

bodyreading the meridians

BY THOMAS MYERS

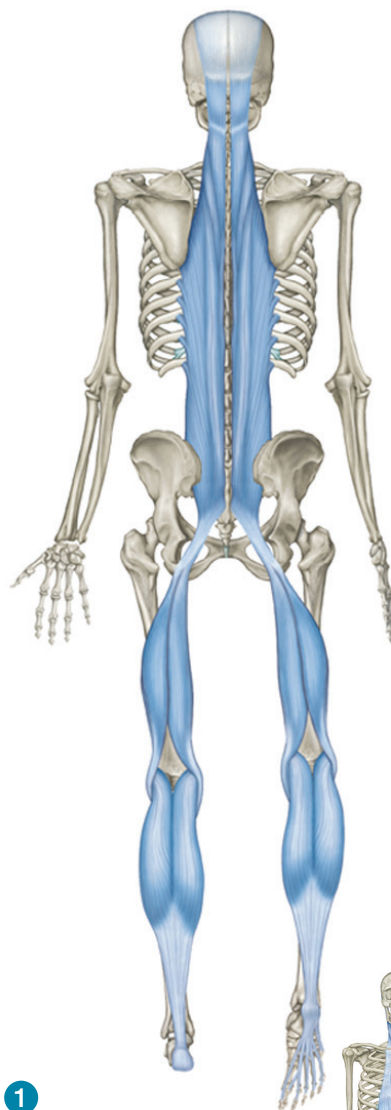


THE SUPERFICIAL BACK LINE

We are in the midst of discussing assessment of the Anatomy Trains Myofascial Meridians, the longitudinal linkages of the muscles through the fascial fabric. Last installment we aired several issues from the Superficial Front Line (SFL), which runs up the ventral side of the body from the top of the toes across the belly and chest to the sides of the skull.

This time we go to its complement, the Superficial Back Line (SBL), which is a coherent chain of force transmission from the underside of the toes along our entire dorsal surface—the legs, the back, and even over the head to the eyebrow ridge (Image 1A).

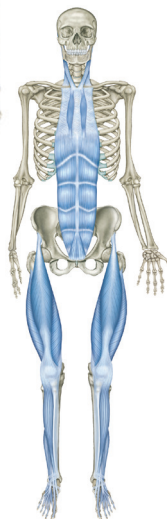
Next time, we will examine the Lateral Lines and assess imbalances between the two largely symmetrical left and right myofascial rigging along our sides. In comparing the front (SFL, Image 1B) and back (SBL), we are comparing two lines that must and do balance each other, but which are not, like the two Lateral Lines, mirror images of each other—not structurally, not even physiologically, and certainly not in their psychobiological meaning (Image 2).



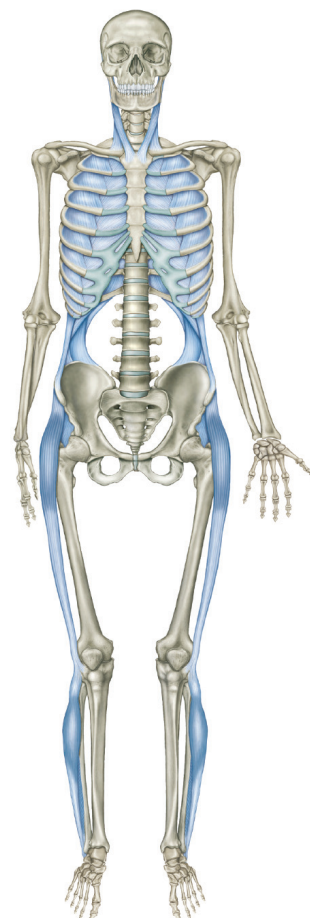
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A

The front and back myofascial meridians counterbalance each other across the sagittal fulcrum of the spine, but are not at all mirror images of each other.

