

### CUSTOM FOOT ORTHOSES AS TREATMENT FOR MEDIAL COMPARTMENT OSTEOARTHRITIS: A WORTHWHILE INSIGHT.

Unloader knee bracing is well documented and widely implemented as a conservative treatment for uni-compartmental osteoarthritis (varum/valgum gonarthrosis). The use of medial or **lateral heel wedges (LHW)** and custom foot orthoses, however, is less understood and is utilized less effectively. Complaints of medial knee pain are often treated with medial wedged foot orthoses with the intention of sound treatment, when in fact the risk of producing a deleterious result is increased<sup>1</sup>. By contrast, **properly designed custom foot orthoses** and lateral heel wedges that incorporate critical details can provide improved compliance and outcomes compared to unloader bracing alone.<sup>1,2</sup> While manipulation of the biomechanics of the sub-talar joint and tibial rotation in correcting knee misalignment is not a new concept, it is worth re-investigating as the topic for of the Orthotics Awareness newsletter.

**Medial compartment osteoarthritis** is a very common disease among aging individuals and is exponentially debilitating over time. Patients display varying degrees of genu varum, often maximized as a dynamic varus thrust during midstance. Complaints of pain at the anteromedial joint surface are consistent with the diagnosis and are often worse during eccentric loading of the quadriceps, such as when walking down stairs. Radiographic confirmation often clearly shows a narrowing of the medial joint space. Common treatment options include intra-articular injections, pharmaceuticals, high tibial osteotomies, unloader bracing and total or partial joint arthroplasty.

Biomechanically, **ground reaction forces (GRF)** will migrate medially beyond what would show in a knee without this deformity. The medially positioned GRF thus imposes a deforming varus moment (torque) at the knee and increased joint forces ensue where the knee can least tolerate it. (Fig. 1)

Without proper diagnostic assessment, one can easily assume that treating the "pain" with conservative foot orthoses is a wise decision and diagnostic test in and of itself. However, foot orthoses that are medially wedged to reduce sub-talar joint overpronation will only serve to move the GRF further medially, reduce internal tibial rotation and thus impose an even greater varus moment on a diseased knee. (Fig. 2) The solution points clearly to a laterally wedged foot orthosis to impose a valgus moment on an otherwise varus-deforming knee. (Fig. 3)

The implications at this point may seem counter-intuitive in that lateral wedging of the foot will hyperpronate the sub-talar joint and cause mid-foot strain and a host of other potential injuries. In fact, the

patient may already have pre-existing or predisposing foot injuries from an overpronating sub-talar joint and collapsing mid-foot. Therein lies the caveat, and the need for a greater level of foot orthosis design by a trained orthotic practitioner, such as a certified orthotist, with a global perspective to clinical assessment.

**Implementation of a lateral heel wedge demands simultaneous and intimate control of the medial longitudinal arch and lateral column.** By pronating the sub-talar joint in this way, the goal then is to minimize an otherwise forced hyperpronating foot by reducing mid-foot excursion and relative forefoot abduction. The desired outcome proximally at the knee ensues without sacrificing proper foot alignment. The details of orthotic design are thus crucial to the outcome. Despite its high control nature, the orthosis - when fit correctly - should be comfortable upon supply and elicit a **reduction of symptoms.**

From a patient perspective, custom foot orthoses are a good approach to the treatment of medial compartment osteoarthritis both in cost and clinical outcome and thus lead to greater compliance. Many patients avoid the use of a brace for they feel it is cumbersome and hot. **However, better outcomes for the knee are expected upon application of both biomechanical systems, i.e. a custom foot orthosis GRF and a three-point pressure system unloader brace.**<sup>3</sup>

In summary, conservative treatment for medial compartment osteoarthritis is possible and efficacious with the use of well-designed custom foot orthoses with a lateral heel wedge; especially in combination with an unloader knee brace.

Figure 1



Figure 2

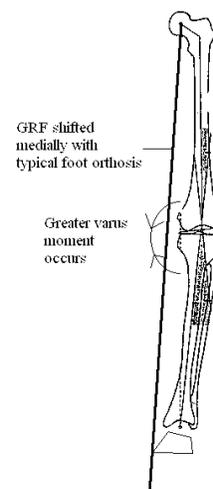
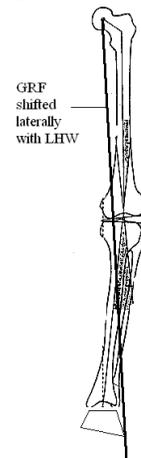


Figure 3



1. Med. Sci. Sports Exerc. 2008 May; 40(5): 913 – 7

2. Arch Phys Med Rehabil, 2006 Nov; 87(11): 1436-41

3. Hsieh, Kuo, Yang, and Hsieh. "Effect of Functional Knee Brace and Lateral Wedge Insole in Management of Patients with Osteoarthritic Knee" [Online] <http://www.tsb-web.org.tw/isb2007/isb2007-paper/ISB/0663.pdf>