

Beyond Body Maps: Considering Peripersonal Space and its Implications for Clients and Practitioners of Structural Integration



Amy Bennett

Amy Bennett, BCSI^{CM}, LMT, is a 2013 graduate of KMI and has practiced bodywork since 2004. Amy lives and practices in Portland, Oregon and is a faculty member at East West College of the Healing Arts teaching kinesiology and assessment and treatment classes. Amy can be reached at amy@elementalbodywork.net.

Abstract:

Our bodies are mapped in the tissue of our brains, often depicted in the distorted visual representation of the sensory and motor homunculi. These "little men" are misproportioned due to the uneven distribution of sensory receptors throughout the body and the corresponding real estate of the brain. These familiar visual representations of our body maps show us to be creatures with enormous lips, tongues, and hands versus tiny legs, hips and torsos, as our hands are teeming with sensory receptors, whereas our torsos contain fewer relative to the area. This article will explore how these maps not only define the limits of our corporal form but also extend beyond our physical selves into our surroundings, including the bodies that we touch and are touched by. This extension into what is called peripersonal space has intriguing ramifications for structural integration, for both the practitioner and the client receiving the work.

Beginning in utero, by utilizing movement, we learn to know the shape of ourselves, how we fit into our environment, and our limitations. Reaching out with a foot or a hand and finding the uterine wall or placing the thumb in the mouth are actions that leave an imprint on our brains, developing maps based on sensory input and movement availability or limitations. The two mapped regions in question, the somatosensory and the motor cortex, are, as their names imply, the portions of the human brain directly responsible for the movement and exchange of sensory and motor information of the body. These maps allow us to understand where we are in relation to our environment and ourselves. More importantly, these maps are dynamic and flexible and will extend beyond our bodies into the space surrounding us when we utilize tools.

In the beginning of the book *The Body Has a Mind of its Own* (Blakeslee & Blakeslee, 2007), the authors state, "The maps that encode your physical body are connected directly, immediately, personally to every point in that space and also map out your potential to perform actions in that space" (p. 3). They go on to discuss how, when utilizing a knife and fork, our peripersonal space grows to incorporate those tools. "Brain cells that normally represent space no farther out than your fingertips extend their fields of

awareness outward, along the length of each utensil, making them part of you" (p. 4).

To anyone who has mastered the use of chopsticks, the idea that a tool "becomes an extension of who we are" is not a new one. (Mr. Miyagi anybody?) Those of us who garden know, based on what we feel through the hoe, whether the hoe is moving through loamy earth or hard clay, whether the rock that we just encountered is jagged or smooth, and the distinct feel of biting into a woody root versus the wet, crisp "snick" of cutting through the taproot of a deep weed. We glean all of this information because, although we are only grasping a wooden handle, our body map has expanded to include the inanimate object, which allows for this feeling or sensing with the tool in addition to allowing us to extend ourselves to act upon the environment in a way that we could not with our bare hands or without bending over.

One map for the senses (touch, taste, proprioception), one for movement: both feature the hands and mouth as predominant components, speaking to the distribution of sensory nerves and our earliest explorations into our environment (see Figure 1). These maps continue to develop and change throughout life and are directly linked to our interaction with the world at large. As human