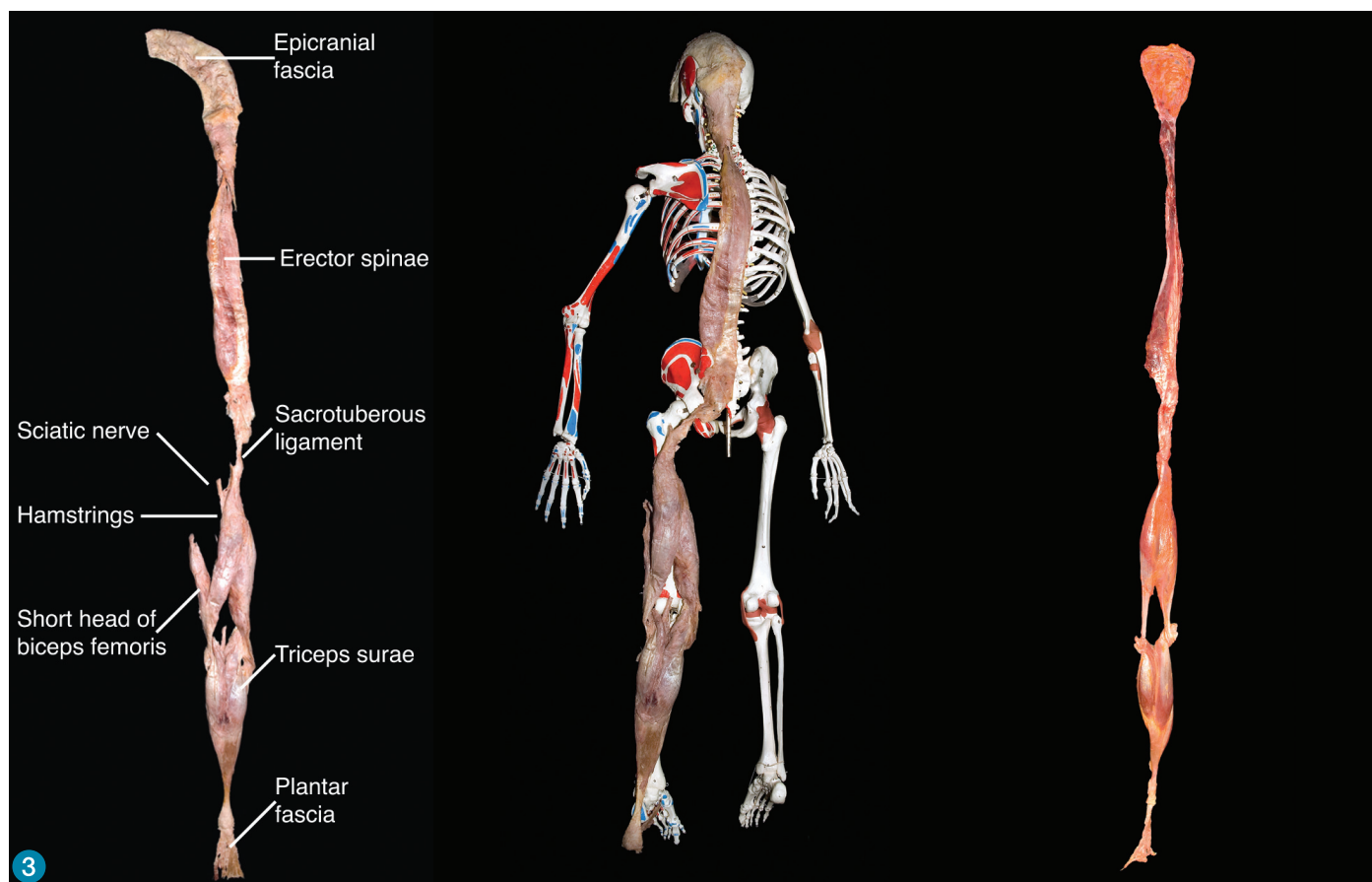


B



2

The two Lateral Lines also counterbalance each other, but with the same bones and soft-tissue structures on each side of the coronal fulcrum.



The Superficial Back Line is not an act of the imagination or simply a concept—it is a dissectible, real entity. Here we see: a) an embalmed specimen of the SBL as a whole—with labels on the familiar parts, b) the same specimen laid onto a classroom skeleton, and c) the same set of structures from a fresh-tissue dissection. The donor body was about 68 inches tall, but the SBL, once dissected away from the skeleton and laid out, was more than 90 inches long.

Let us begin with 1) the physiological differences—that will only take a minute. Then we can go on to 2) the structural layout of the SBL and the SFL-SBL balance—in other words, some anatomy and biomechanics, then into 3) a glance at the meaning the SBL has as a whole, and finally lay out 4) some flags to watch for in BodyReading the SBL.

WHAT IS THE SUPERFICIAL BACK LINE?

