

A Comparison of Insole Materials on Plantar Pressure and Comfort in the Neuroischaemic Diabetic Foot

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Introduction: Elevated plantar pressures are an important predictor of diabetic foot ulceration. Plantar pressures have been shown to be higher in diabetic patients with peripheral neuropathy and peripheral arterial disease (neuroischaemic) than in neuropathic and control patients (Pitei, 1999). Conservative care such as therapeutic footwear has been shown to reduce major amputations in patients with ischaemic ulceration (Edmonds, 2001). Conservative care also needs to be 'comfortable' to encourage the medical need for walking in these patients. The aim of this study was to investigate the effect of various medical grade insole materials on plantar pressure and comfort in a neuroischaemic diabetic patient at risk of foot ulceration.

Methods: A 59 year old man with a history of diabetes, peripheral neuropathy, peripheral arterial disease, foot ulceration, intermittent claudication and 'bruising' pain beneath 4th MPJ's. Nine insole test conditions were examined. Outcome measures included in-shoe plantar pressure and overall shoe comfort. Peak pressure and pressure-time integrals were recorded using the Pedar-mobile[®] in-shoe system (Novel GmbH, Munich, Germany). Overall shoe comfort was measured on a validated 150mm visual analogue scale (Mundermann, 2002).

Results: The contoured multidensity insole was the most effective at reducing peak pressure and pressure-time integrals compared to the shoe only condition while the 6mm slow-release poron[®]/6mm standard poron[®] combination was most comfortable. Interestingly, there was a strong correlation between peak pressure and comfort ($r=-0.838$, $P=0.005$) indicating that 70% (r^2) of the variability in patient comfort could be attributed to differences in peak pressures.

Discussion and Conclusion: The goal of treatment for the neuroischaemic diabetic foot is to maintain functional status, reduce or eliminate ischaemic symptoms and prevent progression of disease. This study was continued to test the long-term effect of these insole materials on walking distance and pain with the results to be presented at the DFSGM.