ANATOMY TRAINS® AUSTRALIA & NEW ZEALAND

EMAGAZINE

ISSUE 2 FREE

SPATIAL MEDICINE

KMI STRUCTURAL INTEGRATION

AT IN DISSECTION LAB

RESEARCH REVIEW

Welcome
welkəm/

Welcome to the second edition of our E-magazine. It's no secret I love anatomy and this edition is for my fellow anatomy nerds.

I have just returned from Maine after attending a workshop with my hero, Jaap van der Wal; it was an immersion of anatomy, science and spirituality. Jaap is an anatomist, embryologist, phenomenologist and philosopher and I am very excited to announce he will be heading to Australia in 2017 - we will keep you posted as we know more!

I am proud to be part of a great group of talented teachers in the global Anatomy Trains family and I would like to start introducing you to the team. In this edition we have articles from Tom and three of his American teachers, Lou Benson, Holly Clemens & Lauri Nemetz.

Anatomy Trains in Training is a brand new workshop developed by Ari Pekka Lindberg (AP). AP will be heading to Perth and Sydney in November with this new and exciting workshop. AP is the only qualified Anatomy Trains in Training teacher in the world and we are very pleased for him to be heading to Australia. AP has developed a workshop that bridges the gap between Anatomy Trains and movement, rehab and functional training. If you are a personal trainer, physiotherapist or exercise physiologist this workshop is for you.

We are currently teaching our Fascial Release for Structural Balance workshops in Perth and Sydney, every month until December. The workshops are proving to be a real success and we are now planning to take the series of workshops around Australia and New Zealand next year. If you are interested in hosting one of these workshops in your area, let us know - we have many options to help you organise your workshop.

Anatomy Trains has been to Sydney, Melbourne, Townsville, Wagga Wagga, Auckland and most recently, Canberra. Come on Adelaide, Darwin and Tasmania we would love to bring Anatomy Trains to you!

Finally, we have an exciting name change - we are now officially Anatomy Trains Australia & New Zealand.

Sit back, relax and we hope you enjoy our E-mag.
Jules

"The more I read, the more I acquire, the more certain I am that I know nothing."
Voltaire

Julie Hammond

Contents
kəntents/

SPATIAL MEDICINE

TOM MYERS

PART 1:
There are four elements in our common physical experience: Space, Matter, Time and Energy. (We'e talking the common meaning here: Matter is moved with Energy to unfold in Space over Time.) Each of these elements could be said to have spawned a form of medicine of its own - thus, Material Medicine, Energy Medicine, Temporal Medicine, and Spatial Medicine (Myers, 1998). Let us take each of these in turn.

The Four Faces of Medicine
In our time, Material Medicine - the introduction of actual substances into the body to effect a change in its chemistry - commands the medical fortress.

Material Medicine began long ago with the very first paleő usage of food and herbs as medicine and got initially codified with the four humours of Hippocrates. It has expanded exponentially in the last industrial century to dominate human medicine, developing ever more complex, specialized drugs ranging from the miraculous to the silly to the downright dangerous (Sutcliffe 1992, Porter 2011).

The science of Material Medicine is predominantly biochemistry, and its mechanism of distribution is the circulatory system. Substances can be introduced orally or nasally, applied topically via the airstream into the lungs, absorbed rectally, or injected directly into the interstitia or bloodstream, but the flow of liquid through our system is what carries any drug or active substance to its target cells and tissues. Seen in this way, the category of Material Medicine includes the drug companies, the vitamin and supplement industry, the use of Chinese traditional or western herbs, vaccination, the basis of surgery in chemical anaesthesia, and the "food as medicine" movement - any attempt to change our functioning through directly altering chemistry.

Energy Medicine may include acupuncture, some aspects of Polarity therapy, Reiki, the laying on of hands, aura work in the energy body, and psychic or distant healing. Homoeopathy, even though pills are ingested, lies in this energy arena, not in the arena of Matter - a 200x remedy has gone past Avogadro's number and likely has no molecules of the original material remaining (Boericke 2008).

Hypnotism and its derivatives may lie in this arena, or may more properly be placed in the next category of Temporal Medicine. Acupuncturists would likely fall in this category, given their emphasis on chi energy, even if some of the mechanisms are turning out to be via the connective tissues (Langevin 2004, 2006).

Energy is of course an element in any interaction, but the problem with Energy Medicine becomes that the term 'energy' is too commonly employed when the mechanism of healing is simply not yet clear. While speculation in this realm is delightful, the basis of these forms of healing in quantum phenomena or electromagnetic fluctuations, or some other yet to be discovered field, is not defined (Oschman 2000, Sheldrake 1985). Energy healing is real, but there's a lot of fluff in the way it gets talked about or explained.

That there is a medicine of Time may not be immediately obvious, but we can understand the origins of Psychiatry and Psychotherapy in this way.

The ability of the brain to focus obsessionally on past or future events is a basis of psychotherapy. Anxiety about coping with an uncertain future or the inability to integrate the traumatic experiences of the past are both staples of psychiatric work. Thus this kind of healing can be seen to be a form of Buddhism - bringing their patients into the present un-tense - thus a medicine of Time (Hanson 2009)

The use of dreams to determine treatment was prominent in the ancient Greek healing employed in the temples of Asklepios (Aesculapius) - the seeds of healing were seen to be alive in the patient's unconscious, awaiting revelation in real time (Woods 2000).

This links psychiatry to the original medicine of Time, shamanism.

SPATIAL MEDICINE

TOM MYERS

Civilization and its discontents create a need for clinical psychiatry (Freud 1930). The alienating effect of larger societies and cities has increased our tendency to become unmoored in time. In the small tribal groups and villages (20-40 people at most) that predominated human experience from the mists of prehistory through to at most a few thousand years ago, it was difficult to get lost. The shaman was there to re-orient the individual or the group if an event dislodged an individual or a group from the present.

In 1982, this author was sitting with the brilliant if troubled psychiatrist R. D. Laing (Laing, 1967). Praeternaturally shy when sober, he was reluctant to look me in the eye, so we were sitting side-by-side both looking at our hands resting on the table. The subject was the similarity between his work and mine. You, know, Tom, he intoned in his Glaswegian accent, we're getting very well paid for what neighbours used to do.

Lamentably, many people no longer know their neighbours well enough to act as the therapists that would keep them oriented in time and place. Certainly Freud found abundant neurosis in the Viennese society of a century ago, and the distressing evidence of social and temporal displacement is now headlined daily. The early alienists allowed Freud's and Jung's great work to unfold, and despite the initial controversies, psychotherapy survived phrenology, the Oedipus complex and its own internal squabbles to become the potent force it is today.

If the 'means whereby' for material medicine is the circulation, the means for the medicine of time is the body's alarm clock, the nervous system. The inroads are via the senses, and the assessment is via motor output, and the structure of the brain and neurology are the substrate of psychiatric work.

We can note that modern therapy, psychiatry especially, has been drawn into the world of Material Medicine. We are introducing ever more drugs to work on the neuro-chemistry -a dim echo of the psychoactive plants used in shamanism and Freud's dalliance with cocaine as a treatment for neurosis - into the practice of mental health. This includes the wide use of SRI and SSRI drugs, as well as the many drugs used to control children's behaviour (Jones 1953)The medicine of Time is being seriously invaded by the medicine of Matter. In an increasingly medicated society, the value of psychoanalysis, the 'talking cure' cognitive, and even behavioural therapy is being increasingly discounted in favour of drugs (Bentall 2010).

Which brings us to the fourth facet of the medical tetrahedron, Spatial Medicine - healing through re-arranging the body in space. Spatial Medicine practitioners would thus include the wide spectrum of readers of this emag:

Osteopaths, including all cranial and visceral approaches•Chiropractors•Physiatrists•Physioth erapists•Soft-tissue therapists such as Structural Integration. MFR, MET, MAT, AIS, trigger-point therapies, etc •Massage therapists

•Body-centered psychotherapists: Somatic Experiencing, Hakomi, Core Energetics, etc.•Yoga teachers•Pilates and Gyrotonics teachers•Personal trainers•Strength and conditioning specialists•Dance teachers and therapists•Martial artists and teachers•Physical educators in schools•Athletic trainers and coaches•Somatic educators: Alexander Technique, Feldenkrais Method, Franklin Method, Continuum, Aston Patterning, and a host of other body-education methods.

Orthopedic and some plastic surgery would also fall into this category-corrective surgery certainly changes the relationship of the body parts in space with an eye toward improved function.

Certain forms of bodywork, such as Polarity and Shiatsu, though apparently akin to Spatial Medicine, might more properly fall in the energetic realm like acupuncturists, given their emphasis on energy fields and flows.

SPOILER: ANATOMY TRAINS AUSTRALIA ARE EXCITED TO ANNOUNCE THAT TOM WILL BE COMING BACK TO AUSTRALIA AND NEW ZEALAND EARLY NEXT YEAR. MORE DETAILS COMING SOON.

SPATIAL MEDICINE

TOM MYERS

These disparate professions constitute a common domain that requires a common language and study. The domain of Spatial Medicine, considered widely, includes:
•Cellular structure and mechanotransduction•The fascial network and adhesome - biomechanical self-regulation•The embryology of form; cell and tissue specialization and structure•Developmental movement; how we progressively move into space•The phylogeny of our upright stance and plantigrade posture•Cultural differences in movement patterning / folk dance•Our interactions with the environment: tools, instruments, shoes, chairs•Artistic and athletic performance enhancement•Biomechanics of the musculo-skeletal system (neuromyofascial web)•Injury repair and rehabilitation•Gait and functional patterning•Aging and movement•Emotional expression as it relates to posture and movement•Induction and education of biomechanically sound movement.

While not arbitrary, our four divisions are blurred at the edges and many conditions present themselves in all four aspects. To take depression as an example, Material Medicine would search for, and probably find, a biochemical aspect that would respond to a pharmaceutical such as Prozac.