The SBL is a continuity of fascial fabric from the bottom of the foot to the top of the head (Image 3). Along the way, many muscles participate in holding this fascia—either shortening

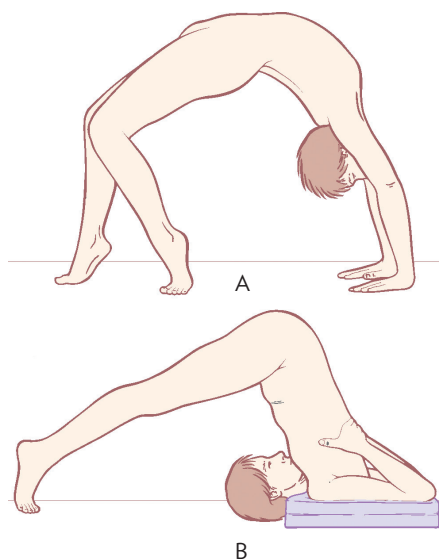
it or preventing the SBL's fascial guy-wires from getting longer. If we totally relaxed in standing, this back sheet of fascia would lose its tension and we would collapse more or less into the fetal position.

In the foot, the plantar fascia is accompanied and tensed by the short toe flexors that lie just above the plantar fascia itself. The fascia passes around the heel into the Achilles tendon, which spreads into an aponeurosis that has the strong soleus on its deep side and the two heads of the gastrocnemius on the superficial side. This interconnects with the hamstring tendons, which are highly tendinous and membranous muscles that blend at the top across the

ischal tuberosity into the sacrotuberous ligament and sacral fascia.

The sacro-lumbar fascia is the origin for the highly complex and stubbornly fascial erector spinae and transversospinalis muscles that span the length of the spine to the back of the head. The final soft-tissue track of the SBL is the scalp, which is primarily fascial but contains the little occipitalis in back (with which you move your scalp, if you can) and the frontalis on your forehead in front that lifts your eyebrows.

Altogether, this fascial sheet stretches from the tips of the toes to the top of the nose around your entire back in one structurally and functionally connected sheet. It is



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The Superficial Back Line is generally activated in back bends and stretched in forward bends, in contrast to the Superficial Front Line.

stretched by forward bends, and needs to be active in back bends (Image 4).

DARK MEAT VS. WHITE MEAT

Our SBL has more slow-twitch, oxygen-eating, endurance muscle fibers (and is therefore more full of blood, like a hen's thigh and leg, which she uses in low-grade contraction all the time), while our SFL muscles tend toward more fast-twitch, phosphorus-eating, quick-acting muscles (and tend therefore to be whiter, like a hen's pectorals, which she uses in short bursts of strong and rapid contractions). In us, the contrast between the two types is far less than in a chicken, so both sets of our muscles are red, but sometimes in dissection you can see a distinguishable difference in color between the front muscles and the corresponding ones in back.

Either one of these lines can contract in surprise. In the last article, we saw how we can curl up toward the fetal position in the startle response when the SFL strongly contracts—and that sometimes we do not or

cannot let go of that contraction, and it becomes an underlying fact of our “attitude” (in both senses of the word).

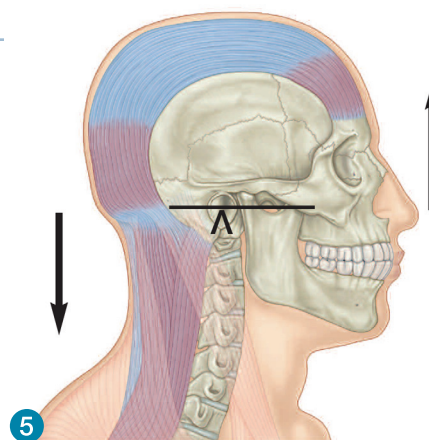
The opposite response—called the Landau response—is also common in babies, and also can become fixed into a posture. The Landau response is a strong contraction of the SBL, in which the back arches, the legs and toes extend, and the hands and arms fly up and back to expose the palms.

If you try both of these fundamental responses—contracting your entire front and then contracting your entire back—you will feel that it is easier to be quick and decisive in shutting down the front, whereas a strong contraction of the SBL is a little slower and a little harder to coordinate. This is because of the difference in the predominance of fast-twitch fibers in the front muscles and slow-twitch fibers in the back muscles.

