the big toe, the tendon moving on the back of the bone where it supports the talus in the medial arch.
- The strong tendon of the tibialis posterior can be felt be putting your fingertip just below the tip of the your model's medial malleolus, and then having her point her toes and invert her foot.
- The tendon will push your finger substantially.
- The tendon continues under the foot but is too deep to be palpable there.
- The flexor digitorum longus muscle tendon is about 1 cm. posterior to the tibialis posterior, but the tendon is small and sometimes hard to find.

The three muscles are palpable only a few inches above the ankle before they disappear beneath the bulky soleus. The deep transverse septum, however, that runs behind them, separating these deep muscles of the Deep Front Line from the triceps surae of the Superficial Back Line, can be palpated – at least its outer edges.

- Place your model supine with one knee flexed, and the foot flat on the surface.
- Sitting by the foot, put your thumbs on the front of the shin, about midway up, and insinuate the fingers of the your inside hand tightly behind the tibia.
- Do the same with the outer hand, going around the fibularii (peroneal) muscles, to come through behind them to the posterior edge of the fibula.
- Once your hands are 'pinching' the deep transverse septum in this way, have the model lift and lower her heel, and then forefoot, to feel the muscles moving past this septum.
- This approach is a better assessment tool than trying to read these muscles by palpating directly through the bulk of the soleus and gastrocnemius.

Though not strictly part of this line, the pes anserinus on the inside of the knee presents itself here for palpation, the three tendons of the sartorius, gracilis, and semimembranosus can be palpated near their inferior end on the medial side of the femoral condyle just above the tibia.

The thigh

- Just above the pes, on the medial side, one can locate the sharpish edge of the medial femoral epicondyle, and the accompanying heavy distal tendon of the adductor magnus.
- Take care not to palpate heavily superior to this epicondylar attachment, as this is where the neurovascular bundle passes through the adductor hiatus.

From the addutor magnus tendon, two heavy bilaminar septa traverse the inside of the thigh – one between the adductor group and the hamstrings posteriorly, and one between the adductors and the quadriceps anteriorly. The anterior wall, known as the medial intermuscular septum, is 'capped' at the surface for most of its run by the sartorius muscle.

- To find and assess the posterior septum, lie your model on her side with the superior hip and knee flexed out of the way (and supported on bolsters) so that the medial aspect of the leg, that lies on the table, is presented to you.
- The lower end of this septum is easily found just above the knee between the adductor magnus attachment to the medial femoral epicondyle and the medial hamstring tendons – a space 2 cm. wide on most models.
- Follow this 'valley' upward toward the ischial tuberosity.
- If you can easily palpate the valley as you go up, this septum is appropriately allowing movement between these muscle groups.
- Often, however, the valley will fill in and disappear, becoming instead a tight wall, indicating a common but less then ideal binding of the hamstring and adductor compartments.

The upper end of the inter-compartmental wall is thus hard to find in these people, but can be located with a simple test:

- Put three finger on the posterior-inferior aspect of the ischial tuberosity, one fingertip on the posterior aspect, one fingertip on the inferomedial 'corner', and one fingertip on the inferior aspect of the tuberosity.
- Have your model lift her knee to the ceiling.
- This will contract the adductor magnus and should 'pop' your finger on the inferior aspect.
- Have the model lower her knee, and flex the knee against resistance (which your thigh can provide) – this should contract the hamstrings and 'pop' your fingertip behind the ischium.
- The superior end of the septum will thus lie with your finger lying between the two at the corner of the ischial tuberosity.

- Just anterior to the adductor magnus tendon and behind the gracilis is often a small 'window' in the fascia where one can palpate (if tolerated by the model) the psoas and iliacus tendon, at their distal attachment to the 'knob' of the lesser trochanter.

Above the ischial tuberosity is the sacrotuberous ligament running from the hamstrings up the medial edge of the gluteus maximus to the lower base of the sacrum. Just medial to this is the ischiorectal fossa, which allows access to the posterior triangle of the pelvic floor fascia.

- Place your model supine or side-lying, and put three fingertips on the medial side of the ischial tuberosity, with your index finger along the edge of the sacrotuberous ligament, using it as a 'guide'.
- Move your fingertips in the direction of the model's umbilicus, sliding into the open space between the anal verge and the ischium.
- Your fingerpads will pass the hardness of the ischium and onto the softer arena of the obturator internus until your fingertips reach the fascia of the inferior side of the pelvic floor.
- Have your model contract and relax the pelvic floor; with practice, you can assess both the muscular as well as fascial tone of the pelvic floor, as well as its relative position in the superior / inferior dimension.

The anterior (medial intermuscular) septum is more easily found:

- Look for a palpable ‘valley’ just behind the sartorius muscle, heading from the medial lower thigh around toward the anterior upper thigh.
- This valley is usually easily found at the surface of the thigh, but its journey to the bone is a curved one, so to really assess the condition of the septum, one must curl one’s fingers around the quadriceps, toward the linea aspera on the posterior side of the femur.

- With your model supine, stand beside the thigh facing in, and search out the surface valley behind and beneath the sartorius.
- Carefully and sensitively follow the valley into the thigh with your fingertips; it will follow a curved path into the thigh toward the back of the bone.
- With a little practice, you can again assess whether the septum is free all the way into the thigh, or (as is common) free at the surface put bound deeper in the thigh.

At the upper end, this septum opens into the femoral triangle, bounded by the sartorius laterally, adductor longus tendon medially, and the inguinal ligament superiorly.

- The adductor longus tendon originates from the pubis, and the intrepid palpator can follow the tendon to the bone to find the round attachment near the pubic tubercle.
- Just lateral to this attachment is the attachment of the pectineus on the iliopectineal ridge.
- Posterior to this tendon, one can palpate the tendinous attachment of gracilis running along the ischiopubic ramus posteriorly to the adductor magnus superior attachment detailed above.