Temporal Medicine would seek out the past event or belief that led to a damaged self-image to replace it with a better understanding. Energy Medicine might scan for the energy blockage that kept the pattern in place and kept the organism from healing itself. Spatial Medicine would look at the human form and see that the depressive is stuck on the exhalation part of the breath cycle and endeavour, through stretching or manipulation or breathing exercises, to correct the problem by correcting the shape of the movement

Each will argue for the efficacy or primacy of its intervention and this author has seen each of these work, solo or in combination. Each condition in each individual invites us to consider all approaches for the most effective in lifting the suffering and affording the quickest, least expensive, and most enduring result. Unfortunately, few ‘general practitioners’ exist who can see the whole picture enough to do proper triage with each patient and their presenting symptoms. If your hand is a hammer, everything looks like a nail.

KMI STRUCTURAL INTEGRATION

LOU BENSON

My name is Lou Benson and I am an SI practitioner (hybrid product of KMI and Aston Patterning), teacher and the Education Director for KMI. This article is a little bit about me but mostly about the living, breathing, ongoing evolution of the KMI training over the last 20 years.

My journey into bodywork started in the summer of 1989 when I was 33, working in Boston as a paralegal for a groovy gay law firm. I had badly injured my back at age 14 in two falls from horses, and it started to really hurt from spending so much time in the library and at a desk. The computer was just a smart typewriter then, with a black screen and green or amber lit text. There was no internet, so all research required poring over books in a library or document storage room. The older legal records had to be deciphered by following a trail of catalogued index cards, frequently back to worn leather bound volumes of fragile, yellowed, hand written pages. That detective work was both tedious and thrilling and taught me a few useful things about the wisdom and rewards of diligence and patience.

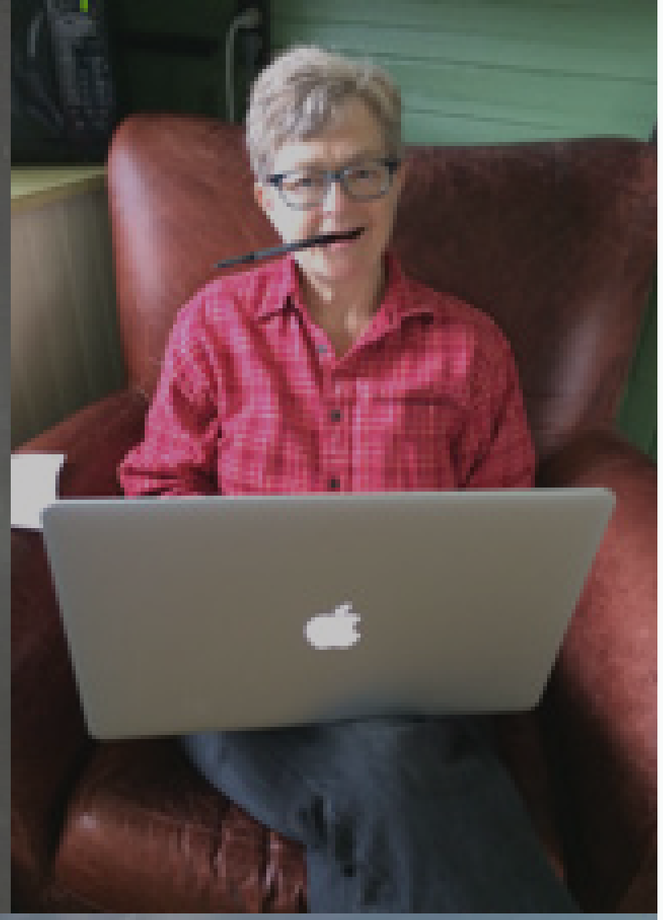
One of the attorneys I worked for recommended that I try massage for my back. His best friend co-owned a massage school in Cambridge, MA, so I made an appointment to see him. I saw him about once a week for a few months. The work felt great and got my back pain under control. I also became very interested in ergonomics at my work place and in working out with “good form” at the gym. I was an amateur bodybuilder then and spent a couple hours at the gym most days. I enrolled for evening classes at massage school a few months later.

Massage school was great and I loved it. I graduated in January 1991, and am very grateful that I had to go through school part time, since I had to work during the week. It slowed me down enough to take the work in much more deeply. Anatomy was the one section of my massage training that wasn’t good. My teacher was just out of chiropractic school, had never taught before, and basically had no idea what he was doing. He was, however, on to this thing called “super learning,” that involved him recording himself (on cassette tape) stating the origins, insertions and actions of muscles we were expected to learn each week, with Baroque music playing in the background at a specific, slow tempo. This in itself wasn’t bad and there is good research to support this method for memorization. But this was the class. Each week, the students brought in a blank cassette tape and he popped each one in his boom box and copied his tape to each of ours, while we took a quiz and then talked amongst ourselves. This took about 90 minutes. Class was supposed to run for 3 hours, but once the cassettes were finished, he gave us some dull xeroxed copies of pictures from Grey’s Anatomy and told us to bugger off, which by then, we were glad to do. Our textbooks were *The Anatomy Coloring Boo*k and three simple, line drawn books, two volumes by Warfel, the other by Stone & Stone. That was it.

In spite of this, and the fact that I had no other science background to speak of, I was fascinated by the material and actually, felt a deep agitation to really understand how it was that these trillions of cells found each other and stayed together, come hell and high water, until death did us part. I had a classmate who was equally fascinated. Our discussions and friendly competition for top grade on our weekly quizzes and exams propelled us forward when our teacher could not.

As my practice grew, I really had to know more about what was going on with the body. Now people were trusting me with their stories, with their pain. And they were paying me. Could I help??? If I was really to help, I had to know more. Back to the library and to finding real teachers.

I started assisting Swedish massage technique classes at my school right after graduation and after a couple years, I was asked to teach that class on my own. When the anatomy teacher quit, I asked to teach that class and, because I was willing (and still warm and breathing), I was given a chance. I’m pretty sure this was in the fall of 1993.



KMI STRUCTURAL INTEGRATION

LOU BENSON

Like a lot of massage therapists, I was a continuing education addict. I studied Neuromuscular, Myofascial and Orthopedic Massage with some great teachers. I dabbled in enough cranial and visceral work to know it was great work, but not my work. I took a 16-day course called “Zen Bodytherapy” with a Rolfer (trained by Ida and also Moshe Feldenkrais) named Dub Leigh. This was a wild ride through Ida’s 10 session recipe. I read her book for the first time. I was hooked.

I met Tom Myers the following summer (1994) and latched on to him as my first real anatomy and SI teacher. The owner of my school asked Tom if he would teach us SI work if she cherry picked a dozen students for him. He agreed, and the first “Structural Strategies” course was born. I helped Tom with basic classroom set up stuff for a couple years after that, happy to hear him lecture, watch him bodyread and demonstrate hands-on work over and over.

Gradually, he encouraged me to take on more responsibility in the classroom, helping students with anatomy, bodyreading, sorting out their body mechanics and practicing technique. People used to ask me, “why are you following this Myers guy around so much?” This was well before *Anatomy Trains* was published. My reply was always, “I’m learning to look.”

In 1998, I took a course with Judith Aston. Tom had always spoken very highly of Judith and I knew I had found another important teacher. For the next three years, I continued to study with and assist Tom, and also studied and certified in Aston Patterning. In 2002, life brought me to a place where I needed a break, so I stopped traveling and hunkered down to my practice and teaching courses at another local massage school. In 2009, Tom and I reconnected and I’ve been back teaching KMI and helping to evolve our curriculum since.

“I remember one of the first lessons I learned from him: when confronted with difficulty, take an action, no matter how small. Anything is possible, if you act (and reflect) with love and devotion.” Patricia Walden remembering BKS Iyengar. This is in perfect alignment with my favorite quote of Ida’s: “Something can be done about anything.”

KMI: We are the people who cannot stop asking “why” and “why not?”.

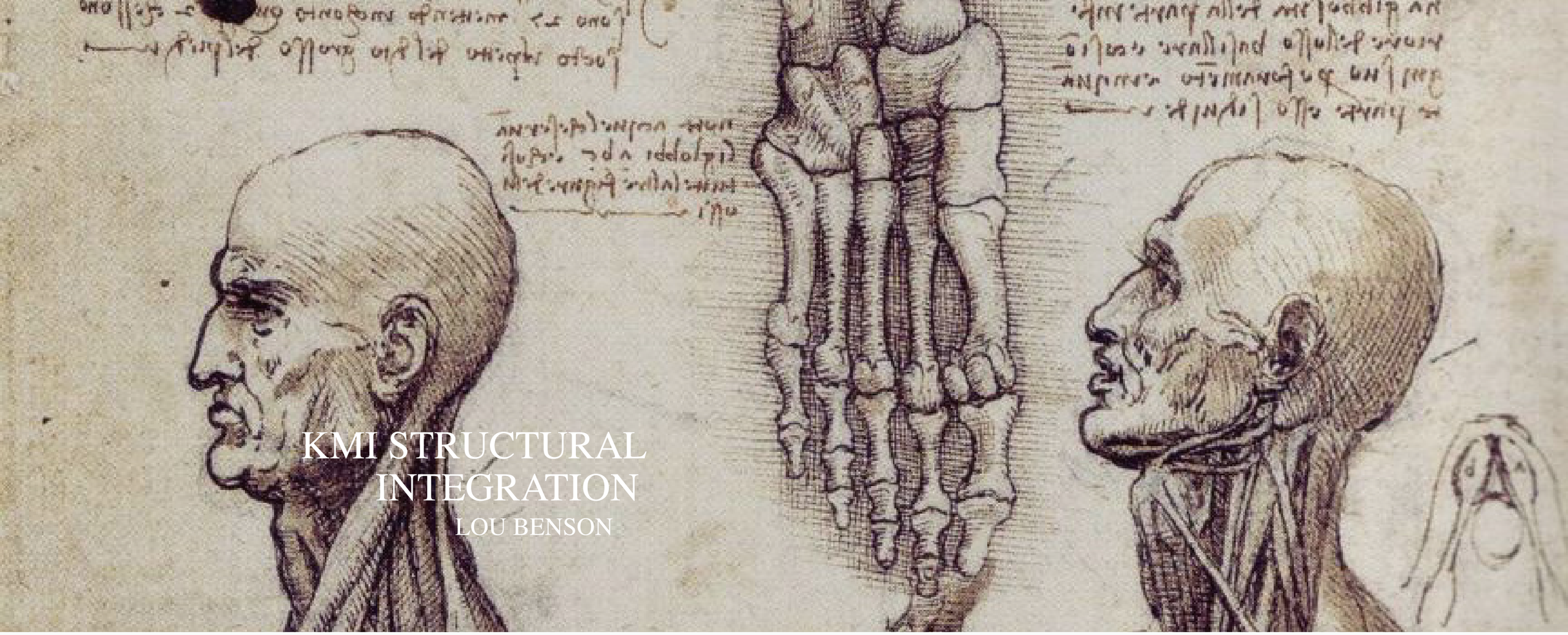
In my view, the essential questions in developing the KMI curriculum are pretty straightforward: What information is needed to start a safe and successful SI practice? What makes the best use of our students’ time with us in class? The ‘essential elements’ (thanks to James Earls for that phrase) for the KMI course are quite well defined and supported.

