

## **Effects of Different Temporal Heel Support Patterns on Skin Blood Perfusion**

Previous work<sup>1-3</sup> showed that heels that are pressure-loaded and then pressure-relieved demonstrate a blood flow hyperemia related to the prior continuous loading-time. However, if overall loading-time is constant, it is unknown how different temporal patterns of heel loading and unloading will affect average blood flow over full load-relief intervals. To investigate this, skin blood perfusion (SBF) was measured (laser-Doppler) in heels of 10 healthy subjects ( $29.6 \pm 1.9$  years) while subjects lay supine for 80 minutes on a support surface. In each of three sequential 20-minute intervals, one heel was cumulatively loaded for 10 minutes, but within intervals, it was completely unloaded after either 10, 5 or 2.5 minutes of loading. Prior to initial loading, baseline SBF was determined for 20 minutes. Results showed that all loading patterns caused significant ( $p < 0.01$ ) decreases in baseline SBF and caused hyperemic responses when unloaded. Average heel SBF during full 20-minute intervals did not significantly differ from each other but SBF in each interval significantly ( $p < 0.001$ ) exceeded baseline. These findings are consistent with the concept that adequate excess perfusion capability, as in these young healthy persons, is protective. Although as yet untested, this may indicate that a deficiency in hyperemic reserve increases risk of heel breakdown.

1. Mayrovitz, HN, Smith J, Delgado M, Regan MB. (1997) Heel blood perfusion responses to pressure loading and unloading in women. *Ostomy/Wound Management* 43:16-26.
2. Mayrovitz, HN and Smith. (1998) Heel-skin microvascular blood perfusion responses to sustained pressure loading and unloading. *Microcirculation*. 5:227-233
3. Mayrovitz HN and Smith J. (1999) Blood perfusion hyperaemia in response to graded loading of human heels assessed by laser-Doppler imaging. *Clinical Physiology* 19:351-359.

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