RESULTS:

All fifteen subjects demonstrated no separation (bone-on-bone) of their medial compartment, at heel-strike, without the assistance of an offloading device. While using a lateral HWI, medial compartment separation could only be detected in 5/15 subjects (33%), but 12/15 subjects (80%) felt pain relief of their osteoarthritic knee at heel-strike. While wearing an osteoarthritic offloading knee brace, the same 12/15 subjects (80%) demonstrated articular separation of the degenerative knee compartment at heel-strike (Figure 4). Again, the same 12/15 (80%) subjects experienced pain relief and demonstrated a change in medial compartment separation while using a lateral HWI and wearing the knee brace.

METHODS:

Fifteen subjects with substantial medial unicompartmental osteoarthritis were studied under fluoroscopic surveillance in the frontal plane while performing level gait on a treadmill (Figure 1) (Dennis, et al., 1996). All subjects exhibited medial compartment narrowing radiographically. Initially, each subject was asked to perform gait without the assistance of an offloading device. Then, a lateral HWI was inserted into the shoe of the leg having joint space narrowing (Figure 2). Next, an offloading knee brace was fixed to the osteoarthritic knee joint. Finally, a lateral HWI was inserted and a brace was fixed to the osteoarthritic knee joint. Therefore, each subject performed normal gait on a treadmill under all four conditions. Successive fluoroscopic images of each patient at heel-strike were then downloaded to a workstation computer. The captured fluoroscopic images were then analyzed using digitization (Figure 3).

INTRODUCTION:

The purpose of the present study is to determine if the addition of a heel wedge insole (HWI) increases the amount of condylar separation during midstance.
DISCUSSION:

Previous biomechanical studies have documented excessive loads in degenerative compartments of patients with unicompartmental arthrosis and associated angular deformities. Offloading braces have been developed to attempt to lessen loads in the degenerative compartment with a subsequent reduction in knee pain. The results from this present study supports the results from previous studies that demonstrate in vivo articular separation of degenerative knee compartments can be achieved with offloading braces while relieving knee pain (Komistek, et al., 1999). Although medial compartment separation could not be detected for subjects using a lateral HWI, the subjective pain relief observed leads to the hypothesis that our digitization technique is not precise enough to detect minute changes in joint separation (<0.3 mm) which may have accounted for the reduction in pain when only a HWI was used.

Figure 3. 2D digitization to determine joint separation.

Figure 4. Fluoroscopy of non-braced subject at heel strike (left), braced subject at heel strike (right).

References:


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