Here’s a recap of the current components of our curriculum:

- Anatomy: Laid out regionally and along the Anatomy Trains Lines, with an eye toward structural and functional connections, continuity, interdependence, and tensegrity. Emphasis on understanding Gravity as the prime mover (read on!). Emphasis on “palpatory literacy.”

- Kinesiology: Instruction and practice time for building an understanding of (1) the basics of posture as a response to gravity and (2) how to use KMI neutral language (bend, shift, tilt, rotate) to describe segmental relationships in static posture and through a variety of “everyday” movements (walking, bending, reaching, sitting, etc.).

- Bodyreading: Postural (body in stillness) and Gestural (body in movement) assessments. This is the backbone (pun intended!) of the KMI training.



KMI STRUCTURAL INTEGRATION

LOU BENSON

Bodyreading KMI style pushes the student to see and describe segmental relationships in stillness and in motion in order to evoke the client's story and create sensible and effective session plans. Using simple, neutral descriptors also helps reduce the negative reaction most people have when a light is shone on the dark corners of their alignment issues and injury history.

- Fascial touch:
Exercises for palpatory sensitivity and anatomic specificity. Includes emphasis on practitioner body mechanics.

- Fascial technique for structural change:
Demonstration and practice of a rich variety of fascial techniques. Hands-on applications are taught in the context of improving postural alignment. Although this style of work is directive (e.g., X and Y are compressed and adhesed and now I'm going to separate and lift them), that direction must be built on a platform of exploration. In other words, every touch is a question.

With our hands, we read the tissues and their response, to feel what is true and how that changes or doesn't/can't change, and we adapt accordingly

- Techniques are presented as adaptable "templates," "springboards," or "ideas" for manual interface.
- All students are required and encouraged to work on Instructors during the Course.

- Everyday Movement Awareness Explorations:
Large and small group demonstrations, brainstorm and practice time. We all live inside our "familiars," the patterns we have made in order to function as best we can every day. Any change from a postural preference or movement sequence that has been repeated often enough to create neural code for it (becoming coordinated on a good day, developing a "habit" on a bad day) feels "weird" at first, even if pain is also relieved. So, how do we invite people to walk into the weird with us, away from the familiar, to build new code for a more balanced, 3-dimensional experience? The movement we teach is in service of having a person understand how they hold or move themselves now and how they might do so with greater balance and ease. It is about how we relate to ourselves and the world.

The goals of movement awareness exercises included in this training help us:

- see and assess the client's holding patterns more clearly
- communicate what we see in neutral language
- facilitate client's grasp of his/her pattern (intellectual, kinesthetic and emotional).
- better engage the client during each session, and in the Series process and goals
- more effectively engage and release fascial restrictions during hands-on work
- give clients awareness exercises to reference postural/gestural preferences/ limitations and better reference neutral (also know as "homework")

- Session Goals & Strategies:
Finally! Defining and articulating the goals and strategies of each session and the Series as a whole. This is where we learn to make hard choices: What are the most important truths and changes within the territory of this session for this client? Where do we begin? How much change is enough? When are we done?

Exercises for building and carrying out Session and Series strategies include time for discussion, session demonstrations, large and small group - problem solving, supervised student exchanges and outside model practice.

- History of SI:
From Ida to the evolution of KMI.

- Client communication:
Time to discuss and brainstorm how to communicate with honesty, respect and compassion. Essentially, there are 2 relevant questions in an SI practice: "Where am I?" and "Where is neutral?" And there's quite a lot of "weird" to walk through building the bridge between these two ideas.

- Safe and ethical practice concerns:
Group discussions about Boundaries, Scope of Practice issues, Contraindications and Cautions

- Marketing-shmarketing: This isn't about selling the work; it's about finding your own way of describing this work and what it means to you.

KMI STRUCTURAL INTEGRATION

LOU BENSON

There are three paradigm shifts absolutely necessary and fundamental to the KMI training.

(1) The first involves moving from a “symptom” driven approach to bodywork to a “system” driven approach. Symptom based work or “spot work,” targets a problem area. System based work considers problem area(s) in relation to the whole body and our “body of experience.” System based work does not require a problem - one can undertake SI work with goals of expanding awareness, enriching experience and optimizing health.

Symptom based thinking is, however, very compelling. If we’re hurting, we want to know why and we want it to go away now. It is hard to pull ourselves and our clients out of this way of thinking, even after multiple symptom based attempts to resolve a problem have failed. Long term solutions most often lie in attending to problem areas in relation to the whole body.

Optimal spatial health is best attained when (a) each part of our self has its own space and is not pushed or pulled out of it and (b) we play well within the twin physical forces that bind us to the earth (gravity) and spring us from the earth (ground reaction). SI works to better organize the body so that everyone has her own space and forces move more cleanly and 3-dimensionally through us.

(2) The second shift is to grasp hands-on work (“technique”) as a template, an idea, a point of departure, a “conversation between two intelligent systems.” Technique is the vehicle we use to teach ourselves to feel what’s true and interact meaningfully with the tissue. There is no technique per se; there is only the process of deepening our sensitivity and responsiveness. We call this “palpation driven work.” Here is a piece written by KMI grad, Kaylee Cahoon, reflecting on what she saw while watching a session demonstration in her training:

This is the conversation I heard your tissue having with your client’s today :)

Hello There.
I see you.
I hear you.
I have a strong sense about you.
Do you think you might want to try this . . . ?
Maybe so; Maybe not.
What might be prohibiting you from trying something new?
Afraid of having more options?
Let’s give some peace of mind to the area. It’s ‘OK’ to do something different.
Can you trust that the change will be ‘OK’ to try?
How can I help you to trust?
Maybe if you have the support of some friends (other tissues), it will give you the courage to trust.
Is the time now or later?
How does that feel?

Can you feel your mind follow the possibilities your body is presenting to you?
How will you use those options when you drive home, when you brush your teeth, when you relate to another?
How does it feel to feel?

(3) The third shift is in getting your head around Gravity as the prime mover. Most anatomy texts and courses teach muscle actions in isolation, as if the unweighted bones were always free to pull “insertions” toward “origins,” one at a time. This is a curious oversight, since the body segments have always been unstable, variously shaped, weighted and stacked up on a horizontal surface.

With regard to posture or, my new favorite old word, “carriage,” it is necessary for us to understand structure and function from this more complex perspective.

A very good resource for making this shift can be found in the “Reverse Actions” sections for each muscle in Joseph Muscolino’s Musculoskeletal Manual.

I would like to end with another quote from my favorite yoga teacher, Patricia Walden, quoting her teacher, BKS Iyengar: *“The greatest gift a teacher can give a student is genuine interest: such genuine interest can transform and shape a student’s life beyond measure.”*

We are very lucky to have students and faculty who arrive with a lot of genuine interest already going for them. It’s a responsibility we don’t take lightly and a joy to keep the classroom alive and humming with it.

I hope this article has given both prospective students and KMI grads an interesting and thought provoking overview of our ever evolving curriculum, and an impetus for some reflection on your current practice, whatever that may be. How are you evolving? What needs some attention? What feels solid? What sparks your genuine interest?

AT IN DISSECTION LAB

LAURI NEMETZ

Many an object is not seen, though it falls within the range of our visual ray, because it does not come within the range of our intellectual ray, i.e. we are not looking for it. So, in the largest sense, we find only the world we look for.
(Henry David Thoreau Journal, 2 July 1857)

I was introduced to Anatomy Trains with the first edition of the book, and was part of the 2007-2008 NYC 500-hour course Body Language, taught by Tom Myers and other senior teachers. I added certifications in yoga and Pilates around that same time, before either was well known in the States. Soon after the Body Language course, I began to attend anatomy labs, from Mt. Sinai's pro-section labs to intensive work with Gil Hedley for many years, and our own Anatomy Trains® labs, serving now as an assistant teacher in lab since 2014. In the last two years, in between my other work (including as a university professor, and being a certified Anatomy Trains® movement faculty) I have occupied myself in dissection lab with creating fascial "ghost" organs, i.e. stripping away the muscle fiber, etc. and leaving behind the extracellular matrix (ECM) or fascia scaffolding.

Several years back, Tom shared an image of a fascial thigh, by Jeffrey Linn, of the National Library of Medicine's Visual Human Project. Tom put out the thought that this was a new model of the connected body system, disappearing all substances (in this case by mathematical algorithms), leaving behind the ECM. As he wrote in the third edition of his book,

"If we could imagine that instead of using a sharp edge we immersed an animal or a cadaver in some form of detergent or solvent which would wash away all the cellular material and leave only the connective tissue fabric (ECM), we would see the entire continuum" (Anatomy Trains, 2014, p. 15).

I found it interesting, but didn't think of its full possibility until coming across a photo of a white, shimmering heart held in gloved hands from Doris Taylor's lab at the Texas Heart Institute. Labeled widely a "ghost" heart, and working through a stepped process to work the organ to its fascial structure; I was intrigued.

In brief, the medical world has thousands of people that are on wait lists for organ transplants, particularly heart transplants. An organ could be washed and cleaned to leave a fascial scaffold that could then be re-seeded with healthy stem cells from the recipient. The organ would not be as likely to be rejected. Many of the experiments used a mix of higher-end lab ingredients as well as more common substances such as household shampoo. I figured I could convert most of the materials from the scientific papers into a regular grocery list, keeping the price point of around twenty U.S. dollars and utilizing non-toxic ingredients.

On my plane ride to assist lab in Tempe AZ in January of 2015, I wrote out in long-hand a list of what I'd need and how long everything might take. Years ago, I developed my own black and white photographs and I likened the process to darkroom photography- basically each step was like start and stop bath procedures- if the organ was left in any solution for too long, it risked ruining the organ. Too short a time and there wasn't enough processing.

