Cool Muscles

Confessions of an Anatomy Geek

By Dr. Joe Muscolino

The myofascial system is an incredible interweaving of tissues, the entirety of which is much greater than the sum of its parts. An analogy might be that the big picture of a jigsaw puzzle cannot be seen and appreciated until all the pieces of the puzzle are placed together in their proper relationship. In this light, each individual muscle functions as part of myofascial meridians and kinematic chains throughout the body. But each muscle also has its own role within this larger scope; therefore, there is value to explore and examine individual muscles.

But which muscles to choose? Although each muscle is important to the kinematic function of the body, there are some muscles that stand out—muscles that, as an anatomy geek, I can only describe as *cool*. What makes them cool? They each have something that is distinctive; something extraordinary only that particular muscle possesses.

Here, I offer an exploration of nine muscles on my cool list (and you'll find 11 more in the digital version of this magazine at massageandbodyworkdigital.com). I am sure many of the ones I have chosen would also be on your list. After all, who would not put the piriformis or psoas major on this list, right? But I will also cover a few muscles that might be underappreciated—those that on deeper examination also rightfully deserve the designation of being cool.

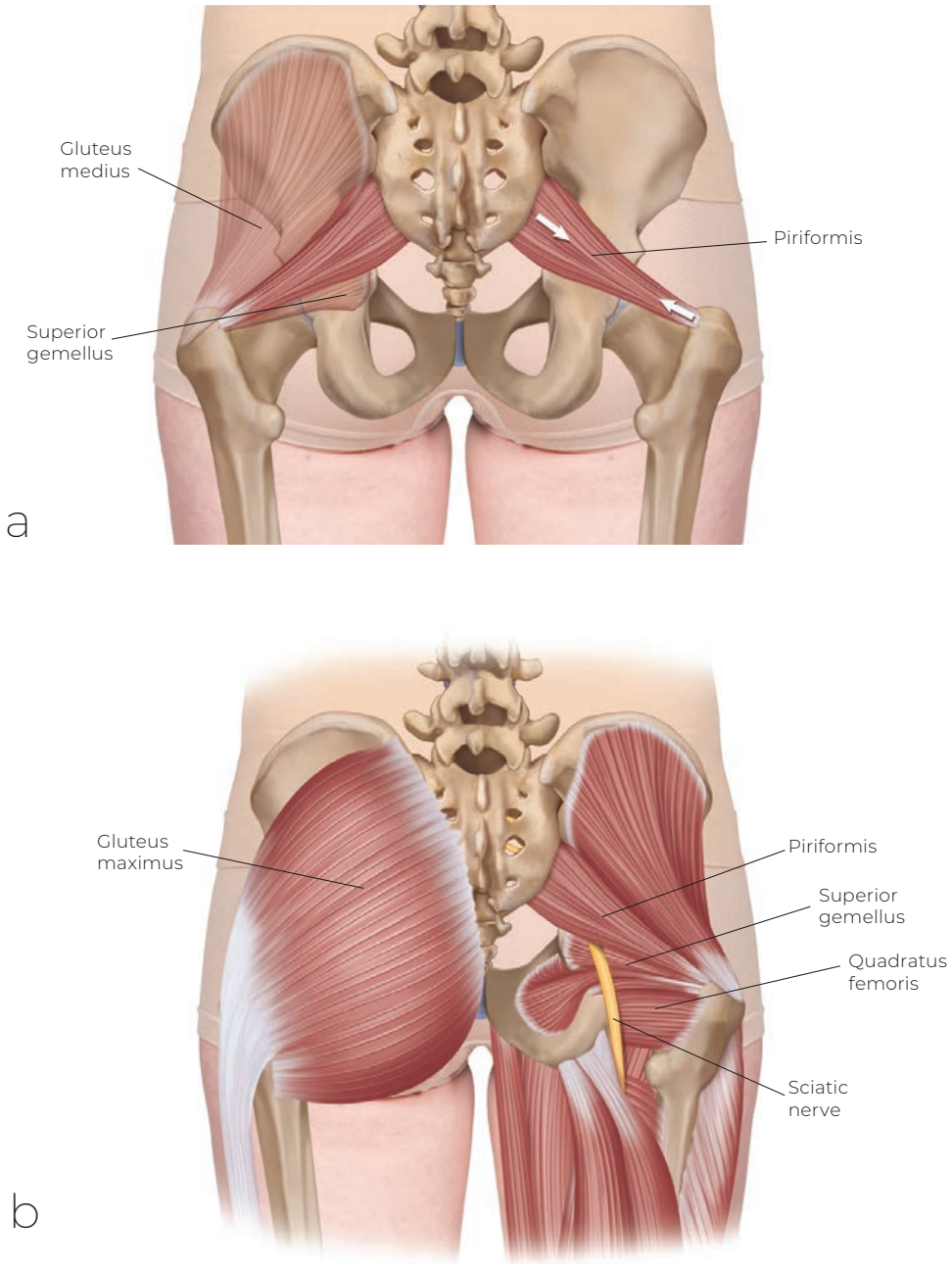
KEY POINT

- Individual muscles should be explored for what makes them distinct and extraordinary, in addition to their relationship to the kinematic function of the body.

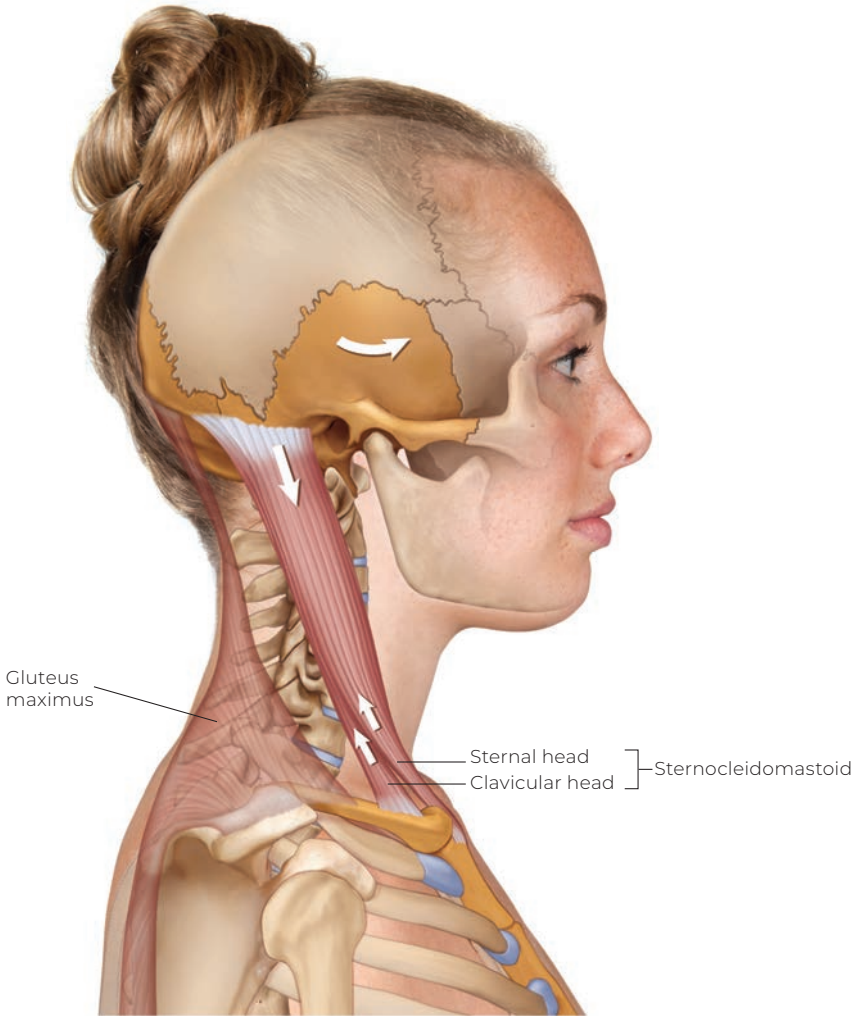
1. PIRIFORMIS

Let's start with one of the perennial favorites, the piriformis. What makes the piriformis cool? To begin, the piriformis is the only member of the deep lateral rotator muscle group (along with the superior and inferior gemellus, the obturator internus and externus, and the quadratus femoris) that also crosses the sacroiliac joint (SIJ), and therefore plays a role in SIJ function and dysfunction. In fact, it is often stated that the piriformis is the *only* muscle that directly crosses the SIJ. This is technically not true because the coccygeus and the superior deeper fibers of the gluteus maximus also cross the SIJ. But the piriformis is likely the most important of these muscles, and it is incredibly important for stabilization of the SIJ. As a result, the piriformis is often overused and tight when there is SIJ dysfunction; and similarly, when the piriformis becomes tight, it can then lead to hypomobility dysfunction of the SIJ.

