



Posturology as a Treatment:

Intrinsic Foot Muscles Instead of Rigid Orthotics?

BY PETER W.B. OOMENS

IN 1952, J.B. BARON, AN OPHTHALMOLOGIST SUGGESTED A LINK BETWEEN HUMAN SIGHT AND POSTURE, THUS CREATING A NEW FIELD OF STUDY CALLED POSTUROLOGY. THIS DISCIPLINE TAKES INTO CONSIDERATION THE INTEGRAL STUDY OF HUMAN POSTURE AND OTHER BODY SYSTEMS INTERACTING TOGETHER. SINCE 1976 WHEN FRENCH NEUROLOGIST RENÉ JACQUES BOURDIOL INTRODUCED AN ORTHOTICS THERAPY USING POSTUROLOGY AS A BASE, A NEW NEUROMODULAR POSTURAL TREATMENT KNOWN TODAY AS PODOPOSTURAL THERAPY, IS TAUGHT TO PHYSICIANS, PHYSICAL THERAPISTS AND PODO-ORTHESIOLOGISTS IN AND AROUND EUROPE.

For 25 years as a podopostural therapist, I have treated patients suffering from (chronic) low back pain and other, posture related, disorders. Podopostural therapy helps change the human posture by balancing the feet. Practicing therapists are able to provide a patient with a personally made pair of very thin insoles, where he glues pieces of cork of 1 to 2 mm thin.

This therapy is based on the findings of Dr. René Jacques Bourdiol, a French neurologist († 2004) mentioned previously, who assumed a direct triggering of the intrafusal fibers of the intrinsic (plantar) foot muscles when applied by therapy. The effectiveness of this type of treatment is within discussion and it is my belief that excitation of the pressure sensitive

mechanoreceptors of the hairless skin of the foot sole, during gait and stance, activates the related (plantar) intrinsic foot muscles (IFM):

Challenging a Theory

In 1995, I published in the NTIG (Dutch Journal of Integral Medicine, 1995; 11(2), 108-112), a research theory that suggested in a loaded human foot, at least in the length, we find a so called 'force closure' construction of the foot joints. This closure is maintained primarily through the intrinsic foot muscles and secondly muscles, supported by strong plantar ligaments, such as the aponeurosis plantaris and lig. calcaneonavicular. These ligaments are unique to humans and not with other mammals.

Living near the beach I have observed thousands of foot imprints in the sand, from both children and adults, and the more I studied them, the more I found something surprising. With 12% of the Dutch population having flat feet (pes planovalgus), I never could observe this foot joint construction from their footprints. On the contrary, all sand imprints I studied were less deep where I expected them to be; the deepest, under the medial arch. This offered me a different approach to researching this observation to find some kind of explanation for this phenomenon. The closest answer I was able to offer is that barefoot pronation is physiological and self-correcting.

Is there a difference between barefoot walking and walking with shoes? Between walking with or without orthotic devices? In 1986, Benno Nigg published Biomechanics of Running

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Neurologic of the Plantar Foot

The hairless skin of the foot sole has a great number and variety of neuro-receptors: Ruffini, Krause, Vater, Pacini, Meisner, free nerve endings, etc. They all have special functions, but many of them are also sensitive to pressure. We call them mechanoreceptors. Kennedy et al identified a total of 104 mechanoreceptors in the hairless skin of the foot sole, active only when the foot was loaded. Yet, when the foot is in an unloaded position no discharge activity in any of the cutaneous receptors was found, especially in the absence of intentionally applied stimulation. These findings suggest that skin receptors of the foot sole behave differently from those receptors found on the hairless skin of the hand. This may reflect the role of foot sole skin receptors in standing balance and movement control.

René Jaques Bourdiol, has published extensively about his theory, however only in French, and unfortunately, not meeting scientific standards of the scientific community. His most important book, *Pied et Statique*, hypothesises that a (cork) insert, 1 to 2 mm thin, placed under (for example) the medial arch, has a direct effect on the intrafusal nuclear chain and the bag spindle of the m.abductor hallucis. He called his therapy 'proprioceptive'.

In his opinion, the sensitivity of these γ -fibers increases to more sensitiveness of the 1-a afferent nerve. This then leads to a contraction of the m. abductor hallucis activated through the α – motor neuron at spine level. These nuclear bag and chain spindles are found within and parallel to the muscle fibers and are sensitive to stretching. Since 1978 this technique, known as podopostural therapy, has been successfully applied in more European countries.

Observations

When we consider the thickness of dermis and epidermis, plus an average tissue thickness of 1 cm under the foot, I can see why scientists are skeptical that a 1 to 2 mm thin piece of cork changes the position of the foot and consequently the posture, in spite of the empirical results. In my opinion, the only sensors that can be activated directly are therefore the mechanoreceptors of the hairless skin of the foot sole.

Excitation of these receptors under the medial arch during gait and stance brings the m.abductor hallucis to a contraction. The role of the γ -system is to preset a base tone. In fact α – and γ – fibres fire almost at the same time: we call this α - γ co-activation. This special function of the intrinsic foot muscles has not been understood for a long time.

Conclusion

The above discussed system, either proprioceptive and/or exteroceptive way, has been applied successfully in more European countries. The effects of these thin inserts can be measured and experienced, both objectively and subjectively immediate. Intrinsic foot muscles instead of rigid orthotics? I think both can be used, depending on the situation.

References

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Continu activiteit van de intrinsieke voetspieren tijdens het staan. Peter W.B.Oomens, Nederlands Tijdschrift voor Integrale Geneeskunde 1995; (2):108-112

Evaluation and Retraining of the Intrinsic Foot Muscles for Pain Syndromes Related to Abnormal Control of Pronation. Bahram Jam, Mphth (Manip), BScPT, FCAMT; <http://podoposturale-therapie.nl>