

## The Effect of Laterally Wedged Orthoses on Talus Angle

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### INTRODUCTION

Laterally wedged insoles are a conservative treatment for medial knee osteoarthritis (OA). These insoles, typically inclined 5-10 degrees, attempt to alter lower extremity alignment and redistribute forces at the knee, potentially reducing knee pain. However, there are conflicting reports of static alignment measured with frontal plane radiographs. A few studies [4,5,6] did not find significant differences in tibio-femoral angle between wedged and non-wedged conditions, whereas another study [7] reported a shift in the mechanical axis, but not in the tibio-femoral angle during one-legged stance.

We previously reported no differences in tibiofemoral angle or mechanical angle with laterally wedged orthoses [3]; however, it is possible that wedged insoles affect ankle alignment as determined by talus position on frontal plane radiographs. The purpose of this study was to determine the effects of laterally wedged insoles on frontal plane talus angle in patients with medial knee OA. It was hypothesized that the talus would rotate medially with the use of a laterally wedged insole.

### METHODS

Eleven males and ten females ( $M_{age} = 61.6 \pm 7.0$  yrs;  $M_{height} = 169.9 \pm 9.8$  cm;  $M_{mass} = 93.9 \pm 18.6$  kg), all diagnosed with medial knee OA of grade II or higher on the Kellgren-Lawrence scale, volunteered to be subjects in this study. Full length laterally wedged foot orthoses were fitted for each subject's affected knee side. Wedging amount ( $9.2 \pm 3.5^\circ$ ) was determined for each subject based on the greatest reduction in knee pain during a lateral step-down task. A two-week period was allowed for accommodation to the orthotic device. Frontal plane radiographs allowed analysis of the affected limb in a bilateral stance with and without the wedged insole in the shoe.

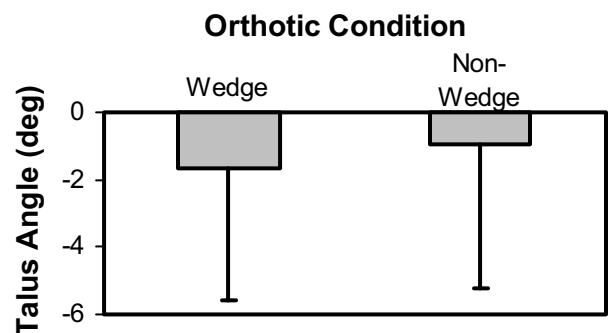
A line was drawn on the radiograph to connect the two most superior articulations of the talus; the angle between this line and horizontal, measured manually with a standard goniometer, defined the talus angle. Positive angles represent a medially rotated (laterally elevated) talus.

A paired samples t-test was used to determine significant differences between wedged and non-wedged conditions for talus angle ( $p < .05$ ).

### RESULTS AND DISCUSSION

Talus angle (Figure 1) for the wedged condition ( $-1.67 \pm 3.93$  deg) did not rotate medially from the non-wedged condition ( $-0.95 \pm 4.25$  deg) as hypothesized ( $p = 0.197$ ). Change in talus angle ranged from -4 to +4 degrees, indicating a highly variable subject response to the wedged orthosis.

Despite wedging of 5-15 degrees, lateral wedging does not seem to affect talus angle during a bilateral static stance. Previously we reported increased subtalar eversion during gait with wedged orthoses, suggesting the calcaneus is altered during the stance phase [1]. Therefore, potential changes in calcaneus alignment do not appear to affect static talus alignment. Additionally, changes in talus angle are not consistent with reductions in frontal plane knee moment [2] or knee pain associated with wedged orthotic use.



**Figure 1:** There were no significant differences in talus angle between insole conditions. Positive angles reflect a medially rotated (laterally elevated) talus.

### CONCLUSIONS

Laterally wedged orthoses did not alter talus angle in subjects with medial knee OA.

### REFERENCES

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### ACKNOWLEDGEMENTS

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