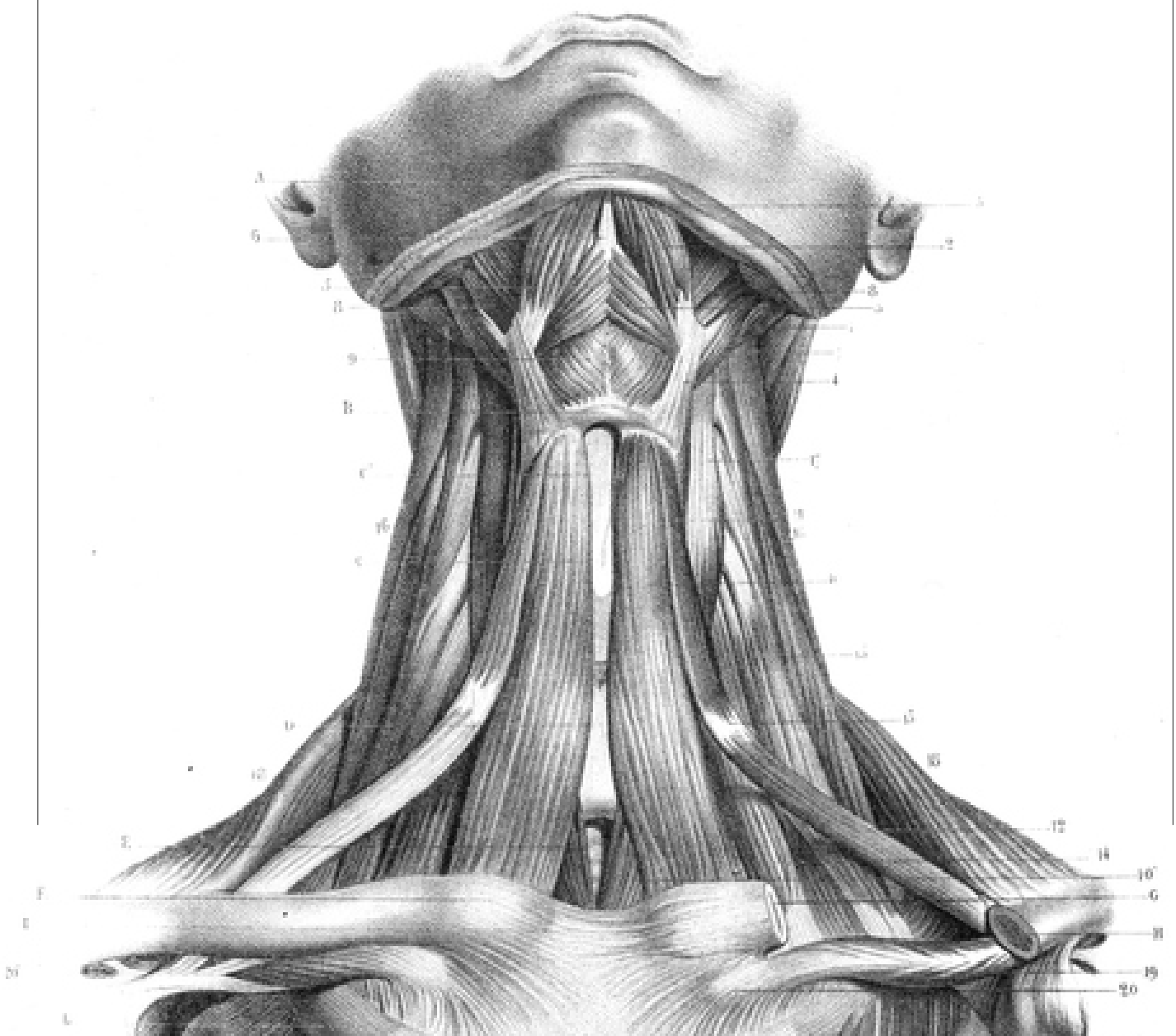
ANATOMY TRAINS

EMAG

FOR THE LOVE OF ANATOMY

ELEVENTH EDITION



INTRODUCTION

ELEVENTH EDITION

Hi, It's so good to be back and creating our 11th e-magazine after a bit of a hiatus.

I love anatomy, writing about it, talking about it and studying it. Hence, it's no surprise that this e-magazine is all about anatomy with articles from our teachers and graduates. The image on the front cover is one of my favourite images and shows the beautiful hyoid muscles. We have four paired suprahyoid muscles, and four paired infra hyoids; they play an essential role in swallowing, chewing and speaking. They depress or elevate the hyoid bone and stabilize the hyoid for mandible depression. With the root of the tongue connecting into the hyoid bone. Tension in the hyoids can contribute to:

- TMJ pain and clicking in the jaw
- A sensation of a lump in the throat when swallowing
- Forward head posture
- The feeling of a rough or hoarse voice
- Difficulty projecting your voice
- General vocal exhaustion

In manual therapy, the hyoids have to be treated with tender loving care, using the lightest pressure and your client's movement. Treat the hyoid muscles with love, and you will be surprised at the results you see in clinical practice.

Put your feet up and enjoy our e-magazine.

Feel free to email me with any feedback:
julie@anatomytrainsaustralia.com

JULIE HAMMOND
Director, Anatomy Trains Australia & New Zealand

As a bodyworker and trainer of yoga teachers I am so inspired by this issue, complemented by all we are discovering in the dissection lab that continues to reinforce the work of Anatomy Trains and Ida Rolf's original concepts related to Structural Integration. My direct experience tells me that my hands become more "knowing" with each article shared, as well as our dissection deep dives into the joints, examining the myofascial continuities not shown in the textbooks, and beautiful anomalies of each life lived, each whole body cherished, and generously shared through the donor program.

The writing in this issue underscores a communal love of anatomy in our extended family, from graduates, teachers, and practitioners, woven together by the brilliant Julie Hammond. If ever there was a time to immerse yourself in this journey of anatomical discovery, this is it!

MELANIE BURNS
Director Anatomy Trains Europe and UK,
Chief Executive Officer Anatomy Trains Global

THE MORE I LIVE,
THE MORE I LEARN.
THE MORE I LEARN,
THE MORE I REALIZE,
THE LESS I KNOW."

— MICHEL LEGRAND

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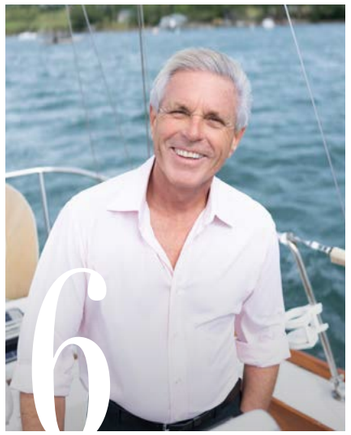

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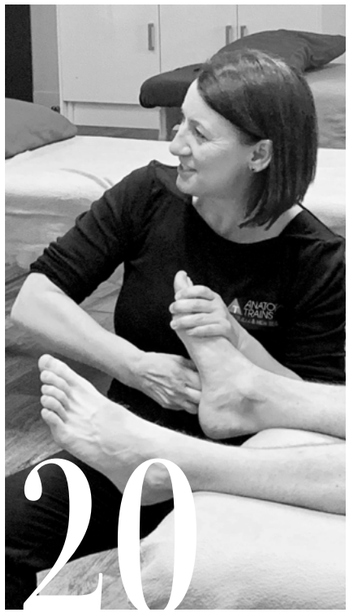
Down the Arms

THOMAS MYERS

Thomas Myers studied with Drs. Ida Rolf, Moshe Feldenkrais, and Buckminster Fuller, and with a variety of movement and manual therapy pioneers. His work is influenced by cranial, visceral, and intrinsic movement studies he made with European schools of osteopathy. An inveterate traveler, Tom has practiced integrative manual therapy for over 40 years in a variety of clinical and cultural settings. Tom is the author of Anatomy Trains (2020, 4th ed), co-author of Fascial Release for Structural Balance (North Atlantic, 2010, 2017), co-author of Anatomy Trains in Motion Study Guide (2019), author of Body3, The Anatomist's Corner, Structural Integration: Collected Articles, and BodyReading: Visual Assessment and The Anatomy Trains, and has also written extensively for Journal of Bodywork and Movement Therapies (Elsevier). He has produced over 20 online learning courses with Anatomy Trains, and others in collaboration with various body-minded professional groups. Tom lives and sails on the coast of Maine in the USA. Tom and his team deliver professional development courses and certification in Structural Integration worldwide.



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Viewing and Treating Pelvic Floor Dysfunction with a Global Lens

JULIE HAMMOND

Julie is director and lead teacher of Anatomy Trains Australia and New Zealand, she has been in the bodywork industry for over twenty years and still runs a busy practice in Western Australia. She is a self-confessed anatomy nerd with a passion for the pelvic floor and jaw anatomy and dysfunction.

It is through her clinical practice observations that Julie became interested in the link between the diaphragms in the body and how focusing on a more global approach achieved greater results with her clients. She teamed up with Fiona Palmer who is a UK Anatomy Trains teacher and Pilates teacher to develop Balancing the Diaphragms. Julie contributed a chapter to David Lesondak's new book 'Fascia, Function and Medical Applications.' The chapter is based on a Structural Integration case study, on a client who had experienced pelvic floor pain and dysfunction after the birth of her son. Julie is currently studying human and medical science with a strong focus on research.

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Living a Resource-Oriented Life, On and Off the Mat

HEIDI SAVAGE

Heidi Savage, MS, is an art of motion educator, Slings Myofascial Training practitioner, personal trainer, yoga teacher, and Wellcoaches® wellness coach. Heidi has served the past twelve years as Fitness Director at RiverWoods Exeter and has over twenty years of experience working with special populations. She is passionate about making the transformative nature of movement accessible to all. Heidi is currently working towards a Master's in Occupational Therapy.

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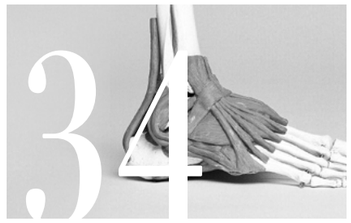

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Tell Us About the Talus

KALI JOHNSON & ISAAC CHILTON

Kali Johnson works to the rhythm of progressive, mindful movement training and manual therapy. She is among few progressive practitioners blending movement work with manual therapy. Her work is guided by her deep grasp of human anatomy and bio-mechanics. She is a proud Aggie with a B.S. in Kinesiology: Dance Science from Texas A&M University (2018). Kali is a licensed manual therapist. She is a partner at Structural Elements in Lewisville, Texas where she works as a movement teacher and corrective and structural bodyworker. As a movement teacher she is strongly interested in helping her students move with mindfulness, growing their kinesthetic awareness. When training others she is focused on restoring fascial pliability, resurrecting lost motor patterns and grooving in new ones. Kali Johnson practices, plays and trains alongside her husband and very accomplished movement trainer Zack Johnson.

Isaac Chilton has a passion for molding human structural behavior. He is a Board Certified Structural Integrator (International Association of Structural Integrators) and Certified Personal Trainer specializing in Corrective Exercise and natural movement reeducation. He has owned Structural Elements LLC since 2004. Sparked by a fascination with Chinese Medicine and Acupuncture he launched into a study of the healing arts at an early age. Initially intended as a spring board into Acupuncture School he trained in and began to practice Therapeutic Massage in 1998. His foray into bodywork morphed into a discipline. Enthralled by anatomy and human structural behavior, Isaac has turned that discipline into a passion. He holds certifications with ATSI (Anatomy Trains School for Structural Integration formerly KMI), International Association of Structural Integrators, the Upledger® Institute in Cranial Sacral Therapy and Visceral Manipulation, CORE® school for Structural Integration (sleeve training only), the National Academy of Sports Medicine (with a specialization in corrective exercise), Stott® Pilates and TRX®.

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The Sphenoid

FIONA PALMER

Fiona has been a movement therapist for the last twenty-five years and a bodyworker for more than twenty years. Her client base of rehabilitating after injury, surgery, childbirth has become her passion. Fiona's background is in clinical pilates, pelvic floor dysfunction and low back pain. She runs a busy clinic in Clare, a small bustling town in Suffolk, and runs an online pilates and hypopressive breathing and postural exercise business. Fi is also one of the Anatomy Trains teachers allowing her to share her passion for anatomy and the body.

Seeing some clients for either movement or manual therapy alone and others for a combination gave rise to some questions. For example, why do some people fare better than others? Is pelvic floor dysfunction about something other than the weakness that most often gets the blame? Does better breathing help back pain and the pelvic floor? A more "wholistic" or global approach seems to offer more significant benefits in the long term. The links between the diaphragms became more interesting when she started introducing hypopressive exercise into her exercise programme.

Fiona teamed up with Julie Hammond, director of Anatomy Trains Australia and New Zealand and together, they have developed Balancing the Diaphragms.

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The Scapular 'X' is More Like An 'Asterisk'

JASON SPITALNIK

Jason Spitalnik has been practicing Tom Myer's Structural Integration since 2007 and teaching Anatomy Trains Structural Integration since 2010. He was also a teacher for students continuing on for an associates degree in health and life sciences. Jason is trained in many different therapies such as, structural integration, osteopathic cranial techniques, visceral manipulation and neuromobilization. Jason has been doing research on collagen and collagenase for several years. Jason runs a practice with massage therapists and an acupuncturist.

DOWN THE ARMS

THOMAS MYERS

Working the Lower Arm

Here are some thoughts about arms and hands for those of us who work with our arms and hands. Our work shapes our hands, for sure. When I was young, I had slim hands with long, thin 'piano fingers', as someone called them. While studying under Ida Rolf, I soon built shorter, thicker, and stronger fingers from all the heavy fascial work we did back then. (I am more delicate with them now, yet I get more done. But my increasingly elderly hands are still very much shaped by my 45 years in bodywork, sure enough.)

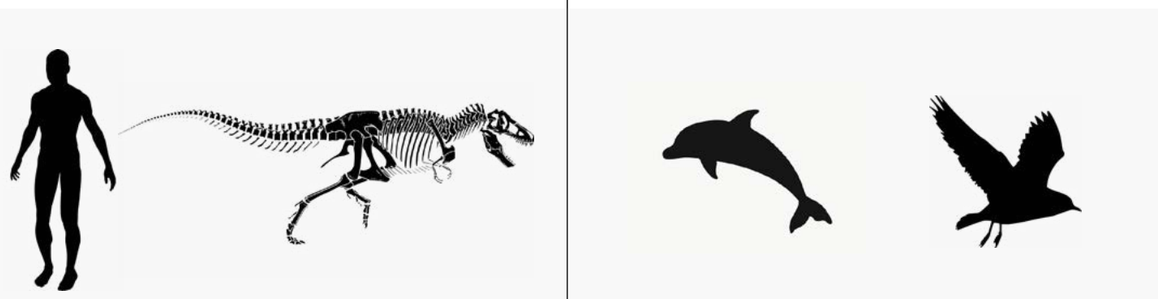
Just as surely, though, our hands have shaped our brain. We are not the only animal to use tools or to vocalise - birds and whales rival Mozart and Brahms. But our sophisticated use of symbol-rich language developed in tandem with our uniquely human hand. How your brain makes sense of your universe is dependent on your language structures, and our language takes much of its shape from how our hands interact with the world.

"Jim gave Gloria the bracelet to look at." Would dolphins - highly intelligent but with flippers instead of hands - construct their grammar in this way - noun, verb, object? I very, much doubt it. What our hands do and how our minds think are inextricably entwined. Only an octopus tentacle or an elephant's trunk can come close to a hand, and both of these sensitive limbs have helped shape the awesome intelligence of those creatures, as our hand has shaped ours.

About 6 million years back, according to anthropology, we reared up on hind legs. When we took the weight off our 'forefeet', we created a limb no longer used for weight-bearing - neither on the ground nor swinging through the trees. The Tyrannosaurus Rex similarly swung himself up on his hindquarters - but ended up with tiny forelimbs of little apparent utility. We humans, however, took another evolutionary path that turned our upper limb toward multiple uses that have in turn shaped our human experience (Fig. 1).

Fig 1: Human, T rex, dolphin, bird silhouettes

Upper limbs have evolved into different forms. Ours, oddly enough, sticks most closely to the original embryological pattern that is used for all of them.



Human forelimbs, taking the same basic bone configuration as the leg (see below), adapted themselves away from being either a weight-bearer or a mover to being almost exclusively for interacting with external objects (including, for instance, our clients).

It was a gradual change - a squirrel, a raccoon, or even a dog will use its 'hands' for digging or holding food when it is not covering ground. Baboons have been observed throwing rocks at their predators. Our unique shoulder and hand, however, have made us such masters at throwing that we regularly throw things all the way to other planets with stunning accuracy.

We will look at the shoulder's uniqueness briefly here, but it is our hand that makes the miracles of juggling, surgery, cello playing, and wrenches on lug nuts possible.

Fig. 2 - Photo of hands with hammer and nail

You as a bodyworker know how many different ways we apply our hands, but in handling tools and (literally) manipulating the environment, these are the two basic grips of the human hand - the power grip and the precision grip.

GET A GRIP.

Specifically, the human hand is capable of several kinds of grip unknown to elephants, octopi, or even our closest relatives. Most of these are variations of two types of grip (Fig 2).

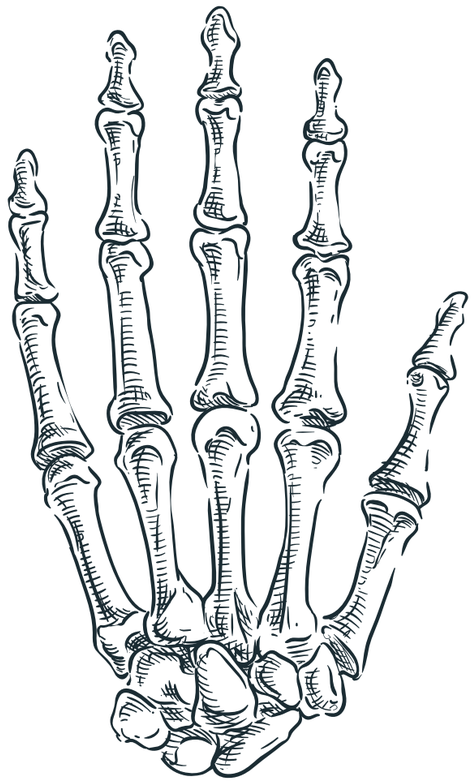
The opposable thumb allowed us to form a 'chuck' between the thumb, index, and middle finger (sometimes supported by 4 and 5) to hold objects at a specific spot and angle - this is the precision grip. We use the precision grip when we thread a needle or write, or hold a nail.