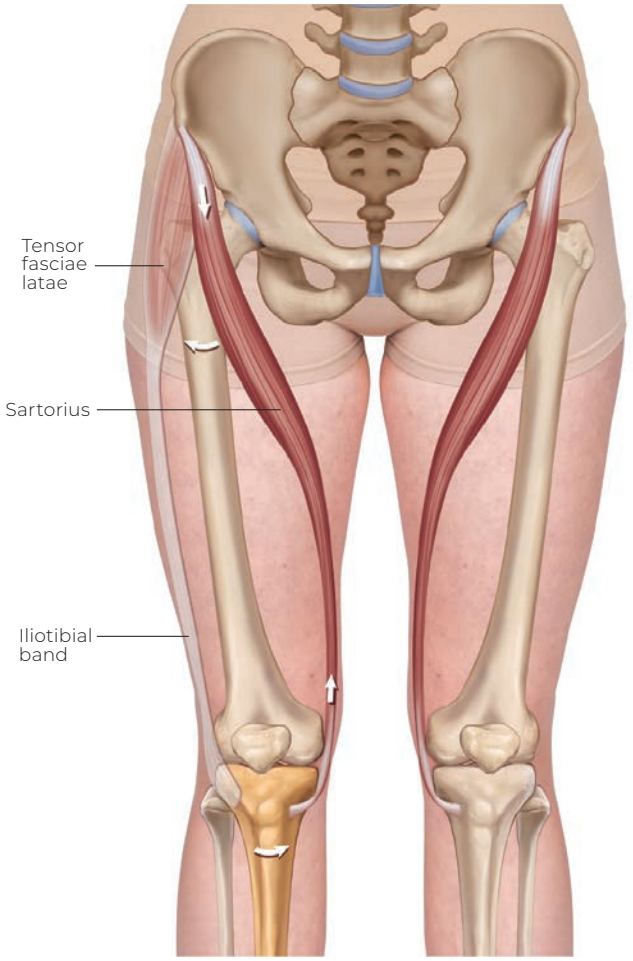
The piriformis has another feature that makes it stand out. The sciatic nerve emerges from the internal pelvis through the greater sciatic foramen between the piriformis and superior gemellus into the gluteal region. However, there is a common anomaly in which all, or part, of the sciatic nerve (usually the common fibular nerve portion) emerges either through the belly of the piriformis or superior to the piriformis. The common narrative is that this anomaly can lead to compression of the sciatic nerve, causing sciatica, mimicking sciatic nerve compression by a pathologic disc. However, it would seem likely that a tight piriformis could cause sciatic nerve compression, regardless of whether there is a normal presentation of the nerve or the anomalous presentation.



Piriformis: Stabilizer of the sacroiliac joint and possible cause of sciatica. Posterior views.



