



## Orthotics treat other areas than the feet!

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*Orthotics treat areas other than the feet! It is perhaps a generalisation but nonetheless worth musing over, that prescription orthoses treat discomfort in sites other than the feet.*

Possibly one of the most obvious and worse scenarios in a host of syndromes and dysfunctions is the patient with gross subtalar over pronation (6-10 degrees of calcaneal eversion) and collapse of the midtarsal joint with no sign of re-supination of the latter structures through to push off. Admittedly other structures become involved as the proprioceptively deprived system as a whole drops into a primitive low gear in a furtive endeavour to lurch to the next step.

The unlocking of all joint congruencies from the head to the ground on shoe contact, is so destructive that a general body reaction appears to occur. A cancerous destabilisation permeates the antigravity structures of the body, the knees, pelvis, low back, thorax, neck, shoulders and head. The ensuing disruption to the dynamic stability appears to have certain characteristics. In the extreme situation, being referred to for illustration, the domino effect becomes global.

Pain in and/or discomfort derives from the feet themselves, the knees, low back, supra scapular area and headaches from various origins. All areas may contribute discomfort at the same time especially when combined with general postural weakness and environmental hostility. Conversely, specific pain areas arise in circumstances where a singular genetic deformity eg. plantarflexed 1st ray or higher subtalar joint axis function disruptively in an otherwise strong, well conditioned individual.

For the sake of illustration the former dysfunction sequence is being referred to. Inappropriate stabilising mechanisms, evidenced in foot biomechanical analysis, succumb to the hard flat surfaces that characterise our modern environment. A turmoil of neuro muscular corrective restabilising behaviour ensues, "ham fist" in its grossness and lacking in finesse.

**Problems of the leg:** The intrinsic of the foot, which appears in many patients to be paralysed into inactivity through a combination of poor orientation and proprio-

ceptive withdrawal, fail to prevent the collapse of joint capsules, stretching of ligaments and violent pull on the plantar fascia that is happening around them. The plantar flexors, especially the soleus and overstretched posterior tibial contract around an everted calcaneus giving about as much polymetric explosiveness and control as 2 fighting ice-hockey players.

Shin splints, stress fractures of the tarsals and metatarsals, talonavicular ligament strain, achilles tendonitis, the dreaded heel spur syndrome and medial calcaneal nerve irritation or entrapment, hallux valgus deformities and pain, hammer toes, anterior compartment syndrome and stress fractures of the tibia can all ensue. (Obviously some of the above are more likely to be tracked down to relate to more specific deformity such as a valgus of the forefoot on the plantarflexed 1st ray and their relationship to the external rotators of the hip.) The external rotators as part of the extremely powerful gluteal region, appear at least superficially, to act as the "rear-guard" so to speak, in a desperate attempt to re-supinate. This more proximal participant in supination heralds the entry of one of the more dominant characters in the gait dysfunction drama. A normal synergist in the re-supination of the foot in the preparation for the propulsion phase of gait, the Piriformis is of major importance.

However it becomes a dominant trouble maker when the bony architecture of the foot is corrupted.

Pronation produces an internal rotation of the tibia against an eccentrically unloading of the external rotators. When the collapse of the subtalar and midfoot is gross and prolonged it appears that the muscles of external hip rotation are over taxed. This complex response sets the scene for hip bursitis, piriformis syndrome, local muscle pain of the upper quadrant of the buttock, iliotibial band friction syndrome and retropatellar pain.

It is highly likely that such dysfunction is a key factor in maltracking of the patella and it appears to inhibit V.M.O. Not only does excessive activity of the posterior lateral compartment of the hip influence the knee and hip, but a common cause of groin pain, is the excessively laterally rotated leg with often an outflared ilium. Suddenly the adductor is positioned as a prime mover in hip flexion. This is accomplished very crudely, and with some penal-



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ty as the pelvic muscle origin is wrenched punishingly, to the point of breakdown. This abuse of muscle insertion and origin can also be seen in what is best called “the replacement knee syndrome”. Here the overtensioned retinaculum and aponeurosis of the medial knee, combined with the dominant pull of the lateral structures, so irritate the fascia, that quite excruciating and chronic knee pain follows. It remains to be seen, as to whether precursing biomechanical signs can be recognised and longer term degenerative changes avoided.

The patella is a case in point, destabilised by inhibition of the V.M.O, it is then wrenched by fibres from the over tightening iliotibial band and the lateral vasti complex. Combined with this is the compounding effect of an internally rotated tibia on an externally rotating femur and this still does not consider the additional disruption caused by non stabilized internal and external tibial torsions. Similarly, the plantar fascia in this situation is stretched to the limit. Its reaction is crippling and along with a stretched and/or entrapped medial calcaneal nerve and malaligned achilles tendon produce a very stubborn area of soft tissue and insertional irritation. Sever's Disease is seen generally early in life, while metatarsal drop with osteo-arthritic changes are later evidence of the acute and chronic manifestation of underlying mechanical imbalance. Woe betide the under prepared unwitting victim of modern lifestyle who challenges his or her incompetent support mechanisms with even protected sojourns along the suburban streets, footpaths and shopping malls, only to be thwarted by pain and dysfunction of structures in the upper and or lower body often occurring at the same time and appearing unrelated.

**Low Back Pain:** As for “aching back” syndromes, the predominant simple dysfunction appears to be via an anteriorly rotated pelvis with an increased lordosis and kyphosis with a consequent poked neck. Abdominal strength and endurance, being at a premium (keep in mind the type of foot that is being discussed as other foot types produce distinct variations.) Common compensation occurs with reverse origin posterior pelvic rotation by the hip extensors (with external tibial and femoral torsions and strong external rotators, ‘flat back syndromes’ commonly eventuate) lumbar extensor rigidity is often palpated presumably in response to the increased lordosis as the longer segmental muscles remain in a shortened position.

Concentration becomes difficult as individuals so affected find it increasingly difficult in maintaining a static posture either in sitting or standing. (Once the syndromes are entrenched they affect non-standing positions due to fatigue.) It could be said that biomechanical deformities of the feet and legs have always been present in the community, however, it can be hypothesized that environmental factors, for example, the dominance of the car, the abundance of hard flat surfaces and advance of technology are providing a proprioceptively featureless pathway allowing weakness to develop. What a mess accrues from the above imbalance, the inference being that the legs do not finish at the ankles and the feet seem so marvellously adapted to transfer information to the rest of the body. The feet are sensitive, mobile but dependant as are other focal points structures on the integrity of muscle and ligaments for stability. however, the difference between the feet and these other structures is that they are the main players in the initiation the distribution of ground reaction forces.

Criticism is levelled at those who apply great credence to the importance of orthotic mediated treatment for biomechanical dysfunction and this is because most research in the area is anecdotal as is this discussion. However what is exciting, is that clinically, patients presenting with the above conditions, improve consistently with correctly prescribed orthoses and even better when in combination with posture and muscle re-education. On the other hand, many patients who show initial improvement to posture and muscle re-education do not show sustained response to the latter forms of treatment, and surgery is often being performed on aspects of deterioration that accrues from long term dysfunction.

The avenue for discussion and research on cause and effect (not forgetting the changing environment) is wide open. #