The power grip (the hand that holds the hammer) is also dependent on the thumb to provide the opposing pressure to press the handle into the palm. Gripping most tools with only the four fingers is a frustrating experience.

Get that thumb in there, however, and the human hand is an incredibly versatile instrument. From using a club to plucking out a thorn, our hands have made us at once the most delicate, capable, and most dangerous of primates.

Consider for a moment what your hand gets up to before you even go to work. It might be a general swipe to get the covers back, but then a precise finger comes over to hit the snooze button. Watch the next time you put on your underwear - what complicated choreography goes on in your fingers! By the time you've brushed your teeth, turned on the stove, hooked the handle of your cup and tied your trainers, your hands have adapted a hundred different ways to adjust your environment in your favor.

And when you get to your studio, of course, your hands are your eyes into the body. A rich and complex wash of heat, fluidity, texture, and vibration comes through our hand and up our arms, which we in turn shape into subtle shifts in our own pressure, speed and angle to release restrictions.



WE ARE BACK TO THE BEGINNING: YOU SHAPE YOUR HANDS AND YOUR HANDS SHAPE YOU.

As an example of how your hand 'lives' in your mind, consider your signature on a check. Up until just a few decades ago we believed that when a hand moves to write a signature, what we call the 'muscle memory' is your brain and spinal cord reassembling in order all the kinesthetic signals from those muscle spindles and Golgi Tendon Organs. When a signature is needed, the brain dials up that same signal series as a 'musical score', which runs out through the muscles again when our signature is required.

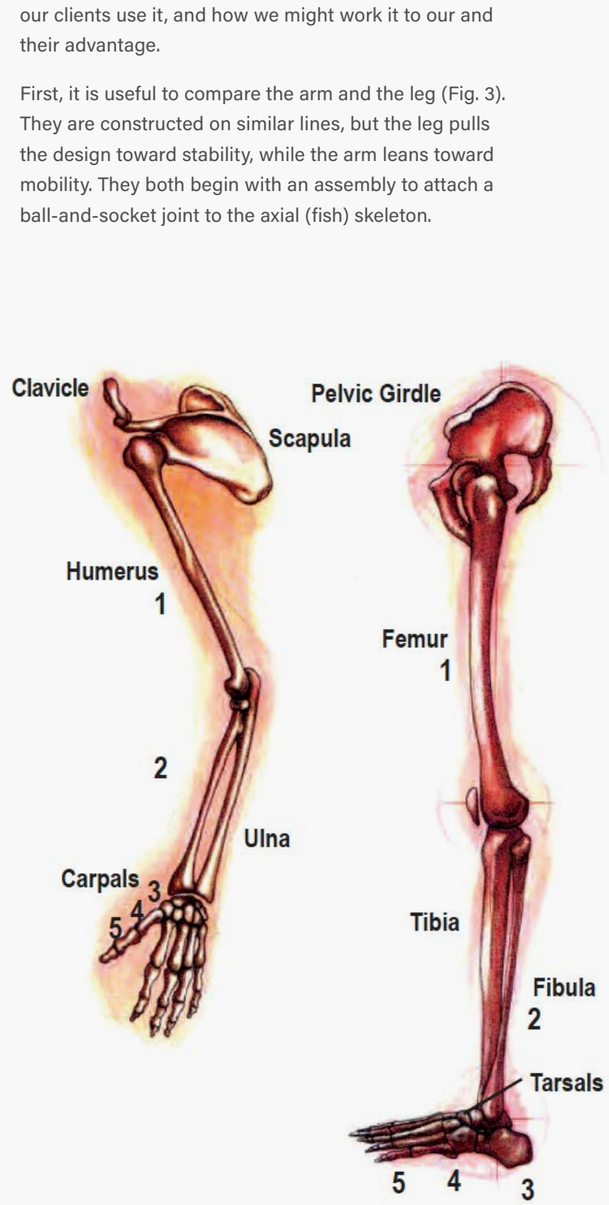
But it turns out to be more complicated than that. Imagine writing your signature on a big blackboard — you would not use the same muscles to do a large signature that you would on a check, but it will be recognisably your signature just the same. So your 'signature' exists as an independent pattern in your head.

Hmmm, so even though your signature started from the small play of muscles, it becomes its own thing and can be played out over other muscles and still keep the pattern. Imagine tromping out your signature on the beach - can you feel it? It's still your signature. This is one example of the way your brain learns 'throwing' from your hand and then extrapolates to throw things at Mars.

AN ARM AND A LEG

As bodyworkers, we all work other people's shoulders a lot. But sometimes (in my experience as a client) we are bit more pro forma when we leave the shoulder for the lower arm and hand. Let us work our way down, then, between the shoulder and the hand, considering how both we and our clients use it, and how we might work it to our and their advantage.

First, it is useful to compare the arm and the leg (Fig. 3). They are constructed on similar lines, but the leg pulls the design toward stability, while the arm leans toward mobility. They both begin with an assembly to attach a ball-and-socket joint to the axial (fish) skeleton.



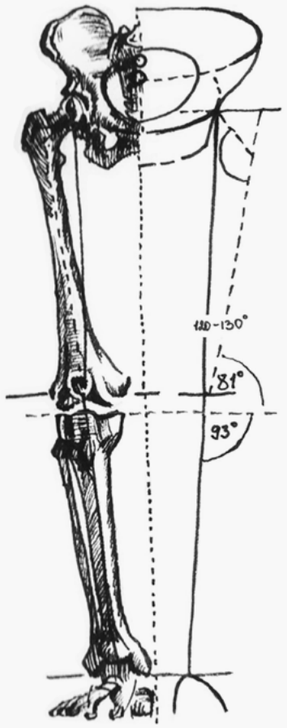


Fig 3 - Arm & leg comparison

The arm and the leg are clearly constructed from a similar blueprint, but the specs have been altered toward weight-bearing in the leg, and toward mobility in the arm.

The legs, which built up at our tail end, are especially designed for 'yield and push', as in a squat thrust. The arms, at the forward end, are more designed for 'reach and pull', as in lat pull downs. Watch a rock climber to see these two in beautiful coordinated action.

Fig. 4 (A) - AT shoulder slings
The principal shoulder stabilizers are the rhomboserratus sling and trapezio-pectoral sling.

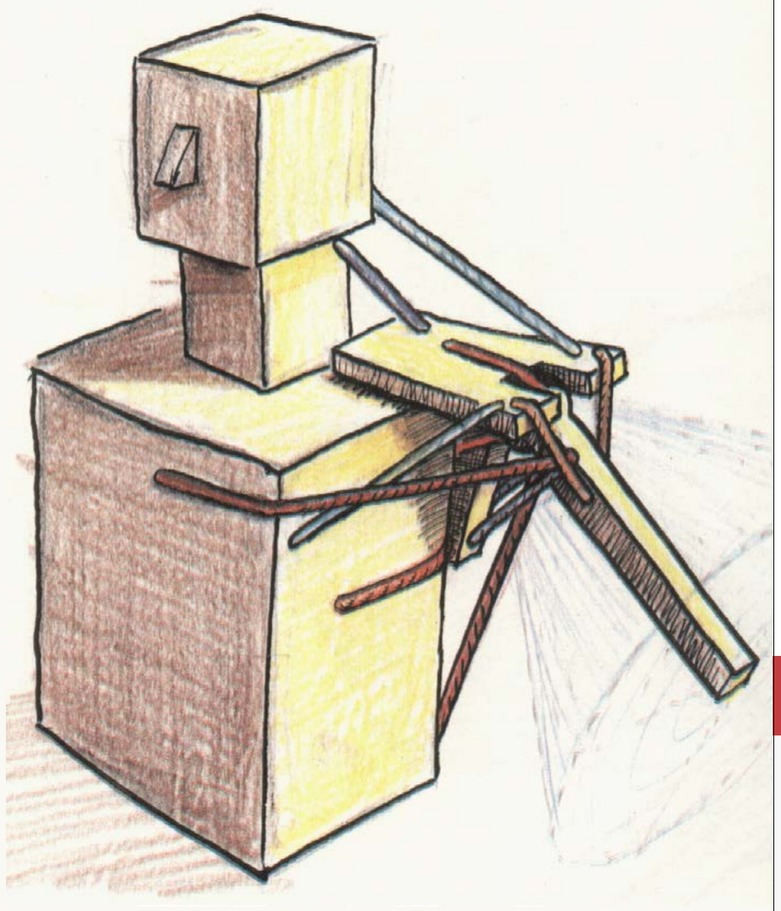


Fig. 4 (B) - Grundy pub sign and AT shoulder slings

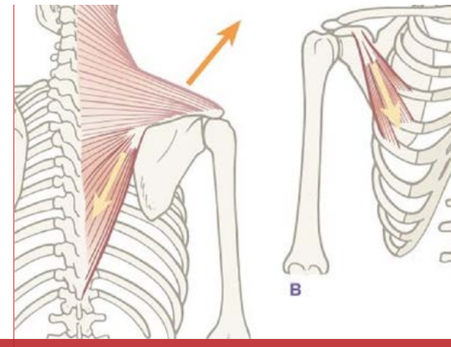
The hip attaches to the spine at the sacroiliac joint, and from the top of the foot it is a straight shot from tibia to femur to ilium to spine. The shoulder, by contrast, has a more complicated journey: It attaches to the sternum via the collarbone and then dances around back through the scapula to get to the humerus. We'll talk about another dance in the lower arm before it gets to the wrist to support the hand.

It's worthwhile noting that both your arm and your leg have a 1, 2, 3, 4, 5 arrangement in the bones (see Sidebar 1). Each tier of movement leads into and supports the next tier. Both start with a ball-and-socket joint before the one bone, both have a hinge joint in the middle. Both the leg and the arm are a miracle of design, but the subtle differences make for radically different function. The two bones in the lower arm rotate over each other, the leg bones will not do that. The wrist is mobile in several dimensions; while the ankle is much more constrained.

Our shoulder has undergone unique evolutionary development since our ancestors swung gracefully through the trees. These changes allow the shoulder to throw with great force and accuracy. Since our shoulder is so mobile and hangs off our spine similarly to a pub sign, it requires many muscles to strap it down (Fig 4). Chief among these are the rhomboid-serratus anterior sling, and the cinching over the top of the trapezius - pectoralis minor sling. We have written extensively on the shoulder elsewhere; here we want to concentrate on the upper and lower arm.*

*** Anatomy Trains, 4th ed., Elsevier 2020**

> "BOTH THE LEG AND THE ARM ARE A MIRACLE OF DESIGN, BUT THE SUBTLE DIFFERENCES MAKE FOR RADICALLY DIFFERENT FUNCTION."



SIDEBAR 1

Humerus	1	Femur
Radius, Ulna	2	Tibia, Fibula
Scaphoid, Lunate, Triquetrum *	3	Talus, Calcaneus, Navicular
Trapezium, Trapezoid,Hamate, Capitate	4	Cuneiforms 1, 2, 3, Cuboid
Metacarpals	5	Metatarsals

***Alert anatomists will object that there are eight carpal bones, not seven.**

The pisiform is a sesamoid bone that does not contribute to the supporting column, and is hence not included in this analogy. Another large sesamoid bone - the patella at the knee - is also not included in this schema.

THE ARM TAKES WING

If we look at the muscles and fascia that arrange themselves around these 15 bones in the arm, it is easiest to see them arranged from core to extremity, with four lines of myofascia corresponding to the four sides of a bird's wing (Fig 5).

The top of the wing is called the Superficial Back Arm Line, and this myofascial continuity starts with the trapezius and deltoid, running down the outside of the arm and the back of the forearm to the fingernails.

The bottom of the wing is the Superficial Front Arm Line, which travels from the powerful pectoralis major and latissimus dorsi down the front of the arm to the palm.

The front of the wing is the Deep Front Arm Line, running from the pectoralis minor via the biceps to the thumb.

The back of the wing is the Deep Back Arm Line, which includes the rhomboids, rotator cuff, and triceps, ending up at the little finger side.

Generally speaking, the two superficial lines provide the power to the arm in throwing, swimming, etc, and the two deep arm lines provide stability and refinement to the movement.

Explore more about the arm lines at:
www.anatomytrains.com

Understanding the lines offers insights into mobility and stability in our arms - and performance issues as well as shoulder and neck pain. Individual muscles are at work within the myofascial continuities of course, so let us examine some of the most salient to massage work.

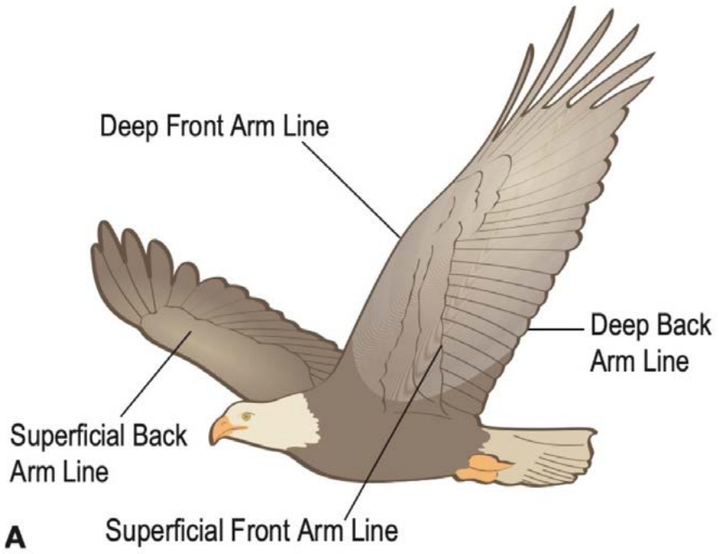


Fig 5 (A) - Arm Lines and bird's wing

The four arm lines map connected patterns of myofascia from four layers in the shoulder to the four corners of the hands. They are easiest to remember in terms of the four aspects of a bird's wing.

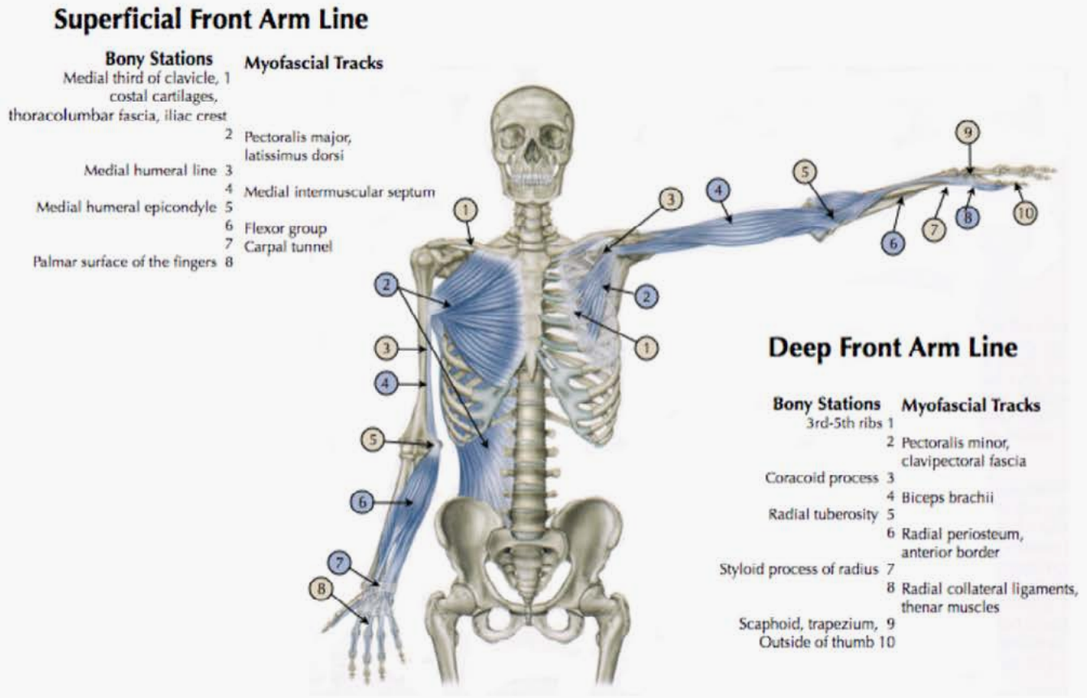


Fig 5 (B)

A CALL TO ARMS

Leaving aside the rotator cuff and the scapular stability / mobility equation for another discussion, we turn our attention to the upper arm. Our clients mostly concern themselves with the size of their 'guns' on the flexor side, or lament the floppiness of their triceps on the underside.

The floppy triceps needs exercise, no doubt about it - planks or push-ups or moving iron overhead is required. Loosening up the triceps is not often what is needed by our clients. As bodyworkers, though, we can assist the client in readying the triceps for the loading work by easing the fascia close to the humerus deep to the triceps (Fig 6).

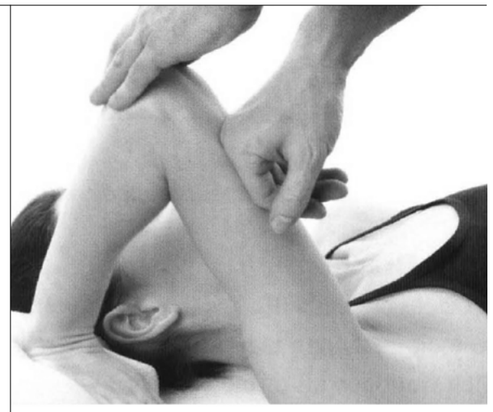


Fig 6 - Position for triceps work

For the fascia of the triceps, position the client's arm up next to their head, as if they were going to push up into a backbend. Go firmly from the olecranon up the whole triceps, staying near the bone. The client can push their elbow through your pressure if they want to help.

