Purpose:
To investigate the short-term effects of decompressive knee bracing on walking endurance, balance, pain, symptoms, activities of daily living, and quality of life (QoL).

Background/Significance:
Knee osteoarthritis (OA) affects approximately 6% of the population older than 30 years and 12% of those older than 65 years. The presence of knee OA is characterized by complaints of knee pain and gait alterations, which commonly reduces an individual’s activity and often participation in society and impairs QoL. As a result of OA, people self-limit activity to reduce pain. This self-imposed inactivity often leads to a decrease in one’s balance and endurance. One nonsurgical, nonpharmacological method used to treat knee OA is to provide a knee brace that unloads the affected compartment thereby reducing compressive forces. Evidence about the efficacy of decompressive braces for the knee is unclear.

Subjects:
This preliminary report includes 8 (1 female) individuals with unilateral knee OA (6 medial, 2 lateral); mean age 58.2 (44-69) mean body mass index 31.5 (27.8-35.7). This study intends to enroll 25 subjects.

Methods and Materials:
At baseline, subjects were measured for the Rebel Reliever (Townsend Design) decompressive knee brace. Subjects then underwent functional testing including completion of the 6-minute walk test (6MWT), a limits of stability (LOS) balance test and the Clinical Test of Sensory Organization and Balance (CTSIB) test on the Biosway (Biodex Medical Systems), and completion of two self-report surveys, the Knee injury and Osteoarthritis Outcome Score (KOOS) (measures 5 domains: pain, symptoms, ADL’s, sport/recreation, and QoL) and the Activities Balance Confidence Scale (ABC). One week following intake, participants were fitted with the decompressive knee brace, instructed in its use, how to put on and take off, and encouraged to wear it as much as possible throughout the day. Two weeks following brace fit (Post-test) subjects underwent testing similar to baseline however this time with the knee brace donned.

Analyses:
Mean values were calculated for all measures. Paired t-tests assessed differences on 6MWT, balance assessments, and survey reports. Due to the limited number enrolled at this time significance was considered at p<0.10.

Results:
At post-test subjects walked significantly further on the 6MWT than at baseline (baseline: 458 meters, post: 514 meters; p=0.02). Significant improvements were noted from the KOOS in the domains of pain (p=0.06), symptoms (p=0.04), ADL’s (p=0.02), and sport/recreation (p=0.01). Improvements noted in QoL from the KOOS (p=0.17) and on the ABC questionnaire (p=0.22) but these changes did not attain statistical significance. With respect to balance, when wearing the brace at post-test the amount of postural sway during the CTSIB did not change from baseline when standing on a firm surface for 20 seconds with eyes open (p=0.67), eyes closed (p=0.27), or on a compliant (foam) surface with eyes open (p=0.50). When standing on a compliant surface with eyes closed the amount of postural sway approached a significant improvement (less sway) when comparing post to baseline (p=0.13). Overall subjects were able to shift their center of mass better during the LOS test when wearing the decompressive knee brace at post-test as compared to baseline (p=0.10).

Conclusions:
Following two weeks of decompressive knee brace use for individuals with knee OA it appears that functional endurance improves with a concurrent reduction of pain and symptoms and improvements in ADL’s. Further, the preliminary
results suggest that balance is not adversely affected when using a decompressive knee brace and, potentially may improve balance capabilities.

Orthotists should take an active role in advocating to physicians the need for patients with knee OA to trial decompressive knee braces as an adjunctive means to facilitate improvements in function and ADL’s which can possibly lead to improvements in reported QoL.

Biographical Sketch:
Dr. Lamberg attended Ithaca College, earning a BS in Clinical Science and a MS in Physical Therapy. He pursued graduate education, earning his research Doctorate in Movement Science from Columbia University. Dr. Lamberg is also a certified Pedorthist.

Dr. Lamberg has numerous publications in peer-reviewed journals and has presented at the national and international levels.