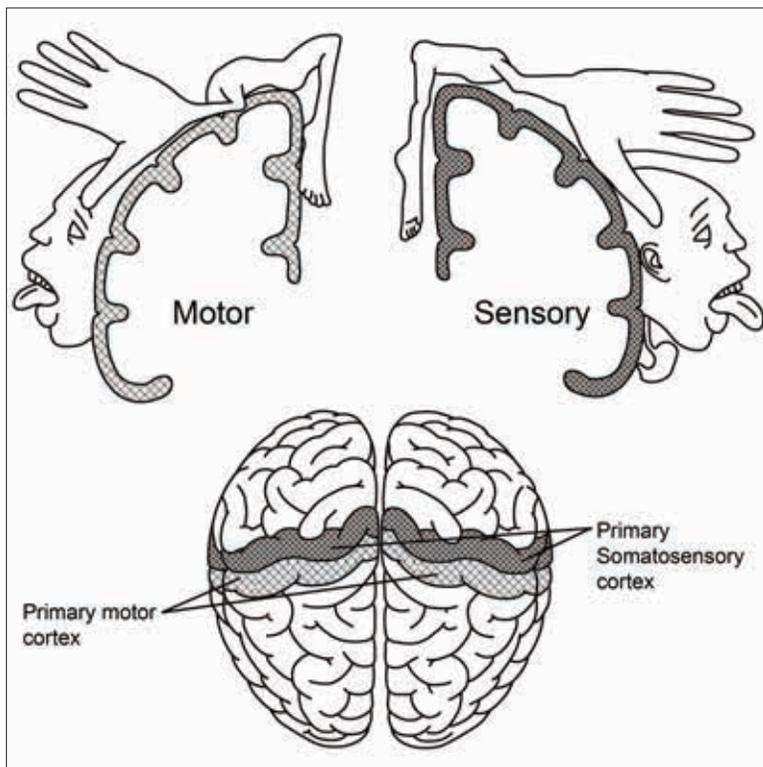


Figure 1. Cortical homunculus: a visual representation of the body map. Illustration by Jeff Boser.

infants, we begin our interaction with the world through nursing and eating; as we grow older we begin to utilize our hands to manipulate our environment, and we use our bodies and feet to manipulate ourselves within that environment.

A case study by Meng Ee Wong, PhD, and Noel Kok Hwee Chia, EdD (2010), reviewed an earlier unpublished research study of congenitally blind children and their ability to represent the human form in both two dimensions (drawing on paper) and three dimensions (modeling in clay). The blind children were able to perform as well as their blindfolded, sighted peers in the control group in both drawing and 3-D plasticine modeling of human figures after receiving intensive “ten 1 ½ hour sessions of the Inter-Sensory Coordination Intervention Program (ISCIP), which covered specific skills involving non-visual exteroception (including shape analysis, size perception, and tactile exteroception), and proprioception (covering mainly the body schema and sensory feedback)” (p. 11). While these researchers are mainly concerned with visual imagery in subjects with total blindness, the study and its conclusion also point to the use of movement and tactile input as a way to clarify an already existing but perhaps “hazy” body map. Simply put, these findings show what structural

integration (SI) practitioners already understand: that tactile input and movement can help to build a clearer sense of self.

If we accept that it is not just the map of the physical body that is clarified by the tactile input and movement re-education provided by SI, but also the inherent mapped peripersonal space as well, then we can begin to look beyond the body in a more intentional way to utilize our own and our clients’ understanding of this invisible and less well understood map of ourselves to help create lasting change for the better.

Because our body maps strongly favor our hands, and because our body maps will expand to include the tools that we are utilizing, the significance of the body as a “tool” through which we may learn and impart knowledge is undeniable. With our hands being one of the primary ways that we both take in and act upon our environment, we have the capacity to sense or reach far into our client’s bodies—not in an energetic “woo-woo” sort of way, but in a very real, physical way. By grasping the wrist or hand of our client and applying a slight traction, we are essentially turning the upper extremity into a tool of discovery. Much like a blind man who knows about the ground and objects in the vicinity through his cane, or the person with the hoe who understands

the texture of the ground she is working with, we can feel, through the tool that we are using, the texture of the joint capsule, the health in the surrounding musculature, the direction of ease of the tissues, the relationship of the axial skeleton to the appendicular skeleton, and the likelihood of function or dysfunction at the glenohumeral joint and scapulothoracic junction.

For a client presenting with stiff calves and feet in the mornings who is observed by the practitioner to have limited or restricted dorsiflexion of the ankles, the gastrocnemius and soleus make a useful tool of exploration to investigate the relationship of triceps surae to the underlying deep posterior compartment. The therapist may also be able to feel proximally into the posterior knee and, if skilled, the tissue of the hamstrings, the sacroiliac joint, and even the erector spinae, ribs, and occiput. The client here, utilizing the stabilization of the tissue offered by the therapist, may explore local active mobilization (mainly flexion and extension of the toes) as a way of “unsticking” the deep and superficial posterior compartments of his calf, creating and exploring new possibilities for movement.

