Interface Pressure Consistency and Temporal Changes: Adaptive Compression vs. Four-Layer Bandaging

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BACKGROUND / OBJECTIVE: Although compression is a treatment mainstay for venous leg ulcers it can be difficult to 1) initially achieve proper interface pressures and 2) insure these pressures are sustained over time. Our objective was to characterize these features as achieved with two modalities; a four-layer compression bandage system (4LCB*) and a wearable electronically-controlled adaptive compression therapy (ACT**) device.

METHODS: Each modality was applied to opposite legs of 12 adult volunteers. Interface pressures (IP) were measured with pneumatic sensors at lower, mid and upper medial calf sites immediately and 1, 4 and 8 hours later with subjects seated and standing. IP was evaluated with respect to values achieved and their change with time. The ACT device was programmed to achieve initial IP values at lower, mid and upper calf of 40, 30 and 20 mmHg. The 4LCB was applied by a therapist with extensive experience in compression bandaging. At the end of the trial subjects rated the devices for overall comfort and acceptance.

RESULTS: After 8 hours of wearing the ACT device, pressures (mmHg±SD) were close to those initially programmed for lower, mid and upper calf being 41.7±7.8, 35.4±5.9, 19.5±6.7 respectively in the seated position and 41.6±7.7, 34.0±6.0, 17.1±6.6 while standing. Contrastingly, after 8 hours of wearing the 4LCB, average pressures decreased by as much as 12 mmHg and had less than optimum distal-proximal pressure gradients that were 47.3±7.5, 47.9±7.4, 45.1±10.6 seated and 48.4±7.7, 51.9±9.2, 44.3±12.5 standing. Overall subject-rated comfort and acceptance of the ACT device was excellent or good in 11/12 subjects compared with 7/12 for the 4LCB.

CONCLUSIONS: The data suggest that the ACT device, in contradistinction to 4LCB, rendered a temporally sustained distal-to-proximal interface pressure gradient with values consistent with venous ulcer therapy standards.

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**ACTiTouch Adaptive Compression Therapy, Tactile Medical, Minneapolis, MN