The reason for this difference is that the front has all the delicate bits along it—our soft underbelly—that, when attacked, need protection immediately, so the startle response cuts in fast. The back, in contrast, is tougher and less sensitive. The Landau response is more of a “flight” response—think of a frog jumping in surprise: “Get me out of here!”

Over the short term, the fast-twitch fibers of the startle response will overcome the steady and loyal SBL. Over the long term, the endurance slow-twitch fibers of the SBL will tend to win out as the front fibers tire, producing common patterns of front tension versus back tension we will examine toward the end of this article.

In normal, unsurprised standing, the part of the body in front of the gravity line is heavier and juts forward more than the back of the body juts back (i.e., given the fulcrum of the atlanto-occipital joint, your face is heavier than the back of your head,



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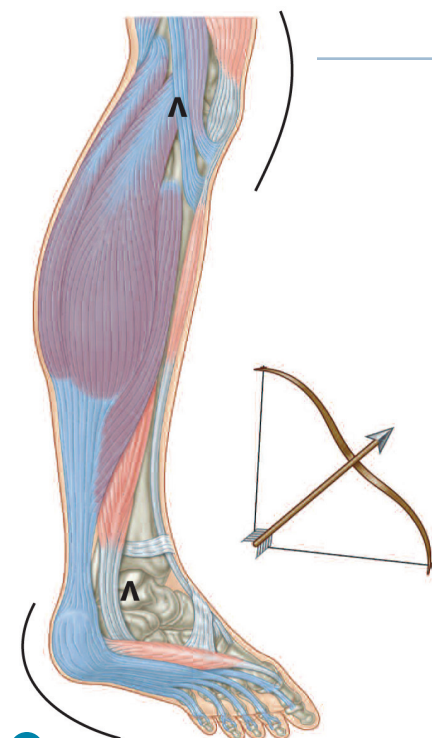
When the head balances on the atlas, the front of the head is quite a bit heavier than the back—so a low-grade contraction in the posterior neck muscles is inescapable, necessary, and par for the course. Too much or too little tension can lead to head position problems.

Image 5). Thus, to prevent us from falling forward or curling into the fetal position, the muscles of the SBL have to have some contraction in them all the time you are standing or sitting. Hence, the SBL needs more slow-burn fibers to maintain that constant, low-grade tension along our back muscles that hold us up.

All that said, these proportions vary from person to person, perhaps genetically, and certainly by training: the long jumper will have trained her back muscles and hamstrings to have more fast-twitch fibers and the tai chi adept may train in more slow-twitch fibers into all his lines.

THE SBL VS. THE SFL

Almost all the way up the body, the SBL and SFL have opposite functions—generally what stretches the SBL requires contraction of the SFL, and vice versa. The muscles of the SBL



6

Just as the patella pushes the soft-tissue of the quads away from the fulcrum of the knee to give it greater leverage, the calcaneus pushes the soft tissue of the SBL away from the fulcrum of the ankle.

point the toes, whereas the muscles of the SFL lift the toes, and so on. This antagonism continues all through the leg and torso: the SBL flexes the knee, whereas contraction of the SFL extends the knee, etc. This continues right up into the lower neck, where the upper back muscles of the SBL extend the neck, while the contraction of the SFL flexes the lower neck.

Along the path, the SBL and SFL use different alternating strategies. At the ankle, for instance, the SBL is stretched around the heel like the string of a bow notched with an arrow, so the taut soft-tissue is pushing the heel into the joint, and the heel acts as the kneecap of the ankle. On the front of that joint, the SFL tissue is trying to get away from the ankle, and its tendons have to be held closely to the joint by the retinaculæ. At the knee, it is the SFL that is stretched around the front of the knee with the patella, while the interface between the gastrocnemius and hamstring tendons tries to pull away from the back of the knee (Image 6). The SBL and SFL create antagonistic actions, but they simply are

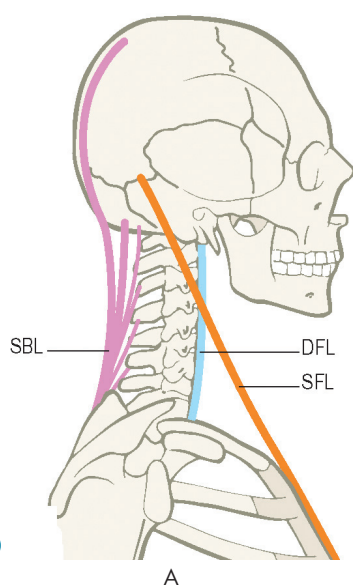
not symmetrical with each other—their relationship is a study in contrasts.