I kept the project as an aside. I didn't want to interrupt lab, but knew I'd be interested in giving the project a go if the opportunity arose. Towards the end of our lab, Todd Garcia, director of the Laboratories of Anatomical Enlightenment asked me what I specifically wanted to do aside from assisting lab. I mentioned the ghost heart project and we decided to give it a go, creating a fascial model which would be returned to the donor body at the end of the final lab day. The shift in what was able to be seen was profound. A heart is known as a muscular organ. As it is stripped of its muscle fiber, the underlying structure is revealed. Everything from the valves to understanding the shape was clearer and had a reality of its own.

The next year, I decided to try the process to develop a fascial kidney. Blood rich from renal arteries, I've dissected many kidneys in the past, being mostly struck by the small organ encased deeply in a sac of fat padding. However, the healthy fascial kidney revealed an amazing network that closely resembled an intricate sea sponge.

AT IN DISSECTION LAB

LAURI NEMETZ

Interestingly, I guested recently in one of Gil Hedley's labs for a day where I repeated this with a clearly diseased kidney from a donor body that had extensive surgery in that area. The organ in that case was difficult to work with- the more steps I performed, the more the fascial structure had difficulty maintaining structure and it lacked the beautiful intricate webbing of the January 2016 kidney. I am guessing that organs, like the rest of our fascia, respond to multi-dimensional vectors and a healthy scaffold will be part of a healthy organ, whereas a weak structure indicates disease and ill health.

After the first fascial heart experiment, I presented my work in the poster session of the 4th Fascial Research Congress, held in the fall of 2015: "The heart of fascia: initial steps toward a three dimensional model of the human extra-cellular matrix in dissection" (Nemetz, Fascia Research IV, 2015, pp. 30-31). I followed that conference with a similar poster presentation of additional fascial organ experiments, including a fascial kidney from January 2016 for the fall 2016 Experimental Biology Conference under the American Association of Anatomists.

In lab, we have now many times dissected the Anatomy Trains® lines. What was once theoretical in Tom's work now has early dissection lab evidence. Any time we shift the visual perception we gain new insights. As part of his doctorate thesis, anatomist, Jaap van Der Wal, MD, PhD, was dissecting the muscle out in between the fascial sheets and focused his work for a time on the structure of fascia and its relationship to proprioception. His current passion on embryology has once again been influential on how we can envision anatomy. Other pioneers in fascial understanding include Peter Huijing (for many contributions including his article, Adaption of physiological cross-sectional area and serial number of sarcomeres after tendon transfer of rat muscle) Scand J Med Sci Sports. 2016 Mar;26(3):244-55. doi: 10.1111/sms.12431. Epub 2015 Feb 18., Robert Schleip (particularly for his work on Fascial Fitness), Carla Stecco (Functional Atlas of the Human Fascial System), Tom Myers (Anatomy Trains®) amongst many others.

An important factor to consider in looking at fascia is that the methods for dissection have changed dramatically in the past years. Obviously, original dissections were worked without the benefit of any preservation and were often done under dubious circumstances that required medical students also being responsible for finding their own bodies to dissect. During the Renaissance, the idea of artistic écorché came into fashion, being a painting, drawing or sculpture of the human body without the skin layer, and normally highlighting the muscular body. This is the image we are most familiar with, and while one can catch glimpses of fascial septa, in general this tissue was quickly discarded in favor of highlighting the muscular system. It is likely that sometimes in favor of quickening the process of dissection, the first layers were quickly burned off, stripping the first layers of connective tissue. So immediately, part of the story was gone, in order to see the muscular system.

As the axiom goes, everything is connected; the collagen fibers, GAGs (glycoproteins) and areolar tissues all together. An embalmed cadaver will present drier, more sinewy fascia and is less moveable than "fresh" tissue. Once again, our perception of a body is so strongly tied into the images that get presented, but this is only part of the story. If we look at an embalmed cadaver, we might assume an unnatural stiffness that may or may not have been present in real life. If I cut the fascial layers in an embalmed body, the "fuzz" moves apart and shatters rather like moving through a cloud-like cluster of cotton candy- the structure immediately breaks apart. However in "fresh tissue" (i.e. previous frozen, without any preservatives) the fascia is slippery and glides, and the body can move through a more natural range of motion.

We have made the switch in the Anatomy Trains® Dissections to fresh tissue cadavers (as have many similarly minded programs) as the movement quality is retained and the risk of toxic chemical exposure (formaldehyde, etc.) is eliminated.

AT IN DISSECTION LAB

LAURI NEMETZ

Our shift would also allow the experiment to be similar to those in labs prepping for the ideas of eventual surgery. Decellularization is achieved through using enzymes and detergents to flush out cellular content and while the preservation technique may or may not matter, I believe preserved tissue might interact negatively with some of the procedure for decellularation and be less true to the living form.

Actually, the one exception to a completely “natural” process is the deep-freezing that our cadavers go through as their only preservation technique. This is beneficial however for the experiment, as freezing begins to break apart cell wall structure. As noted in my extract from the Experimental biology conference (Nemetz, EB, Abstract ID: 7769 Experimental Biology 2016, San Diego):

“As there was no need for surgical specifications, the author chose to use household substitutions for medical grade materials and developed a 15 step process to create the final model based on several current articles.

Replacing sterile salt solution, the author created a saline solution with kitchen salt and water. Instead of trypsin, which is used to cleave peptide bonds, bromelain (from fruit like papayas) or meat tenderizer can be utilized, the latter of which was chosen. Instead of Triton X, which breaks up fats, any strong commercial detergent can be utilized with sodium laurel sulfate or sodium lauryl ether sulfate (SLES), which is an anionic detergent. The author utilized a common shampoo with a high percentage of sodium laurel sulfate. Finally, an “OxiClean” type product, primarily sodium percarbonate (2Na2CO3•3H2O2) was utilized in the final steps, creating an interaction between oxygen and water, acting as a non-chlorine bleach. In January of 2016, a total of five additional hearts were chosen to repeat the process, as well as a kidney.”

I plan to keep repeating this process, and refining the technique to create a fascial model in lab. I am looking to try with other organs such as the bladder or ovaries, and perhaps even a lung. If the technique can be refined, I may be able to work with larger areas in connection (i.e. psoas diaphragam, etc).

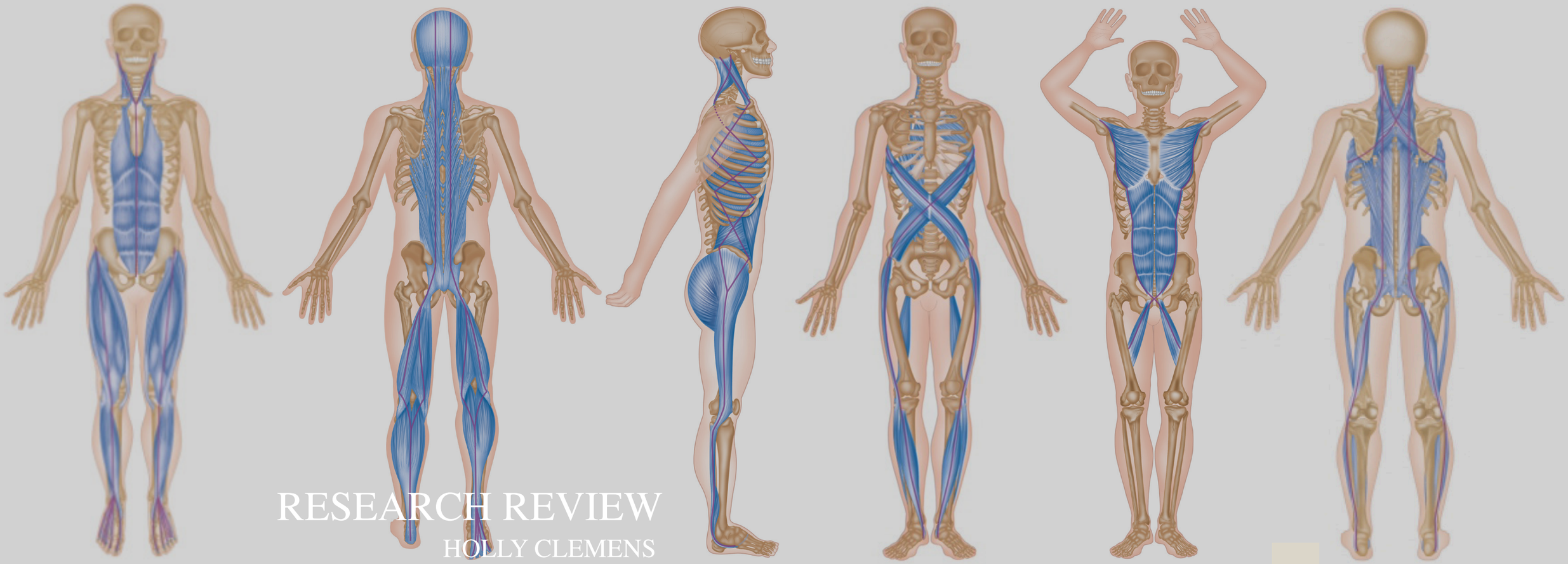
I have long loved the quote from naturalist Barry López, describing “Everything is held together with stories. That is all that is holding us together, stories and compassion.” In looking at the fascial story that we present, we are giving another ability to understand our very complex human body. It is my hope to use that in being able to strategize and give my own clients (and myself) possibilities that lead them to optimal health and resiliency. I see my work as a trail guide both in lab and as a movement therapist. I know a road map and with that I can point people to different possibilities. They ultimately need to hike their own way, but having another viewpoint to draw upon can often help make a pathway.