Place the client's hand near their head as if they were about to push up into a Wheel, a backbend. Ideally, the palm is face down and the thumb near the ear, with their fingers pointing to the feet. (Stiff 'Rolfer' that I am, I am unable to get my hands comfortably into this position, so with people like me, get as close as you can - maybe the fingers point out, maybe the heel of the hand is not fully grounded - no worries.)

Now stand at the table's head and get your six fingertips into the insertion of triceps at the elbow. Sink through the layers (often not difficult) close to the bone - you will feel a dense layer in these folks close to the humerus. Ease, melt, scrape, hydrate this layer near the bone, moving toward the armpit (but not getting that far) as they move their elbow into your pressure. Then send them off to the gym or vinyasa and they will build their triceps more easily and consistently.

On the other side are the flexors, notably the biceps, but also the two underlying muscles - coracobrachialis and brachialis. You would never know it from all the curls the gym rats are doing, but the upper arm is primarily concerned with elbow stability. Curls may make it look great on a body builder, but how often do you lift your groceries or a child to your chest in this way? A curl is not how our biceps generally function.

Watch your arms while you are doing massage, doing yoga inversions, or using almost any tool. Are your elbows bending in and out? No. There might be a little flexion and extension in the elbow as you work, but the power comes through the elbow, not from the elbow. Your upper arm muscles, while certainly capable of curls and triceps extensions, tense mostly for stability, not power or range, as curl training implies. A boxing jab punch is an exception, relying on the triceps for power.

Fig. 7 - Position for brachialis

The brachialis muscle is often responsible for chronic elbow flexion.

Fig 8 - Position for coracobrachialis

The coracobrachialis is the 'adductor magnus' of the arm.

So while I work with both heads (and both 'feet' as well) of the biceps, especially if it has been injured, my upper arm work more often reaches beneath to the brachialis and coracobrachialis.

The brachialis is likewise close to the bone and likes to be 'scraped' off of it before a workout. It can then expand and push the biceps up, a happy result for the body builder.

For those with chronically flexed elbows, releasing the brachialis is often more effective than anything you can do with the biceps. With the client supine and the palm up, have them flex the elbow and then you press finger or thumb-tips into the brachialis near the elbow on either side of the biceps tendon. With full but comfortable pressure, have them straighten the elbow back to the table, stretching the brachialis out from under your fingertips.

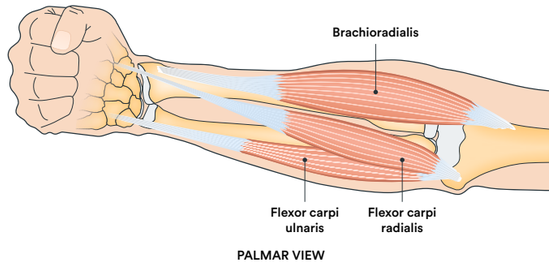
The coracobrachialis is particularly active in those where - observed in standing - the elbow is closer to the body than the wrist. This is a defensive and 'weak' position, and the coracobrachialis - the adductor magnus of the arm - is nearly solely responsible. Can the following technique improve 'confidence' in the shoulder? I believe so, but whether that is right or not, you can definitely help resolve the body part of a somato-emotional pattern.

With the client seated at the edge of the table so the arm hangs free, put your hand palm out into the armpit (Fig 8). Have them press their elbow against their side to pop the coracobrachialis under your fingers - just anterior to the nerves of the brachial plexus. Having located it, you can release the muscle down, toward the elbow, as the client rotates the shoulder in and abducts the elbow a bit. **Repeat as necessary.**

The biceps and triceps are part of the Deep Front and Deep Back Arm Lines respectively. Interestingly, the Superficial Front and Back Arm Lines have no muscles in the upper arm, and are instead represented fascially by the two walls (septa) that separate the biceps and triceps.

Palpate just proximal to the two epicondyles of your humerus and you might be able feel these fascial walls. On the outside / backside it is sometimes hard to discern, but you can often feel it on the inside as a guitar string just north of the epicondyle between the biceps and triceps tendons. This fascial string can sometimes inhibit shoulder extension and abduction, and is worth opening in those cases.

Turning to the forearm, below these epicondyles the muscles open up into the numerous flexors and extensors that control the wrists and fingers (Fig 8). Just distal to the bone, many muscles are seeking attachment, and in those with complex hand movements like musicians, these attachment sites need a ton of 'combing out' - both extensors and flexors, or sometimes I do them both at once - while the client takes the hand in a circle to move the muscles below my hand and give my 'eyes' into what I am doing.



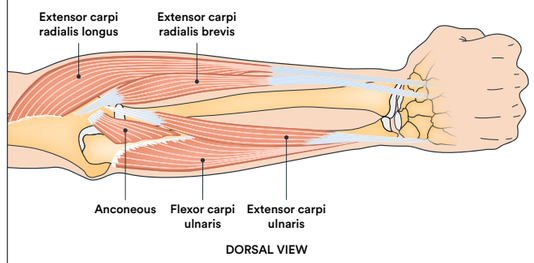


Fig. 8 - Two sides of lower arm with epicondyles and carpal muscles identified

The two epicondyles are key to lower arm ease. Of the many muscles that come from these bony landmarks, all those with 'carpi' in the name control the wrist.

An important spot is where the biceps attaches into the radius. Hold one hand against your belly, and trace down the biceps tendon - you will follow it in toward its attachment on the radial tuberosity. Pronate and supinate to feel it move.

Now swing your lower arm away from you, into lateral humeral rotation, and track that tendon again. The bicipital aponeurosis (sometimes called the tendon of Lacertus) will surprise you by leading you into the flexor group in the lower arm. This tendon is seldom shown accurately, and often not shown at all. People who regularly carry heavy loads will often need easing work here.

Now bring your arm medially, and again put your finger down the 'hole' where the biceps tendon goes (Fig. 9). There are muscles on either side of the V-shaped opening. Now turn your thumb in and out (pronate and supinate) strongly, to the ends of the movement. You will feel one and then the other of the two muscles on either side, the pronator teres and supinator, forming a V that reaches halfway down the radius. So if someone is strongly pronated or supinated in the relaxed position, one of these might draw your attention.

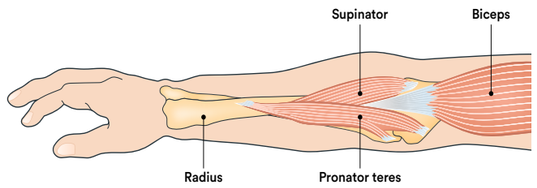


Fig 9 - The V in the forearm

Where the biceps tendon disappears into the forearm toward the radius, a V forms between two muscles that are so important in aim.

But going back to the whole grip idea, these muscles are a big help with aim. As you can see and feel, these muscles are controlling the angle of your thumb. **Play with it - this has a lot to do with your accuracy and spin with a spear, ball, rock, or even a bow and arrow.**

UNTANGLING THE FOREARM

Going back to the flexors and extensors outside these muscles, the ones all coming off the attachment at the epicondyles, it is confusing to the beginner to try to parse these muscles out. Allow me to help.

One concept from Anatomy Trains is the idea of ‘expresses’ and ‘locals’ - expresses being myofascial units (muscles) that cross multiple joints, and locals being muscles that cross fewer or only one joint. For instance, we just looked at the upper arm. The biceps is an express muscle, crossing both shoulder and elbow (and the radio-ulnar joint too, for that matter, the biceps helps the supinator). The coracobrachialis is deep under the biceps, and crosses only the shoulder joint. Brachialis is also a one-joint muscle, a local crossing only the elbow joint. The triceps is the only muscle on the back of the arm, and two of its heads are locals, crossing only the elbow, while the long head crosses the shoulder as well.

The more surface ‘expresses’ are designed to coordinate muscles to make joint movement across multiple joints seamless and smooth, while the underlying locals are more joint stabilisers, and thus more responsible for our resting posture. This statement generally holds true for the spine, shoulder, hip, upper arm, and thigh.

Interestingly, it reverses in the lower arm and lower leg. In the leg, the muscles that control the ankle are more superficial while the ones that control the toes are the deepest. Same in your lower arm: The muscles controlling the wrist are on the surface, and those that reach to the fingers are very deep.

This allows us to reach into the lower arm in three ways (see Fig 8). First, working around the epicondyles themselves, both the flexors and extensors that come in to either one. Teasing, melting, combing, releasing - whatever word you want to use, the tissue near the condyles almost always benefits from our slow and careful attention - especially on the extensor side, I found to my surprise. For those with lower arm achiness or dysfunction, detailed and picky work around the epicondyles is often called for.

Once the picky work is done, finish with an integrating move: With the client supine and arm palm down on the table, put one loose fist on the anterior deltoid, and the other right at or just distal to the lateral epicondyle.

Fig 11

Begin moving (sorry, but ‘plowing’ works) the tissue down the arm. Because the upper and lower arm are about the same length, your upper hand will meet the elbow as the lower hand gets to the wrist. The client moves their elbow a couple of inches in and out as you make the pass. This is a great technique for integrating the arm, people will often comment on the way the arm rests on the ground (Fig 10).

Second, pay attention to the angle of the wrist. It is capable of going from flexion to hyperextension, but where does it rest? As a relaxed extension of the forearm, or held curled in flexion or anxiously in extension?

The wrist is also capable of radial and ulnar deviation, as in waving ‘bye-‘bye.’ You can increase range of motion, but the other question is where it rests. Few rest in radial deviation, but ulnar deviation is more common, especially among massage therapists, because that is the way the hands naturally approach the curved surfaces of the body.

“WHAT YOU DON’T USE IS WHAT YOU LOSE”

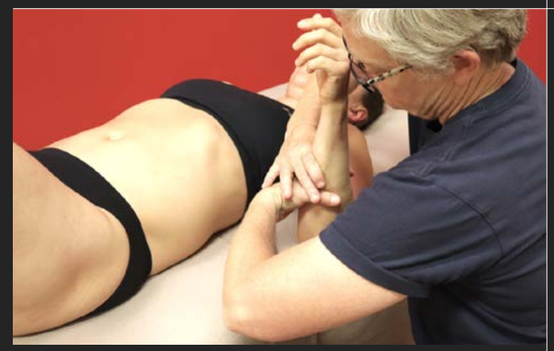


Fig 12

Now, these superficial muscles in the forearm that control wrist position all come from these epicondyles, and are conveniently attached to the four corners of the wrist. Obviously release the flexors if the wrist is flexed and vice versa. Ulnar or radial deviation can be dealt with by easing tissue of either the two inside (radial) muscles or, because ulnar deviation is way more common, the two outside (ulnar) muscles (Fig 11).

Make a loose fist and put one knuckle on either side of the ulna near the elbow. Work the tissue deeply and slowly toward the wrist, easing the tissue near the bone and dissolving all the ‘pops’ you feel. As you go, the client brings their hand in sideways toward the thumb, away from your work, repeating as necessary.

Thirdly, for those who use their fingers in very complex ways - musicians and machinists - you can delve down into the deep muscles that control the fingers. It is amazing, given their complexity, that we do not have more troubles in the arm and hand. There are two related reasons for this: 1) There are more nerves, and therefore more feedback, than in most places in the body and 2) we use our hands so much every day that they stay organised. What you don’t use is what you lose.

Nevertheless, even more felt sense and coordination can come from unearthing these muscles deep in the forearm close to the interosseous membrane. These are the finger flexors and extensors that head through the carpal tunnel. They are the very eyes of the hand, and can awaken new feelings in those who use their hands for art.

For the same reasons, the hand has fewer problems, and you have likely been taught how to spread open the flexor retinaculum over the carpal tunnel, and to open the palm via the thenar and hypothenar muscles that sit at the base of the thumb and little finger.
It is also worthwhile checking out the position of their capitate bone, which is the ‘pelvis’ of the hand.
Often this bone will ‘pop’ to good effect when you open the palm or wrist.

Even though our arms work so well, we cannot afford to just wave at it as we go by in our sessions. We hope this discussion of some of the issues you will encounter is helpful. It is those suffering clients with odd and inexplicable symptoms that leads to yet more study of the intricate detail and wonderful invention hidden in the uniquely human arm and hand.

VIEWING AND TREATING PELVIC FLOOR DYSFUNCTION WITH A GLOBAL LENS

JULIE HAMMOND

A few days ago, while standing in a long queue for the checkout in my local supermarket, I noticed so many different packs of adult liners on offer for incontinence problems for men and women. Clearly there is a lot of demand. When did this become ok?

In Australia 10% of men and 38% of women suffer from urinary incontinence (Continence Foundation of Australia, 2019). The Continence Foundation of Australia also found that 62% of people suffering do not seek treatment. Why? What is stopping people from talking about this and seeking treatment? Often there is shame, embarrassment and maybe the feeling, especially after childbirth or menopause, that it is just something we must live with. This is not true and shouldn't just be accepted as normal; however, finding treatment can be a minefield. Wouldn't it be nice as health professionals if we could make it easier for clients to know who to see? Wouldn't it also be nice if this was a subject that was easier for men and women to talk about?

Treating pelvic floor dysfunction, or as I am going to call it for the rest of the article, pelvic diaphragm dysfunction, should be a multidisciplinary approach with collaboration between health professionals. It involves exercise (but not just strengthening exercises), awareness, proprioception, interoception, relaxation. There is always an emotional component that goes with pelvic diaphragm dysfunction which also needs to be addressed. The most common form of incontinence is stress urinary incontinence, which is involuntary loss of urine due to increased pressure from coughing, sneezing or exercise (Nie et al., 2017). Urge incontinence is the sudden urge to urinate with an involuntary loss of urine. Pelvic diaphragm dysfunction is often attributed to weakness of the pelvic diaphragm, but this isn't always the case. There can be weakness or underactivity, there can also be muscle tightness and spasm and overactivity, or it could be due to pelvic dyssynergia where the muscles in the pelvic diaphragm lose coordination (Scott et al., 2019).

Image by Anna Satmari

LOCAL LENS/ ZOOMING IN

Understanding the fine detail

In this article I explain the fine detail before looking at the bigger picture, but in clinical practice this isn't the treatment protocol. Looking at the fine detail is important but then zooming out and looking at the bigger picture is needed before you plan your strategy. Making sure the pelvis has enough support from above and below before easing tension in the pelvic diaphragm is important, otherwise the client may not be able to cope with or hold the changes.

The pelvis

The pelvis is made up of the two innominate bones or Os coxae, the sacrum and the coccyx. Each of these innominate bones is made up of three fused bones, the ilium, the ischium and pubis. In standing and walking the pelvis functions to transfer load of the upper body onto the lower limbs. It protects the pelvic organs and allows for childbirth and provides attachments for muscles, ligaments and fascia.

The pelvic diaphragm

The pelvic diaphragm anatomy can at first appear overwhelming, made up of interrelated structures of muscles, ligaments and fascia. According to Stoker (2009) the pelvic diaphragm consists of four layers; the endopelvic fascia, the muscular pelvic diaphragm, perineal membrane and superficial perineal layer. The pelvic diaphragm functions to maintain continence, facilitating bladder and bowel movement, whilst giving support to the pelvic organs, helping to stabilise the hips and Si joint from within, important in sexual function and forms part of the birth canal (Stoker, 2009; Bordoni et al, 2020)

The pelvic diaphragm muscles (PDMs)

Refer to Figure 1

The muscular pelvic diaphragm is made up of the levator ani musculature and coccygeus. The levator ani consists of the iliococcygeus, pubococcygeus and puboviscerali more commonly known as puborectalis, which can also be subdivided depending on its attachments to the urethra, vagina and anus. We also have piriformis forming part of the back wall and obturator internus.

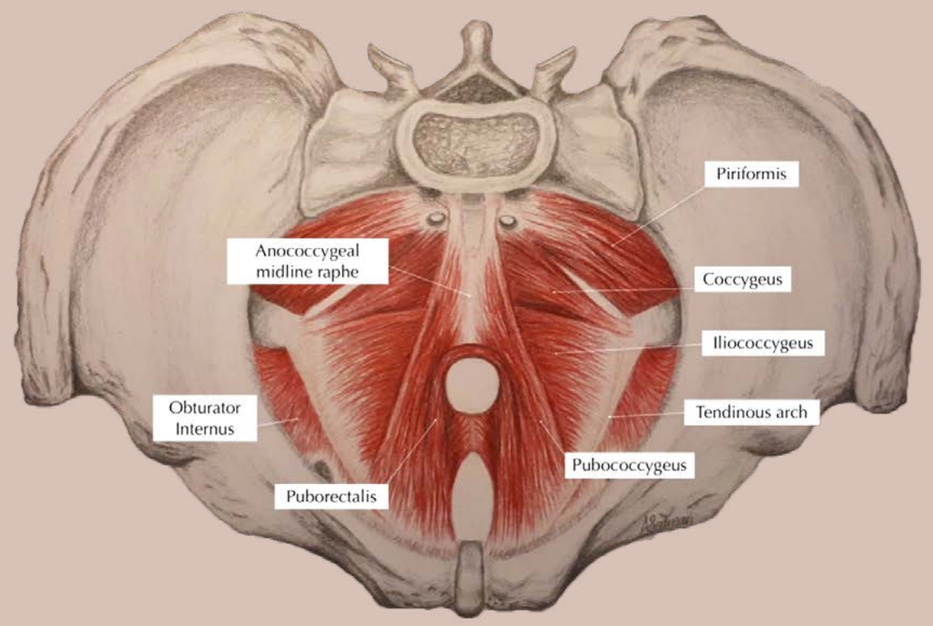
Iliococcygeus: arises from the posterior half of the tendinous arch of the levator ani and the ischial spine, inserting into the coccyx and midline anococcygeal raphe (iliococcygeus from both sides interdigitates to form the midline anococcygeal raphe, along with the posterior fibres of pubococcygeus). This median raphe is also known as the levator plate between the anus and coccyx and supports the pelvic organs (Herschorn, 2004).

