

# Heel Pain Control Characteristics of the Active Ankle Brace

Sorin Siegler, Ph.D., Drexel University

Wen Liu, M.S., Drexel University

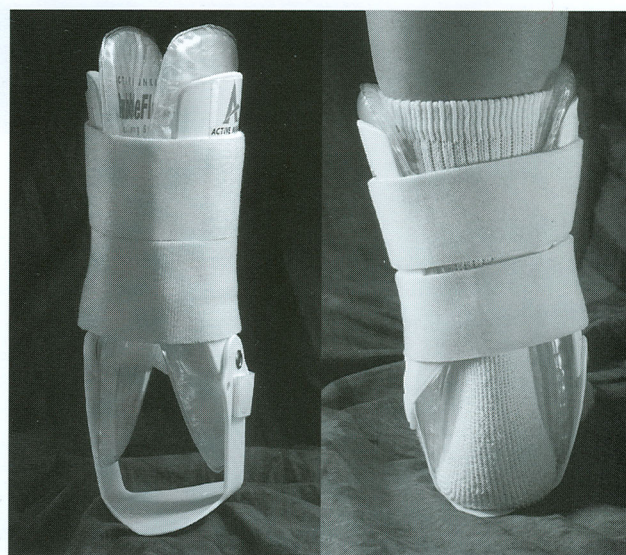
**INTRODUCTION:** The underlying assumption of this study was that heel pain may be reduced or controlled by reducing the amount of force transmitted through the heel region during normal activities such as standing and walking. Therefore, the goal of this study was to examine the efficacy of the Active Ankle brace, with its unique solid-U-shape design, in reducing the amount of force transmitted through the heel during both standing and level walking.

## METHOD

Ten healthy subjects (men and women) volunteered in this study. None of the subjects had a recent history of ankle sprains. Each subject was tested while wearing his or her low top athletic shoes. The Active Ankle brace was applied and the F-scan transducer was inserted between the brace and the heel. The F-scan is a device consisting of a very thin in-shoe insert possessing an array of printed circuits which provide a measure of pressure distribution beneath the foot. This device was used to test the loading on the heel area during standing and level walking both with and without the Active Ankle brace. Testing was conducted under two different conditions. First, with the brace loose, simulating a non-supported condition, and secondly, after tightening the brace around the region below the calf. Two activities were evaluated: standing and walking at the subject's selected speed. The ten subjects were randomly divided into two separate groups. In group A, the brace was loose during the first data collection and tightened for the second. The order of testing was reversed in group B.

## DATA ANALYSIS

The average net force transmitted through the heel area was used in the analysis during the upright posture test. For walking trials, the average peak force transmitted through the heel area for three consecutive steps was used in the statistical analysis. Paired t-test statistical analyses were used to identify if significant differences (95% confidence level) existed between the "brace loose" and the "brace tight" conditions.



Posterior views of the Active Ankle® brace.

## RESULTS

The results of the statistical analyses are summarized in the table below. These values represent averages obtained from all subjects tested.

	<u>Condition</u>	<u>Mean force(lb)</u>
Standing	Loose	38.59
	Tight	36.75
Walking	Loose	52.69*
	Tight	48.37

\*Significant difference when  $p < 0.05$

## CONCLUSION

The Active Ankle brace reduces the net force transmitted through the heel region both during standing (by 4.8%) and during walking (by 8.2%). Only the reduction during walking was found to be statistically significant. This finding supports the original assumption that the solid-U-shape design of this brace as responsible for force attenuation during heel strike. From this, it can be postulated that the brace may help reduce or control painful heel conditions in some patients. Furthermore, this force reduction characteristic may diminish forces transmitted through the heel to the ankle joint complex and its associated structures.