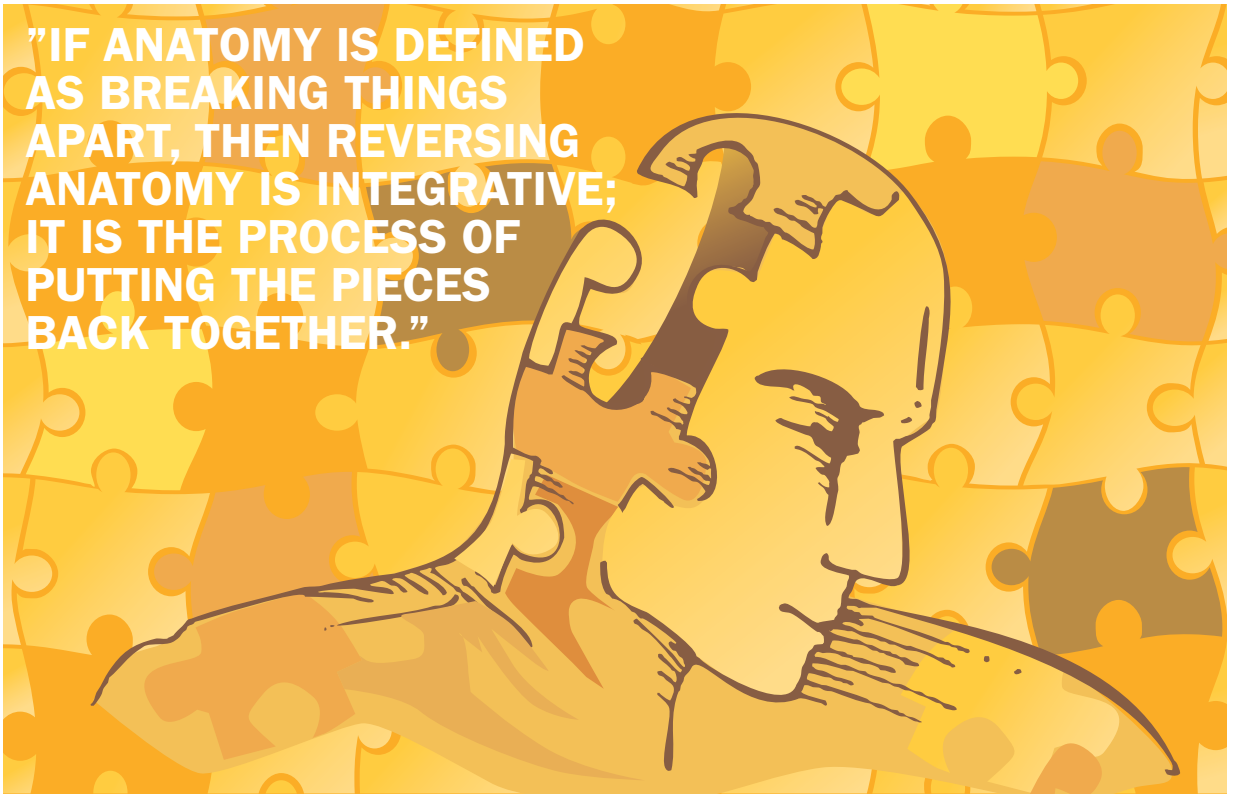


reversing anatomy: from muscles to myofascial meridians

As massage therapy continues to carve out its rightful niche in the world of integrative health, the responsibility to better know anatomy and physiology increases. Successful clinical orthopedic work cannot be accomplished with the application of memorized treatment technique routines. Rather, it requires critical thinking that is only possible with a true understanding of the principles of anatomy and physiology of the human body. Understanding these principles enables us to apply them to the specific circumstances of the client who is on the table, allowing for competent assessment and treatment.

ANATOMY AND PHYSIOLOGY

Anatomy is the study of the structure of the body, and physiology is the study of the body's functioning. These are not the same things, but they are certainly related. It's the anatomic structure that determines the physiologic functioning of the body. Two musculoskeletal examples: 1) It is the rigid structure of a bone allows it to function as a lever, and 2) It is the presence of parallel actin and myosin filaments with cross-bridges between them in muscle tissue that allows for the sliding of one filament along the other, creating the functional pulling force of muscle. Given that function follows from structure, structural anatomy is usually studied first so that physiologic functioning can then be understood.

THE CUTTING UP OF ANATOMY

However, learning anatomy is usually a daunting task for students and therapists because it's basically a naming game, with thousands—if not tens of thousands—of names to learn. We cut the body up into smaller and smaller pieces, which are each named, usually with Latin root words. In fact, the term anatomy itself comes from the Latin-based roots *tome* and *ana*, which literally mean *cut up*. This is appropriate because it perfectly describes the origins of anatomy training, where a cadaver was cut up into pieces and the pieces were named.

This method of anatomy training still exists today, and for all its faults, is likely necessary. After all, it's impossible to present the entire human body to a student or therapist, and simply say "Here it is. Know it." To make this study feasible, we need to divide the body into smaller chunks of content so that they are more easily learned by the student.

The inherent risk involved with our approach to anatomy is that the more we divide up the body, the

more likely we are to lose sight of the bigger picture, where individual structures are interwoven to function together. In a sense, we risk ending up with thousands of jigsaw puzzle pieces, each one learned and committed to memory, without a good understanding of the picture they form.