The surprise comes in the upper neck—usually C3 on up—where both the SBL and SFL shortness will hyperextend the upper neck. This points to why head retraction and head forward posture—primarily addressed via the Alexander Technique—are so ubiquitous: both the SBL and SFL contraction patterns tend to create this pattern. Only the longus colli and capitis muscles of the Deep Front Line (stay tuned, we'll get there a few articles from now) can defend against this tendency, so loosening these superficial lines first, and then reinforcing the strength of the neck's core, is a good strategy for improving this inefficient pattern (Images 7A and 7B).

THE FUNCTION OF THE SBL

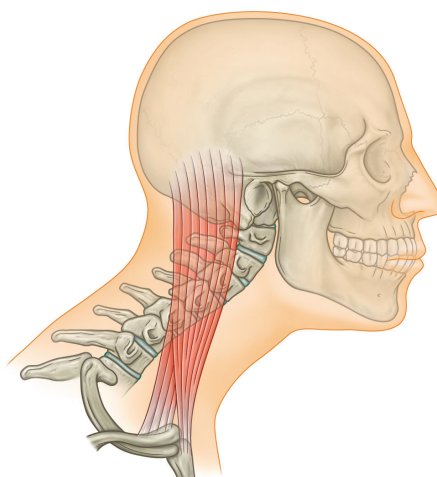
One key to the function of the SBL as a whole (as opposed to parsing out individual muscle functions, which is ably done elsewhere) is found in Psalm 23: "I will lift up mine eyes unto the hills, whence cometh my help." The SBL is associated with the eyes and vision, as progressive shortening of the SBL lifts us from the fetal curve into lifting and controlling the head, and then progressively up through the developmental stages toward standing (Image 8).

Watch a baby lying on its belly to see progressive control and shortening of the SBL, as the baby lifts its head, legs, and arms. Succeeding stages of sitting, crawling, kneeling, and standing present more opportunity for the child to see farther and explore the world with ever-greater control of the body and the eyes.



7

A



B

Both the SFL and the SBL hyperextend the upper neck and tilt the head back. It is left to the deep (and often forgotten and undertreated) longus muscles of the Deep Front Line to counteract this tendency.



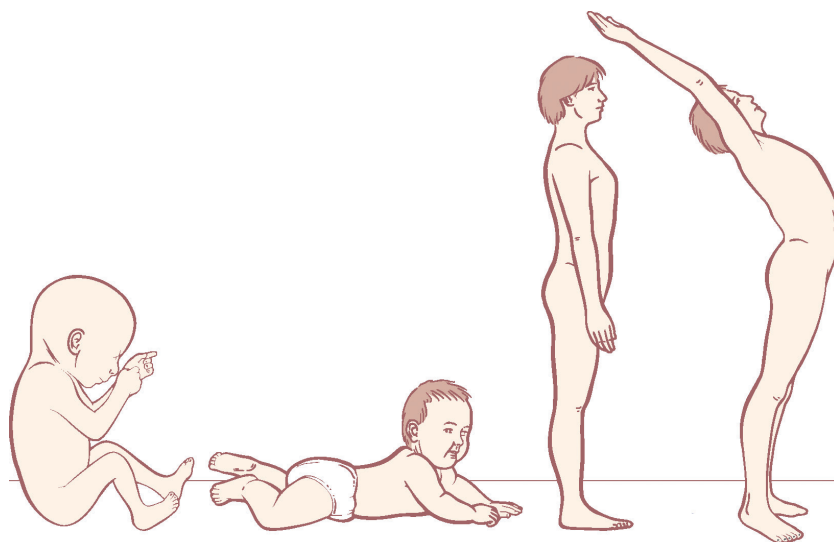
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For the child to support himself in sitting and then in standing requires a refined control of the SBL to keep a high center of gravity balanced over a small base of support. For our precarious human standing to work, the long and singular primary C-curve of the fetal spine we see at the left side in Image 8 has to turn into an undulating series of waves we call primary and secondary curves—as seen in Image 10. As a baby lifts its head, the muscles in the back of the neck strengthen enough to change the shape of the discs and allow the neck to bend from concave forward to concave backward—in other words, into a secondary curve.

