The Effect of Pneumatic Compression in Adults with Chronic Limb Edema. A Preliminary Study.

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PURPOSE
The purpose of this study was to explore the feasibility of home-based pneumatic compression treatments in reducing edema. The secondary purpose was to explore the effects of this treatment on function in adults with diabetes and people post-stroke.

BACKGROUND
• Pneumatic compression devices have been shown to attenuate lower extremity edema.1
• The use of layered compression bandages was found to be safe and effective in treatment of chronic lower extremity diabetic edema.2
• No clearly effective treatment is available to alleviate hand edema after stroke.3
• A scarcity of research has investigated the effectiveness of a home-based pneumatic compression treatment in adults with edema related to diabetes or stroke.

METHODS
• In the diabetes group, the dependent variables included volumetric measurement (VOL) of the lower limbs, active range of motion (AROM), the Michigan Neuropathy Screening Instrument (MNSI), and the 10-Meter-Walk (10MW).
• In the stroke group, the dependent variables included the VOL of the upper extremity, AROM of wrist, grip strength, Fugl-Meyer Upper Extremity motor test (FMUE), and Wolf Motor Test (WMT) of the affected side.
• Using the two-standard-deviation points (2SD) method, we compared the means of all intervention data to the baseline values.

RESULTS
• In the diabetes group, 2 subjects showed decrease of edema beyond the 2SD of the baseline values (post-intervention VOL 1955.0±106.1cm³ < 2SD 2011.6cm³, VOL 890.5±41.49cm³ < 2SD 903.28cm³), and the other 2 subjects showed decrease of edema lower than baseline mean, but not beyond the 2SD of baseline values (VOL 2000.88±57.22cm³ < baseline 2158.00±142.33cm³, VOL 1695.50±35.87cm³ < baseline 1744.40±30.40cm³).
• All 4 diabetic subjects showed increase of AROM (dorsi-flexion & plantar-flexion) bilaterally beyond the 2SD of the baseline values. No significant change in MNSI or 10MW was observed.
• In the stroke group, 1 subject showed decrease of edema in the affected arm beyond 2SD of the baseline (intervention VOL 857.1±34.6cm³ < 2SD 912.9cm³) and increase of AROM (intervention active-wrist-flexion 3.0±0.0° > 2SD 2.0°). No significant functional change was observed in either stroke participants.

CONCLUSION
This pilot project demonstrated that 1) home-based pneumatic compression treatment is feasible; and 2) it can inconsistently reduce limb edema and increase AROM in people with diabetes and people post-stroke. Future investigation with a larger sample size is planned.

IMPLICATIONS
Physical therapists may be able to prescribe this home-based pneumatic compression treatment to partially alleviate patient’s edema and gain some range of motion in order to aid other task-specific interventions.

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REFERENCES