AT IN DISSECTION LAB

LAURI NEMETZ

Laurice D. Nemetz
MA, BC-DMT, E-RYT500, LCAT
Wellness Bridge www.wellnessbridge.com
Pace University Pleasantville faculty
Ananda Ashram faculty-applied anatomy
Certified teacher Anatomy Trains ®

Lauri is a certified Anatomy Trains ® teacher and teaches AT for Movement courses throughout North America and has been an assistant for the Anatomy Trains Dissection labs since 2014 . She is a registered experienced-level yoga teacher (E-RYT 500), Stott Pilates® certified instructor, a board-certified member of the Academy of Dance/ Movement Therapists and a licensed creative arts therapist (psychotherapy). She is a past president of the YTA (Yoga Teachers' Association) and has been a professor at Pace University since 2007. In addition to teaching movement and anatomy and working as a therapist with a wide range of populations, Lauri leads yoga and kayaking trips on the Hudson River, in Canada and in Costa Rica. She lives in the Hudson Valley with her husband where they raised their teenage boys, one off to college this fall. More info on her at: www.wellnessbridge.com



RESEARCH REVIEW

HOLLY CLEMENS

Anatomy Trains has provided an explanation of how the body moves more as a whole-body myofascial tensegrity system than a system of individual muscles and levers (Myers, 2014). These myofascial meridians are considered lines of pull which distribute strain, transmit force and affect the structure and function of the body. The theory of the myofascial meridians helps manual and movement practitioners explore how one structure affects other distance structures in the body.

The myofascial meridians have been referenced in several studies (Hyouk & Kang, 2013; Weisman, Haddad, Lavi, & Vulfsons, 2013; Grieve et al., 2015). Despite the references, the theory of the myofascial meridians is based on anecdotal evidence rather than evidence- based research. However, Wilke, Krause, Vogt and Banzer (2016) conducted a systematic literature review to provide evidence of the existence of six myofascial meridians based on anatomic dissection studies. These meridians included the superficial front line, superficial back line, lateral line, spiral line, back functional line and front functional line.

So, how did studies get selected for this systematic review?

A search for peer-reviewed anatomic dissection studies, published from 1900-2014, was conducted using key search terms in Google Scholar, PubMed and ScienceDirect. This initial literature research yielded 6584 publications. Next, duplicate articles and articles not pertaining to the research question were removed and exclusion criteria was applied (Wilke et al., 2016). The final review yielded 62 studies. Of these studies, evidence of each meridian and its transitions were classified as strong, moderate, limited, conflicting or not existent (Wilke et al., 2016). A transition was considered a myofasical link between two muscles. For example, the gastrocnemius and hamstring are considered to be a transition of the superficial back line.

What did the results indicate?
The results yielded strong evidence for myofascial transitions in three of the six examined myofascial meridians: Superficial back line, back functional line and front functional line. In the superficial back line, three myofascial transitions (plantar fascia-gastrocnemius; gastrocnemius-hamstrings; hamstrings-lumbar fascia/ erector spine) were verified in fifteen studies.

In the back functional line, three myofascial transitions (latissimus-lumbar fascia; lumbar fascia-gluteus maximus; gluteus maximus-vastus lateralis) were verified in eight studies. Finally, the front functional line verified strong evidence for two myofascial transitions (pectoralis major-rectus abdominis; rectus abdominis-adductor longus) in six studies. There was moderate evidence for the meridians and transitions of the spiral line (five of ninw verified transitions, based on twenty one studies) and the lateral line two of five verified transitions, based on ten studies). There was no evidence for the meridians and transitions of the superficial front line, (based on seven studies)
(Wilke et al., 2016).

How can the results be applied to manual and movement practitioners?

The practical relevance of the findings by Wilke et al. (2016) regarding the existence of myofascial meridians can help explain how lines of pull and compensations in one structure of the body can impact other distance structures. As a result, more appropriate diagnostic, therapeutic and exercise strategies can be developed by manual and movement practitioners for their patients and clients.

Final Thoughts
The research by Wilke et al. (2016) is the first systematic review to provide solid evidence for the existence of the Anatomy Trains myofascial meridians, especially for the superficial back line and front and back functional lines. It is important that the limitations of the study be addressed in future studies. Wilke et al. (2016) suggest that future studies include randomized, controlled in vivo studies since most of the experimental research was carried out in vitro using cadavers. It will also be valuable to conduct further research on the spiral, lateral and superficial front lines to determine if there is stronger evidence to support their existence and begin to explore evidence for the deep front line and arm lines.

It will be exciting to see future research regarding the Anatomy Train myofascial meridians. As future research is published we will be writing about it. Stay tuned!

RESEARCH REVIEW

HOLLY CLEMENS

Holly Clemens, Ph.D., is an Associate Professor of Sport & Exercise Studies at Cuyahoga Community College, Parma, Ohio. Her teaching expertise includes kinesiology, exercise physiology, biomechanics, exercise testing and exercise prescription.

Holly holds a Ph.D. in Health Education/ Health Promotion, M.Ed. in Exercise Science, and B.S. in Physical Education. She has been involved in the fitness industry for 30+ years coaching athletes, teaching a variety of group exercise and personal training classes, and working in cardiac rehabilitation and corporate fitness and wellness. Holly is an Anatomy Trains certified teacher, ACSM-Certified Exercise Physiologist, Fascial Stretch Therapist-III, Neurokinetic Specialist-I , NSCA-Certified Strength and Conditioning Specialist, ERYT-500 and Yoga Tune-Up Level I Certified Teacher. Holly also assists Tom Myers and Todd Garcia with dissection workshops at the Laboratories of Anatomical Enlightenment in Tempe, AZ.

STRUCTURAL INTEGRATION AND SCARRING

HELEN DEJONG

Disclaimer: the contents of this article are based on the opinion of Helen DeJong and do not necessarily reflect the opinion of the institutions or organisations with which she is affiliated.

Structural integration is a process of reestablishing the structural balance in the body to regain or enhance function. Scars can alter the tensegrity of the body's structural network, influencing posture, movement and its functional potential. Scars are an integral part of the structural network and therefore need to be incorporated into any structural treatments. The aim of this article is to provide a better understanding of the physiological basis of scarring.

Scars are Specialised Connective Tissue.
The basic structural component of all connective tissues is the extracellular matrix (ECM), which is composed of a gel like ground substance containing macromolecules (glycosamionoglycans) and supporting fibrous proteins (collagen, elastin, fibronectin and laminin). It was once thought the ECM was only an inert scaffold for connective tissues, however it is now recognised that the ECM regulates the behaviour of cells, influencing their survival, migration, proliferation, development, shape and function as well as regulating the mechanical qualities (stiffness) of connective tissues.
The mechanical properties of the ECM depends on the ratio between fibres to ground substance, which can range from being more fluid in consistency (greater amount of ground substance), to various levels of jelly like consistency, to a firmer and less adaptable consistency (greater amount of collagen fibres).

The organisation of the fibres is highly diverse amongst the different connective tissue types and determines the tissues strength, extensibility, elasticity and plane of movement. The specific metabolic function of each individual connective tissue type is then further defined by the specialised cells contained within. The ECM forms a continuous, interconnected, structural network surrounding and connecting every cell, vessel, tissue and organ.

Scar tissue is a specialised, whole connective tissue, which has the specific purpose of reestablishing the continuum of the complex ECM matrix, reconnecting and repairing damaged tissue. Scar tissue, like all connective tissue, has specialised cells sensitive to mechanical forces which modulate the mechanical properties of the tissue. In addition, just like all other connective tissues, the viscoelastic response of scar tissue changes in relation to the magnitude, duration, speed, repetitiveness and direction of the mechanical forces transmitted through it.

Therefore scar tissue alters the degree of strength, extensibility, and elasticity of the tissue it has replaced, influencing the tensegrity of the structural system as a whole.

What is Scar Tissue?
The main cell which maintains the ECM in connective tissue is the fibroblast. Fibroblasts secrete collagen, then crawl over it, tugging on it to arrange it in the direction of the mechanical tension. Fibroblasts work on a daily basis to maintain the ECM and ensure it can withstand the mechanical stresses placed upon it. As part of the wound healing process fibroblasts increase in numbers to produce more collagen quickly and then pull the collagen fibres together to close the wound. Collagen fibres attach to each other via covalent cross-links, which are designed to resist tensile forces. Therefore increased levels of tension on the scar tissue result in a greater number of cross links.

STRUCTURAL INTEGRATION AND SCARRING

HELEN DEJONG

The fibroblast family has many specialised members including chrondroblasts which form cartilage and osteoblasts which form bone. Scars also develop specialised cells, myofibroblasts, which are kind of like fibroblasts on steroids! They are bigger and stronger producing more collagen, quicker and pulling harder on the collagen fibres. Myofibroblasts disappear from the functional scar tissue when the balance in the tissue's mechanical tension is restored, however they persist for long periods in dysfunctional scars.

Functional and Dysfunctional Scar Tissue
Scar tissue can be functional, forming a structural composition similar to the tissue it has replaced: the tissue glides in a similar manner, has a similar degree of strength and distributes the tensional forces in a similar manner. These are referred to as normatrophic scars and are typically flat, pale and relatively flexible scars. Sometimes however, the body can produce scar tissue which is sub-standard or excessive. Dysfunctional scar tissue includes scars which result in limitations of movement or sensation, cause pain, itching, disfigurement or psychological distress.
Dysfunctional scars typically include pathological scars, such as hypertrophic, keloid, atrophic, hyper or hypo pigmented scars, fragile scars, adhered scars, and contractures. Normatrophic scars can still be considered dysfunctional, however it is usually due to the secondary changes occurring in tissues surrounding the scar (adhesions), or due to psychological distress associated with the original injury.

The various types of scars are defined by both their cells and the structural composition of their ECM. All injuries deeper than the mid (reticular) dermis result in scar tissue. Those confined to the superficial (papiliary) dermis and epidermis regenerate and therefore don't result in a scar.
It is a common misconception that tattoos are scar tissue, however tattoos are ink infused modified tissues, and do not have the structural composition of scar tissues.

The larger and deeper the wound the more risk of developing a pathological scar and the associated secondary effects. Scars are permanent. Once established, scars are there for life. It appears that the cells within scar tissue undergo epigenetic changes altering their function, therefore continuing to maintain the scar tissue structure. This is why scars formed in childhood grow proportionally within the adult.

Hypertrophic (HTS), Keloid Scars, Contractures, Adhesions and Adhered Scars!
Both hypertrophic (HTS) and keloid scars are raised above the surface of the skin, are red, hard and quite often painful and itchy. There is a lot of confusion between the two scar types and the terms are often used interchangeably. It has recently been suggested that they be classified as two subtypes of the same condition, the main difference being the duration of inflammation. Keloid scars have a continual inflammatory process resulting in persistent, continually growing benign tumor extending beyond the boundary of the original wound; whereas in HTS the inflammation subsides allowing the scar to gradually soften and fade over the course of approximately one to two years. Another suggested difference is that HTS contain contractile elements, whereas keloid scars don't, however this is an area of ongoing investigation. Keloid scars are less common and are the only scar to have a leading edge which progresses and invades the healthy surrounding tissues.