*Tendinous arch/ tendinous arc/ arcus tendinous (changes depending on the literature) of levator ani runs from the pubic ramus to the ischial spine and it is a thickening of the connective tissue that covers obturator internus

Pubococcygeus: Is the more medial portion of the levator ani, it arises from the anterior half of the tendinous arch and the posterior surface of the pubic bone, inserting into the anococcygeal raphe and coccyx (Stoker, 2009).

Puborectalis: Is a sling like muscle originating laterally from the pubic symphysis on both sides and encircling the rectum. Contraction of the puborectalis creates an anorectal angle; this angle and puborectalis assist in preventing defecation. Puborectalis has resting tone and can also contract rapidly to prevent incontinence with an increase in intra-abdominal pressure. The urogenital hiatus is a gap anterior of the pelvic diaphragm that the urethra and vagina pass through; contraction of puborectalis leads to narrowing of the urogenital hiatus.

Figure 1. The muscular pelvic diaphragm
Image by Anna Satmari



GLOBAL LENS/ ZOOMING OUT

Looking at the bigger picture

Pelvic diaphragm and respiratory diaphragm connection:

The pelvic and respiratory diaphragm are structurally and functionally intimately linked. The respiratory diaphragm is the principal muscle of breathing as well as providing trunk stability along with the abdominals (often bracing and providing too much stability but that is a topic for another article). The pelvic diaphragm muscles and the respiratory diaphragm work with the abdominals to react and control changes in intra-abdominal pressure (Park & Han, 2015).

During inspiration as the respiratory diaphragm moves downwards the pelvic diaphragm relaxes, being aware that it doesn't fully relax it just eases tension, to assist in increasing inspiration. During exhalation or coughing or sneezing they contract (not always for some of us), increasing intra-abdominal pressure and assisting the diaphragm to move upward. Park & Han (2015) found that with contraction of the pelvic diaphragm muscles, the motion of the diaphragm was hindered. Hypertonic pelvic diaphragm muscles are a common problem in clinical practice and clients get frustrated that they can't strengthen their PDM, but they are already working too hard and need relaxation techniques first. This has a knock-on effect on breath and breathing dysfunction and can in turn have a knock-on effect on pelvic diaphragm function, along with anxiety (Paulus, 2013) and so the circle continues.

Compression from above:

I have been fascinated in clinical practice with compression from above; it can be abdominals, obliques, upper chest and shoulders that contribute to a look of shortening and heaviness in the upper body. Compression from above increases intra-abdominal pressure, affecting the pelvic diaphragm and in particular the pelvic organs and the breath. I have found in clinical practice, women with prolapse or urinary incontinence can often have a pattern of compression from above and, as part of the treatment strategy, easing and lifting tension in the abdominals not only helps with breath dysfunction but is also important for pelvic diaphragm function. Also easing shoulder tension and compression, will have similar benefits for some clients.

I was very excited when I read a blog by Diane Lee about chest grippers (what I term compression from above). In this blog she describes a postural pattern of upper chest and abdominal tension which causes the lower abdominals to protrude, due to an increase in abdominal pressure. She states that symptoms of this pattern lead to disordered breathing patterns, an increase in intra-abdominal pressure putting pelvic organs at risk of prolapse or stress urinary incontinence.

Pelvic diaphragm and foot connection:

My other interest in clinical practice is the connection between lower leg position, foot position, adaptability of the feet and PDM function. Studies have shown that the pelvic angle is changed by the ankle position (Chen et al., 2009; Kannan et al., 2017; Lee, 2019) and therefore, can alter the contraction of the PDMs. However, the research had contradicting results. A study by Chen et al. (2005) looked at how the ankle's position could change the PDM contraction strength. The study included 39 women, all with SUI. PDM activity was measured in standing in three different ankle positions, neutral, plantarflexion (PF) and dorsiflexion (DF). When the ankle was in PF, the pelvis posteriorly tilted, and in DF, the pelvis anteriorly tilted. The results showed that PFM activity was weakest in PF and most significant in ankle DF. This study had its limitations as the ankle movement was passive and didn't consider active movement on PDM activity. A similar study that used active and passive ankle positions (Chen et al., 2009) tested PDM activity in nine different ankle positions, with horizontal as a baseline. They tested active DF at two different heights, passive DF and PF, and PF and DF with arms raised. Results showed that PDM activity was more significant in all ankle positions than horizontal but no significant difference between PF and DF. The greatest significant difference was the mean maximum contraction of the PDMs in PF with the arms raised, closely followed by passive DF with a 4.5cm block. Ankle neutral had the weakest PDM activation. The results show that ankle position can change PDM activation but are contradictory on which position is optimum.

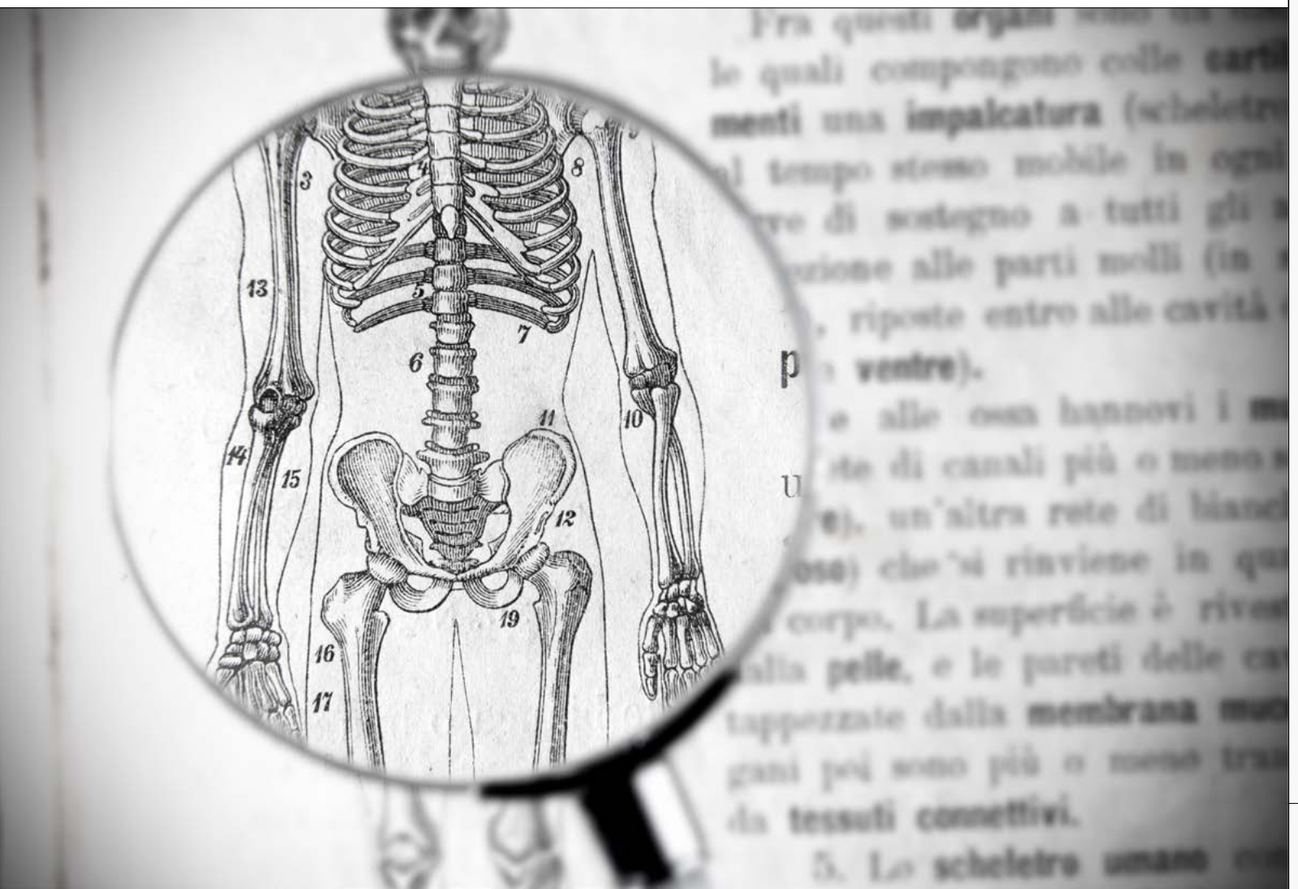
A newer study by Lee (2018) also looked at ankle position and its effect on PDMs but with active movement. The participants in this study were 24 men and 26 women with no history of SUI (it would have been good to see this study on people with history of SUI). As well as measuring PDM activation, electrodes measured muscle activity and tracked body segments. The data was collected in ankle neutral, DF and PF. The mean measurement showed PDM activity was greatest in DF, then PF and weakest at neutral. The motion analysis showed that in DF, the pelvis tilted anteriorly and increased the activation of the PDMs. It didn't show change in pelvic position in PF, which was different from the study by Chen et al. (2005). The research is contradictory but does show changes in pelvic diaphragm muscle activation with the feet in different positions. It also shows that each person's pelvic dysfunction is unique and treatment strategies and exercise need to be tailored to suit the uniqueness of each individual.

CLINICAL RELEVANCE:

I love listening to Carla Stecco lecturing and after she has given you a lot of information she always asks, “what means?” This one question sits with me whenever I am preparing a lesson or writing. You can get lost in the information but what does it actually mean? In clinical practice, treating women with pelvic diaphragm dysfunction or pain is a multidisciplinary approach. Pelvic diaphragm dysfunction is more than just a pelvis problem and many factors need to be looked at. I am a great believer in collaboration and working with other health professionals for the good of the client. Internal work for the pelvis has its place but in what sequence of the treatment?
Making sure the client has a good foundation and support and can then cope with the changes that need to be made. A local understanding of the problem, followed by a global assessment and treatment, before going locally to treat the pelvis. What if you ease the pelvic diaphragm but the client has compression from above, how will this impact the pelvic diaphragm and can the person maintain the change, no!

Do they have support from underneath, what position is the lower leg in? Are they already starting the exercise in plantar flexion or dorsiflexion of the lower leg? What position is the pelvis in? How will this impact the pelvic diaphragm balanced within the bony pelvis?

These are all questions that need to be looked at before exercises are given. Then thinking how can I help ease and balance the pelvis/ lower leg/ foot that will help the exercises be more effective?



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LIVING A RESOURCE-ORIENTED LIFE, ON AND OFF THE MAT

Keys to Active Aging with Vitality and Grace

HEIDI SAVAGE

The phrase "resource-oriented" lives at the core of Karin Gurtner's Slings Myofascial Training. Built from the ground up, the foundational scaffolding of this deliberately fascia-focused movement concept is formed on the backdrop of Karin's vast experience and her own journey through Tom Myers' Anatomy Trains Structural Integration training (ATSI, then KMI).

If you are familiar with ATSI, then you know that BodyReading is a critical element where postural patterns are revealed. Step one of BodyReading begins with an inventory of at least three resources that a person has. These are identified by client and practitioner together, which is a key part of the process. For many, it is challenging to look at oneself in the mirror (figuratively or literally), let alone digging deep to acknowledge authentic, beautiful strengths that lie within. Karin has woven resource-oriented into the fabric of Slings as both a guiding principle and the umbrella term to parallel manual therapy's structural integration for movement approaches — Resource-oriented integrative movement.

The first time I heard the phrase "resource-oriented" was in January 2018, in Tempe, Arizona (United States). I was in day one of my very first rung of the Slings Myofascial Training (AKA "Slings") curriculum — Anatomy Trains in Motion. Karin Gurtner, the architect behind this movement-oriented answer (Slings) to structural integration, was my teacher. Zooming in on these two words, "resource-oriented," this article is written in an effort to share briefly what these words have meant to me as an individual and more deeply as a movement teacher of older adults.

I work with those categorized in research as the old (75-84), old-old (85-94), and oldest old (95+). This is a population often written off to pasture; yet they truly flourish when given the opportunity to explore their own somatic tapestries one mindful step at a time with a strength-based perspective. A resource-oriented approach is transformative in overcoming stereotypes, resignation mindsets, and actual challenges that are often present. For each victory on the mat, there is a cascading effect that can flow into the stream of life in a multidimensional way.

Heidi and Karin
Tempe 2018

MY JOURNEY TOWARD RESOURCE-ORIENTED MOVEMENT AND LIVING:

When I heard Karin explain her resource-oriented lens — a light went on that has not faded. It illuminated my own journey on the mat, which in turn brought new levels of freedom to my daily life. To this day it is a facet of her work that mesmerizes me, strongly influencing virtually every area of my work and life.

Karin challenged us at the outset to let go of everything we had brought with us that would say, "I can't do this! I am not supposed to do this. This is not good for me." Instead, she empowered us to be the pilot of our own somatic cockpit, encouraging us to explore, with wisdom, the territory of possibilities on our mats. She also made it clear that we were responsible for ourselves and that we needed to listen to our bodies.

I came to Karin's work (as many do) via Tom Myers' Anatomy Trains. I had been in search of a miracle — and I do believe I found it in the form of Slings. Just ten months before I had been stamped with a diagnosis of hypermobility joint disorder and fibromyalgia. I was told that my incessant chronic pain was permanent. I was also told that it was likely due to trauma from my military service. The doctor indicated it would be wise for me to do just a few things movement-wise for the rest of my life — walking, stretching, and moderate strength training in a gym. The visit ended with a charge to live with the pain as best I could, that I should hold off on taking any pain meds until I was 70 or 80 years old, and I was as good as I would get. That was it. No follow-up visit. I bought it — hook, line, and sinker.

In the summer of 2017, I journeyed to Walpole, Maine to hear about Anatomy Trains straight from the horse's mouth (Tom Myers). There, I began to have an inkling that maybe my fate was not sealed. I absorbed some of Tom's own resource-oriented wisdom. A key take-away from him was to hold diagnoses lightly and not let these words continue to cripple me. While in Maine I picked up two of Karin's early DVD's and I began to explore Slings movement with my best efforts at a daily practice.

Heidi on the flight deck for a photo opportunity with crewmates (1997)

On the backdrop of other work, I could tell that in the context of her diverse and intelligent movement sequences, things were shifting for the better. This experience is what led me to sign up for that very first course. Since then, I have developed my own deep and daily Slings practice, I have certified as a Slings Myofascial Training Practitioner, and most recently have had the honor of joining the art of motion team as an educator.

Resource-oriented to the core, I still have many of the same issues I had when I started, yet mindset and courage have transformed my life on and off the mat. I made a decision to do exactly as Karin encouraged. First, I took responsibility for my body and my choices. Second, I listened to my body in each movement, particularly those that I felt sure a medical person would have labeled as contraindicated for me. Paying attention to the intelligence of the cuing and approach, the territory of my movement expanded one exploration at a time.

At 53-years-old I am uniquely able to empathize with my older clients. I understand what it means to be debilitated by pain, compensations, limitations, and to feel that life is getting smaller and smaller. My own victories on the mat generated a great passion in me to share this work with the people I serve. I believe that a resource-oriented commitment is key to healthy and vibrant aging. This mindset allows a person to live their best life at any age.

Heidi's early exploration with poles

Heidi 2018, already pondering ways to modify Karin's work for her clients.

A Heather Tuning into SFL

Poles assist grounding as Heather taps into her inner-tensegrity and superficial front line with confidence and deep dimensions of breathwork.

Resource-Oriented Active Aging

"Active aging" is a phrase that was coined by the International Council of Active Aging. This organization exists to change the way people think about aging. If their goal is to see people be active in their later years, how much the better to also have a resource-oriented mindset. As I have reflected on my own transformation through adopting a resource-oriented approach to life, I see four elements that are key to fostering this in others, especially the active aging:

1. Empower older adults to redirect their focus from all that is wrong and lacking to all that is going well and waiting to flourish.
2. Educate older adults to understand the why behind the work to establish buy-in and enthusiasm.
3. Reframe the use of props and adaptations as a way to expand the territory of movement as opposed to falling short of the "real deal" on the mat.
4. Ensure the inclusion of challenge and play for all ages, avoiding the staleness of ruts.

TAKE TIME TO INVENTORY RESOURCES AND "CANS"

One day a few years back, I had an 84-year-old man come into my office with a look of devastation. I asked him what was wrong. He said, "Heidi, I am never going to be able to ski again. Getting old is no fun." Over the next half hour, we talked about his last ski trip. It turned out that he had to walk down a trail that was a "Double-Black Diamond" — a very hard trail, for anyone. Over time it was clear that my friend was still able to ski just fine; he just could not ski the very hardest trails. I encouraged him to think about all the benefits that came from continuing to ski, even if it meant some trails were now out of reach. The list was long: time with grandchildren, time outside, the trips themselves, enjoying the lodges, fantastic exercise, using equipment that he had invested a lot of money in, and more.

It is easy to get sucked down the path of focusing on everything that cannot be done. Older adults can get weighed down heavily by a sense of loss and scarcity. From doctors, to spouses, to well-meaning children, often all they hear is what they cannot and should not do. A resource-oriented approach elicits a focus on everything that can be done, celebrating success. Peggy Cappy, who specializes in adapting Yoga for older adults, works with people with extreme conditions. She has been able to retain people in her classes by pointing out that whether a person does 2% of a movement or 100% of the movement, they are moving and they are doing Yoga. That is a resource-oriented perspective.

By taking time to coach people into inventorying their strengths, their resources, and recognizing all that they can do, you can set a person on a much better course as they mosey down the road of time. Similar to working on the mat, each person needs to take responsibility for their own choices. Whether it is which trail to ski down or which pose to continue holding, people need to be empowered to live life to the fullest in a healthy and fun way. Learning to do this in a movement pose can in turn assist someone to do the same in day-to-day life.