Later, with sitting and crawling, the lumbar secondary curve begins to form in the same way: the erector muscles of the SBL shorten and strengthen to hold the spine erect, as their name implies (Image 9).

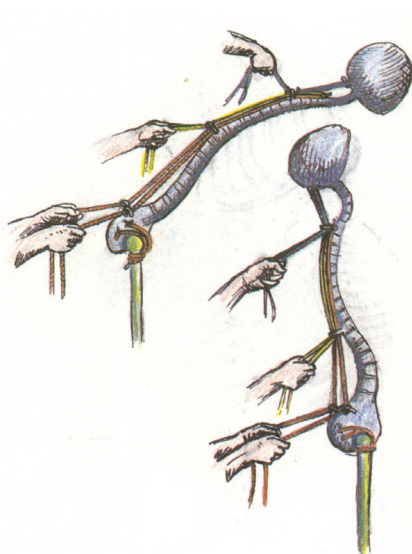
At this point the spine has two original primary curves (the thoracic and sacro-coccygeal, both held in place by the surrounding bones) and two secondary curves (the cervical and the lumbar, both held in place by the balance of the surrounding myofascia).

If we extend this idea over the whole SBL, we could imagine another couple of primary and secondary curves in the legs: the knee curve is a secondary curve (concave back), the heel a primary curve, and the arch a secondary curve. Thus the SBL is a continuous myofascial sheet that extends over five primary and four secondary curves. Note that all the primary curves are held in place by the shapes of the bones, but all the secondary curves are all held in place by a balance of the soft tissues—that makes them more amenable to change via manual therapy (Image 10).



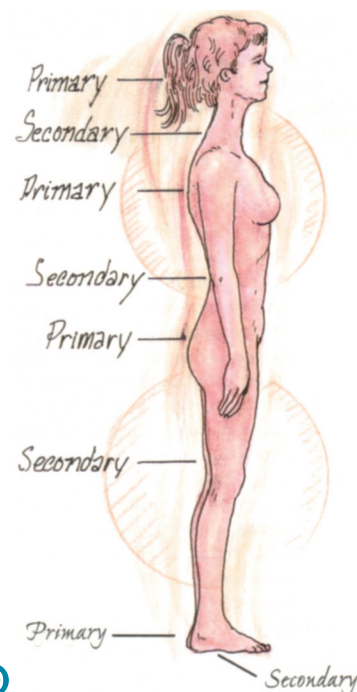
8

The SBL progressively unfolds the baby's body, lifting the eyes from looking inward to ever-greater horizons and control over the world—until, at about the end of his first year, he is standing upright. This is a prime achievement and duty of the SBL.



9

An amusing picture by John Grundy of how the erector spinae create and maintain the two secondary curves of the spine.



10

In balanced upright standing, the SBL presides over the balance of a series of primary and secondary curves. The secondary curves are the arches, the knee, the lumbar, and the cervicals.



11

Though this girl on the left (pretreatment) may have come in for low-back pain, you will not get good results if you do not attend to her knees. Pretreatment, her hyperextended knees form a primary curve where they should be softened into a secondary curve, as in the second, posttreatment photo. This change at the knees allows the changes in the lumbar and cervicals—clearly different pre- and posttreatment. *Used with the kind permission of Robert Toporek.*

BODYREADING THE SUPERFICIAL BACK LINE

This primary and secondary curve idea is key to visual assessment of the SBL. Simply put, the primary curves should be balanced over each other, and the secondary curves should be over each other as well.

In the pretreatment photo of the little girl in Image 11, she has a strong lumbar and cervical curve, and could be suffering from low-back or neck pain, or perhaps her parents just sent her in because her posture was deteriorating. Bring your attention down to her knees—see that hyperextension? That can be seen as taking what should be a secondary

