SHORT AND LONG-TERM INFLUENCE OF A CUSTOM FOOT ORTHOTIC INTERVENTION ON LOWER EXTREMITY DYNAMICS IN INJURED RUNNERS

Christopher L. MacLean and Joseph Hamill
Biomechanics Laboratory, University of Massachusetts-Amherst, Amherst, Massachusetts, USA
E-mail: cmaclean@excsci.umass.edu

INTRODUCTION

Prior research on the influence of custom foot orthotic (CFO) intervention has primarily focused on the short-term dynamical influences at the ankle and knee in healthy runners. That is, subjects in the study were dispensed custom foot orthoses and tested immediately with no controlled period of wear. In addition, for the most part, subjects included in these studies have been healthy subjects who are not typically candidates for this intervention (Mundermann et al., 2003). Therefore, the purpose of this study was to analyze the short and long-term influence of a CFO intervention on the lower extremity dynamics in a sample of runners who had a history of running related knee injury.

METHODS

Eight female runners (at least 10+ miles per week) with a history of a knee-related running injury were selected for participation in the study. Each subject performed 5 acceptable over-ground running trials with a CFO and without a CFO (SHOD) (Paris Orthotics Lab, Vancouver, BC, Canada). Subjects were tested at the time of orthotic dispense and following 6 weeks of orthotic wear during all running activity.

Kinematic data were collected using Qualisys® software (Gothenburg, Sweden) at 240Hz and kinetic data were collected using an AMTI® force platform (Watertown, MA, USA) at 1920Hz. Data were processed using Visual 3D® (C-Motion, Inc. Rockville, MD, USA) for the calculation of ankle and knee angles and internal joint moments. Data were statistically analyzed using a Condition X Time X Subjects repeated measures ANOVA. Significant main effects and interactions were indicated with a criterion alpha level of 0.05.

RESULTS AND DISCUSSION

CFO intervention resulted in significant main effects for Condition (CFO vrs Shod) but not for Time (0 vrs 6 weeks). Short and long-term intervention led to significant decreases in maximum values for rearfoot eversion angle (Figure 1), rearfoot eversion velocity (Figure 2) and internal ankle inversion moment (Figure 3).

The results of this study reveal that 3-D frontal plane dynamics of the ankle were affected by CFO intervention in subjects with a history of running-related knee injury. Results from this sample of runners indicate that the influence of CFO intervention might be realized immediately and that changes in dynamical variables were not significantly influenced by prolonged wear following dispense.

Figure 1: Mean peak rearfoot eversion angles (CFO condition: gray; Shod condition: white).

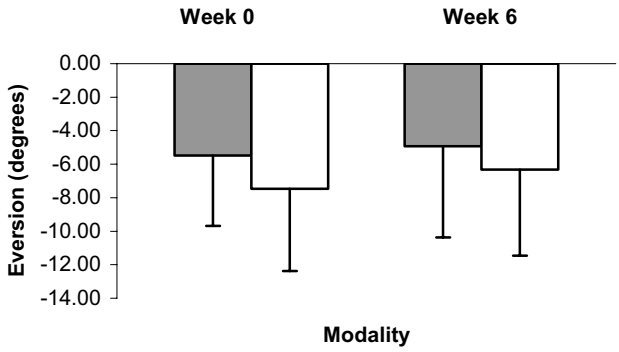


Figure 2: Mean peak rearfoot eversion velocity. (CFO condition: gray; Shod condition: white).

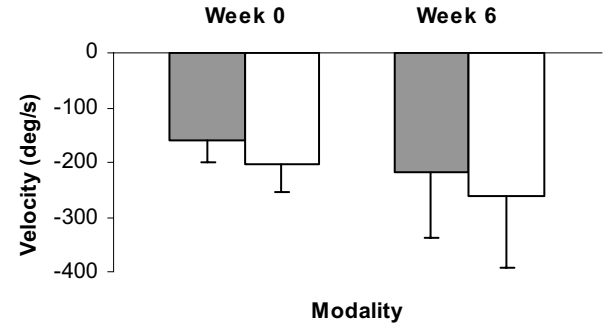
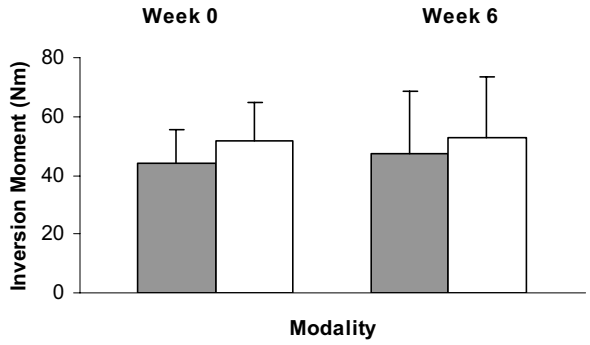


Figure 3: Mean peak ankle inversion moment. (CFO condition: gray; Shod condition: white).



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Mundermann et al., (2003). *Clinical Biomechanics*, **18**, 254-262.

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