2 Sternocleidomastoid (SCM): The SCM is located in both the anterior and posterior cervicocranial regions.



3 Sartorius: Anterior to posterior to anterior.

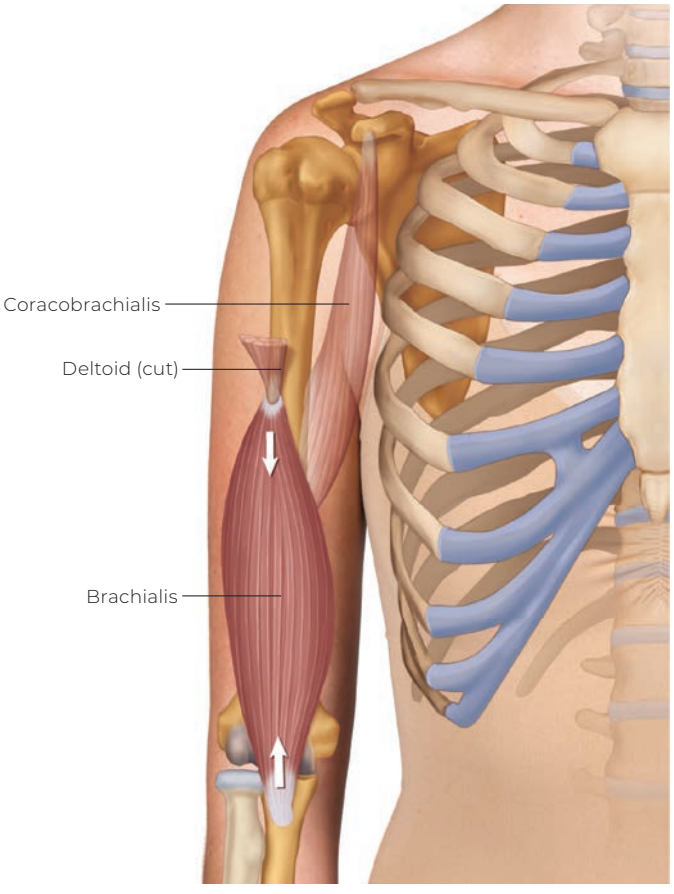
2. STERNOCLEIDOMASTOID

I include the sternocleidomastoid (SCM) in our group of cool muscles because of the sides of the body where it is located. Most muscles of the body cross joints on one side *or* the other. For example, when looking at sagittal-plane function, flexors of the neck cross the cervical spine in front; extensors cross the cervical spine in back. But the SCM crosses in front and in back. It begins anteriorly on the sternum and clavicle (as its name implies); therefore, as it ascends the neck, it crosses the cervical spine anteriorly. Its path, however, is not perfectly superior. Rather, it is superior and posterior, ultimately attaching to the mastoid process of the temporal bone (also implied in its name); therefore, the SCM crosses the upper cervical spine posteriorly. Due to its path, the SCM flexes the lower and middle neck but extends the head and upper neck (exactly where this division occurs depends on the posture of the person's cervical spine). Consequently, this gives the SCM a different role than the other neck flexors, such as the scalene and longus muscles. And, as a result, forward-head posture (which involves an overly flexed lower/middle neck with hyperextension of the head) and tight (locked short/overly facilitated) SCM muscles are intimately involved with each other.

3. SARTORIUS

The sartorius is well known by many therapists as being the longest muscle in the human body. It is also known for having a name that implies its joint actions. The name *sartorius* comes from the Latin word for *tailor*. Before the advent of sewing machines, tailors would sit in a cross-legged position. To attain this position, the thigh (from anatomic position) would have to be flexed, abducted, and laterally rotated at the hip joint, and the (lower) leg would have to be flexed at the knee joint . . . precisely the four major joint actions of the sartorius.

However, there is another aspect to the sartorius that makes it cool, similar in reasoning to the inclusion of SCM on this list, but even more dramatic. The sartorius attaches proximally on the anterior side of the pelvic

