The Sympathetic Sacrum

A Rose by Another Name?

By Til Luchau

Once more, it looks like we were wrong about one of the basic tenets of our work: the nerves of the sacral plexus are sympathetic, not parasympathetic as we were taught. We all learned that the sacral plexus (Image 1) was the second major center of parasympathetic neuron concentration (after the vagus nerve), and that these parasympathetic sacral nerves controlled bladder, bowel, and genital function.

"Wait," someone always asked in Physiology class, "I thought parasympathetic nerves were about relaxing. You're saying sexual arousal is like digestion and going to sleep?"

"Yes," we were assured, "the sympathetic nervous system's fight-or-flight function is complemented by the parasympathetic's feed-and-breed role." Since it was on the test that way, that's the way we learned it; and in the years since, that's how we teachers have continued teaching it.

But a new study published in the November 18, 2016, issue of *Science* has me reasonably convinced we were wrong (Image 2). In a detailed comparison of these sacral nerves' characteristics with sympathetic and parasympathetic motor neurons elsewhere in the nervous system, the study's authors found sacral nerves matched sympathetic nerves in

The nerves of the sacral plexus and the sympathetic ganglia. Image courtesy Primal Pictures, used by permission.



15 out of 15 molecular features studied, but had zero matches with parasympathetic features.¹

If independently verified, this reclassification of sacral nerves as sympathetic means we need to revise many of our explanations about how hands-on work with the sacrum affects the autonomic nervous system (ANS). Sacral work has long been observed to be calming and settling. "A pelvic lift is always in order in an emergency," according to Ida Rolf, who finished most all her sessions with the osteopathy-inspired pelvic lift technique (Image 3).² In this technique, as in many types of sacral work, our favored explanation was that we were helping calm autonomic activation via the parasympathetic plexus of the sacrum³ (which now turn out not to be parasympathetic after all).

If this reclassification gains acceptance (and it appears likely that it will), not only will it mean revising large numbers of anatomical and neurological reference materials, but the numerous therapeutic disciplines that work with the sacrum may also need to rethink at least some of their rationales. Affected modalities could potentially include the aforementioned Rolfing and structural integration, as well as osteopathy and craniosacral therapy. (The parasympathetic system is actually called the cranio-sacral division, though the idea that craniosacral therapy owes its name to the now-in-question sites of parasympathetic concentration is most likely incorrect).4 Trauma-oriented approaches such as David Berceli's Tension & Trauma Releasing Exercises and Stephen Porges's polyvagal theory may also need to revisit some of their rationales. And, unfortunately, a chapter in the second volume of my Advanced Myofascial

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"Floating the Sacrum Technique"

Techniques book now needs a bit of revision, even though it came out less than six months ago.⁵ Darn.

WHAT ELSE DOES THIS CHANGE?

Like other newly emerging disruptive explanations (such as the changing views of pain and nociception;⁶ the debate about the importance or unimportance of biomechanics;⁷ or the questions about tissue-change explanations for the results we see in hands-on work);⁸ the key question is, "How does this affect what we do in the practice room?"

If we could correct for our own confirmation bias (and we can't, at least not by ourselves), we could say that if the old methods work, then maybe we just need to explain them differently. For instance, if clients seem to get calmer after a pelvic lift technique, then that technique is presumably doing what we want it to, even if we need to update our theory about why it seems to work. After all, the only thing we've changed is what we call this branch of the nervous system, and a rose by any other name would smell just as sweet.

Or so they say. But since we're all prone to look for the results we expect to see (the confirmation bias I mentioned), I wonder what we will notice if we start thinking about affecting sympathetic function (instead of parasympathetic function) with our pelvic lifts, sacral holds, etc. For the moment, let's leave aside questions about whether our touch is able to directly affect these deep structures. Are there new possibilities we might consider, given this reclassification? For instance, instead of upregulating the parasympathetic system with a pelvic lift, what happens if we think of



The autonomic nervous system's efferent nerves are divided into sympathetic (red) and parasympathetic (blue) outflows. The recently revised mapping reassigns the sacral nerves of
the pelvic ganglia (in purple) from parasympathetic to the sympathetic division. III: occulumotor nerve; VII: facial nerve; IX: glossopharyngeal nerve; X: vagus nerve; gg: ganglion. *Image courtesy Advanced-Trainings.com. After H.V Carter 1918, and O.S. Espinosa-Medina et al, 2016.*



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The pelvic lift, taught by Ida Rolf and others as a way to "stimulate parasympathetic autonomic tone," is among the many sacrumbased methodologies that may now need revised explanations. *Image courtesy Advanced-Trainings.com.*

down-regulating the sympathetic autonomic nervous system via our less-direct version, the Floating the Sacrum technique? In other words, would we touch differently, and notice different effects, if we imagined we were calming the sympathetic system, rather than stimulating the parasympathetic?

In the specialized world of neurobiology, this change is big news.9 Time will tell if it is independently confirmed, and even then, it will take more time for the change to become widely accepted (there are a lot of anatomy charts out there that will need changing). But in all likelihood, the difference this information makes in our actual hands-on practice, as interesting as it is to us anatomy geeks, is probably fairly minor. We'll still be able to get the results we got before, maybe even more effectively now; and this may even open up more possibilities. (And at this point, thankfully, it doesn't look like I'll have to revise more than a couple of paragraphs for the next printing of my book, even if this new model proves accurate.)

The only question I still have about the reclassification study itself is this: although the study (which was done on mice) used a very sophisticated comparison of these nerves' physical features, it did not include observations of the nerves' functional effects. In other words, I don't see evidence

that the actual motor, vascular, or visceral effects of the neurons of the sacral plexus were considered—solely their origin, genetics, and structure. This makes me wonder: is the sympathetic/parasympathetic distinction functional or anatomical? As University of Chicago neurobiology professor Peggy Mason, PhD, suggests in her video and blog posts on this topic, it doesn't look like observations of function played much of a role (if any) in classifying these structures as sympathetic or parasympathetic, even to begin with.¹⁰ It was British physiologist Walter Gaskell who first proposed the sympathetic/parasympathetic model in the late 1880s, and it seems that it was their anatomy, rather than their function, that he (and those who built on his concept) used to assign various nerves their sympathetic/parasympathetic classification in the first place.

Even though this obscure little news event is probably something only a few of us get excited about, I personally enjoy the questioning and rethinking this new finding (and the other recent "disruptive" ideas) brings to my own work and to our field as a whole. Just as we aim to foster greater physical ease and adaptability in our clients, it is our own openness to possibility and change—that is, our own flexibility of mind and concept—that helps us learn and grow, and keeps our work current, relevant, and effective. m&b Author note: Thanks to Pedro Prado, PhD, Kate Dennington, CAMT, and Michael Shea, PhD, for their conversations and input in this article.

Notes

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