Jack demonstrating an adapted version of the Slings Hamstring Stretch & Glide.

He understands how important glide is to allow for greater range of motion, dynamic stability, and laying the foundation for other more playful movements.

Building the Why Creates Curiosity, Commitment, and Courage

Elevate the learning when you are working with older adults. Everyone benefits from knowing what they are doing and why. This is foundational to Karin's Slings Myofascial Training that is broken into what (Anatomy Trains in Motion), why (Slings Essentials), and how (the Slings Myofascial Training repertoire courses). Education creates buy-in. For older adults, it also provides much needed cognitive challenge, which is always valuable. Learning new things is one of the best things a person can do for brain health, so why not bring it in to work with your older clients.

In the summer of 2018, we did a simple study at RiverWoods Exeter, with residents living in our community. We had twelve enthusiastic participants who buckled in for 26 sessions of fascia-focused movement. Although our results were not consistent for the parameters we identified, without exception every participant reported that their walking had improved and felt better. This was not our initial goal, but it was a significant win. On top of this, the residents were excited to be participating in a study. This is a great way to bring in that depth of learning to inspire interest and follow through.

In early 2019 we were extremely fortunate to catch Dr. Robert Schleip in our part of the world. He came and did a talk to our older adults on fascia and movement. At the end of his talk, one of the participants who was over 90, Helen, came up to him to show him that she could put her foot up on a chair without any help. She attributed it to the work we had done in the study. She was beaming ear to ear.

Helen and Dr. Schleip

Helen beaming after sharing with Dr. Schleip

Provision of a cushion under the knee and poles for support makes this playful Slings movement accessible to Heather

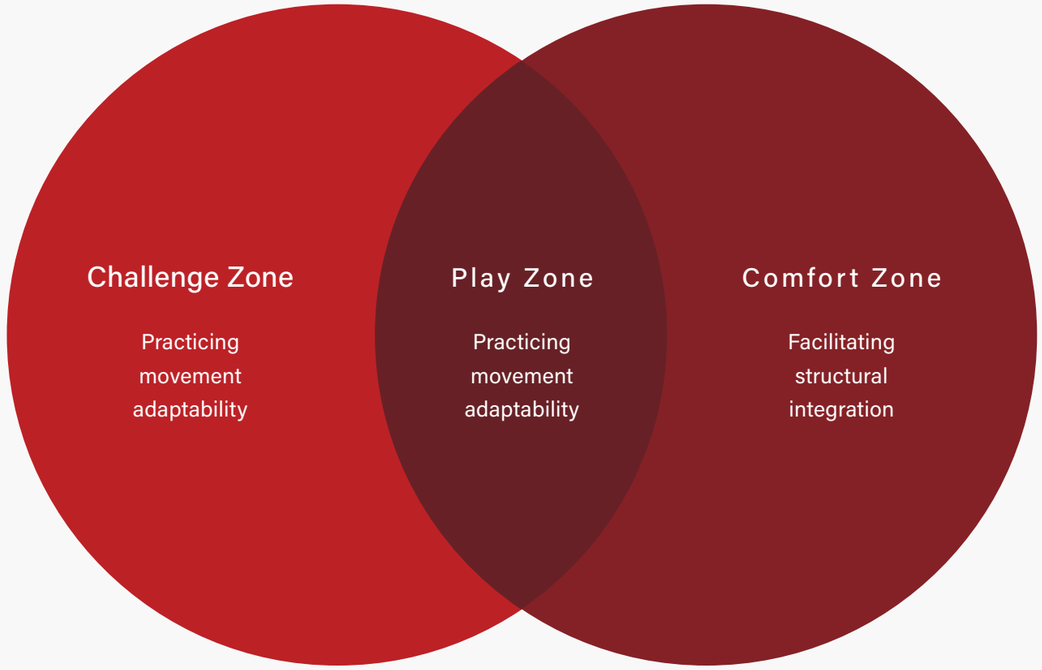
Providing educational opportunities and continuing to teach beyond cuing and choreography is what has kept me on the Slings path and it definitely has kept many of our folks committed to having fascia-focused movement in their routines. Four years later I see Helen still going strong with early morning walks. Additionally, she continues to do some of the daily practices that we taught during that study. She knows that fascia-focused exercise is as important for her as it is for an elite athlete. It matters!

Props as Empowering Tools for Expanding Anyone's Territories

I often remark with a little bit of humor, that ego is the last faculty to leave us as we mature toward the end of life. Consistently over the years, I have struggled with the reality that props are often seen as a "crutch," and that any adaptation to an exercise is translated as either "not doing it right" or "wimping out." This is an unfortunate reality that must be confronted with upbeat strategies.

A simple example is the use of something to underlie the head for cervical spine alignment. The head cranked back is a scenario that encourages the body to reinforce forward head posture. By taking a cushion or ball of proper height under the head, all of a sudden the SCM softens and allows the deep neck flexors to find ease and integrity. Combine this with excellent manual therapy, and some intentional balancing of core and sleeve in this area, and progress can be made. I have literally seen a person, with hard work, slowly be able to diminish the cushion under their head to nothing. As you can imagine, that in turn has a marvelous influence on the body's entire presence.

PROPS AND ADAPTATIONS EXPAND THE TERRITORIES OF COMFORT, CHALLENGE AND PLAY



Within each Slings class there is a commitment to have three zones of movement that will vary from person to person: comfort zone, challenge zone, and play zone. The comfort zone exercises are exercises that are accessible and that facilitate structural integration. The challenge and play zones incorporate the exercises that allow for practicing adaptability of movement. Challenge means just that. It is those exercises that maybe feel a bit out of reach or difficult. Initially one may have to adapt or modify just to try these exercises, but over time as they begin to be more and more accessible, the exercises might become play for a mover. This dimension and variety makes the Slings classes enjoyable and evolving.

People are waking up to the reality that everyone wants interesting, challenging, exciting, science-informed exercise programs. Slings Myofascial Training is a movement concept that can be applied to any modality. I have successfully applied it to myself, as a Combat Veteran who was a garden-variety trauma survivor. My world was so small. By pursuing greater things on the mat, I have found greater things in life. This same principle can be applied to any aging individual. Every single one of them has a history, and I have never met someone during my fifteen years of specializing with this age group, who did not want better for themselves.

I hope that this article inspires creativity and affirms all the ways you are already leading a resource-oriented life. Aging is a word full of potential, hope, and inspiration. The most amazing people I have met in my life have been those at the end of their lives — true rock stars in my opinion.

TELL-US ABOUT THE TALUS

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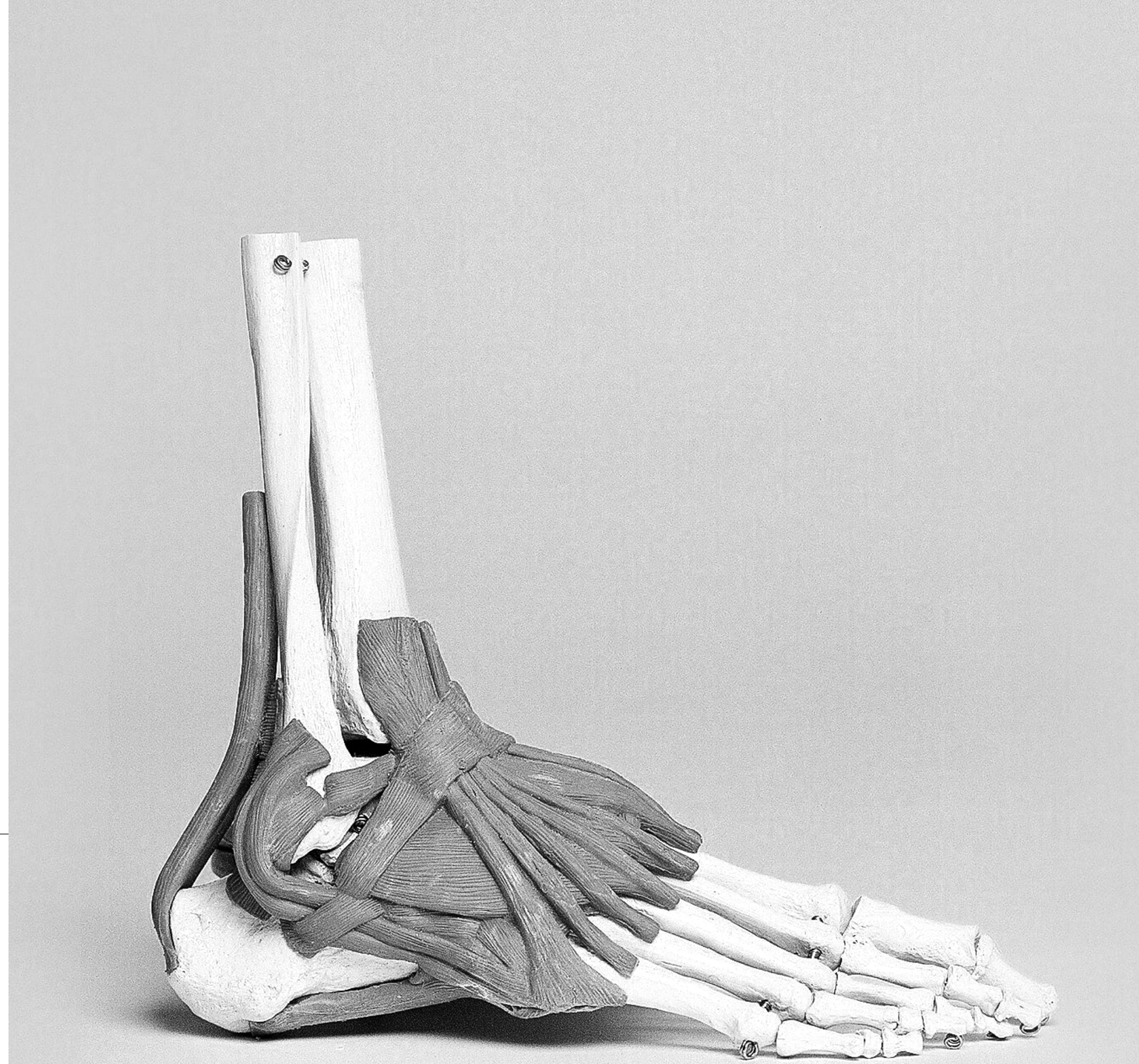
Ida Rolf wrote that “problems in the upper body vanish as the feet ‘understand’ them.” She also labeled feet “tattletales.” [1] Are you a movement teacher, a manual therapy practitioner or both? You probably work with feet all day long. You fully appreciate that feet need neuromyofascial organization, and pliability. You know that good foot-awareness is essential in order for the people in your care to “under-stand themselves.” Have you seen feet that “tattle” on the goings-on upstream? Admittedly, to fully understand the marvelous mechanics of feet takes some effort. Rigid models, architecture inspired descriptions, thick books and heady papers have caused more than a little confusion about the biomechanics of feet. Sadly, as a result, some of us have misunderstood the feet we are trying to help - feet that desperately need to stand under their owners.



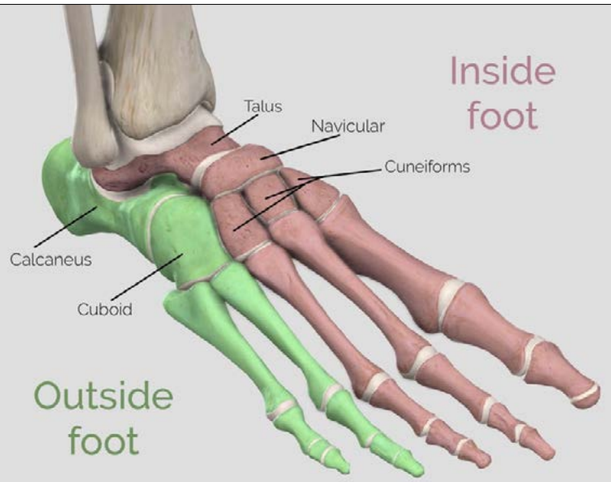
YOUR TWO FEET IN FOUR

Many practitioners crave clearer explanations of foot biomechanics. If you are in that camp, don't fret, you are not alone. In this article we will make some aspects of foot biomechanics crystal clear. A few simple metaphors might just give you an understanding you'll regift to your clients and students.

Understanding is the ability to relate the parts to the whole. To understand feet, we need to grasp the workings of the parts. We will elucidate the shape and behavior of several foot structures and zero in on the talus. Understanding how these parts work will help you visualize how the entire foot moves. But, this is only a summary of the story. We'll save the rest for future articles. But we gotta start somewhere! To get us "off on the right foot," let's start with your two feet, in four.

Ida Rolf offered another helpful explanation of the "tattletales" she knew so well: "an inner longitudinal arch rides on top of an outer longitudinal arch." [1] Some say this in a more confusing way by referring to this construction as "heel foot" and "toe foot." To provide some clarity, Tom Myers works this out for us in Anatomy Trains with the "canoe" and "outrigger" illustration. [2] To keep it even more simple, we can think of the two arches as the "inside foot" and the "outside foot."

Figure 1



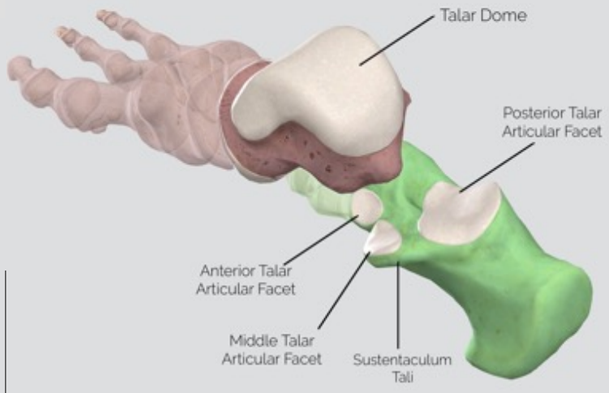


Figure 2

Knowing which bones make up our inside foot can help us assess standing bodies. Knowing how the inside foot rides on top of and slides away (unlocks) from the outside foot will help us assess moving bodies.

We can see the beauty in the relationship between the inside foot and the outside foot when we understand three things:

1. The "two" feet primarily connect to each other to become one foot between the talus and calcaneus.
2. In the walking gait cycle the outside foot contacts the ground before the inside foot by means of "heel strike."
3. In gait, when the foot accepts the weight of the body the outside foot tilts medially (inward) and nods downward, presenting the inside foot to the ground. The inside foot slides away from (unlocks) from the outside foot.

You stand on two feet. You walk on four, at least for a moment. When the inside foot unlocks from the outside foot your inside foot is accepting the weight of your body, conforming to the ground. In this way it expands into all its fascial riggings and wrappings. This generates useful spring-loaded tension and lots of information for later in the cycle. See? Everyone has two left feet... until they don't. But let's suss out just how the inside foot is encouraged to slide away (unlock) from the outside foot.

> "EVERYONE HAS TWO LEFT FEET, UNTIL THEY DON'T."

Tell-Us About the Talus

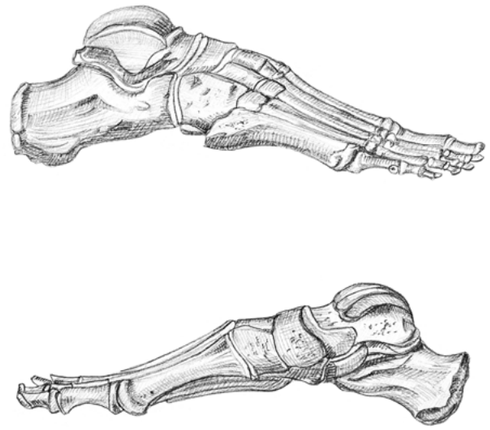
Look at the shape of the talus in Figure 2. Notice how the talus and heel connect to each other in three places. The hollow space between those joints is called the sinus tarsi. It contains blood vessels, fat, nerves and of course, organized water. Can you see how the talus rests on a tray-like projection on the calcaneus? If the "tray" were to tip, what do you think would happen to the talus? We'll get to that. Just know that this relationship between the talus and calcaneus is referred to as the subtalar joint.

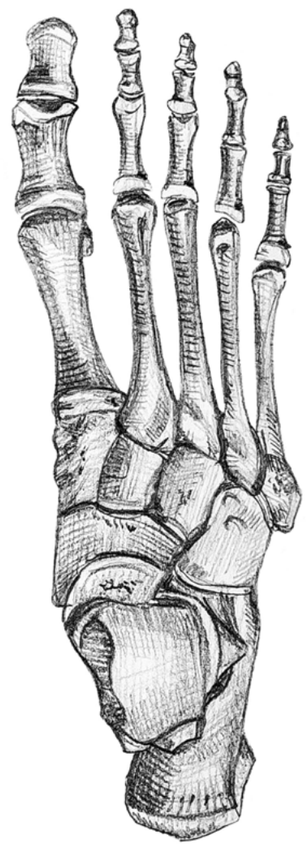
Turn your attention to the top of the talus. It looks like a saddle; doesn't it? The bottom surfaces of the tibia and fibula are also saddle shaped. These two saddle shapes connect to form the ankle joint. Can you also picture how the fibula and tibia hold on to the talus? Gary Ward, author of What The Foot aptly describes the talus/fibula/tibia relationship as a head wearing headphones. [3] The talus is the head and the malleoli of the fibula and tibia (ankle bones) are the headphones. (Figure 3) As Mr. Ward puts it,

THE TALUS IS "THE DRIVER OF THE BUS" AND "WHERE THE TALUS GOES, THE WHOLE BODY WILL FOLLOW."

When the talus moves, the headphones follow. The word "crural" is used to refer to things related to the lowest part of the lower limb, where the tibia and fibula live. The tibia, fibula and talus form the talocrural joint.

Through its neck, the talus reaches out to the navicular. The "ball" of the end of the talus fits in the "socket" of the navicular. The talus is poised to push the boat-shaped navicular bone.