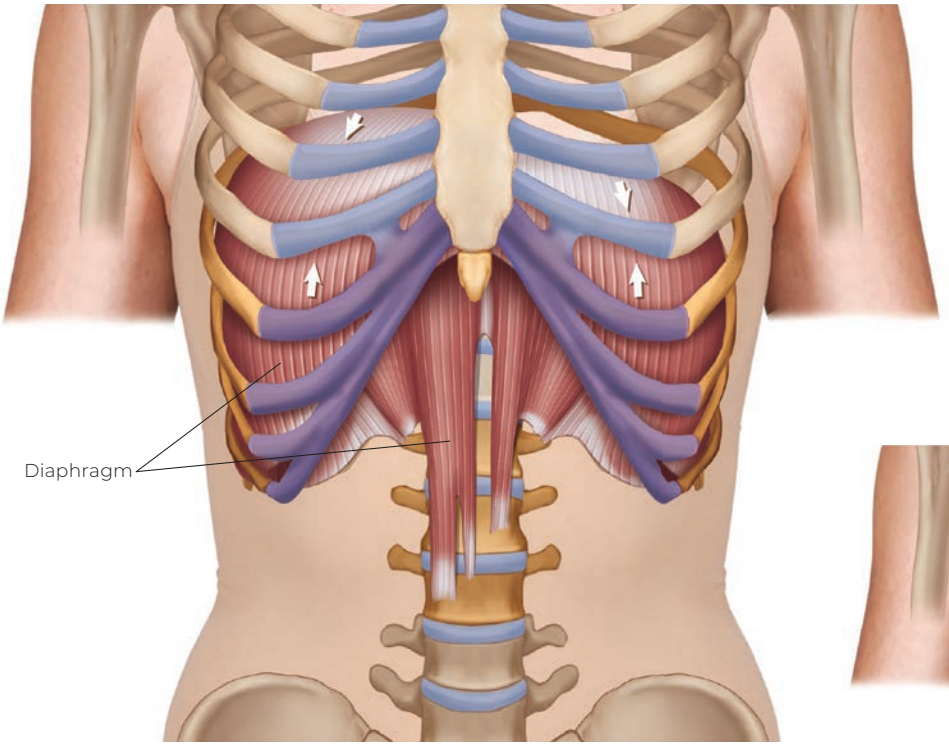


4 Brachialis: *Behind every great biceps brachii is a great brachialis.* a) Anterior view. b) Lateral view.

bone, travels distally to cross the knee joint posteriorly, but then returns to the anterior side of the body for its distal attachment onto the tibia. No other muscle in the human body has such an unusual path. The natural question is why? The answer lies in evolution. If we look at many quadrupeds (e.g., dogs, cats) who have a flexed position to their back legs, we see that the sartorius travels in a straight line. But when humans stood up to be bipedal, the fascia that held the sartorius in place continued to hold the fascia down against the body such that it now travels from anterior to posterior, and then back to anterior again. *Cool!*

4. BRACHIALIS

The brachialis is a simple muscle. It attaches proximally onto the humerus and distally onto the ulna. In doing so, it crosses the elbow joint anteriorly. And because the elbow joint is a uniaxial hinge joint, the action of the brachialis is simply flexion at the elbow joint, nothing more. For this reason, I love to start teaching muscle function by using the brachialis. Simple and elegant. And this is part of its coolness. But much of what makes me love the brachialis so much is its location, which (from an anterior perspective) is deep to the much-more-famous biceps brachii. Because the biceps brachii is more superficial, it gets most of the fame. But the brachialis is usually considered to be the stronger prime mover of elbow joint flexion. I always like to say: "Behind every great biceps brachii is a great brachialis." (Note—the more superficial gastrocnemius and the deeper soleus of the lower extremity have a similar relationship.)

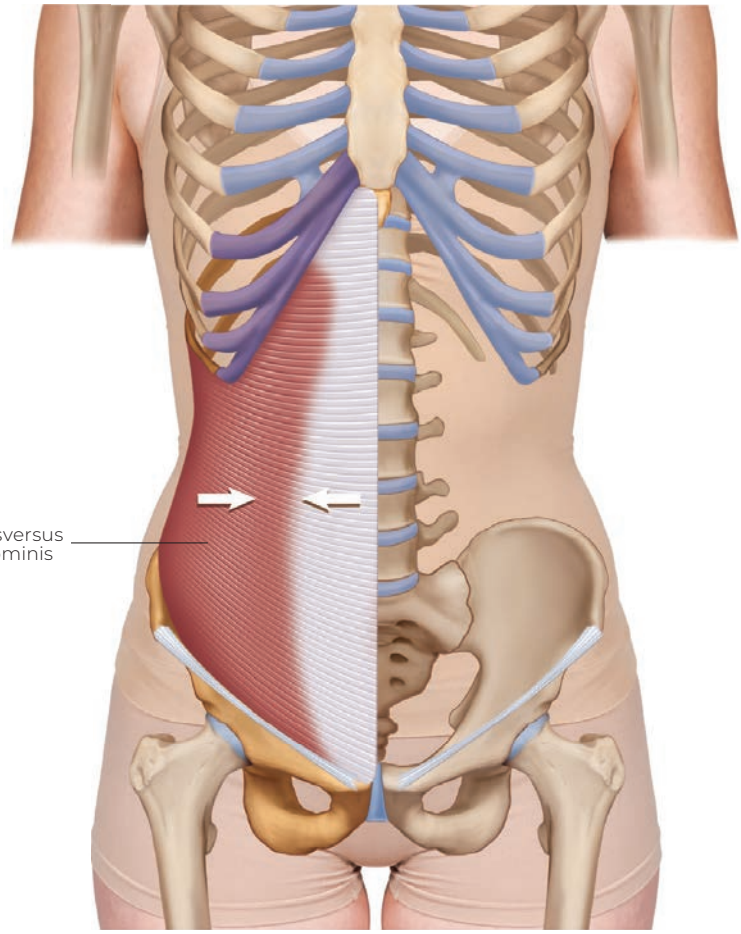


5 Diaphragm: Bilateral muscles under conscious and subconscious control.

5. DIAPHRAGM

The diaphragm is cool for so many reasons. First, it is the primary muscle of respiration. Although there are many accessory muscles of respiration that create forceful inspiration or expiration, contraction of the diaphragm is the only muscle needed for quiet inspiration, and relaxation of the diaphragm is sufficient for quiet expiration. Further, the diaphragm is under both conscious and subconscious control by the nervous system. We can "will" it to contract upon demand, but if we are sleeping or simply not thinking about it, subconscious nervous system control of the diaphragm will maintain its rhythmic contraction.