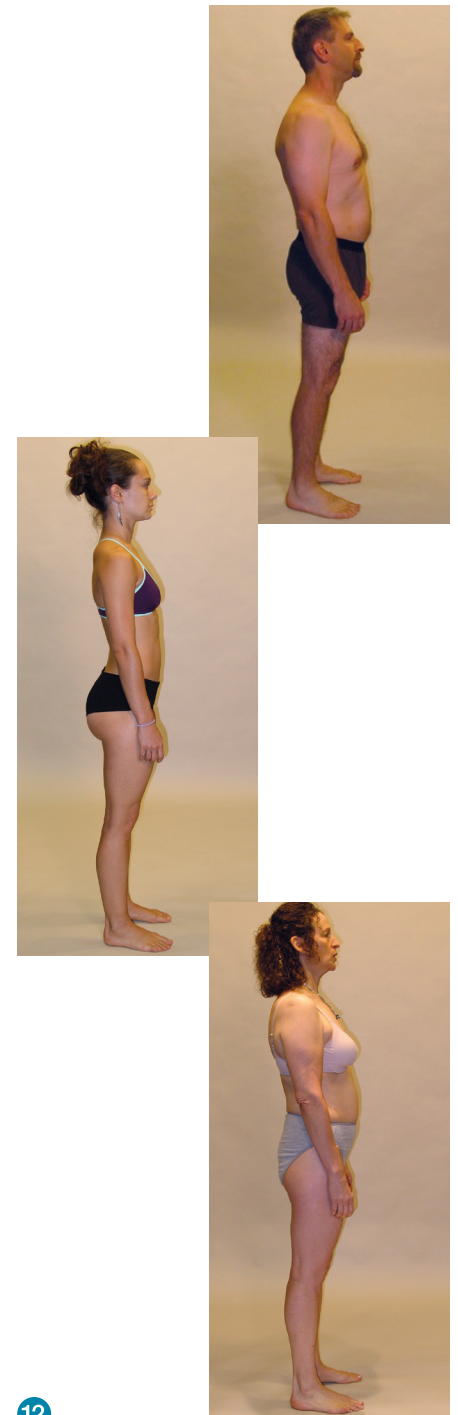
curve—the slight bend in the knees—and turning it into a primary curve with a convex back and a concave front.

Trying to relieve her low back or neck will be an exercise in frustration; if we do not address her knee pattern in the course of the treatment, the relief will be only temporary. The method does not matter—trigger points, deep-tissue work, movement re-education, or many other methods could all be effective in changing this pattern—but see the whole pattern, not just parts of it.

The balanced SBL waves back and forth along the curves of the skeleton; when the curves go out of balance, the SBL will get corresponding areas of hyper- or hypotone. It is easier to change the secondary curves than it is the primary curves, and via them you can get the primary curves to be in better alignment—whatever modality you use. So the primary BodyReading image for the SBL is to watch the balance of the primary and secondary curves, which is primarily SBL, but of course affected by the other lines as well, especially shortness in the SFL, which we examined last issue.

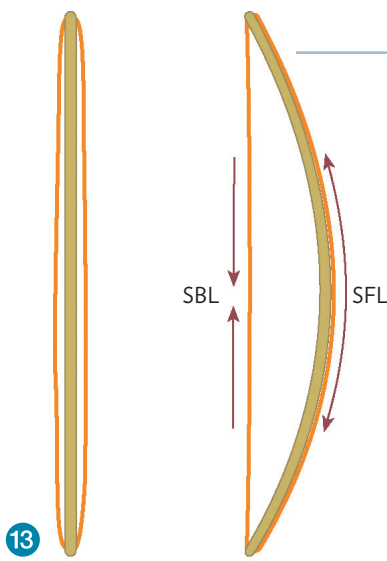
SFL-SBL imbalance can manifest in many ways: hyperextended knees as discussed, the extra long lumbar curve of the ballet-trained, the pushed forward pelvis of the timid, the backward lean of the fashion model, the extra cervical flexion and hyperextension of forward head posture—many postural distortions involve imbalance of the SBL.

Before we leave this line, let us turn our attention to one more pattern in this line that we see so commonly in our clients. Many people create an arch from the ankles to the shoulders, usually under a forward head posture. This involves an anterior tilt somewhere in the leg (either the thigh, as in Image 11, or in the lower leg, or the leg as a whole. We show a few common examples in Image 12) that results in an anterior shift



12

Examples of the common bow pattern from feet to shoulder, often disguising and underlying head-forward posture.