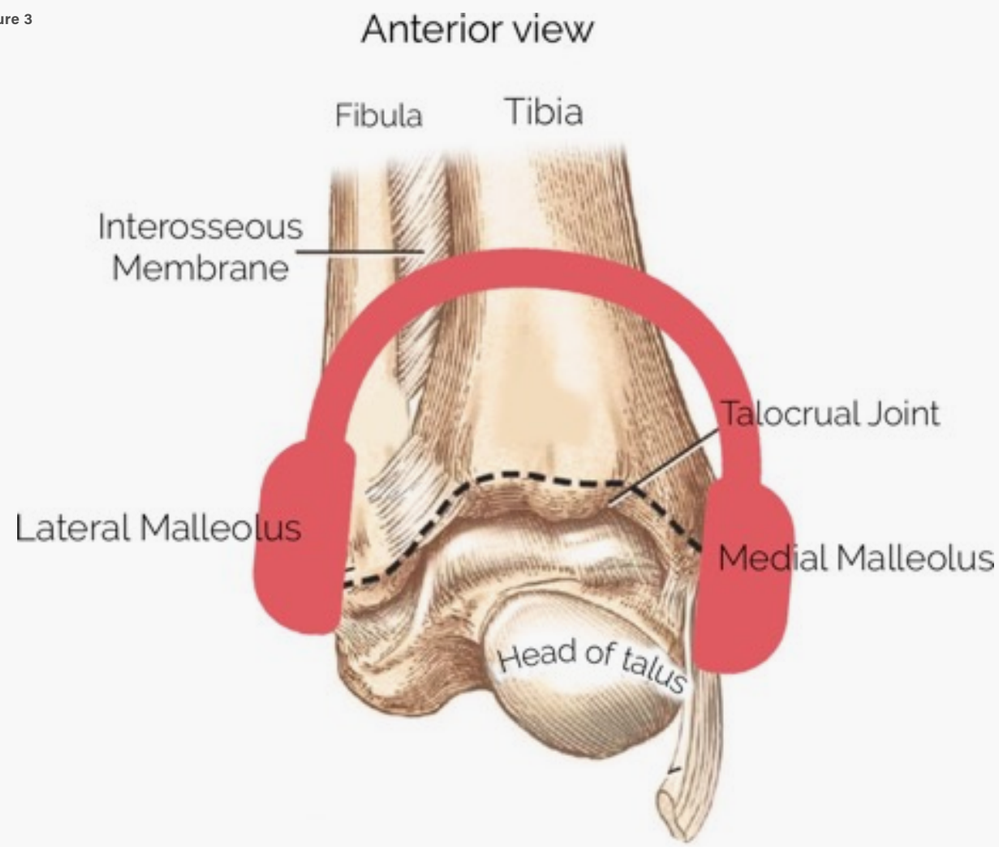
So how does the talus move in walking? Thought you'd never ask! If you can understand how the talus moves, you can understand how the inside foot unlocks from the outside foot, via the subtalar joint, sliding toward the ground when your foot accepts the weight of your body.

In walking gait, when your leg swings forward to prepare you to step, your calcaneus flies through the air in a laterally tilted position. When it lands, its outside back corner lands first. Viewed from the back, the calcaneus is lopsided (careful, some anatomy apps fail to render this tilted shape of the bottom of the calcaneus).

Due to its shape and the speed with which it contacts the ground after landing, a healthy calcaneus will abruptly tilt inward. It also tilts forward like a ball rolling down a hill. What happens next is explained well by James Earls in Born to Walk. After heel strike, and as your foot begins to accept the weight of your forward traveling body, your tibia and fibula "pivot in the talar joint, similar to a vaulter's pole." [4]

These are the events that occur below and above the talus in the weight acceptance part of walking gait. But what about the talus itself?

Figure 3



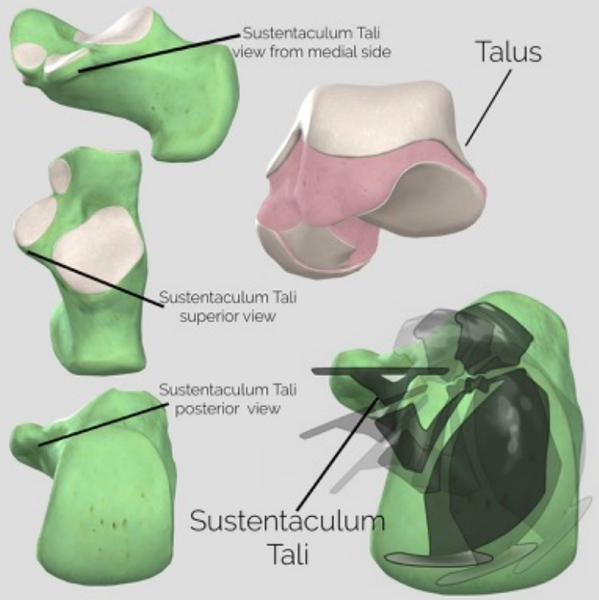


Figure 4

It's during the weight acceptance part of our gait that we can really see the talus do its "thing." Since the tibia and fibula have pivoted, bringing the rest of the body along, the load on the talus from above is greatly increased. The calcaneus also tilts inward and rolls forward. As a result, its waiter's tray is tilted toward the ground. Picture a waiter bowing to lower a tray. (Figure 4) This lowers support for the talar head. Increased weight from above? Support removed from below? What is a talus to do? These changes cause the talus to tilt inward and to rotate downward, away from its nestles in the calcaneus. This motion unlocks or expands the three articulations between the talus and the calcaneus. Thus, the inside foot slides away from the outside foot.

To picture the movement of the talus during the weight acceptance part of gait, make a fist with the back of your hand toward the ceiling. Now flex your wrist toward your torso (radial deviation). Then flex your wrist toward the floor. That's roughly how the talus moves during gait, unlocking the inside foot from the outside foot.

To use clearer language, we prefer to use the description "joint expansion" instead of "unlock." Besides a separation from the outside foot, the talus drives more expansion to help your foot adapt. Remember, the talus is buddies with the navicular bone too. During its weight-acceptance-dance, it nudges the navicular bone.

The shape of these two bones and the angle of force from the movement of the talus expands the space between them. This chain reaction expansion continues down the inside foot.

As you visualize the movement of the talus and how the inside foot is presented to the ground by the outside foot, please do not miss this key takeaway: healthy feet need access to LOTSO' medial tilt (pronation). Arches in feet need to "collapse" and expand, "fall" and rise. That's adaptability. If we cling tightly to unyielding architectural metaphors and encourage stability at the expense of adaptability, the feet we influence and the bodies above them will also be rigid. Your manual work and movement teaching can be good medicine for feet that need to access more adaptability.

We have explained that during the weight acceptance part of gait, after heel strike, the calcaneus abruptly tilts inward and rolls forward. With the tibia and fibula pivoting to shift the body's weight over the planted foot, the talus is loaded from above. In response to the movements of the calcaneus below and the increased weight from above, the talus tilts and rotates inward.

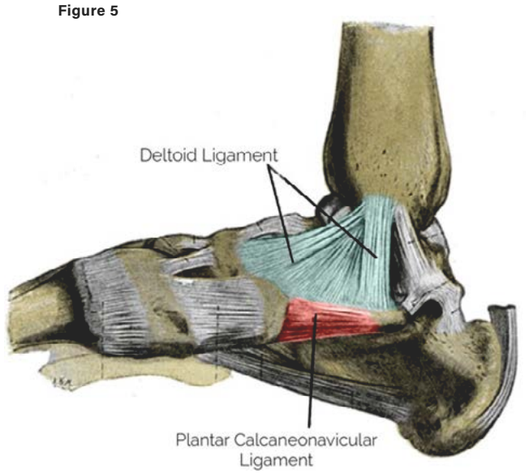
These are descriptions of how the bones move. Let's take a quick look at the behavior of the joints, the spaces between the talus and its friends.

Why the Talus Is Like T12 Upside Down

We mentioned the three bottom side articulations the talus has with the calcaneus. Topside, it also articulates in three places. The talar dome articulates with the tibia, and then each side of the talus connects to the medial malleolus (part of the tibia) & lateral malleolus (part of the fibula). This saddle-in-saddle shaped (some say mortis and tenon) relationship between the tibia, fibula and talus allows the foot to dorsiflex and plantar flex. This is a motion that happens predominantly in the sagittal plane (think "plane in which a bicycle wheel rolls"). On bottom, the three joints between the talus and calcaneus allow the talus and calcaneus to rotate relative to each other in the transverse plane (think "plane in which a plate could slide or rotate on a tabletop").

Said another way: above the talus, the talocrural joint engages in sagittal plane movement. Below the talus, the subtalar joint rotates in the transverse plane. In this way the talus is like T12 upside down. The arrangement of the facets between T12 and L1 (below T12) only allow those joints to move predominantly in the sagittal plane. The arrangements of the facets between T12 and T11 (above T12) only allow those joints to move in the transverse plane. T12 is a diplomatic bone, allowing for one type of motion above and another below. Like a U-Joint or a CV-joint, it converts some of the motion in one plane to motion in another plane. In a similar way, some of the aspects of talar movement involve taking energy from movement in one plane and using that energy in another plane.

Figure 5



Rotation, Rotation, Rotation

Ironically, in order for us to propel ourselves forward in the sagittal plane, our bodies use a lot of rotational motion in the transverse plane. We can see evidence of this in the wind-up action of the ribcage. In order to harvest rotational force from the ground, somewhere in our bodies something has to convert the upward traveling ground reaction force into rotational force and then drive that energy upward in spirals. That kind of energy conversion, of course, is initiated by the action of the subtalar joint. When the talus responsively rotates, the headphones (tibia and fibula) follow that rotation. The rotation of the tibia causes the femur to rotate in the same direction. The femur's rotation, combined with the energy from the leg swing, will cause the pelvis to rotate in the same direction. [4] The sacrum and lumbars follow suit, all rotating in… you guessed it, the same direction. The arms and rib cage (rib basket) rotate in the opposite direction. All this rotation is resolved in the spine so that our head can point our eyes forward. We don't want our heads swinging in the "no" motion while we walk. But thanks to the subtalar joint we move forward using rotational energy. Can you see the benefits we derive from encouraging healthy medial tilt of the inside foot?

Fascial Hammock

Take a few minutes to study Figure 5. Visualize the deformations that will occur in the following ligaments:

1. The deltoid ligament (between the tibia and navicular, tibia and talus, tibia and calcaneus)
2. The plantar calcaneonavicular ligament (the wide springy ligament that spans between the sustentaculuum tali and the navicular and which forms the floor of the talonavicular joint) [5]

Picture the twists and tensions these tissues feel as the tibia tilts anteriorly and transfers the weight of a walking body downward. Picture the stretch that would be sensed as the talar head pushes down and into this hammock-like fascia. Can you imagine how the longitudinal fibers would be loaded, not only from the pressure of an inwardly rotating talus but also by the inward tilt of the calcaneus?

The fibrous tissues associated with the inside foot receive oodles of "stretchy," "tensiony," "twisty," "loady" information as we walk. Can you see how these tissues could be begging for your therapeutic input? By studying fiber directions and imagining how they behave as the bones move, we can formulate manual or movement approaches that will lengthen, widen, unstick, wake up or settle down these sensing tissues.

SHOULD WE WORK TO RESTORE ARCHES?

When guiding someone into a better relationship with gravity, we sometimes need to help feet find more space under themselves. As structural integrators, we spend time looking with our clients at their feet in a standing position. It has been suggested, by Tom Myers and others, that standing assessments allow us a glimpse at how a person is choosing to "be." This sort of body-reading may pull back the curtain on body schemata or maps that live on the rind of the brain. A standing assessment opens up questions like: "What is this person's sense of self?" or "How are parts relating to their whole?" However, moving assessments can give us brighter views of deeper neural patterns, motor maps and networks that represent relationships with the outside-self-world. (For movement assessment ideas see Figures 6 & 7.)

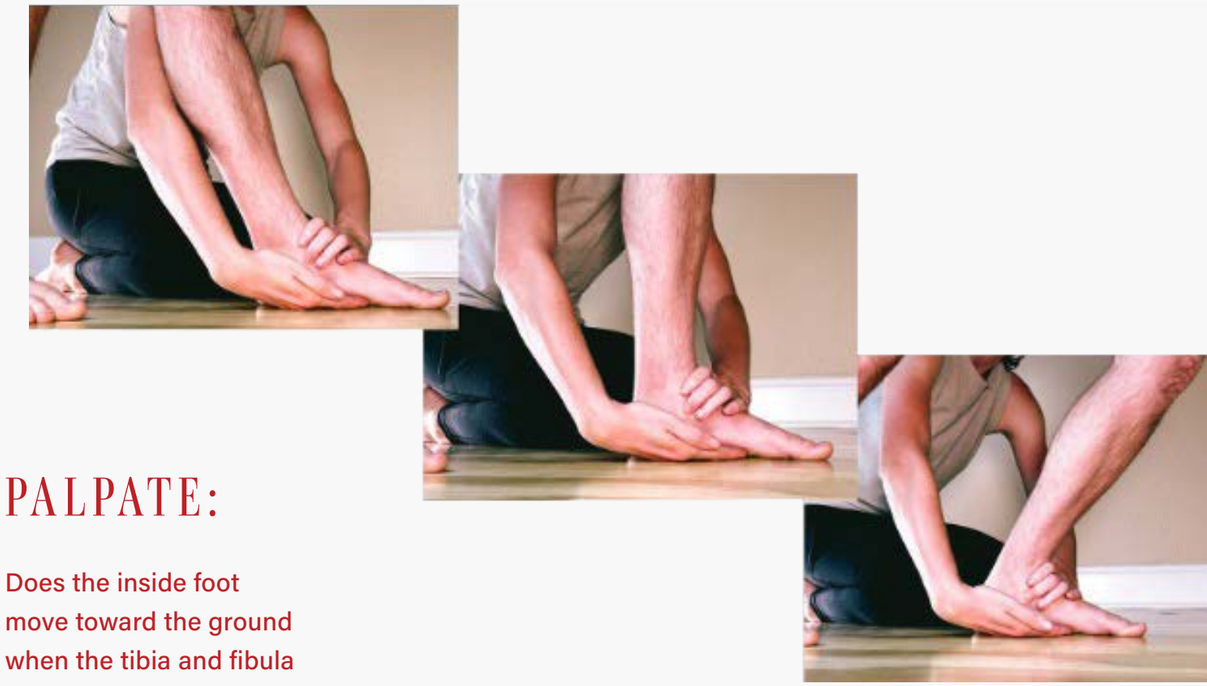
When assessing how the inside foot relates to the outside foot, it is more than worthwhile to ask our students and clients to move. If we assess feet in standing positions only, we may miss valuable information. One common mistake in foot work is to overemphasize good arches. In a standing assessment, the inside foot may look like the lofty arches podiatrists prize. But we need to know if feet are adaptable. Will that nicely elevated inside foot slide away from the outside foot when loaded? Will the talus rotate and tilt downward? Does it bulge into and spread ligaments of the ankle? Does it expand other tarsal joints, preparing the foot to mold onto stepping surfaces and to collect energy from the ground?

Monika Volkmar, creator of the Liberated Body Workshops based on the work of Gary Ward (Anatomy in Motion), states the principle point this way: "Pronation and supination are meant to be verbs, not nouns - pronating and supinating. The body should have dynamic access to both options...of the foot motion spectrum, not stuck in one or the other."

It's important to remember, there is such a thing as too much support (exempli gratia, learned helplessness). As structural integrators and movement teachers, we may need to stop helping arches and start encouraging the inside foot to find its full range in both pronation and supination. In a structural integration series, opportunities to restore full movement to the inside foot can be found during inseam or lower deep front line work. In movement teaching, cues to help people relax the inside foot toward the ground counterintuitively create self-supported arches. Ask yourself: am I inhibiting natural movement of the talus by too much arch-lift cueing?

When we sense that we are fully understood, we open up, we relax. Speaking psychobiologically, bodies that are open and relaxed are usually standing under themselves. As practitioners, letting go of rigid approaches and encouraging healthy inside foot expansion will help those in our care access this understanding. As you do your good work to restore foot pliability, enjoy the results! You'll see the bodies you work with open up and relax, standing under themselves with feet that are free to move, easily gathering energy from the ground.

Figure 6



PALPATE:

Does the inside foot move toward the ground when the tibia and fibula pivot in the talar joint?

Figure 7

PALPATE:

Does the inside foot move as the hips rotate left and right?

Rotating the hips towards the inside foot should lift it. Rotating the hips away from the outside foot should drop it.

TALUS TIDBITS

The soldiers of Ancient Rome would carve out playing dice from horses' cube(ish) shaped bones: the Cuboid, Calcaneus, and Talus. This is why the Talus is sometimes referred to as the 'astragalus' which means 'die' in Latin.

Sustentaculum Tali is named for what it does for the Talus. It sustains or supports it (until it doesn't). It's like a tray.

The Talus is the only known bone into which no muscle fibers attach.

The Talus, Calcaneus, Navicular, Cuboid and all the Cuneiforms make up the tarsus. These tarsal bones are said to articulate with all the metatarsals at the tarsometatarsal joint.

