Effects of Different Temporal Heel Support Patterns on Skin Blood Perfusion

Previous work\textsuperscript{1-3} 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±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.


Harvey N Mayrovitz, Ph.D., College of Medical Sciences, Nova Southeastern University, 3200 S. University Drive, Ft. Lauderdale, FL 33328, 954-262-1313, fax: 954-262-1802, e-mail: mayrovit@nova.edu

Lori Dribin, Ph.D., College of Medical Sciences, Nova Southeastern University, 3200 S. University Drive, Ft. Lauderdale, FL 33328

Nancy Sims, R.N., Wound-Lymphedema Center, North Broward Hospital District, Ft. Lauderdale, FL.