

## The Effect of Prophylactic Knee Braces on Balance and Uninjured Knee Range of Motion

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### ABSTRACT

There has been numerous studies performed regarding the effectiveness of prophylactic knee braces (PKB) preventing knee injuries or the effect of PKB on injured knees, but minimal research is available on the effect of how PKB affect the functioning capacity of uninjured knees. **PURPOSE:** To examine the effects of two different types of PKB, hinged (HGB) and non-hinged (NHB), on uninjured preferred knee joint range of motion and dynamic balance in males and females. **METHODS:** Thirty subjects were recruited (male=15, female=15) with ages ranging from 18-28 years. Only participants with no history of any knee injuries or current knee problems were allowed to participate. Subjects were blinded to the purpose of the study, but were allowed practice trials for the dynamic balance test (Y-Balance test). Prior to experimental trials subjects were measured for body composition and knee brace size. All subjects underwent three experimental trials [HGB, NHB, and a no PKB control (CON)] on the same day in balanced cross-over design. During the treatment trials, the subjects wore the braces on their preferred leg. Each experimental trial was comprised of a test for dynamic balance and four tests for knee joint range of motion. Dynamic balance composite score, knee extension/flexion ( $^{\circ}$ ), and internal/external knee rotation ( $^{\circ}$ ) were compared between sex (M, F) and across PKB (HGB, NHB, CON) using an ANOVA (1 between, 1 within),  $\alpha=0.05$ . Age and body composition differences between sex were examined using independent *t*-tests,  $\alpha=0.05$ . **RESULTS:** M and F did not differ ( $p>0.05$ ) with regard to age, but did differ significantly ( $p<0.05$ ) in body mass, body stature, and percent body fat. For the sex main effect, when pooled across PKB (CON, HGB, NHB) M and F did not differ ( $p>0.05$ ) in knee flexion, internal knee rotation, right/left leg balance, but did differ significantly ( $p<0.05$ ) in knee extension (M=+0.8 $\pm$ 1.8 $^{\circ}$ , F=-0.6 $\pm$ 2.4 $^{\circ}$ ) and external knee rotation (M=29.7 $\pm$ 7.5 $^{\circ}$ , F=35.9 $\pm$ 9.7 $^{\circ}$ ). For the main effect for PKB, when pooled across sex external knee rotation and right/left leg balance did not differ ( $p>0.05$ ) between HGB, NHB, and CON, but both HGB and NHB differed significantly ( $p<0.05$ ) from CON for internal rotation (HGB=21.9 $\pm$ 10.3 $^{\circ}$ , NHB=22.5 $\pm$ 9.8 $^{\circ}$ , CON=24.8 $\pm$ 10.0 $^{\circ}$ ), flexion (HGB=126.9 $\pm$ 17.7 $^{\circ}$ , NHB=125.7 $\pm$ 15.9 $^{\circ}$ , CON=139.0 $\pm$ 6.8 $^{\circ}$ ), and extension (HGB=+0.7 $\pm$ 1.4 $^{\circ}$ , NHB=+1.3 $\pm$ 1.8 $^{\circ}$ , CON=-1.7 $\pm$ 2.2 $^{\circ}$ ). The sex x knee brace interaction was not significant ( $p>0.05$ ). **CONCLUSION:** PKB have no effect on dynamic balance, but appear to hinder the range of motion for most motions of the knee.