ISAAC CHILTON

KALI JOHNSON

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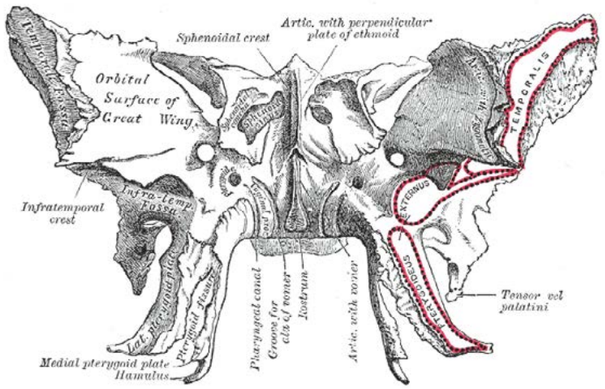
6. Kali Johnson LMT, BS Kinesiology Dance Science & Isaac Chilton LMT, CKTP, CPT (CES), MovNat, BCSI can be reached for comment or question at http://structuralelements.net/call-us

THE SPHENOID BONE

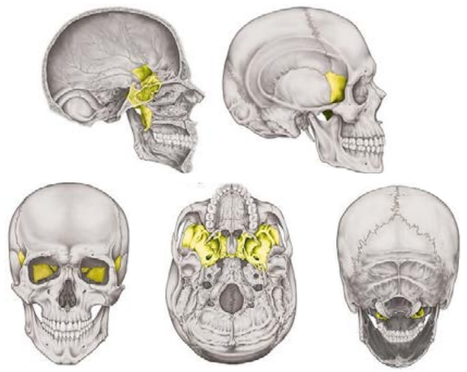
FIONA PALMER



I don't know about you, but it takes me more time to understand something that I am not touching. So I perhaps could have been guilty of underplaying its significance due to a lack of understanding.

I hope this article sparks your interest and leads you to explore a little further.

Directly or indirectly, the sphenoid articulates with each of the cranial bones. This beautiful bone looks like a butterfly to me. Perhaps bat or wasp-like might be better descriptions when the sphenoid relationships with those bones are out of balance, and we suffer "brain fog" amongst other things? Anyway, I think the sphenoid deserves a shout out.



The sphenoid bone has been given different names through the centuries. The Romans called it the "cuneiform", "os colatorii" by the Arabs and the "basilar bone" by the Barbarians due to its location at the skull base.

The Sphenoid (Greek for wedge-shaped) bone resembling a butterfly (see pictures) sits towards the base and middle of the skull. It is behind the frontal and in front of the occipital bones. To help visualise, it is part of the nasal cavity and helps make up the base and sides of the skull. It articulates with the unpaired bones: Ethmoid, Frontal, Occipital and Vomer and the paired bones: Palantine, Parietal, Temporal and Zygomatic. It makes up the posterior surface of the orbit and helps connect the neurocranium and the face. The relationship of the bones makes the skull more stable and gives it some rigidity. The Pterion is the place the frontal, parietal, sphenoid and temporal bones meet; you can see (suture image) it makes an H shape. The part of the sphenoid located here is the greater wing.

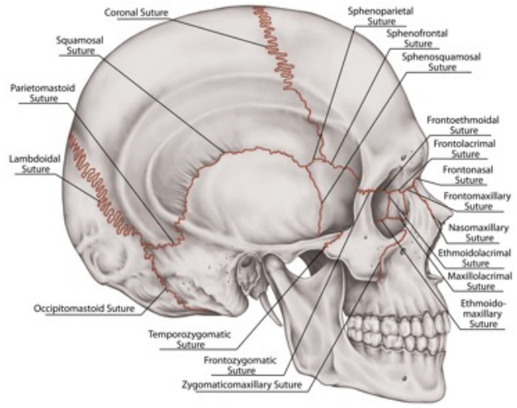
The cranial sutures give some elasticity to the skull. Cranial sutures are mainly named for the bones they articulate - Sphenofrontal, the sphenoid and frontal bones. Sphenosquamosal is the suture between the sphenoid and temporal bones and one that has a unique name. The sutures are a type of fibrous joint and allow a tiny amount of movement. (For more information, see Cranial Sutures and Sutural Movement. Avadhan Larson 2019. One of the papers looked at, measured pre and post-treatment changes in the cranial bone position of 91.6% of the sphenoid.)

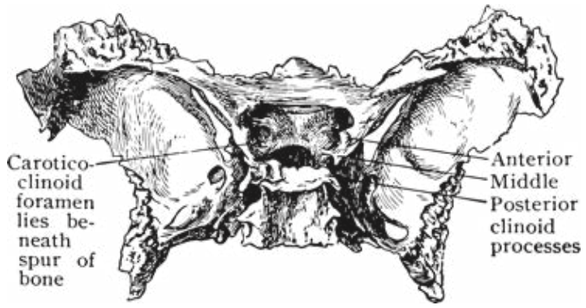
Looking a little more closely at the sphenoid, we can break it down into four main parts: The central body or sulcus, the greater and lesser wings and Pterygoid process.

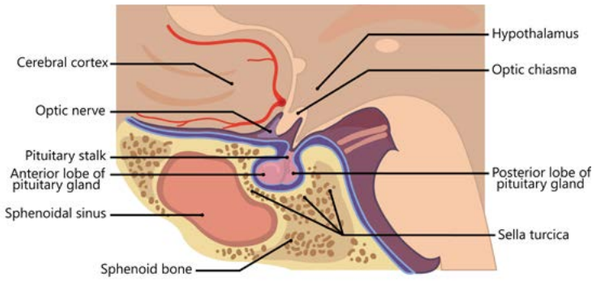
The Central Body

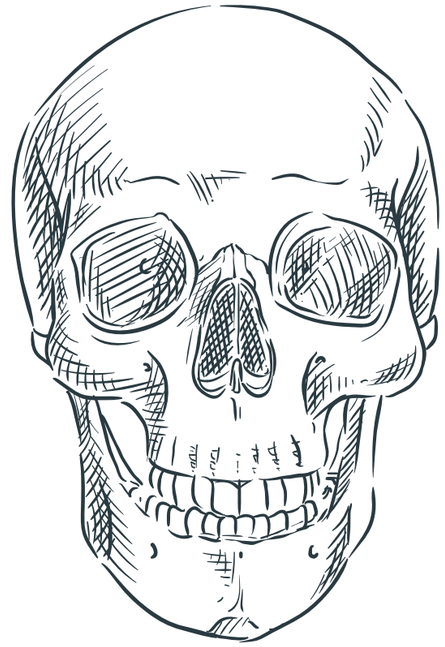
The sphenoid sinus, one of four that allows air to be warmed, humidified and cleaned, is here. The sella (Greek for seat or saddle) turcica is a saddle-shaped depression (this is how I remember things). The deepest part is called the hypophyseal fossa, housing the pituitary gland: Tuberculum sellae anterior and chiasmatic groove just anterior to that and posterior is the dorsum sellae making up a saddle shape. The diaphragma sellae are the leaves of the dura mater that cover the sella turcica and pituitary gland. Four clinoid (cline being Greek for bed) processes surround the sellae turcica like a four-poster bed; two protrude from the lesser wings, two from the dorsum sellae.

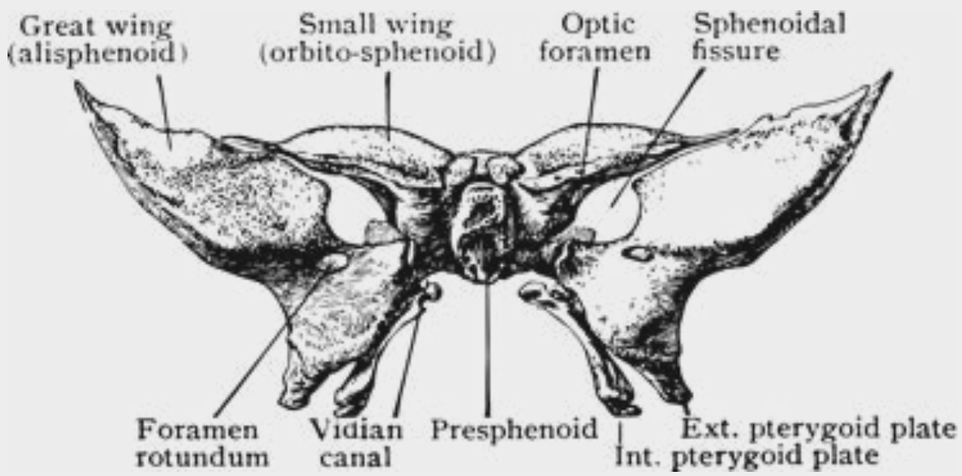
These latter projections are where the free edge of tentorium cerebelli come round and attach. The dorsum sellae, where it meets the basilar part of the occipital bone together, make up the clivus (Latin for slope) which helps support the pons of the brainstem. The articulation of the basilar part of the occiput and sphenoid is known as the sphenobasilar junction. This junction moves superiorly on inspiration and inferiorly on expiration. Any upset in this movement could lead to increased dural tension, and this may cause headaches, blurry vision, problems with balance or that fuzzy head feeling. It is also thought that the subtle movement of the sphenoid optimises pituitary gland function and the release of hormones, although this is not proven.









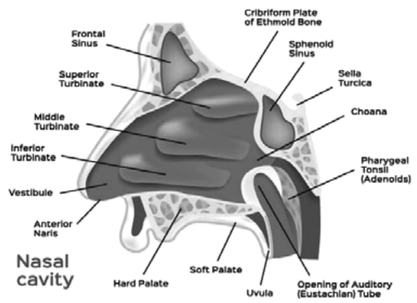


THE GREATER WINGS

The greater wings are larger ones on the side and provide an attachment site for the temporalis muscle. The lesser wings are smaller and sit anteriorly. Lastly, we have the pterygoid process; these project downwards and, as the names suggest, provide attachment for the named muscles.

These latter projections are where the free edge of tentorium cerebelli come round and attach. The dorsum sellae, where it meets the basilar part of the occipital bone together, make up the clivus (Latin for slope) which helps support the pons of the brainstem. The articulation of the basilar part of the occiput and sphenoid is known as the sphenobasilar junction. This junction moves superiorly on inspiration and inferiorly on expiration. Any upset in this movement could lead to increased dural tension, and this may cause headaches, blurry vision, problems with balance or that fuzzy head feeling. It is also thought that the subtle movement of the sphenoid optimises pituitary gland function and the release of hormones, although this is not proven.

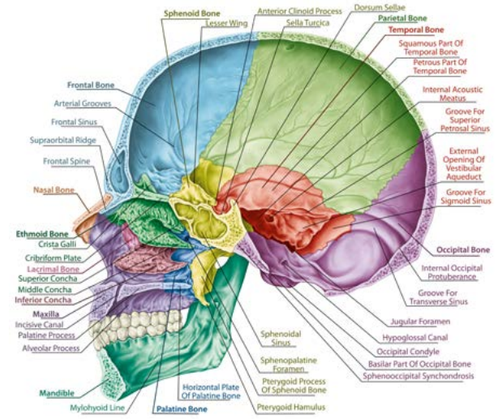
Note of interest, Tensor Veli Palatini muscle which stiffens the soft palate. The soft palate is important for speech, breathing and swallowing. Fibres of tensor veli palantini attach onto the inferior surface of the sphenoid, then go inferiorly and between the medial and lateral pterygoid muscles forming a tendon wrapping around the hamular of the pterygoid plate, using it as a pulley. It then attaches to the median palantine raphe.



SO WHAT IS THE FUNCTION OF THE SPHENOID BONE?

We could think of it as the keystone of the skull, wedged between the other bones. It allows for the transition of vessels and nerves through many foramina and canals to the head and neck. In addition, it provides an attachment site for many of the muscles of mastication.

Take a look at all the pictures to familiarise yourself with all the bones. Now shut your eyes and visualise a three-dimensional jigsaw puzzle of the skull, fitting all of the pieces together. What happens to the jigsaw if you grind your teeth, or the jaw is a little out of kilter? What is the knock-on effect to the reciprocal tension membranes like the tentorium? The sphenoid articulates with the occiput at the spheno-basilar junction, and there should be the availability for motion at this junction to help cerebrospinal fluid pump. If the relationship between the pieces is not quite right, the superior and inferior movement that should occur with each breath we take may not happen as it should.



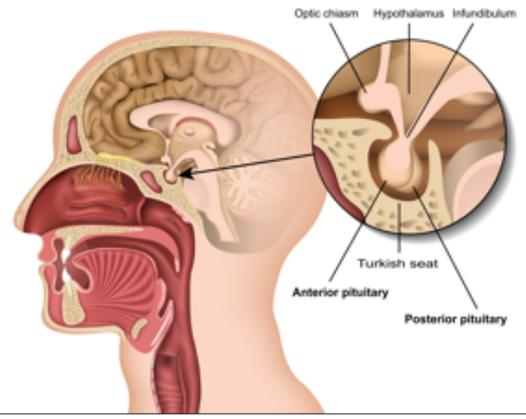
Palpation Exercise

One part of the sphenoid bone that we can feel is the greater wing. Next, find your zygomatic arch, the point where the temporal and zygomatic bones meet. Use two-finger pads and very gently slide upwards. You can be sure of position using soft cross friction and becoming aware of the sutures. Once you have found the sutures, the gentle palpation will draw your attention to any subtle differences. The space between your fingers is the greater wing of the sphenoid. (Note - I find the posterior suture between the temporal and sphenoid bones easiest to follow, although this may differ for each person). Follow the suture to the 3-way junction and H shape of the Pterion I mentioned earlier. The meeting point of the frontal, parietal, sphenoid and temporal bones. This area is known to be the weakest part of the skull. Use feather-light touch to get a sense of the sutures and greater wing. If your hands allow, leave a finger pad positioned lightly on a suture and sphenoid and use another finger of each hand to block your nose. Sniff and blow and feel the subtle changes.

To finish and to sense the relationship of the diaphragms (In Balancing the Diaphragms we list 5 diaphragms - Pelvic Floor, Respiratory, Thoracic Aperture, Floor or the Mouth, Tentorium Cerebelli and our honorary diaphragm The Arches of the Feet). Lie supine on the floor. Legs straight and a slight bend at the knees, draw your feet and toes towards your head and very lightly push heels into the ground and imagine bringing them towards your bottom. Lengthen your spine, soften your rib cage, use a little chin tuck and lengthen your neck. Bring your arms down beside you and reach them towards your heels. Take three breath cycles. On the last exhale, make sure it is a full exhale and then pause 3-8 counts. You can hold your breath or perform a hypopressive apnea if you are familiar and have no illness that could be upset by this. (Use any bolsters needed to maintain head position and a long soft spine and rib cage.)

And to close.....

Do you ever find yourself resting your head in your hands? Perhaps if you have a headache or feel a little lost or with brain fog and wanting to find some clarity before speaking? Is this our very own unconscious body intelligence?
One of the functions of the sinuses is to lighten the skull; another is to improve our voices. How often do you mindlessly rest an elbow on the table and plop your heavy head on your hand?



Here is a question...

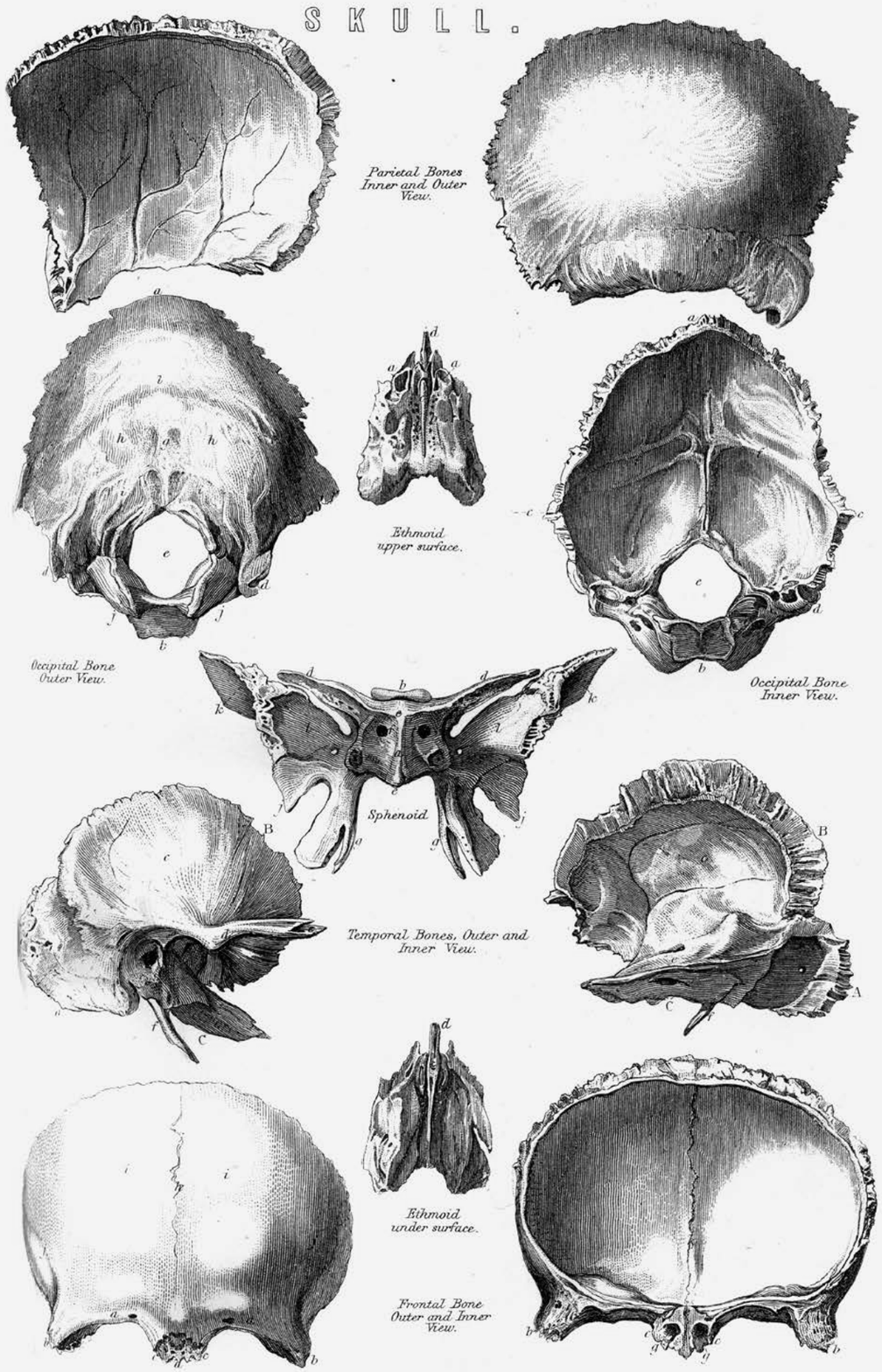
“IS THIS AGAIN BODY INTELLIGENCE MOBILISING THINGS, OR IS THIS CREATING AN IMBALANCE”?

