Thoracolumbar Fascial Network

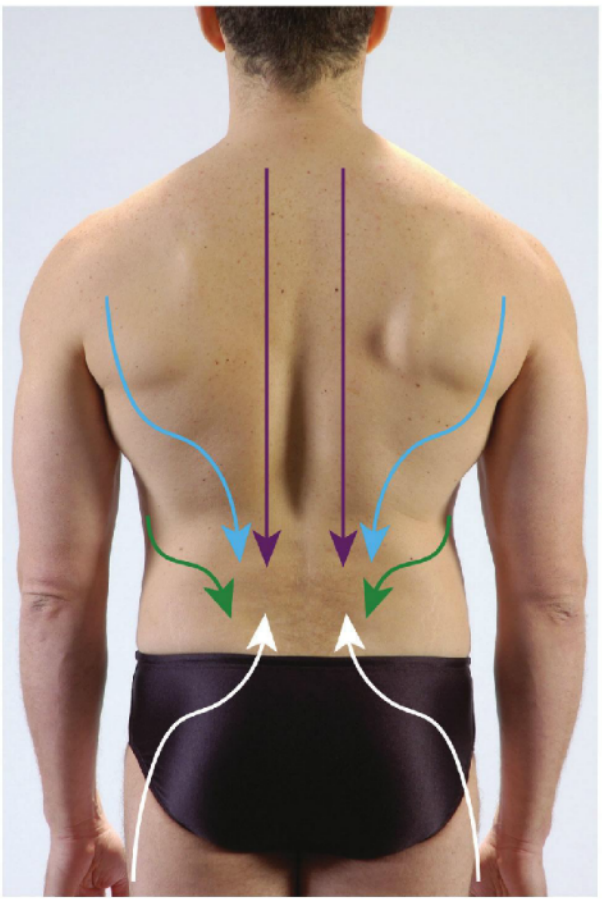
By Christy Cael

The thoracolumbar fascia (TLF) is a dense, multilayered system of connective tissue located in the low back. This diamond-shaped structure consists of both osteofibrous tissue and tendinous aponeuroses that surround and separate spinal muscles and transmit forces through the area. Based at the sacrum and ligaments of the sacroiliac joints, the TLF attaches medially to the lumbar spinous processes and thoracic transverse processes and ribs, and joins the paraspinal retinacular sheath (PRS) laterally. The PRS forms a sleeve around the erector spinae muscles (spinalis, longissimus, and iliocostalis), structurally enclosing and separating them from the deeper paravertebral muscles.

Several muscles affect the fascial configuration and structure of the TLF. Superiorly, the erector spinae muscles create tension caudally, through the PRS. The strongest influence from the upper extremity is exerted by latissimus dorsi, but some effect is also noted with activation of the trapezius, rhomboids, and serratus posterior inferior. Laterally, the transverse abdominis exerts the greatest force, but there is evidence that the internal oblique may affect the TLF. The lower extremity connects via the gluteal fascia from the iliac crest laterally, through the gluteus medius, and medially to the posterior superior iliac spine.

FUNCTION

The TLF forms a resilient, relatively inelastic fulcrum that stabilizes the pelvis, bridges the torso and extremities, and transfers loads between different regions. When the transverse abdominis muscles are activated, pulling the anterior iliac crests toward the midline, the TLF network limits lateral movement of the posterior ilia and stabilizes the sacroiliac joints. Horizontal tension created by the transverse abdominis and concurrent resistance by the TLF network effectively compresses the abdomen and stabilizes the pelvis and lumbar spine.



Various muscles contribute to balanced tension in the diamond-shaped thoracolumbar fascial network, including the erector spinae group (purple), latissimus dorsi (blue), transverse abdominis (green), and gluteals (white).

When the trunk is flexed, tension develops vertically in the TLF. Passive rebounding of the stretched tissue extends the spine, returning it to a neutral position. This passive extension requires minimal effort and exerts less strain on the intervertebral joints and discs when compared to that achieved by active contraction of spinal extensor muscles.

