Dynamic Chiropractic

SOFT TISSUE / TRIGGER POINTS

Anatomy Texts Got It All Wrong

Warren Hammer, MS, DC, DABCO

Almost all of the major anatomical textbooks - Netter's *Atlas of Human Anatomy* and *Gray's Anatomy,* for example - show beautiful photos and illustrations of muscles attached to bones. Unfortunately, based on this type of muscular description, they are describing only part of a structure and giving the impression that this represents the muscle in its entirety. What is being left out is the part of the muscle that transmits its force and even more importantly, the part of the muscle that allows it to function.

As stated by Jaap Van Der Wall, MD, PhD,[1] at the last fascial conference in Amsterdam, the most important part missing in the term *musculoskeletal system* is the connective tissue. For years, anatomists have been cutting away an essential portion of the muscles: the fascia. Many muscle fibers insert into intermuscular and epimysial fascia without being attached directly into bone.[2]

Van Der Wall has been a gross anatomist for 40 years and contends that anatomists dissect to find joints, muscles and ligaments, and dissect with preconceived notions. They "dissect what they have in their mind and lose the continuity of the tissue." When they clean muscles, they remove its functional quality. They cut away the connective tissue as if it doesn't exist.

For example, the antibrachial fascia is an inserting area for the underlying muscle fascicles; this is the case in most areas throughout the body. Besides serving as an attachment for muscles, fascia allows sliding and gliding of muscles and tendons against each other and other structures.[1] Another major function of the fascia has to do with proprioception.

Van Der Wall's PhD thesis was based on the dissection of the rat elbow. He found that rather than muscle fascicles inserting into the lateral epicondyle, as all anatomy books state, they insert into a complex connective-tissue structure. With regard to the elbow ligaments, his students said that during dissection, they could not find the ligaments; Van Der Wall agreed with them. These ligaments are created in the minds of the anatomists.

There are no actual collateral or annular ligaments since the tissues are all part of a complex structure. Van Der Wall states that in special situations, for example, the cruciate ligaments are considered true ligaments. The usual definition of a ligament is one that restricts motion in a particular direction. Van Der Wall states that ligaments, especially in the elbow, are considered by anatomists as structures that can only guide forces in a particular position of the joint and are passive, while muscles transmit the force. He can't believe that evolution would be so inefficient and allow a structure to be only functional in one particular joint position.[1]

The ligaments are not separate structures. Instead, there is a complex connective-tissue apparatus. The connective tissue and the muscle tissue function as one and help to keep joints together in every position of the joint. Van Der Wall feels that connective tissue and muscles are organized in series, rather than being parallel, so that even the so-called ligaments are functional in all positions.

This theory debunks the whole concept of distinguishing between passive and contractile structures as originally taught by Cyriax around 60 years ago. But the idea that a simple insertion into bone is unusual was even expressed in 1985 when Briggs and Elliott[3] dissected 139 limbs from embalmed specimens to reveal the attachments of extensor muscles in the area of the lateral epicondyle. On only 29 limbs did they find a direct attachment of the ECRB to the lateral epicondyle. In all the other limbs, the ECRB had attachments to the extensor carpi radialis longus, extensor digitorum communis, supinator, radial collateral ligament, orbicular ligament (if there are elbow ligaments), the capsule of the elbow joint and the deep fascia.

Regarding proprioceptors such as spindle cells, golgi tendon organs, and free nerve endings, rather than describing them as anatomically located in capsules, ligaments, tendons and joints, Van Der Wall1 states that they should be described according to the architecture (universal overall structure) of the tissue. "Muscle spindles and GTOs are mostly concentrated in areas of muscular tissue directly intermediating distal and proximal regular dense collagenous connective tissue structures." These mechanoreceptors occur often in muscle/connective tissue transition.

Stecco[4] states that muscle spindles are embedded in the endomyceum and perimyceum, and that if fascia is too rigid, it may alter the stretch of the muscle spindle and adversely affect its normal firing. Fascial restrictions may also create an adverse effect on the free nerve endings, which also function as mechanoreceptors - resulting in changes in tissue viscosity,[5] especially when the restricted fascia is overstretched. Densified fascia could alter afferent signals, resulting in muscle incoordination along the myokinetic chain and causing abnormal biomechanics, eventual abnormal muscle compensation and pain.

Regarding the term *myofascia*, it is becoming most evident that we cannot separate the two. What is also evident is that fascia can be deformed my manual loading, whereas muscle does not equally respond.

References

1. Van der Wall, J. The Architecture of the Connective Tissue in the Musculoskeletal System - An Often Overlooked Functional Parameter as to Proprioception in the Locomotor Apparatus. In *Fascia Research II,* edited by Huijing PA, Hollander P, Findley TW, Schleip R. Conference Proceedings of the 2nd International Fascia Research Congress: Elsevier, 2009.
2. Mameren Hv, Drukker J. A functional anatomical basis of injuries to the ligamentum and other soft tissues around the elbow joint. Transmission of tensile and compressive loads. *Int J Sports Med*, 1984;5:88-92.
3. Briggs CA, Elliott. Lateral epicondylitis: a review of structures associated with tennis elbow. *Anat Clin*, 1985;7:149-153.
4. Stecco L, Stecco C. *Fascial Manipulation; Practical Part.* Piccin: Padova, Italy, 2009.
5. Schleip R. Fascial plasticity - a new neurobiological explanation. *J Bodywork Movement Therapies*, 2003;7(1):11-19.

JANUARY 2011