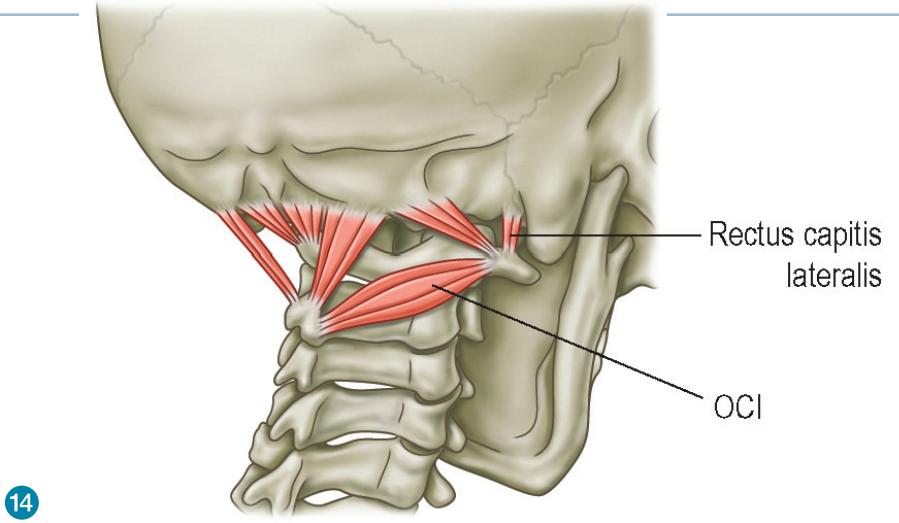
13 As the SBL tightens, the skeleton is pushed forward against the SFL, creating an arch. “Where you see a bow, look for the bowstring.” —Thomas Myers

of the pelvis. All of the folks who manifest this pattern have a shortened bowstring in the SBL that needs easing and lengthening (Image 13).

On top of the pelvis, there is usually a swayback and a posterior tilt of the rib cage. The heads in Image 12 may appear to be on top of the body, but look again. Their rib cages are all leaning back (posteriorly tilted in our BodyReading language). If you turn the page so their rib cages are straight up and down, you will see how they are hiding a head forward posture with this arching bow pattern.

Finally, we come to the very top of the neck—a very vulnerable place in human anatomy. As we noted, both the SBL and SFL pull down on the back of the head. The SFL, as we noted last time, pulls from the sternocleidomastoid down over the sternum into the belly and hips. The SBL pulls down along all the long and short back muscles.

Right under your head are the tiny suboccipital muscles—very important orientation muscles that are hardwired to your eyes (Image 14). Roll your thumbs under your occiput and move your eyes in a circle



14 The tiny suboccipitals are the functional center of the SBL and are very commonly functioning suboptimally in Western adult bodies.

to feel these muscles in action—even if you don’t move your head, these muscles follow your eye movements, ready to coordinate your neck and spine movements to your eyes at a moment’s notice. If you hear a snake’s rattle or a lion’s growl, your eyes follow your ears, your neck follows your eyes, and the spine follows the neck in rapid succession—reflexively, without you thinking about it.

But in human upright posture, the larger muscles of the SFL and SBL can overcome these tiny ancient righting muscles, and one of three things happen, none of them optimal:

- 1) the head moves down and forward on the body (i.e., forward head posture). In our BodyReading terminology, we call this anterior shift of the head relative to the rib cage, or
- 2) the head tilts back on the neck—what we would call a posterior tilt of the head. This approach tends to shut down these small orientation muscles in the back of the neck, and to fix the way in which we look through the eyes. This is a very common pattern for people who wear glasses.

- 3) the head moves forward in the atlanto-occipital joint—an anterior shift of the occiput on the atlas. This is a tiny but pernicious movement that locks these muscles, limits the eye movements, and tends to tie up the entire spinal posture. This is a difficult compensation to see right away because the actual postural distortion is very small, but the effects are very large.

While the plantar fascia, hamstrings, lumbosacral fascia, and the erector muscles are much stronger and fascially more dense than these tiny muscles at the top of the neck, freeing these suboccipital muscles—which are the functional center of the SBL even though they are located near its upper end—is key to the proper primary and secondary wave balance of the SBL. **m&b**

Thomas Myers is the author of *Anatomy Trains* (Elsevier, 2009) and *Fascial Release for Structural Balance* (North Atlantic, 2010). Myers studied with Ida Rolf and has practiced integrative bodywork for more than 35 years. He directs *Kinesis*, which offers more than 100 professional certifications and continuing education seminars per year worldwide. For more information, visit www.anatomytrains.com.