Consider also the psoas-diaphragm complex at the thoracolumbar junction. Like pointing a flashlight into a dark room, the SI practitioner can place an index finger under the 12th rib posteriorly and traction gently away from the midline while the opposite hand is placed on the ipsilateral costal arch and applies a gentle traction inferiorly. In this way the “fabric” of the diaphragm can be placed under tension thereby “illuminating” the medial arcuate ligament-psoas major intersection. Once the awareness is made allowing the client to explore movement specific to the psoas versus the diaphragm, she can find a way to differentiate these structures. As one option, client movement of the femur resulting in a disengagement of the psoas from the diaphragm may result in the possibility for more mobility at the lumbar or coxal joints.

We may grasp the biceps brachii anteriorly and the long head of the triceps posteriorly, drawing the biceps proximally and the triceps distally, in order to draw or shift the head of the humerus posteriorly in the joint capsule utilizing the tissue like ropes in a pulley system. With practice we can begin to use the head of the humerus to explore particular areas of restriction or tension within the joint capsule itself. The movement of the humerus to a new location

in the glenoid cavity by the client is assisted by the “clamp” of the practitioner’s hands.

As fascinating as it is to contemplate that we may use another person’s humerus as a tool and that our body maps have grown to encompass their extremity as part of our own system, and vice versa, the true implications for peripersonal space arises as our clients enter and leave the integration sessions. Normalizing, balancing, and increasing range of motion (ROM) within specific joints and acquiring an understanding of new patterns of use is often a main goal for our clients in the integration sessions and the series as a whole.

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Having utilized the practitioner’s hands as tools with which she has increased tissue resiliency and joint ROM, our client is now able to explore more thoroughly the possibilities of movement available to her. Via these explorations our client comes to an awareness of abeyant locomotion and gesture. It is through explorations of tissue change via movement, which haptic input has facilitated, that she is able to reconnect with or revitalize her existing maps, including a refined sensory map and an expanded motor map. The mapping of the space around the client, her peripersonal space, has now changed to include future possibilities for motion that may not have existed prior to treatment.

The integration sessions are a place to begin the exploration of new, more balanced movement patterns. Often these experiments are guided by the practitioner through direct contact and guidance of a joint such as with knee flexion and extension in the sagittal plane or more nuanced and complicated suggestions of possible patterns in the oblique movements of the pelvis and torso. In many cases, these explorations are met with a reaction from the client that she “did not know that her hips could do that,” or that “her knees never went that far before.” As we help our clients explore and discover new movement patterns via cues with physical touch or

the use of actual props such as a small ball under an arch to suggest lift in the core, it is relevant to educate these clients about the existence of their peripersonal space. It is often quite obvious that their body maps, now more integrated with their tissues, are better quality schema than before. What may not be obvious is the idea of mapping the space around them as well as the reality of their own daily tool use.

One of the primary ways that we as a species manipulate our environment is through our use of tools. Our body maps will expand to include the tool being used and, as we transition from infants to adults, part of our development is based on our proficiency in utilizing certain tools. That we judge a tool's desirability based on its design or ease of usability or ergonomic promise is a given. Many of these tools, unlike a pair of chopsticks, more readily accept a shift in their inanimate shape based on our individual patterns of use of that object. Two common ones that spring to the mind of this author are shoes and office chairs. Both can be considered tools, objects used to accomplish a specific task. Both will readily be accepted into one's own body schema. ("I have wheels on my butt!") Both of these objects as tools can be easily understood to remodel themselves based on our use of them. Shoe wear differs from person to person based on the individual gait pattern and many an office chair is found to list to one side or another due to the owner's propensity for leaning on one elbow or another.

Clarifying our comprehension of peripersonal space and the ramifications it has for the hands-on component of our work, in addition to the role it plays in movement re-education, is vital. Once clearly recognized and understood, we can then educate our clients about not only their bodies and movement, but also bring their attention to this invisible "other dimension" of their body maps. Many clients will report that their shoes no longer fit, or that they now "feel crooked" in a car seat. By looking beyond our clients' physical patterns, we can help them identify the object patterns in their lives as they move beyond the series. Receiving cues of a previous, less integrated pattern from an old mattress, pair of shoes, or decade-old office chair is something that deserves to be articulated in order for our clients to reap the best that this work has to offer.

References

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