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TAI CHI & FASCIA

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Tai Chi, Fascia & Biotensegrity

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“Fascia forms a continuous tensional network throughout the human body, covering and connecting every single organ, every muscle, and even every nerve fibre.” (1)



“The world is full of obvious things that no-one by any chance ever observes.” Sherlock Homes

Research into the role fascia as an effective means of understanding the physical reality of the body is still a recent thing but is rapidly gaining much credence in the realms of musculoskeletal and movement therapies and sports science. For practitioners and teachers of Internal Martial Arts such as Tai Chi it is really worth looking at and acquiring an idea of the basics, which I will briefly outline here, for there are some stunning similarities between them and perhaps you will be able to observe some correlations in your own training. (2)



Before Anatomy Trains there was Chen Tai Chi. This image, taken from 'Chen Xin's Illustrated Canon of Chen Family Taijiquan' (1933) shows the spiral line of fascia that courses through the body.

That the human body moves and functions as a single unit, so well illustrated by research into fascia and biotensegrity, has in fact been well known by Tai Chi players for hundreds, if not thousands, of years. Tai Chi training principles are based not upon intellectual theory but a long history of direct experience gained through highly perceptive movement research, acute empirical observation of natural phenomena (such as the laws of physics) at both micro and macro levels and rigorous proof testing through application (self-defence/fighting). All of this eventually culminated in a most natural and optimal way to train the human body and mind for health and martial arts that we know and love as Tai Chi.

It is a huge misconception that Tai Chi consists only of slow movements most suitable for the elderly or comprises a pseudo-spiritual pursuit. Nothing could be further from the truth. First we train slowly and smoothly to develop accurate perception (this requires a calm mind), body coherence and balanced, connected strength. Once these basic requirements are well established we train for speed and power but with an intelligent and calm foundation that we continually work on and seek to improve.

Balanced, relaxed, whole-body movement forms the core principle of all good Tai Chi practice and vastly contributes to its superb efficacy in not only optimizing health and all bodily functions but also as a method for developing superb movement, power and 'whole-body' strength without damaging the body on the way. If you consider it carefully, to have this as the key fundamental premise for how one trains makes more sense than many other approaches, for when a system is integrated it will be optimal, adaptive and harmonious in its functioning (3):

"From one principle come ten thousand movements" Chen Xiao Wang (4)

"When one part moves, all parts move; the whole body responds" Tai Chi Classics (5)

So let's get back to fascia. Fascia is primarily made up of densely packed collagen fibers that comprise an integrated system of sheets, chords and bags that permeate the human body in its entirety. This three dimensional fascial web is jam packed with mechanoreceptors and essentially forms a 'global' sensory organ which richly communicates where we are in space, what our bodies are doing and most importantly, how they are doing it. Fascia is elastic in nature and exhibits this

quality even more so when in good condition facilitating connected and fluid movement. It responds to the continuous force of gravity around which it organizes bodily structure and function; if you can imagine wearing an elasticated wet-suit that permeates your body entirely, adapted and yet ever adaptive to how you most commonly use your body then this may give you some idea of this incredible stuff. Although most of us are not aware of it, to extend out a limb results in a corresponding stretch across the whole fascial 'body-suit' priming the body to recoil in one elastic and fluid motion. Whether we run, jump, walk or do Tai Chi a large part of the energy of that movement comes from the elastic recoil and spring-like properties of fascia. Similarly, the Tai Chi classic texts state that:

“When storing energy it is like a drawing a bow, when releasing energy it is like shooting an arrow.” (6)

Incredibly, it has been discovered that the fascia of humans has a similar kinetic storage capacity to that of Kangaroos! (7) Fascia has long been ignored until recent years being seen only as a kind of unimportant bulking agent of the body. However, anyone deeply engaged with any kind of movement practice who has developed the above-average level of body-awareness necessary to do so is likely to agree that the usually favored isolated muscle presentation as the be all and end all of movement anatomy leaves much to be desired. While some may find it intellectually pleasing to categorize and separate the human body, its actions and functions into disparate bits, it in fact operates and is organized as a unit of function; an integrated whole. (8) The human being grows organically from a single egg and so from conception to expiration this single unit operates inextricably. (9) Separating movement into discrete functions fails to provide an accurate or useful picture of the seamless integration and responsiveness seen in and experienced by a living body. Fortunately, fascia is here to fill the gap:

“...that the complexity of human movement and stability can be derived by summing up the action of these individual muscles is a naive and reductionist conviction.” (10)

The general consensus has been to think of only one or two muscles participating in any given movement but no matter how common this misconception may be the reality is that any movement is essentially a whole-body movement. For movement is not simply the mere coordinated bending of separate hinges but instead expansion, repositioning and contraction of the tensegrity of the body as a whole via the fascial web. (11) So the Tai Chi classics were certainly on to something when they told us that if one part moves, the whole body responds *'like a string of pearls connected by interwoven threads of silk.'* (12)

