

Intelligence of the Thoracic Spine and Whole Body Integration | #395



Full Episode Transcript

With your host:

Susi Hatelly

[From Pain to Possibility](#) with Susi Hatelly

Introduction (00:00.00)

You are listening to From Pain To Possibility with Susi Hatelly. You'll hear Susi's best ideas on how to reduce or even eradicate your pain, and learn how to listen to your body when it whispers so you don't have to hear it scream. And now here's your host, Susi Hatelly.

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Welcome and welcome back. I'm so glad that you're here because in this episode, we're exploring an area of the body that's not often spoken about in relationship to pain and strain, and yet can be a vital missing link, and that's the thoracic spine. Sometimes when we connect with this area, the changes that we notice elsewhere can be really, really surprising.

And so with this episode, I wanna share some of the connections I've seen with clients and build the anatomy picture, including the relationships between the thoracic spine and shoulder blade and arm, and then follow those connections down through to the pelvis. I also wanna tie in some of the research that's associated with what I'm talking about here.

So let's dig into it. I first became curious about these connections shortly after graduating with my Bachelor of Science in Kinesiology. I was working at a chronic pain center alongside a phenomenal physical therapist, and we were seeing someone with repetitive strain injury and carpal tunnel syndrome.

When the physical therapist worked at the thoracic spine, and specifically at very specific vertebral junctions, we noticed there were changes in how the person's elbow and wrist were functioning and as well as how they experienced their symptoms. Now, at the time, at this clinic, the people who were coming had been injured in work or motor vehicle accidents.

There was often litigation involved, lots of independent medical type of doctors, and I distinctly remember the lawyers and the doctors simply not accepting this connection between elbow and wrist and T-spine. How could working with a thoracic spine make a difference at the elbow or the wrist? Now, keep in mind we're, we're talking like 1995, 1996, and the whole myofascial chain renaissance hadn't really arrived yet.

The work of Tom Myers had not gotten out into the world in a big, big way yet. But there were whispers amongst some professionals who were noticing these relationships. All in all, the experience at the clinic, the whispers of myofascial connections got me curious. Now, remember, I'm not a physical therapist.

I don't manipulate or adjust joints. I'm not a massage therapist. I don't have scalpels or pins or needles or anything of that sort. My skill set is utilizing movement, breath, and stillness. So my question became, how can I explore this through movement? How, how do these relationships show up in exercises that we might give somebody?

Because ultimately, the wrist is not just the wrist, the elbow is not just the elbow. And as I paid closer attention, what caught my eye wasn't necessarily a lack of range in the thoracic spine. It wasn't simply that someone had kyphosis or even, uh, military posture, but rather it was something in the relationship between how the segments moved and the quality of the person's movement.

There was a kind of snagging, a moment when the movement of the thorax and the movement of the arm didn't quite flow together. The harmony wasn't there. So I began exploring this more with the people who had wrist and elbow pain, including repetitive strain and overuse problems. And I kept going back to anatomy pictures, asking, "How does the...

how do these actually connect? And what does it have to do with what's happening farther down the arm into the fingers, the hand, or the wrist?" So let's build that picture together, beginning with the ribcage. So if we think about the ribcage, we've got the thoracic spine, 12 vertebrae, T1 through T12, and that's forming the middle region of your back.

It provides support for your upper torso and is a foundation for movement, and the ribs attach to the thoracic spine, curving around the front of your body. Many connect with the breastbone through cartilage. The bottom two pairs don't attach at all to the sternum. Now, even though we call this the ribcage, I actually prefer or like the "rib basket" term, which I've heard Tom Myers use.

It gives us a sense of a structure that has support but also some give. There's enough stiffness to help protect the heart and lungs, along with the capacity to move, hopefully, as you breathe, turn, and bend. Because it's meant to move, and I'd like you to keep that in mind as we bring the shoulder blades into the picture.

You can think of the shoulder region as a transfer station between the ribcage, the thoracic spine, and the hand. And if it seems like I'm moving away from the thoracic spine when I'm talking about it this way, stay with me, because the muscular connections tie this transfer station directly back to the spine.

