



# BENEFITS OF BRACING KNEE OSTEOARTHRITIS

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## INTRODUCTION

Knee osteoarthritis (OA) is a common joint disease, affecting ~6% of the population older than 30 years (Felson, 1998). Knee OA is characterized by complaints of knee pain, gait disturbance, stiffness, and functional limitations leading to reduced activity and impaired quality of life (QoL) (Murphy, 2008, Baert, 2012, Brouwer, 2006). Bracing the OA knee to unload the diseased compartment is an underutilized treatment. This study investigated if use of a decompressive knee brace can improve clinical, functional and biomechanical factors.

## METHOD

Nineteen with knee OA (15 medial) participated: mean age 55 years; KL grade (II =5, III =10, IV =4).

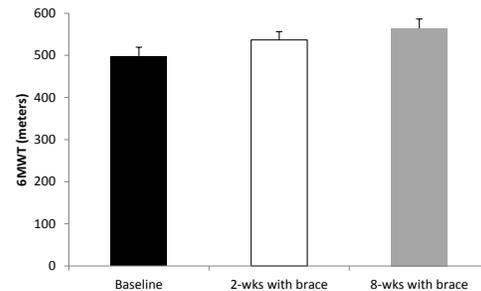
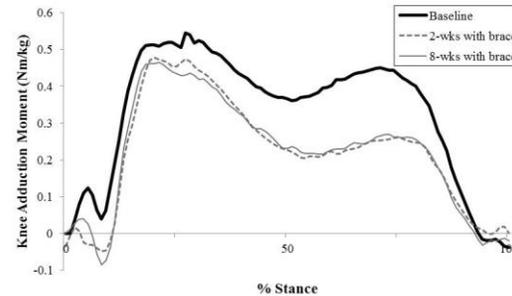
**Procedures:** At baseline subjects were measured for the Rebel Reliever (Townsend Design) knee brace. Subjects underwent gait analysis to identify knee adduction moment (KAM) and knee adduction impulse (KAI) of the involved leg. Subjects also completed a 6-minute walk test (6MWT), strength testing (knee extensors/flexors) on a Biodex, and completed the Knee injury and Osteoarthritis Outcome Score (KOOS) and the Activities Balance Confidence Scale (ABC). One week following base, subjects were fit with the brace, instructed in its use, and repeated the KOOS and ABC. Two and 8-wks after receiving the brace, subjects underwent testing similar to base with the knee brace on except during strength testing. Subjects also returned surveys 3-months and 6-months after fitting.

**Data Analysis:** Repeated measures ANOVA's with were used to detect differences in KAI, KAM, strength, and 6MWT at base, after 2-wks and 8-wks of brace use. KAI and KAM reported only for those with medial OA. Repeated measures ANOVA's were also used to detect differences in KOOS and ABC at base, fitting, 2-wks, 8-wks, 3-months, and 6-months.

## RESULTS

The KAI (Fig 1. area under curve) and peak KAM in the 2<sup>nd</sup> half of stance was significantly reduced from base compared to both 2- and 8-wks of brace use ( $p < 0.05$ ). Subjects walked significantly further at 2- and 8-wks on the 6MWT (Fig 2) than at base and at 8-wks compared to 2-wks ( $p < 0.05$ ). Knee extension and flexion strength, measured by average peak torque and power significantly improved from base to 8-wks ( $p < 0.001$ ). Of the 14 subjects that returned the KOOS and ABC through the 6-month session, no significant changes were found when comparing base

to fitting, indicating pain and function remained problematic prior to brace use. However, significant improvements in pain, symptoms, ADL's and QoL were found when comparing 2-wks, 8-wks, 3-month and 6-month report to base (all  $p < 0.01$ ).



## DISCUSSION

Use of the Rebel Reliever for 8-weeks resulted in a reduction of potentially detrimental adduction forces at the knee for those affected with medial disease. Further, use of the brace improved functional walking capacity, improved knee muscle function and provided significant changes in reported pain and symptoms, ADL's and QoL measures. All changes in KOOS exceeded suggested values for clinically important changes, indicating the changes had a meaningful impact in the life of the participants.

## CONCLUSION

Using the Rebel Reliever for knee OA is effective in reducing potentially biomechanical forces and improving function and QoL.

## CLINICAL APPLICATIONS

We believe bracing individuals with knee OA is safe and effective and should be used as a mode of treatment, leading to meaningful functional changes.

## REFERENCES

- Felson, DT et al. *Arthritis Rheum.* 41; 1343-55, 1998.
- Murphy L, et al. *Arthritis Rheum.* 59; 1207-13, 2008.
- Baert IA, et al. *Clin Biomech.* 28; 40-47, 2012.
- Brouwer RW, et al. *Osteo Cart.* 14; 777-83, 2006.

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