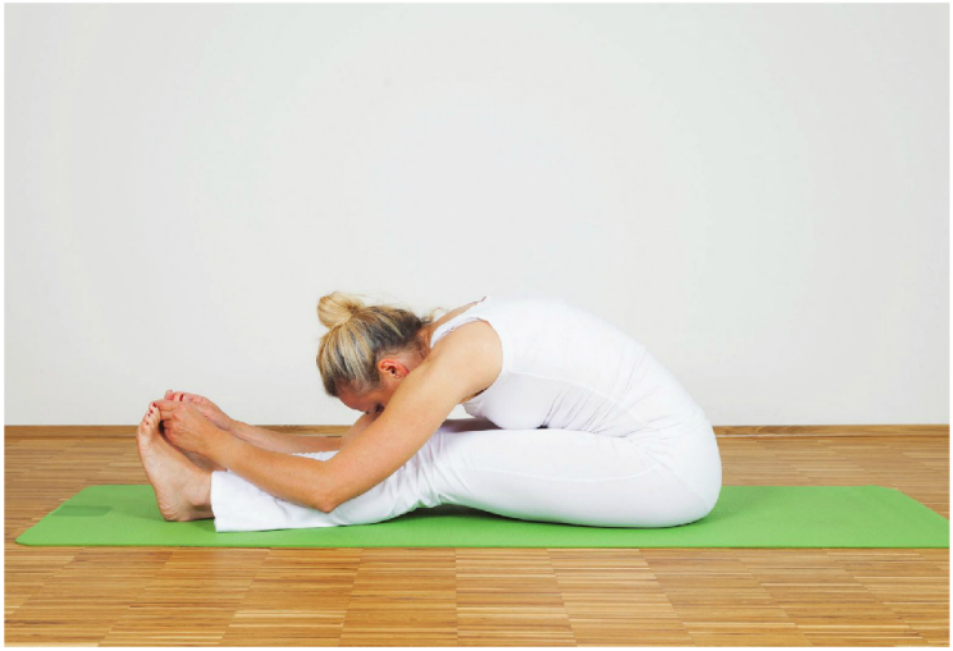
During gait, the TLF network functions like a fascial spring. Potential energy is created obliquely through the TLF when one leg and the opposite arm swing forward, effectively lengthening the tissue. The trunk passively rotates to the opposite side as the resilient tissue springs back and initiates swing phase on the opposite side. This mechanism significantly reduces the effort required for continuous walking or running motions.

The TLF also transfers forces between the upper and lower extremities. Powerful motions like throwing are initiated in the lower extremity, transmitted through the TLF, and into the contralateral upper extremity. Force transfer also occurs in the opposite direction, from the upper body, through the lower back, and into the lower extremities. This is common during reaching and lifting motions.

DYSFUNCTION

Maintaining appropriate mobility and resilience in the TLF network is critical in preventing injury, pain, and dysfunction in the pelvis and low back. Postural deviations, asymmetrical muscle tension, and dysfunctional movement patterns can all contribute to a distorted and ineffective fascial system. Identify and address distorted tension patterns or general lack of mobility due to fibrosis to prevent or treat this type of problem, with specific assessment of all pertinent muscle groups.

For example, excessive anterior pelvic tilt or lumbar lordosis will decrease the vertical height of the TLF, flattening and widening the diamond shape. This distortion increases the horizontal slack, reducing resistance to lateral movement of the posterior ilium when the transverse abdominis muscles fire. Pelvic stabilization is compromised and the potential for sacroiliac instability, dysfunction, and injury increases. Decreasing tension in the psoas, iliacus, rectus femoris, and quadratus lumborum helps restore neutral posture to the pelvis and lumbar spine, increases vertical height and decreases horizontal slack in the TLF, and improves sacroiliac and lumbar stability. **m&b**



Client Homework—Forward Fold

1. Sit on the floor with your legs straight in front of you.
2. Flex your ankles and bring the tops of your feet toward your shins.
3. Reach forward with both arms as you bend forward, hinging at your hips.
4. Hold and take several deep breaths as you stretch your shoulders, low back, and hamstrings.

Christy Cael is a licensed massage therapist, certified strength and conditioning specialist, and instructor at the Bodymechanics School of Myotherapy & Massage in Olympia, Washington. Her private practice focuses on injury treatment, biomechanical analysis, craniosacral therapy, and massage for clients with neurological issues. She is the author of *Functional Anatomy: Musculoskeletal Anatomy, Kinesiology, and Palpation for Manual Therapists* (Lippincott Williams & Wilkins, 2009). Contact her at functionalbook@hotmail.com.

Editor's note: The Client Homework element in Functional Anatomy is intended as a take-home resource for clients experiencing issues with the profiled muscle. The stretches identified in Functional Anatomy should not be performed within massage sessions or progressed by massage therapists, in order to comply with state laws and maintain scope of practice.

Resource

Willard, F. H. et al. "The Thoracolumbar Fascia: Anatomy, Function and Clinical Considerations." *Journal of Anatomy* 221, no. 6 (December 2012): 507–36.