It is also cool how diaphragm function can create both abdominal (belly) and thoracic (chest) breathing. When its upper dome moves down toward the rib cage attachment, we have belly breathing; when its rib cage attachment moves up toward the upper dome, we have chest breathing. Finally, the diaphragm is distinctive in that it is usually described as being one muscle, but it truly is two muscles that join at the midline so there actually are right-side and left-side diaphragm muscles, as evidenced by by two separate (right-side and left-side) phrenic nerves.



6 Transversus abdominis: The abdominal core muscle, the powerhouse.

6. TRANSVERSUS ABDOMINIS

The transversus abdominis is a favorite muscle of Pilates instructors, and indeed all professionals who work with core stability, because it is one of the most important muscles of the core of the body—the powerhouse. The transversus abdominis, as its name implies, runs transversely across the abdomen of the body, in the anterior, lateral, and posterior abdominal walls. So,

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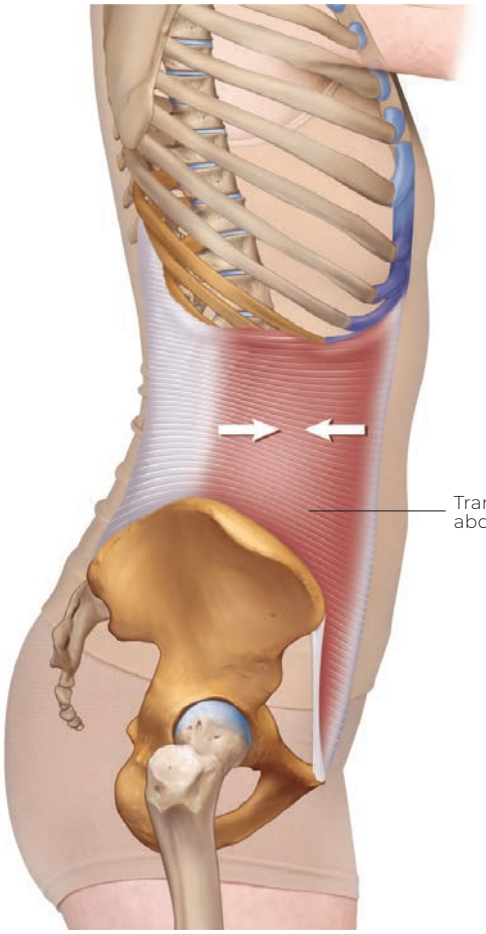

bilaterally, the two transversus abdominis muscles wrap around the entirety of the abdominal/lumbar region. Even though the transversus abdominis is a skeletal muscle, it actually has no skeletal joint action per se; in other words, it does not actually move a bone at a joint. Rather, its function is to pull in on the abdomen, tautening and stabilizing the abdominal/lumbar region.

7. PLANTARIS

The plantaris is a muscle with a lot of personality. I like to describe it as "the little muscle that can." It attaches proximally onto the femur, and then has a short belly that is only 2–3 inches long that crosses the knee joint posteriorly; it has a tremendously long ribbon-like tendon that travels the entire distance of the (lower) leg to cross the ankle joint and attach onto the calcaneus, right next to the calcaneal (Achilles) tendon. It is a small muscle from the distal femur that has the determination to make its way all the way down to the foot! A lot of pluck!