The more common normatrophic and hypertropic scars do not spread. Keloid scars are not generally responsive to manual or other conservative therapies and generally require surgical or invasive intervention. The keloid scars can develop directly after the injury, however they can also start forming months after the injury has healed and they don't regress. Hypertrophic scars typically start to become evident about 6-8 weeks post injury and continue to worsen over 6 to12 months and then regress naturally, between 18 to 24 months.

STRUCTURAL INTEGRATION AND SCARRING

HELEN DEJONG

More often than not the manual therapist will see patients with hypertrophic rather than keloid scars. Both these pathological scars have an increased production of ground substance. The glycosamionoglycans (GAGs) in ground substance are responsible for the water-holding capacity of connective tissue. Therefore HTS are actually hyper-hydrated, which is thought responsible for the increased tension and turgor in scar tissue. However there is also a significant increase in collagen expressed which is disproportionate to the GAGs, therefore scars can still become dry and brittle. Both HTS and keloids have about twice the number of fibroblasts than normal skin which are responsible for these increased levels of collagen. The collagen is also disorganised and can form knots and whorls. Both HTS and keloids have higher levels of the collagen fibril cross-linking making these scars stronger than the tissue they have replaced and more resistant to stretch. And lastly an increased expression of the glycoprotein fibronectin is found in these scars which increases cell adhesion to the collagen matrix impacting on cell-matrix communication.

Contraction and Contracture

The fibroblasts and myofibroblasts attached to the ECM pull the edges of the wound (and scar) closer together in a process called contraction. This is a normal process of wound healing and in normatrophic scars the myofibroblasts disappear signifying scar maturation. However in pathological scars the myofibroblasts stay and continue the contraction process, making the scars tighter over time. Contractures are the pathological end product of the contraction process. Contractures can occur with or without hypertrophic scarring and potentially alter the function of the surrounding tissues resulting in tissue adhesions, joint restrictions and altered movement patterns.

Adhered scars and Adhesions

These terms are also used interchangeably, however are different processes, one involving scarring and one a secondary effect of altered tissue viscosity.

Adhered scars: When an injury transverses many layers, e.g. the skin, fat and muscle layers, the body produces the same scar tissue, regardless of the tissue type. It therefore produces one scar joining all these injured layers together. Adhered scar tissue results in depressions of scars and a puckering of tissue with movement. Adhered scars can occur with or without contraction.

Adhesions on the other hand don't necessarily require injury, only inflammation. Adhesions can be a serious complication of abdominal and shoulder surgery. Fibroblasts in adhesions express different levels of the enzyme cyclooxygenase-2 (COX-2) which are not expressed by other fibroblasts. Adhesions are induced by hypoxia and result in an excessive and prolonged production of fibrin deposited during the inflammatory phase of wound healing; whereas pathological scar tissue formation forms in the proliferative phase of wound healing with an excessive secretion and reduced degradation of collagen. It is currently unknown why these imbalances occur. However increased levels of mechanical tension on the healing tissue are an essential element of hypertrophic and keloid scars,

whereas adhesions are associated with increased tension but can also occur following periods of immobilisation. There are also possible links with neurogenic inflammation which may help to explain the body generated pain mechanisms.

In normal, flat and mobile scars the stiffness that can be palpated in and around the tissue is more than likely to be adhesions rather than scar tissue. Adhesions are more responsive to manual therapy and when released can produce significant changes. The structural integration therapist potentially releases adhesions on a regular basis as part of the normal series of treatments.

STRUCTURAL INTEGRATION AND SCARRING

HELEN DEJONG

Structural Integration Therapy.
The level of touch and the intention of therapy varies in the three phases of scarring:

- *The inflammatory phase* is the acute phase and can be recognised by an increased redness in the scar, together with a relative mobility of the scar. Some scars can have a generalised firmness about them and they can be tender to touch. Normatrophic scars move through this phase in a matter of days however pathological scars have prolonged periods of inflammation. Manual treatment of scars in this phase is gentle, avoiding aggressive manipulation, only using slow micro-mobilization of each layer of tissue. You can also work on the surrounding non-injured tissues heading towards the scar to reduce the surrounding tension on the forming scar. Sink in slowly and watch for your clients' responses. If they tense up or feel pain then stop as you don't want to increase tension on the wound.

- *The Proliferative phase* is the crucial time for pathological scar formation. Both he normatrophic and pathological scars are still red, however the scar tissue becomes firmer and may increase in height and thickness. This is a normal response for all scars. If the firmness and raised appearance continues past the 6-8 week mark, then the scar can be classified as hypertrophic. The scar may or may not be painful. Increased mechanical loading increases the incidence of keloid and HTS. Therefore releasing the tension around the scars can potentially alter the cellular response and collagen organisation. Incorporating movement as is typically done in SI practices is great, using a pin and stretch technique. Pin the scar tissue (gently) and ask for movement to redistribute the forces and sensory feedback into healthy tissue and away from the scar tissue.

- *Remodelling phase* like all connective tissues this phase is for life. Scar tissue can continue to respond to therapy and remodel depending on the tensional forces being distributed through the tissue. However due to the structural organisation of the collagen it becomes more difficult; this is when the tissue can become fibrotic. Fibrotic scars are difficult to alter at this stage because there is a structural change in the tissue. However this is where adhesions can once again be the main source of dysfunction. Movement patterns may be altered in such a way as to cause irritation and inflammation. Realigning posture and movement patterns and re-establishing sensation around the scar are the main goals for SI.

Many therapists talk about 'breaking up the scar tissue', 'getting rid of scar tissue' or 'dissolving scar tissue' with manual therapy. However it is currently unknown what we actually do to the tissue when we manipulate scars.

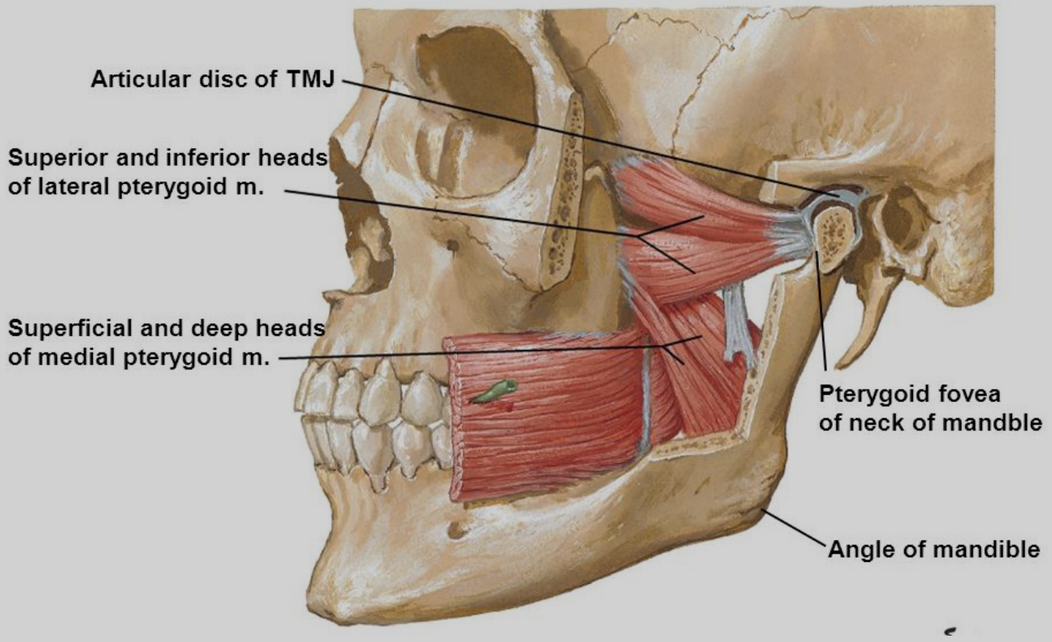
Do we actually make structural changes to the collagen bonds, break collagen fibres, or soften the viscosity of ECM; or do we have absolutely no impact on the scar itself and only soften the adhesions that are surrounding the scar? One thing I am sure of is that treating the scar as it is forming is far more effective than treating a scar with an established structural matrix. Just like treating a tendon: you can soften a tendon, make it more supple and adaptable, but it will always be a tendon. Scar tissue will always be scar tissue; however mobilising scar tissue and stimulating the mechanical-sensory interactions between the cells and the ECM can modulate the stiffness, adaptablity and elasticity to make the scar more functional rather than dysfunctional.