This is certainly true when learning the muscular system. Learning muscles usually involves just that: learning each individual muscle one at a time, separate from the others. If our instructor and textbook do not present the bigger picture of muscular structure within the body, however, we will have learned the names of many pretty jigsaw pieces without having learned how they fit together. True understanding of kinesiology (human motion) requires more than memorizing lists of individual muscles; it requires a level of understanding that can only come from seeing the bigger picture of muscle structure and function. From this understanding, the application to competent clinical orthopedic work follows.

STRUCTURAL AND FUNCTIONAL MUSCLE GROUPS

The solution involves proper framing of the content. Taking a step back and presenting a somewhat larger picture of musculature before studying the minutiae of individual muscles can be helpful.

Muscles can be organized into structural groups at a joint: these groups are located anteriorly, posteriorly, laterally, etc. When examining these structural groups, we can also relate them to their functions. For example, all muscles that cross the glenohumeral joint anteriorly with a vertical component to their fiber direction can flex the arm at the glenohumeral joint. Therefore, the structural group of anterior muscles (with a vertical orientation) is the functional group of flexors. Similarly, all posterior muscles oriented in this manner can extend the arm at the glenohumeral joint.

This reasoning can also be used for laterally oriented abductors and medially oriented adductors. Regarding rotations, all muscles that wrap horizontally around the glenohumeral joint on the anterior side can medially rotate the arm at the glenohumeral joint, and muscles that wrap horizontally on the posterior side can laterally rotate the arm at the glenohumeral joint.

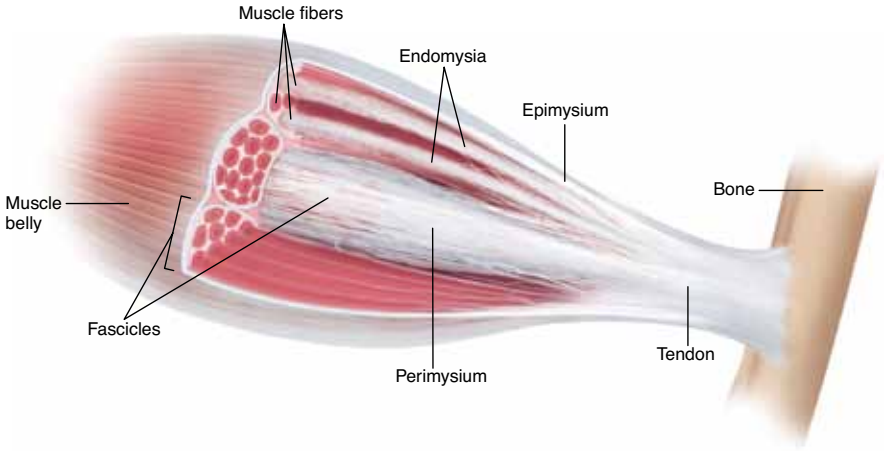
Pointing out these structural groups not only facili-

Figure 1. Fibrous fascia forms one continuous web that traverses and connects the entire body.

CREDIT: Paoletti, S: The Fasciae: Anatomy, Dysfunction and Treatment, Seattle, 2006, Eastland Press

Figure 2. The tendon (or aponeurosis) of a muscle is actually the coalescing of all the endomysia, perimysia, and the epimysium.

CREDIT : Illustrated by Giovanni Rimasti



tates our anatomic approach of learning the individual muscles by giving us a framework for their organization, it also immediately points out the anatomic/physiologic relationship between structural groups and functional groups, making critical and creative thinking possible.

"REVERSING ANATOMY"

With the big picture of functional groups at each individual joint presented first, we can now learn each individual muscle. When that's done, the next critical step is reversing anatomy.

If anatomy is defined as breaking things apart, then reversing anatomy is integrative—the process of putting the pieces back together. Now is the time to reassemble all the muscles that have been learned back into the big picture of the entire muscular system. This process is especially instructive now that we know and appreciate each individual jigsaw piece.

It's now possible to see the larger picture of all the functional groups of mover muscles throughout the body, as well as the interrelationship between the functional groups, such as whether they are mover/antagonist pairs or mover/stabilizer pairs, for example. This level of knowledge is truly important when looking to understand and assess postural and movement patterns in the human body.

FASCIAL WEBBING

However, the process of reversing anatomy does not stop here. Just when we think that we see the big picture, there is often an even *larger* picture to appreciate. This even bigger picture involves placing muscles into the fascial webbing that traverses the entire body (FIGURE 1). Looking at the muscular system in this manner requires us to look at patterns of muscle groupings that extend beyond the local joint(s) where, we learned, each of the muscle has its actions. To best understand how muscles fit into the fascial web of the body, we need to look at the body from the perspective of fibrous fascial connective tissue.

The term fascia literally means bandage. Like a bandage, fibrous fascia creates a web that wraps around structures of the body, providing a continuum that connects these structures to the rest of the body. The fascial web truly forms the structural framework that unites the entire human body.

Looking at the body from this fascial perspective, we can see that fascia provides the framework for all other tissues to form. If bone cells (osteocytes) lay down bone matrix within a fascial sleeve, a bone is formed within fascial periosteum. If nerve cells (neurons) are formed within fascial sleeving, the brain and spinal cord are formed within meninges, and peripheral nerves are formed within sleeves of endoneurium, perineurium, and epineurium.

MYOFASCIAL UNITS

In our area of focus, if muscle cells are created within