We have the trapezius as example, with broad attachments from your head and neck down through the thoracic spine and out to the shoulder blade. Rhomboids connect the spine through the inner border of the shoulder blade, and the rhomboid minor up around C7, T1, and the rhomboid major T2 to T5. And then there's the serratus anterior attaching to the ribs and wraps around the underside of the inner border of your shoulder blade.

And those are just a few of the muscles. So the key here is when we talk about the blade moving over the ribs, we're talking about the muscles spanning between these structures, supporting and moving the blade. The shoulder is one of the more mobile regions of the human body. Because the shoulder blade is meant to float dynamically on the ribcage, the movement really depends on how these segments move together.

When we look at the glenohumeral joint where your humerus, the upper arm bone, meets the socket of the shoulder blade, and we think about the scapulothoracic joint, which isn't a true joint, but a functional joint in how the blade slides over the ribs, these two together really bring in rhythm. When you raise your arm, they need to work together.

You may have heard this described as a two-to-one ratio, roughly two degrees of movement at the glenohumeral joint for every one degree of upward rotation of the shoulder blade, and that's what we call the scapulohumeral rhythm. That ratio varies, of course. It isn't supposed to be precisely two to one throughout every movement.

But what I want you to picture is the arm and the shoulder blade working together in a harmony. Now, that blade might not work well if it's not moving well on the ribcage or if the ribcage or the thoracic spine is stiff or limited. Think about it. The arm can reach forward, overhead, extend behind, move out to the side and back towards your body, rotate inward and outward, move across your chest and open back out again, because the blade enables it to.

When the blade moves well, it also elevates, depresses, moves into retraction toward the spine, protraction away from the spine, and rotate upward and downward. The blade enables the arm to be a mobile crane, where the arm is the long boom of that crane, and the shoulder blade carries that socket from which it moves.

So if the blade is gliding well and rotating well in relationship to the ribcage, it changes the position and direction of the shoulder socket in an effective, harmonious way, contributing effectively and efficiently to where your hand can go. Underneath that, the ribcage and thoracic spine are both meant to move and are also contributing to how that mobile crane functions.

Because if there's stiffness, if there's limitation, there might not be fluidity or smoothness present. People can feel it gunky, stuck, stiff, congested, jammed, or gummed up, right? And I get that those aren't technical terms, but rather they're interoceptive terms that people use to describe how this area can feel.

So come back to the image of the crane again and imagine it getting snagged, and think of all the reasons it could be snagged. Maybe the thoracic spine is a little stiff. Maybe the blade isn't moving easily over the ribs. Maybe the issue is the relationship between them. The platform from which the arm bone moves would have fewer options in this circumstance.

But nonetheless, your hand, your wrist still has a job to do. You're reaching into a cupboard. You're pushing a door. You're vacuuming. So then where do you get the movement to come from to complete the job? Maybe you lift the whole shoulder, turn your torso, brace in another way, change the position of your elbow or wrist. Compensation happens to make the movement happen.

But it's not just down through the arm and the hand. We can trace a relationship from the thoracic spine into your lumbar spine and into the sacrum and pelvis. Muscles and connective

tissue also span these regions, of course. Think about your quadratus lumborum attaching to the top of your pelvis, transverse processes of your v- lumbar vertebrae, and then your 12th rib.

So picture this, a connection from your pelvis to the very bottom of your ribcage. As the relationship between the pelvis and ribs changes, the length and work of that muscle can change, too. And there's also latissimus dorsi attaching from your upper arm, has broad attachments through the lower thoracic region, lower ribs, the top of the pelvis, and the thoracolumbar fascia.

And that fascia is a layered sheet of connective tissue in your back. In the three-layer description of this fascia, the quadratus lumborum sits between its anterior middle layers while the broad tendon of the lats contributes to its posterior layer. And while the QL and lat are distinct muscles, they have relationships with the same layered fascial structure.

And through these muscular and fascial connections, forces can be transmitted between the arm, the thoracic spine, the whole of the trunk, and pelvis. Your abdominal muscles also connect the ribcage and pelvis, contributing to how you turn, bend, and support yourself. So you can begin to picture why moving the pelvis might change the experience in your thoracic region.