How about this as focused, mindful relaxation. Once a week, rest both elbows on the table and rest your head in your hands. Rest your jaw on your thumbs and have the finger pads find the sphenoid’s greater wing and sutures. Feather-light touch and inner focus on the 3-dimensional jigsaw of your skull are required. Breathe deeply and use a pause before the next breath cycle. Use your fingers to mobilise the tissue or micro-movements of the head to fine-tune.

It might take a couple of minutes or several breath cycles to balance the jigsaw. When you feel you have finished, you can then sit upright. Lengthen the neck, soften the jaw and eyes, bring the tongue to rest behind the teeth. Allow yourself a full minute or 6-10 breath cycles to visualise the relationship of the bones, how the sinuses function, how your head feels.

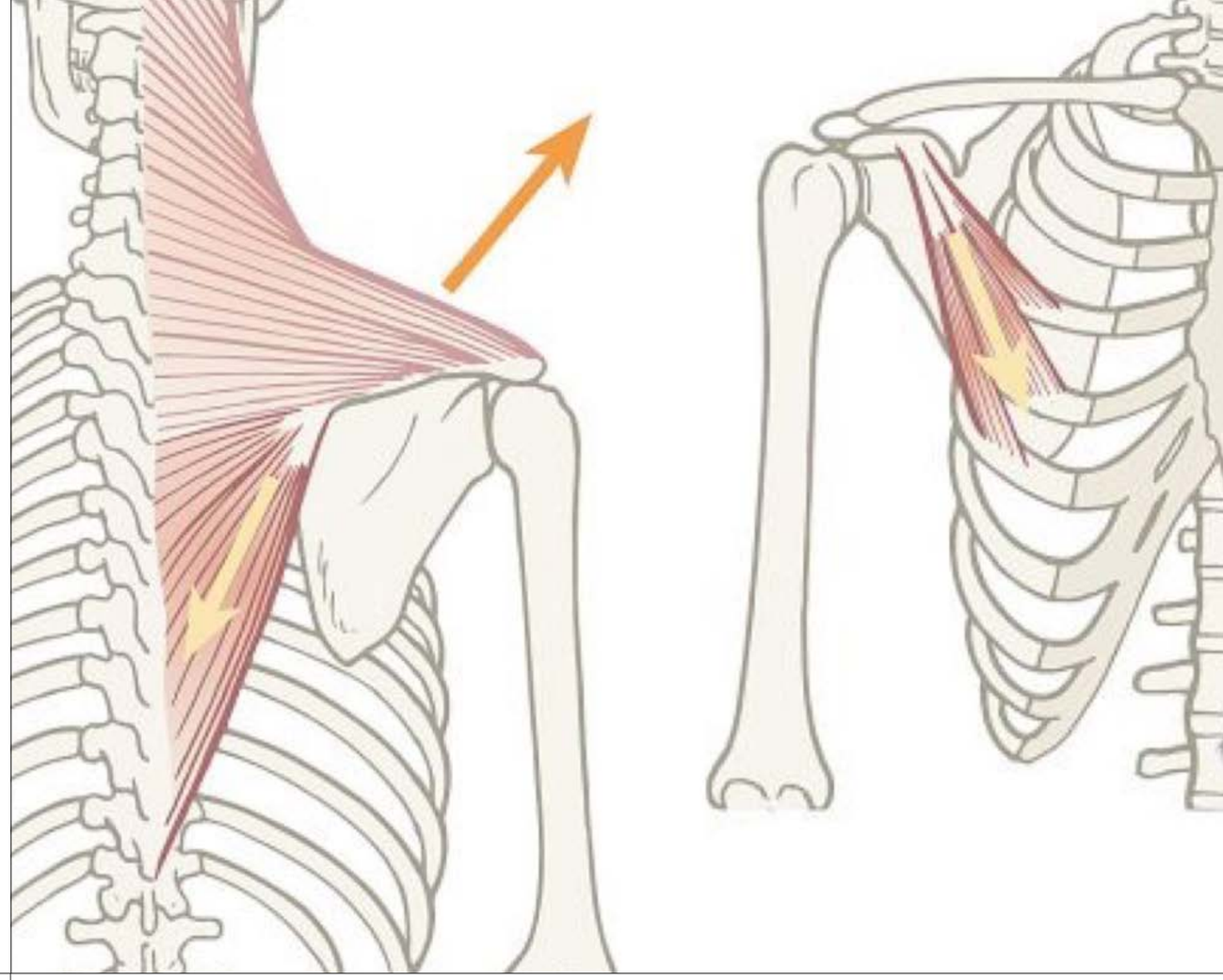
Trauma to the head, a whiplash injury, traumatic childbirth could all affect the sphenoid. Stiffness in the neck, the position of the head, the jaw and further away the pelvis may also impact the sphenoid bone.

You can find more information by liking our Balancing the Diaphragms page on Facebook. I am an Anatomy Trains Structural Integration practitioner and teacher for the faculty. I have been teaching pilates for the last 20 years. I blend movement, hypopressives and self mobilising techniques during sessions and call it “Therapy in Motion”.



THE SCAPULAR ‘X’ IS MORE LIKE AN ‘ASTERISK’

JASON SPITALNIK



Have you noticed flat thoracic spines (T3-7) where the middle part of trapezius runs most horizontal? Here we surmise that over time the upper serratus anterior becomes quite strong and locked short, leaving the middle trapezius in eccentric loading.

Myers (Anatomy Trains - 2021) discusses an ‘X’ made up of muscles which dictates the position of the scapula relative to the length of the four muscles that form the X.

The rhomboids and serratus anterior make up one leg of the X. These ‘two’ muscles balance the position of the scapula in a medial / superior shift (rhomboids) or a lateral / inferior shift (serratus anterior). The other leg of the X is shared by the pectoralis minor and the lower trapezius. These two muscles balance the position of the scapula in a superior / lateral shift (pectoralis minor) and an inferior / medial shift (lower trapezius). These four muscles can combine forces in any number of patterns that can shift, and / or rotate the scapula out of a neutral position.

Of course, many other muscles such as levator scapulae and even latissimus dorsi compete for attachment space and resultant pull on the scapula. Here we focus on a horizontal reciprocity across the medial border of the scapula.

It seems there might be one more leg to the X, making it look closer to an asterisk. There seems to be a horizontal leg, which can shift the scapula medial or lateral.
The medial portion of this horizontal leg is the middle trapezius. The grain in the fabric of the middle trapezius runs roughly horizontally from the spine of the scapula to the spinous processes of T1-T4, by most accounts the most horizontal fibers of this muscle.

The complementary part of this leg of course will also need to attach to the scapula and the fibers must also run in the same direction to set up a tensional sling. Fortunately, there is a good candidate: the upper most fibers of the serratus anterior run in a horizontal direction. One could argue that the serratus anterior is made up of two different triangular muscles. The lower triangle starts at a narrow point on the lower third, of the vertebral border of the scapula and widens to grab ribs 3 - 9. This oblique angled, lower triangle of the serratus anterior is the portion that Myers uses in the rhombo-serratus leg of the X and upper Spiral Line.

The upper triangle, attaching to ribs 1, 2 and maybe 3, is the narrow point of the triangle, widening as it reaches ‘horizontally’ to attach to the upper two thirds of the vertebral border of the scapula. Therefore the third possible leg to the Myers’ X could be the upper serratus / mid trapezius leg.

This pattern was recognized after noticing thoracic spines, flattening out right about where the middle trapezius approaches the spine. This is where the exploration and the idea for the new leg of the X began.

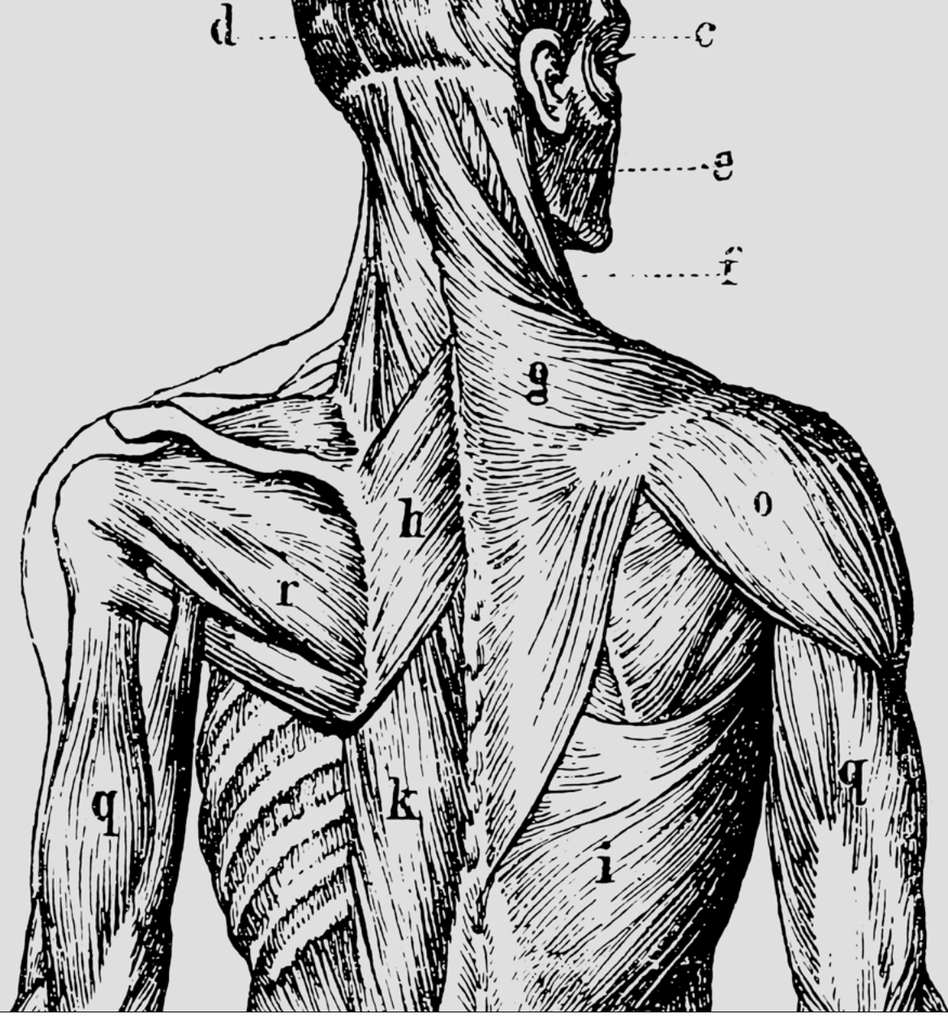
In this image you can see the medial rotation of both scapula yet there is no excessive lordotic curve, in fact you can say the opposite. The thoracic spine has flattened. And if you look closely, those middle trapezius are working very hard to prevent the scapula from shifting laterally around the rib cage via the pull of the upper serratus anterior. There must be a tug of war going on between the middle trapezius and the upper serratus anterior.

If the upper triangle / fibers of the serratus anterior are stuck short, then the middle trapezius ‘should’ be stuck long. But I would not agree, in patterns such as this example as well as others. I think the middle trapezius are almost stuck short, at best neutral, yet holding on for dear life. The victim of this battle falls upon the upper thoracic spine, becoming flat.

Let's consider that the scapula has similar properties to some of our sesamoid bones. These bones are embedded within tendons or muscles. The patella and the pair under the distal end of the first metatarsal bone of the foot and although not shaped like a sesame seed, the hyoid.

The scapula certainly does have a classic joint connection, the 'socket' for the ball of the humerus to sit in for the very movable arm. The scapula also has a strong, relatively less mobile pivotal connection to the clavicle via the AC joint. If we exclude those two joints, how does the rest of the scapula relate to the torso and spine? You can see how the scapula floats posterior to the rib basket suspended in a muscular hammock, or Myers' Scapular X.

THE SCAPULAE ARE A SET OF BONES UNIQUE UNTO THEMSELVES, AN EXCEPTION TO THE RULE.



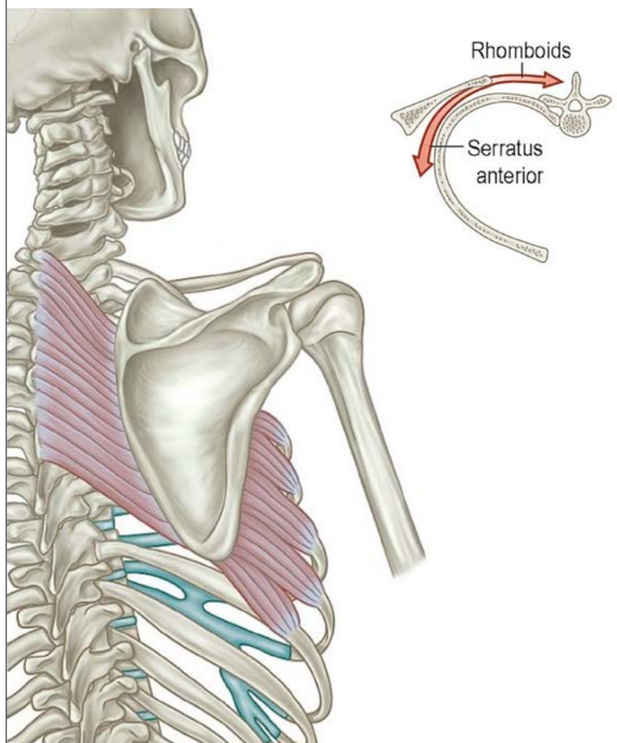
And we can see they are centers of a tug of war between the surrounding muscles. There are many different lines of pull from all these different muscles surrounding the scapula. They can pull the scapula in any number of directions but for this article we will continue to use the 2 muscles that make up the new leg of the Scapular X.

Myers uses an analogy in Anatomy Trains referring to the bow and the bow string. If there is a bow, what is the string? The bow appears to be the upper thoracic spine and the string would be the left and the right middle trapezius. It was recently discovered, the middle trapezius (like most other muscle 'attachments') do not completely attach to the spinous processes of thoracic vertebrae, a portion of the fibers skip right over and continue on to the middle trapezius of the opposite side of the spine, with a strong connection. How do we get the upper thoracic spine to come out? As explained above, the flattened spine seems to be a symptom of the collective tensioning of the middle trapezius, both sides. The bilateral tensioned middle trapezius are a symptom of the upper serratus anterior locked short.

If we release the upper serratus anterior and bring it to its proper length, unwind the holding pattern, the middle trapezius can let go of its tension and then we can work around the thoracic spine to potentially restore the natural convex curve. At least this could be one piece of the puzzle.

Now let's connect the thoracic spine via the middle trapezius into the arm lines; more specifically the Deep Back Arm Line (DBAL).

The scapula is 'embedded' in the DBAL, sandwiched between three of the rotator cuff muscles. Following through with the 'scapular sandwich,' how many ways can the new leg of this X affect the rotator cuff? Where there is hypomobility in one area, nearby there will be hyper mobility. While the thoracic spine does some flexion and extension, it mostly does rotation.



The combined action is required for any number of actions between rotation in the thoracic spine and lateral shift of the scapula, for example, reaching out for a simple pat on the back, or a golf swing, tennis swing or baseball pitch. Of course the scapula is doing more than just a lateral shift but we want to keep the actions simple here, to explain the suggested addition to the Scapular X. If the thoracic spine, as noted above is flat and under tension from the bilateral middle trapezii, it is very possible the thoracic spine is going to have decreased rotation and the scapula will not laterally shift as far as it needs. Where will the body compensate for its lost rotation? Possibly the joint capsule. Where do we find most injuries among our clients? The injuries occur around the shoulder girdle. Or perhaps pain in the neck due to hypermobility or mid back pain.

If we take it down into the arms via the DBAL, perhaps your client has lateral epicondylitis. Where might the problem originate? **Answer:** The upper serratus anterior. As Ida Rolf said, 'where you think it is, it ain't.'

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This has by far been the most illuminating CE experience in my 10 years of being in massage therapy practice. I am humbled by the opportunity to encounter the body in such an intimate way and marvel the skills and knowledge of both Todd and Tom. Thank you for an unforgettable experience!

Vlada Yaneva, LMT

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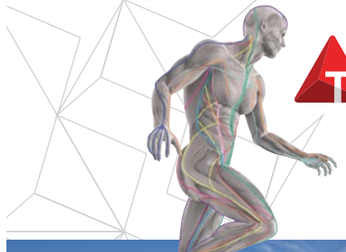

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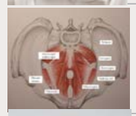
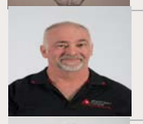
Slings BodyReading & Movement Strategies - Online
12th, 13th, 14th & 15th August 2021
Prerequisite: ATiM, SE, SiMB/SiM1
Teacher: Muriel Morwitzer

Anatomy Trains in Structure & Function - Hybrid Online
21st & 22nd August 2021
For Manual Therapists and interested Movement Therapists
Teachers: Julie Hammond & Julie Mower

Anatomy Trains in Motion - Online
26th, 27th, 28th & 29th August 2021
For Movement Therapists and interested Manual Therapists
Teacher: Muriel Morwitzer



Shining a Spotlight on 'The Pelvic Diaphragm' Webinar
Sunday 5th September 2021: 3.00pm - 5.00pm AWST
Presented by Fiona Palmer & Julie Hammond



Structural Essentials: Arches & Legs - Online
1st & 2nd October 2021
Teachers: Julie Hammond & Chris Clayton

Structural Essentials: Fans of the Hip - Online
29th & 30th October 2021
Teachers: Julie Hammond & Maree Clayton

Slings Essentials - Online
7th, 8th & 9th November 2021
Prerequisite: ATiM
Teacher: Muriel Morwitzer

Slings in Motion 1 - Online
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