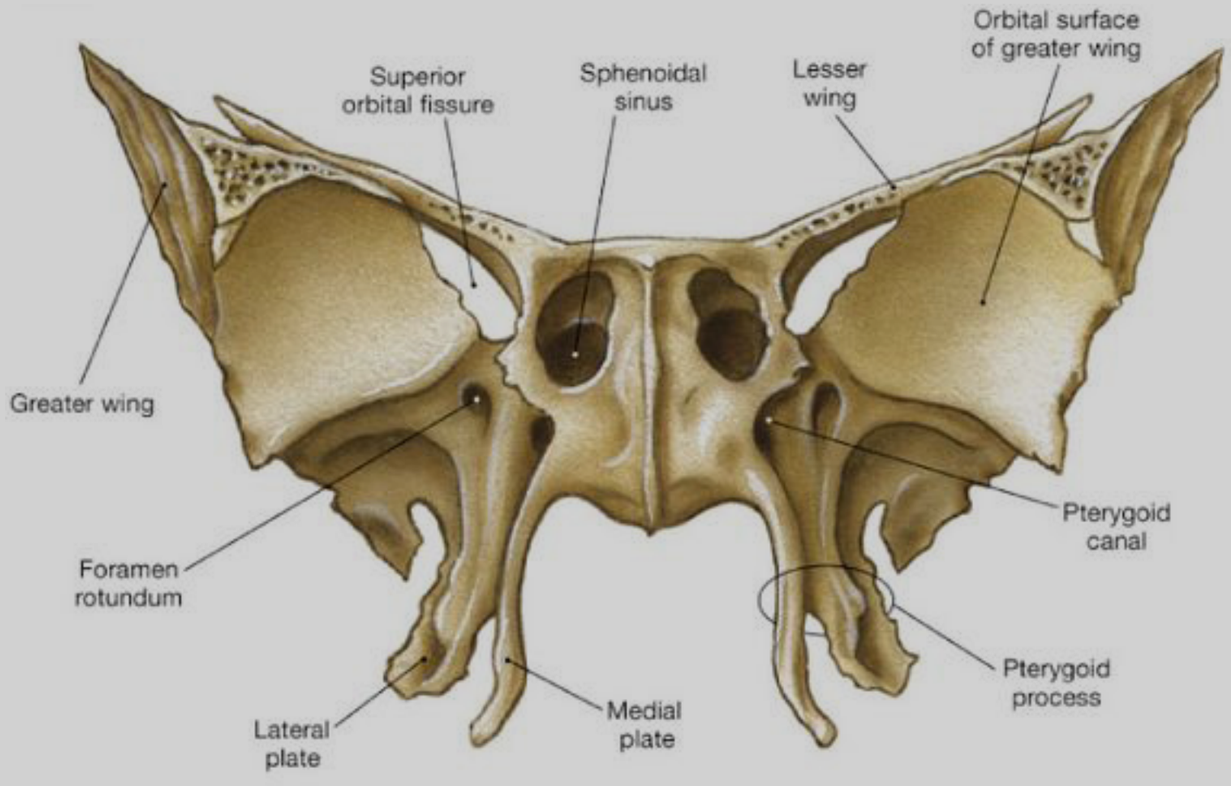
STRUCTURAL INTEGRATION AND SCARRING

HELEN DEJONG

Helen DeJong
Occupational Therapist and KMI Structural Integration Therapist.
Perth Scar and Pain Clinic
Edith Cowan University
Harry Perkins Institute of Medical Research
Fiona Wood Foundation
Burn Injury Service of Western Australia

Helen graduated as an OT in 1993. She has worked with hand trauma, neurology, sensory integration and burn-injured clients. She was introduced to structural integration in 2011 and became a certified KMI structural integration therapist in 2015. She runs her own private practice and has just started her PhD investigating the biomechanics of scar formation focusing on the interaction between the structural system with the nervous system during healing. Helen has co-written a book chapter on scarring, been published in peer reviewed journals and presented her research at local and international conferences.





ANATOMY IN FOCUS THE PTERYGOIDS

JULIE HAMMOND

Understanding the pterygoids is integral to balancing the jaw. By balancing the jaw it can in turn help relieve clients prolonged neck tension. We all have clients who hold onto so much tension in their jaw, sometimes not even aware of how tight set their jaw is. We also have clients with jaw pain, clicking, limited range of movement and clients who grind and clench their teeth. The pterygoids are on my list of favourite muscles, however I do have a long list. So let's have a look at the pterygoids and their effect on the temporomandibular joint (TMJ) and articular disc.

The **temporomandibular joint (TMJ)** is basically a hinge joint. Although if you would like its official title it is a 'ginglymoarthrodial' joint, a term derived from ginglymus meaning a hinge joint and arthrodia meaning a joint which permits a gliding motion of the surfaces. The TMJ connects the mandible to the temporal bone. The joint allows the jaw to move up and down and side to side. Muscles attached to and surrounding the joint control the position and movement of the jaw. Hence the importance of balancing the myofascia that supports the jaw. Temporomandibular joint dysfunction (TMD) or (TMJD) is an umbrella term used for pain and dysfunction of the muscles of mastication and the temporomandibular joints.

I'm going to go through the anatomy, function and palpation, but will not be going into techniques in this article as I feel these techniques are safer taught in a classroom environment. Both of these muscles are treated intra orally and would include a full history, checking for contra indications and the client's consent. We are going to look at the two pterygoids that form the inner sling of the jaw and part of the main four muscles of mastication. Balancing the jaw would also have to include work on the outer sling of the jaw, the masseter and temporalis as well as looking at the suprahyoids and neck musculature but for this article we will focus on the inner sling.

The word pterygoid derives from the root word 'wing'. Both pterygoids are named because both attach onto the lateral pterygoid plate of the pterygoid process of the sphenoid bone. The medial pterygoid attaches onto the medial surface of the lateral pterygoid plate and the lateral pterygoid attaches to the lateral surface of the lateral pterygoid plate.

The medial pterygoid has a deep head and a superficial head; the deep head is the larger of the two. It attaches to the medial surface of the lateral pterygoid plate of the sphenoid bone and onto the internal surface of the mandible down to the angle of the mandible. The medial pterygoid on the inside of the mouth mirrors the masseter on the outside of the jaw.

These two muscles create a 'v' shaped sling that the mandible sits in and, like the masseter, the medial pterygoid closes the jaw. Along with closing the jaw the medial pterygoid and masseter create grinding, side to side movement. Because of its attachments and fibre direction it will pull the mandible superior towards the sphenoid, elevating the jaw as well as pulling medially towards the sphenoid causing the jaw to contra laterally deviate. Tension and muscle imbalance in medial pterygoids can create compression of the joint.

Palpating your medial pterygoid:
Use the index finger of your right hand inside the left side of your lower teeth until you reach the back molars, finger pad against the inside of the teeth. Continue back until you meet a soft barrier, this is the muscle. Gently press against the muscle and move your jaw to the opposite side to feel the muscle contract. Careful of the gag reflex!

The Lateral Pterygoids are smaller and slightly more difficult to access than the medial pterygoid. The lateral pterygoids have two heads, one inferior and one superior. Both play an important part in temporomandibular joint function.

The inferior head attaches from the lateral surface of the lateral pterygoid plate of the sphenoid to the neck of the mandible, the mandibular condyle. When both inferior heads contract they pull the condyles forward out of the fossa and down. If they contract alternately this allows the jaw to move laterally side to side.

The superior head attaches from the greater wing of the sphenoid to the capsule and the articular disc of the TMJ. The lateral pterygoids protract the mandible and the articular disc. It is important that the mandible and disc protract together when the jaw is opened, otherwise the disc can be jammed between the two bones.

Although all four major muscles of mastication can be involved in TMJ dysfunction, because the lateral pterygoid attaches directly into the joint capsule and disc it is going to be a key player.

The Articular Disc is a fibrous saddle shaped structure located between the mandibular condyle and temporal bone. It functions to accommodate a hinging action as well as gliding between the temporal bone and mandible. It is shaped like a peaked cap that divides the joint into a large upper compartment and smaller lower compartment. Imagine this cap tied onto the mandibular condyle ensuring that the disc and condyle move together in protraction and retraction however it is also attached to the capsule. The superior belly of the lateral pterygoid attaches to the joint capsule and disc and is responsible for the disc movement in coordination with the movement of the mandible. Excessive tension can cause the disc to be anteriorly displaced in front of the condyle; this often feels like a pop or click. Normally the clicking is associated with anterior displacement of the disc and then it returning to its normal position. Sometimes the clicking sound disappears but the jaw movement is severely limited - this is because this disc has displaced and not returned back to its normal position.

Palpating your lateral pterygoid:
Take your right index finger along the external surface of your top left row of teeth, fingernail side against your teeth. Keep going until you fall off the teeth and reach into a pocket; press posterior and superior. Open your jaw slightly to confirm you are on the muscle; you will feel it contract.

JULIE HAMMOND IS THE DIRECTOR OF THE ANATOMY TRAINS AUSTRALIA & NEW ZEALAND OFFICE.SHE TEACHES ANATOMY TRAINS WORKSHOPS AND FASCIAL RELEASE FOR STRUCTURAL BALANCE WORKSHOPS AROUND AUSTRALIA AND NEW ZEALAND. SHE WILL BE TEACHING THE HEAD, NECK & JAW WORKSHOP IN PERTH ON THE 5TH & 6TH NOVEMBER AND IN SYDNEY ON THE 12TH & 13TH NOVEMBER 2016.

TEACHER IN FOCUS

DON THOMPSON

Don has been involved in the study of the human form for the best part of three decades. He draws upon his broad experiences of having formerly been a strength athlete, an adventure-sport adrenalin junky, and a successful personal trainer as much as from his personal journey through the vicissitudes of Life. Along with an extensive education in bodywork and complementary therapies he brings humour, clarity and open-enquiry to his workshops. He holds a BSc in Complementary Therapies and Bodywork from the University of Westminster in London, UK and - with his partner, a lymphoedema therapist - lives and works in the Scottish Highlands where they run a small but busy clinic that is run on not-for-profit and community ideals. The majority of Don's clinical work is with people with chronic pain and discomforts that have their origins in work patterns, habits, and posture. He takes a problem-solving approach using Structural Integration, visceral/neural manipulation and movement re-education with the people he works with.

I first met Tom at one of the early Anatomy Trains workshops at the University of Westminster in London, where I was part of the degree programme in complementary therapies with a specialism in therapeutic bodywork.

Leon Chaitow, the renowned osteopath who teaches a variety of soft-tissue manipulation techniques, was my senior lecturer. Leon is also the editor of the Journal of Bodywork and Movement Therapies and was one of of the first people to recognise the map and relevance of the Anatomy Trains. Leon thought it would be a good idea to have Tom present at the University and duly sent out an invitation. A few months later, the appointed day arrived and we excitedly went off to hear first-hand from this guy Leon had been enthusing about so much along with this map of interconnected anatomy - little did I know that that day would change my life in a number of ways.

I need to rewind a bit here.
Some years previous to that I had a climbing fall and quite badly messed up my knee. Long story short, the aftermath required me to spend some R&R time back home with my family where I grew up.

We are talking the early 90's (i.e. before the internet!) so part of my mum's routine every Saturday was to go to the library in the small town near where we lived. One fortuitous day, she came home with Ida Rolf's book 'Rolfing' that she'd found amongst a pile of other books. I wasn't in the best of places back then; I was 'back home', was taking a long time to heal, had dropped out of my MSc in Exercise and Health Studies and my research in high altitude physiology for mountaineers, and had lost my prime spot as a Personal Trainer in a fancy London health club.