When you change the relationship between the structures, when you add more stability if it's needed, the demands on the muscles between them and the position from which the ribcage moves changes.

So with that anatomical biomechanical picture in mind, and really that's just scratching the surface of the way parts of our body relate to each other when we're thinking about that thoracic spine at the center of this, let's now look at some of the research that tells us about these relationships. There was a study published in twenty fifteen that compared twenty-eight people with tennis elbow with twenty-eight people without it.

The researchers found less strength in the middle and lower trapezius and serratus anterior, along with less endurance of the shoulder blade muscles in the group with elbow pain. These are muscles that connect the shoulder blade with the spine, including the thoracic part of the spine and ribs. So here we have people with symptoms at the elbow showing differences in the performance of muscles further up the chain.

Now, it doesn't tell us which came first, the chicken or the egg, but it does give us a reason to start looking in this area. There's also a small study from 2020 that brings the thoracic spine into this quite directly. 30 people with tennis elbow were assigned either a thoracic mobilization group or a comparison group receiving sham ultrasound.

The mobilization was applied at the rib vertebrae connection around T5 for two minutes. The researchers measured pain-free grip, how much force someone could produce before pain began. Immediately after the mobilization, the treatment group's pain-free grip had increased by an average of four point six kilograms from its starting measurement.

So it's interesting because maybe this resembles the relationship that the physical therapist and I noticed all those years ago. Now, the study only measured an immediate response, so it doesn't tell us whether the improvement lasted. It also doesn't establish where or if a certain segment was a source of the pain, but rather there's a relationship that makes me interested.

Now let's look at research on thoracic position and shoulder movement. In one laboratory study, people raised their arms in a slouched sitting position and a more erect position. In the slouched position, they had on average about 24 degrees less shoulder abduction. With the arm held horizontally, the force they could produce was about 16% lower.

Same person, different position through the thorax, different movement and force available at the shoulder. But position and pain aren't the same thing. A review of 10 studies found that people with shoulder pain didn't consistently have more thoracic kyphosis than people without shoulder pain, yet changing thoracic position could change the available shoulder range.

So what's relevant here is partly what I was saying earlier. It's not simply the shape of someone's upper back, but rather how parts are moving together and how they relate. Now, if we look toward the pelvis, the anatomical and biomechanical research on thoracolumbar fascia describes connections with the latissimus dorsi, abdominal muscles, and the muscles around the spine and pelvis, creating pathways through which forces can be transmitted.

And that supports the anatomy that I've outlined. Again, it doesn't tell us exactly why one person feels freer through the thoracic spine after changing something at their pelvis, but it does open up our eyes to explore. So how do I bring all this into practice, considering my memory of my time with a physical therapist when I first graduated?

Looking at some of these anatomical relationships and then diving into some of the research that sheds a little bit of light on the area. See, for me, when someone has pain, I'm, I'm not going after mechanism, partly because I am a yoga therapist and kinesiologist. I'm not a physician, physical therapist.

I'm none of those things. I work with movement. I work with exercise. I work with breath. I work with stillness. I'm looking at relationships, and there can be all sorts of spaces in the biopsychosocial model that can be contributing to the experience someone is having. So to truly say this is the mechanism is, is incomplete.

But I can watch how someone's moving in front of me, knowing that these muscles that are attaching from spine to shoulder blade...

When we can shift experiences at the thoracic spine, if we can shift the way the blades are moving, if we can shift the way that those muscles are responding, if we can improve the relationships between blade and ribs, arm in the socket, ribs relative to pelvis, if we can settle down that qualitative feel of snagging, ratchetedness, clunkiness, clicking, and we help

facilitate a change and then return to a movement that matters to them and is meaningful, do they feel less gunky?

Is there less effort? Can they reach or grip more comfortably? And does that change carry over into the thing they actually wanna do? That's where this gets really, really interesting.

If this is capturing your attention, if exploring the thoracic spine and all of its connections is capturing something in your heart, in your mind, in that deep inner knowing, then come join me. I'm running Power of Pure Movement: The Intelligence of the Thoracic Spine, Ribcage, and Whole Body Integration.

I would love for you to join me. You can read more over at **functionalsynergy.com/thoracicspine**.