The Abdomen

Above the inguinal ligament, one can find the iliac fascia between the iliacus and psoas major muscles. If shortened, this fascia can pull the psoas laterally toward the iliacus, and impede its easy function.

- Place your model supine with both knees up.
- Find the ASIS, and go in and posterior just medial and superior to the ASIS.
- The iliacus muscle is immediately available under your fingerpads.
- If you slide posteromedially on this muscle, as if skiing down a slope, you fingertips will run into the psoas eventually, which you can confirm by feeling it tense as they lift that foot from the table.
- If the iliac fascia is too short or unusually dense, you will have trouble skiing down the slope, the journey will end in a dense and ‘muddy’ fascia, and the separation between the two parts of the iliopsoas will not be clear.

The umbilicus is like a ‘staple’ that pins together all the layers of the abdomen from the skin all the way down to the peritoneum into one.

- Pick up that umbilicus on your supine model, with (more usually) or without the rectus abdominis and bring it anteriorly (ceilingward).
- This is a strange sensation for the model, but with a little practice they can learn to tolerate it, as it is not really painful but feels quite strange to the neophyte.
- With even a mild lifting, you can ‘weigh’ the abdominal contents, and feel the connections of the peritoneum around the body wall.

- With practice, this palpation can be used to assess adhesions in the peritoneal attachments and ligaments.

The Anterior Longitudinal Ligament (ALL) is a primary soft-tissue structure in the body, running up the front of the original notocord, or in our case, up the front of the intervertebral discs. As such its very bottom at the coccyx would only be accessible by entering the lower body cavity, beyond the scope of practice of most readers. You can access the ALL at the sacral promontory on some willing clients. Although we are describing palpations here, not techniques, lifting the ALL here and in the neck (see below) can have profound effects.

Make sure your model has an empty bladder, and preferably is not swollen (e.g. pre-menstrually) before you attempt this palpation.
Pain is an immediate contraindication.

- Have her lie supine with her knees up to soften the abdomen.
- Drop your fingertips gently into the abdomen below the navel, but above the line of the pubic hair, headed straight posteriorly.
- Let your fingers 'swim' through the tissue – force will not work.
- If you come across the pulse of the aorta, you are too high; come out and go in more caudally.
- About halfway through the body, you will find the front of the spine.
- The sacral promontory is an edge of bone, where the spine turns from nearly horizontal (along the front of the sacrum) to vertical (along the front of L3 or so).
- The ALL is the tough fabric running over the sacrum, the L5-S1 disc (which is softer to the touch), and onto the L5 body (which is slightly scalloped, so that the ALL can be felt here distinct from the bone itself.
- Usually, trying to go any higher up the spine than this is frustrated by the joining of the common iliac arteries into the aorta with its characteristic pulse.
- Do not challenge its authority.

The thorax

The structures of the Deep Front Line – the medistinum, pleura, and endothoracic fascial layers - lie entirely within the embrace of the rib cage, and are only palpable by indirect methods.

The neck

The scalene muscles are more fascial than most, forming a strong skirt around the cervical spine that supports the neck on the upper ribs, as well as supporting both the upper ribs and the pleura of the lungs as well. These muscles form a fascial complex with the envelope for the brachial plexus, as well as being the secondary muscles of breathing, readily palpable during the latter part of inhalation.

- You can palpate the fascial extension of the scalene complex down the outside of the rib cage.
- With your model side-lying, put one hand in the axilla, palm down and fingertips as far up into the axillary space as is comfortable.
- With your other hand, lift the model's head toward you (side-bending their neck away from the table.

- At the same time slide your hand into the axilla, allowing the shoulder to drop up toward her ear.
- Slowly lower your model's head back toward the table to feel the extension of the scalene fascia move out from under your fingers on the surface of the ribs.
- Have your model lift her head toward you again to feel the fascia tense as a sheet.

Coupled with these muscles are the two muscular reinforcements for the ALL in the neck, the longus colli and longus capitis muscles.

- With your model supine and you sitting at the head of the treatment table, lean in to place your hands palm down with your fingertips of both hands facing each other just at the trailing (posterior) edge of the sternocleidomastoid muscle (SCM).
- Lift the SCM slightly forward with the fingernail side of your fingertips, and slip in behind the SCM, but in front of the hard cylinder of muscle surrounding the neck, including the scalenes.
- With a little practice, it becomes easy and comfortable to slip between the motor cylinder and visceral cylinder of the neck.
- This puts you behind the alar fascia (and thus behind the visceral endangerment sites), but in front of the pre-vertebral fascia and the ALL.

- The anterior scalene will be readily palpable under the cleidal head of the SCM as a 1/2" band that gets taut during or at the top of the breath.
- A bit further medial, and the 'bumps' of the anterior tubercles of the transverse processes can be felt.
- Still further medial, if your model can tolerate it and you can keep your fingers soft and exploratory, you will find the longus colli or capitis muscles (depending on where you are superiorly or inferiorly in the neck).
- These muscles often need to be strengthened to reinforce the ALL in those with a hyperextended cervical spine, or eased in those with a reduced curve (military neck).

This concludes our tour of some of the more prominent and available larger features in the fascial network of the myofascia, which we hope you have enjoyed and valued. In closing, we would like to re-emphasize the idea that the structures we have identified are not separate entities, but simply palpable geography within a body-wide net that is increasingly identified as dynamic, responsive, and highly communicative over its whole length and breadth.
With practice, the skilled palpator can assess the state of any one part of that net from a station at any other part, through coupling client movement with a refined sense of 'end-feel'.

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