I connected with IPR's book immediately; many things I had seen in my personal training clients and had no answers for were right there in this fascinating blue book. Quite what IPR's book was doing on a shelf in a small library in a town of less than 20,000 people that day, is still a question. I can only think fate determined that somebody nearby needed it!

Being injured and in the process of exploring a variety of different therapeutic approaches led me to deciding on a career change and becoming a bodyworker. I initially trained as a massage therapist and that led to a year at an osteopathic school. I soon discovered that the manipulative approach wasn't for me - the ideas I'd discovered from IPR's book kept coming back to me. Visits to the dissection lab were frustrating as we saw only embalmed and prepared forms; all the fascial fabric had already been consigned to the biological waste bin!

After leaving osteopathic school, I transferred to the University of Westminster and under the guidance of Leon Chaitow and Mark Gray (a Hellerworker) I soon found my home and my path.

Fast forward back to Tom's workshop at the University - I sat there enthralled. Enthralled not just by Tom's fabulously engaging and entertaining presenting style but also, the more he unveiled this map of connected anatomy and talked about the properties of fascia and about Structural Integration, the more I knew I had to study with him. And, somewhere in the back of my mind was the embryo - possibly planted by Tom - that maybe one day I could teach this stuff.

TEACHER IN FOCUS

DON THOMPSON

It took a while, but finally - and with many years of assisting classes in between - I joined the Faculty in 2014 and have been teaching on a regular basis since then.

The other reason that Tom's workshop changed my life is that it is the day a certain classmate and I stopped being classmates and that person becoming the person I share my life with.

In 2003 I travelled to Maine to start my KMI training - but completion was delayed for a few years as a result of some of those awful things that Life sometimes throws our way.

At the time, the delay was a huge frustration for me - but with hindsight it gave me time to sit with the work and the various skill-sets required to be an SI practitioner. The hiatus in my training also gave me another blessing - James Earls. I completed my KMI SI training with Tom, James and Larry Phipps and very quickly recognised James' strengths as a teacher and educator.

Tom is wonderfully inspiring and taps into his wealth of experience in this field. James has a wonderfully engaging and studied approach to teaching … he has a rare clarity that is delivered in a relaxed, humorous manner and has that ability to convey difficult concepts in a way that is easy to comprehend. It is that that I seek to emulate in the classes I teach myself now … [note to self; still a work in progress!]

Within my KMI SI training I experienced a couple of moments that have stayed with me over the years - an idea that the Anatomy Trains concept had more value in understanding movement than was being presented at that time was one of them. The other came out of my wide background in movement; those experiences led me to question what is 'integration' - how do we define it, what are the steps needed to achieve it, what does it look like?

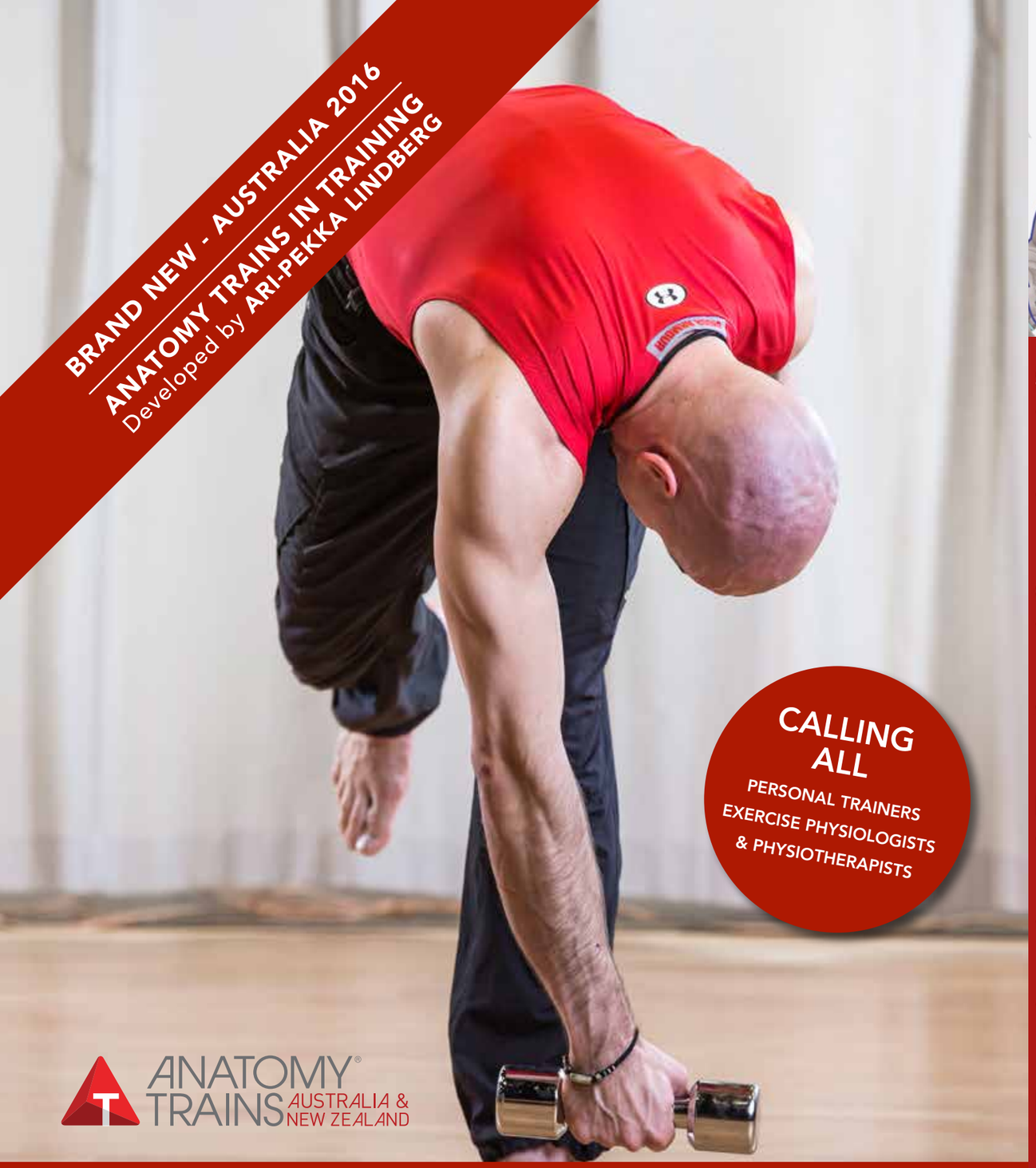
In recent years, James, as we all know, wrote the book Born to Walk and the ideas and material presented there have, for me, been as valuable to my appreciation of this work as those that I have received from Tom.

The notion of the body as a tensegrity structure is, I think, getting more and more accepted in our world but if we take the tensegrity body into movement, we start to see that rather than creating movement, the muscles control it. The muscles are fine-tuning the responses, minimising the forces the system receives, and allow us to exploit the potential to capture elastic energy. In order to do that, the understanding of the interplay of the bones, their joints and the myofascial system is key to an appreciation of what integration means and looks like. For me, James' contribution to our curriculum gives us the tools to help see/feel where that is and is not happening in the system of the person we are working with … and it is this perspective that I most enjoy teaching.

I am very much a manual therapist but in recent years I have become increasingly fascinated in how we can integrate manual and movement therapies and how form and function come together. My interest in movement is not the 'performance' end of the spectrum … it lies wholeheartedly in what basic essential events and properties are required to be in place for the system(s) of the body to work well and allow our bodies to be efficient at biomechanical auto-regulation … for it is there that we find resilience, adaptability, grace and poise.

I am intrigued by the complexity of the 3-D shape puzzle that leads to each of our individual structure and function outcomes. Alongside this lies a passionate interest in the timeline of where we have collectively come from in evolutionary terms, of the individual personal story we each have (I actually wanted to write '4-D' above, as that element of time is important to me) and of the future potential within the transformative process that can occur through the easing of restriction patterns, improved structural relationships and of reconnecting to the inner awareness of the body.

Don teaches Anatomy Trains & all of the FRSB workshops regularly in the UK, Norway and Hungary (amongst other places) and is looking forwards to joining Julie Hammond for the Structural Bodywork Certification Module in Sydney, Australia at the end of the year.



BRAND NEW - AUSTRALIA 2016

ANATOMY TRAINS IN TRAINING

Developed by ARI-PEKKA LINDBERG

CALLING ALL

PERSONAL TRAINERS
EXERCISE PHYSIOLOGISTS
& PHYSIOTHERAPISTS

ANATOMY TRAINS AUSTRALIA & NEW ZEALAND

ARI-PEKKA LINDBERG

the only Certified Anatomy Trains in Training Teacher in the world is coming to AUSTRALIA!

ROCKINGHAM, PERTH WA
25th - 28th November 2016

CAMPERDOWN, SYDNEY NSW
1st - 4th December 2016

EARLY BIRD OFFER

$900 by 10/09/16
$1,100 thereafter.

info@anatomytrainsaustralia.com | www.anatomytrainsaustralia.com

ANATOMY TRAINS AUSTRALIA & NEW ZEALAND

September:

- **FRSB Tensegrity Spine**- Perth
  3rd,4th & 5th September, 2.5 days
  Julie Hammond
- **FRSB Tensegrity Spine-** Sydney
  10th,11th & 12th September, 2.5 days
  Julie Hammond

October:

- **FRSB Shoulders and Arms**- Perth
  8th & 9th October, 2 days
  Julie Hammond
- **FRSB Shoulders and Arms-** Sydney
  15th & 16th October,2 days
  Julie Hammond

November:

- **FRSB Head,Neck and Jaw**- Perth
  5th & 6th November, 2 days
  Julie Hammond
- **FRSB Head, Neck and Jaw**- Sydney
  12th & 13th November, 2 days
  Julie Hammond
- **Anatomy Trains in Training** - Perth
  25th, 26th, 27th & 28th November
  Ari- Pekka Lindberg

December

- **Anatomy Trains in Training** - Sydney
  1st, 2nd, 3rd & 4th December
  Ari- Pekka Lindberg
- **KMI part 2- Structural Balance Certification Module-Sydney**
  2nd - 5th Dec, 6th & 7th off, 8th - 11th Dec- 8 days
  Don Thompson and Julie Hammond

Julie Hammond

Don Thompson

Ari Pekka Lindberg

For more information, email: info@anatomytrainsaustralia.com