At school we learn to intellectually divide the body into the skeletal, muscular, nervous and circulatory systems, etc but the only tissue that can facilitate the integrated responsiveness humans possess is fascia.(13)

This 'living matrix' is in fact the most abundant component of human matter and forms the bulk of the human body and as such is probably worth paying some attention to. The overall form of the body, as well as the architecture, mechanical and functional properties of all its parts, are largely determined by the configuration and properties of fascia. (14) For example, we have long assumed that the skeletal system holds the body up and that our muscles hang off the skeleton and that specific muscles move the bones in isolation. In reality however, bones float in a three dimensional mass of soft-tissues, their positions determined by the tensional balance or tensegrity of the entire fascial web and thus it is this web that actually comprises our body structure.

It is mainly due to our distinct lack of body awareness and an incorrect, intellectual understanding of movement that we do not experience the body in this way and thus capitalize on it's inherent, natural

attributes. For usually when we exercise we immediately try to force the body to change in some superficial way rather than learning how pay attention to what it does naturally without interference, intervention or biased-control. It is the ability to pay attention accurately which allows us to discover the inherent structure of our human form, something that is with us whatever we are doing, whether we are 'exercising' or standing in a queue at the supermarket. What more sensible first port of call could there be to commence your training?

It is very curious that even in the typically touted holistic practice of Yoga most practitioners seem bent on achieving controlled aesthetics. Most postures have no relation to good bio-mechanics or whole-body movement and are counter productive to the development of a resilient, elastic body structure that is vital for optimal movement.



All good movement is enjoyable, relaxed, whole-body movement. Isn't that a good premise to start training from? Photo of Skating Legend Ben Moor-courtesy of Daniel Turner

A body that exhibited tensegrity in an optimal way would be tensionally balanced in all directions under the reliable and constant pressure of gravity. This, incidentally, is the first basic and ongoing (there isn't a fixed finished product) goal in Tai Chi training and forms the foundation for all subsequent movement. The Tai Chi classics point to this when they say that in our training, specifically regarding how we move, we should seek:

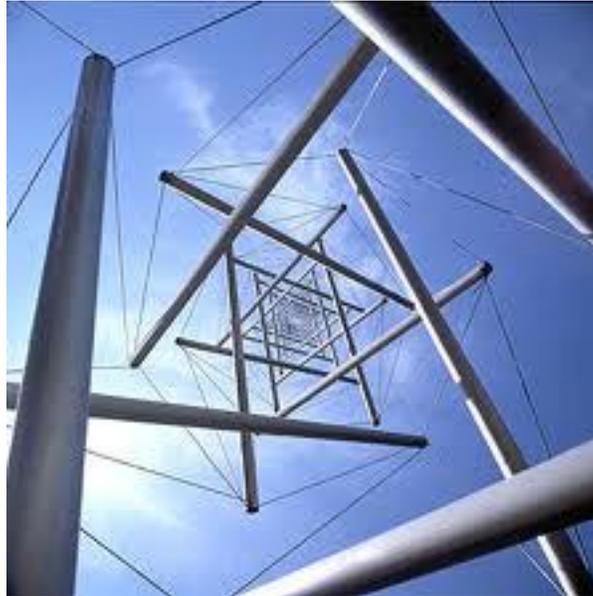
"No hollows and no protuberances. No deficiencies, no excess" (15)

And in regards to perceiving and maintaining such balanced, structural integrity in every movement:

"When there is up, there should also be down, When there is forwards, there should also be backwards. When there is left, there should also be right. When there is opening, there should also be closing" (16)

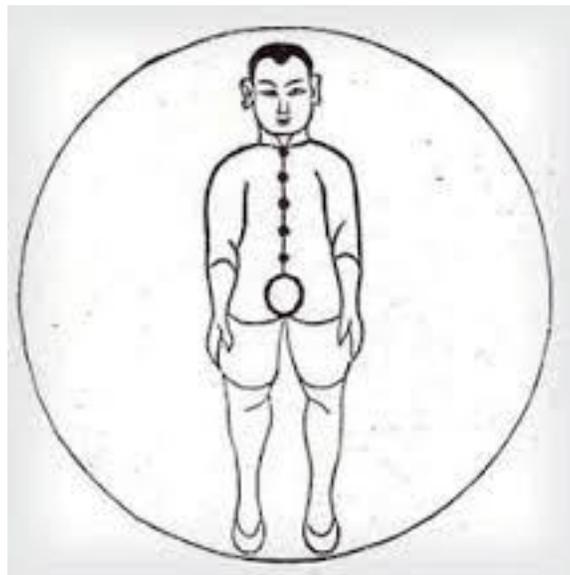
This concept of Tensegrity also known as Biotensegrity (17) is a phrase coined by the designer R. Buckminster Fuller. Tensegrity structures, such as the human body, distribute forces and movement throughout the system via the spring-like fascial web rather than being dealt with locally as they are in lever systems:

“The word ‘tensegrity’ is an invention: a contraction of ‘tensional integrity’. Tensegrity describes a structural-relationship principle in which structural shape is guaranteed by the finitely closed, comprehensively continuous, tensional behaviours of the system and not by the discontinuous and exclusively local compressional member behaviours. Tensegrity provides the ability to yield increasingly without ultimately breaking or coming asunder” R. Buckminster Fuller (18)



A man made tensegrity structure.

