

Other inserts rely on sensory response or stimulation to create a motor response to make the feet work in a fashion that the orthotist feels most appropriate. My favorite way of explaining this approach is to suggest that a sharp tack placed under the big toe joint would at first cause a reflex reaction to the painful stimulus then a learned motor response to change the pattern of muscular recruitment to prevent the foot from coming down on the tack again. I suspect that if the tack were left in place it would change the entire body position as we walk or stand as well as change the central nervous system's learned pattern of muscular recruitment for the entire body. This doesn't mean that the new body position or the new motor recruitment response is appropriate, just different. But if a patient were having pain, this change in body position and motor recruitment pattern would most likely change or eliminate the pain the patient was having. The disadvantage is that if the patient continued in this abnormal gait pattern created by the tack under the big toe joint there would eventually be a whole host of other problems that would be created.

All orthotics use this same type of sensory response to cause a change in neuromuscular recruitment which then changes gait. This is why all orthotics work to some degree and some work better than others. There are more nerve endings per square cm on the bottom of the foot than anywhere else on the body. The bottom of the foot and the proprioception of the joints is where the brain gets all of its sensory information to help us keep our balance.

The question then becomes, “What should the relationship of the joints be to each other for the most efficient use of energy to move us from one place to another”? From what I’ve seen out there, other approaches do nothing to re-align the joints of the foot or to align the 1st MTPJ, ankle, and knee to keep the axis of motion of these joints perpendicular to the direction the individual is walking. Some approaches are similar to Postural Restoration in trying to get a proprioceptive response which we are aware can change the positioning of the spine creating the many beneficial changes we see. They believe that they can strengthen the muscles of the lower leg to decrease pronation but most experts agree that most of the structure and stability of the foot is created by the bone structure. Excessive pronation is secondary mostly to the varus deformity of the bones and ligamentous laxity. Excessive pronation leads to subluxation of the joints and eventually degenerative arthritis. If the joints are not aligned the tendons cannot pull properly no matter how much learned muscular recruitment takes place from proprioceptive sensation.

I have to question why it is that anyone wants to re-align the hips and spine and not re-align the foot. If the muscles are strengthened in a mal-aligned position then they will most likely help hold the foot in a mal-aligned position. When the joints of the foot are held in a neutral position in their midrange of motion then the muscular contraction and resulting pull of the tendon is almost always more effective.

I would say that the Postural Restoration Institute (PRI) orthotics are several steps ahead of most other orthotics. We have the proprioceptive response while also re-aligning the joints of the foot so the muscles and tendons can create motion around the joints, resulting in stronger muscles because they are pulling in a more appropriate position. In addition, the PRI orthotics are highly contoured to the patient's foot providing stimulation of more nerve endings and providing more sensory information for the brain to analyze. The orthotics are designed to flex with the foot throughout the gait cycle while maintaining the joints of the foot in their midrange of motion. Keeping the foot aligned results in the alignment of the big toe joint, ankle, knee, hips, pelvis, and on up the spine. – *Paul Coffin, DPM*