

QUANTIFYING FIT IN ICE HOCKEY SKATE BOOTS

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INTRODUCTION: Skates are specifically designed for the hockey game context. It is vital that skates be chosen in relation with proper size and shape, as well as with respect to play style and position (Pearsall et al. 2000). To provide optimal function, they must "fit". Fit infers many traits: to fit snugly around the contours of the bony ankle and foot structures, to provide stability, and to avoid discomfort. Nonetheless, players have often sacrificed "fit for comfort" at the expense of "fit for performance". Comfort and fit are interrelated qualities and important factors for footwear in recreational and physical activities. Increasing interest in footwear comfort resulted in several investigations that associated comfort with plantar pressure distribution (Chen et al. 1994). To date, improved ratings for shoes comfort can be done by adding a control condition to the testing protocol and using a visual analog scale (VAS) to assess comfort (Mündermann et al. 2002). Little have been done in assessing fit in ice hockey boots. The purpose of this study is to quantify fit in the ice hockey skate boots by means of pressure distribution measures in conjunction with perceptual VAS ratings.

METHODS: 15 male volunteer participants will be selected (5 university elite players and 10 recreational players) and asked to sign a written consent form. Inclusion condition is size 8 (North American) and exclusion any type of foot deformity. Clusters of piezo-resistive sensors (FSA Verg Inc. Canada) will be taped on the skin on the plantar, dorsal, medial, and lateral aspect of the foot and posterior aspect of the heel and leg. Each subject will be asked to put on his skates and, while standing on a sheet of glice, to perform simple movements such as foot inversion, eversion, and plantar/dorsiflexion. The pressure values in all sensors will be recorded on line (10 Hz) and at the end of data collecting, each subject will be asked to fill out a 10 items fit test questionnaire regarding the comfort and performance during the test, using a 150mm visual analogue scale (VAS). For two consecutive days, each participant will be asked during the trials to wear the skates and to assess them regarding to pressure values. The FSA system calibration will be done every time and for every subject before the test session using a pressure bladder to measure values up to 100 PSI. Collected data from the pressure sensors will be filtered to eliminate distortions using Matlab modules (The MathWorks Inc., Natick, Massachusetts, US). The variables will be statistically analyzed as well as comparison between pressure value and comfort.

RESULTS AND DISCUSSION: Obtained pressure values will be compared with the comfort assessment in order to express fit. Increased pressure values (in PSI) and discomfort is expected for the one size smaller condition.

CONCLUSION: A reliable method for "measuring" fit will give the opportunity to the skate boots manufacturers to consider some of the findings in their design process, which will contribute to increases in performance

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