The classics suggest that through Tai Chi training our bodies can be so well tuned in this way that even a fly alighting from one part of the body should set our entire structure in motion – we should perceive all nuances of movement and indeed external forces as distributed through the whole. (19) Chen Xiao Wang often states that in all of our training we should constantly seek ‘balance in all directions’ and thus develop what he calls ‘all-sided support’. He is, of course, referring to the facilitation of the inherent biotensegrity of the human body as a most sensible basis for movement.



Hundreds of years before the word biotensegrity was even coined, Tai Chi players were bang on it. Another illustration from Chen Xin (1849-1929) shows the human structure as a sphere – the most economical and useful of shapes.

Tensegrity reverses the centuries-old concept that the skeleton is a frame upon which soft-tissue is draped and replaces it with an integrated fascial fabric with floating compression elements enmeshed within the interstices of tensional elements. (20) One feature of this fascial body structure is that it never stops adapting to how we use it most; the body has a great capacity for structural change at any age so we always can keep learning and improving. (21)

To me, Tai Chi is the science of optimal human movement and being. Through the process of our training we seek to discover and develop 'global' or whole-body awareness, connection and movement that is balanced, organised and integrated through the centre of the body. Learning about fascia can help us achieve this, but of course just having an intellectual understanding will not even nearly suffice. First to actually discover a direct sense of this whole-body connection and movement and then to augment what occurs naturally is our ongoing aim.

Right from the start, in the warm-ups and basic exercises that beginners often find tedious, and throughout all aspects of our training should we seek to observe the simplicity of whole-body integration. For once you start to get a sense of the golden feeling of whole-body movement, all training becomes a real pleasure that is sweet like honey. Not some kind of chore to blindly flagellate ourselves with. Even basic movements like warming up specific joints should always directly relate to the whole and we can find out how by acutely focusing the mind on the physical job in hand firmly cementing the inextricable link between mind and body:

“The skin is no more separated from the brain than a surface of a lake is separate from its depths; the two are different locations in a continuous medium...The brain is a single functional unit, from cortex to fingertips to toes. To touch the surface is to stir the depths.” (22)



There is a great deal to be learned from looking at nature – a quiet mind allows us to fully observe and take it all in

A good way that we can discover and develop these principles is whilst training something very simple such as the maintaining of a simple 'neutral' standing posture as in Zhanzhuang (standing meditation, it's simple and brilliant – learn it from a decent teacher). The absence of deliberate movement focuses the mind into the body and heightens the senses. This allows us to discover and thus relax the restricted and unfelt areas of our body structure, which for most people, especially in the beginning, comprises the majority. This way we can improve our direct sense and functioning of the whole fascial net.

With regular practice we can perceive steadily more and start to clearly experience the body as a balanced and connected unit. As we progress to simple movements we see if we can perceive and

achieve the same level of integration; do we feel the elasticity that fascia imparts to our movement? Can we feel the spherical nature of our tensionally balanced form? From here we progress to training more complicated movements, a Tai Chi form for example, and it is much more difficult to allow the same principles to come to fruition. It is an ongoing process and any deviations that we might discover can be resolved by taking a step back to the preceding basics and ironing out what seem to be current discrepancies:

“Learning Taijiquan means to educate oneself. It is like slowly advancing from primary school to university. As time passes, more and more knowledge is gained. Without the foundations of primary school and secondary school one will not be able to follow the seminars at university.” Chen Xiao Wang (23)

The properties of fascia mirror many aspects of how we approach training in Tai Chi and allows us a more contemporary way of understanding what we do. The important point is that not only do we normally fail to understand that the body functions as an integrated unit on an intellectual level but also on an experiential level; surprisingly low levels of body awareness or body-intelligence are the norm in our society, even (and often especially) in the very active. We tend to rely on our arms and hands and it is here that most of our awareness lies. If we were to think of the archetypal image of strength we would probably see an arm with a bulging bicep in our mind's eye rather than a body in its entirety well connected, balanced and integrated. Remembering that the body moves as one unit, supported by our understanding of fascia, can help us keep on the right track with our training rather than being distracted by what we consider to be separate parts.

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