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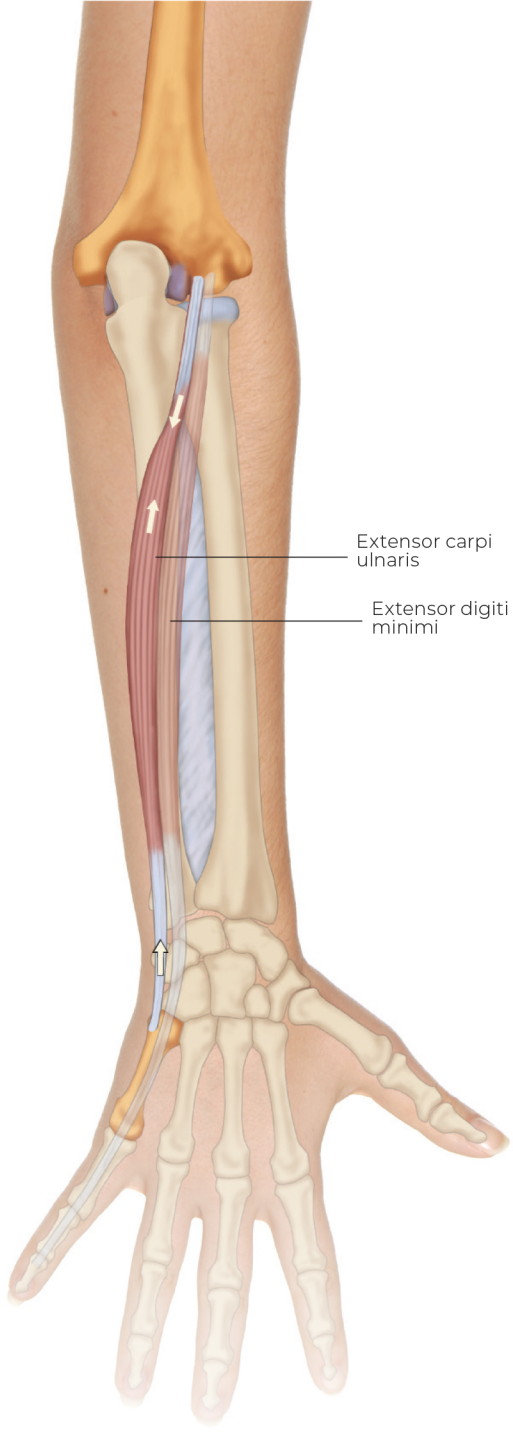
Plantaris: *The little muscle that can.*



8 Extensor carpi ulnaris: An often overlooked muscle.

8. EXTENSOR CARPI ULNARIS

I include the extensor carpi ulnaris (ECU) on this list for an unusual reason—because manual/massage therapists so often skip this muscle when working on clients. Therapists usually work the extensor compartment of the forearm with the client lying supine and the forearm pronated. But the ECU is situated right next to the ulna, a bit around the bend so to speak, so therapists usually do an excellent job of working the rest of the musculature of the extensor compartment, but often miss the ECU itself. This is a pity because the ECU is often tight. It is a cool muscle deserving of manual therapy treatment.

9. PSOAS MAJOR

For our final muscle under consideration, we have the psoas major, likely the most controversial muscle in the human body. Limiting our discussion to the sagittal plane, the psoas major is an important hip flexor that, when tight, can exert its (reverse-action/closed-chain) pull upon the pelvis, thereby increasing the anterior tilt of the pelvis. This changes what is known as the sacral-base angle, resulting in an increased lordotic curve of the lumbar spine, which then kinematically influences the sagittal-plane posture of the rest of the spine above. Therefore, through its pull on the pelvis, the psoas major, like all hip flexors, can indirectly affect spinal posture.

But the psoas major also crosses spinal joints directly, attaching as superiorly as T12, and can therefore directly influence spinal posture. Again, looking at the sagittal plane, the line of pull of the psoas major crosses the lumbar spine anteriorly, so it should flex the spine. For this reason, there is an argument made that sit-ups, especially the old-fashioned ones with the hips and knees straight, disproportionately strengthen and tighten the psoas major, which then increases anterior pelvic tilt, thereby increasing lumbar lordosis. For this reason, one paradox of psoas major function is that even though it is a spinal flexor, it can result in increased lumbar extension (lordosis is extension).

However, there is another level to the paradox of psoas major function that results in increased lumbar lordosis; its line of pull relative to the mediolateral sagittal-plane axis of motion for the lumbar spine can change with changes in posture of the spine. In typical anatomic position posture, the psoas major crosses the lumbar spine anteriorly. But if a person has a hyperlordotic lumbar spine, the line of pull of the psoas major moves posteriorly to cross the lumbar spine (especially the upper lumbar spine) posteriorly, thereby becoming an extensor of the spine. This adds to the paradox that is the psoas major. It can be both a flexor of the lumbar spine and an extensor.