

Fluid distribution in upper limb primary lymphoedema and its response to compression

Authors: Jane Phillips, Lymphoedema Therapist, Assistant Professor, Philadelphia College of Osteopathic Medicine and LymphEd, LLC; Professor Sue Gordon, Research Director and Workforce Capability Lead, ARIIA: Aged Care Research and Industry Innovation Australia

Primary upper limb lymphoedema is even more uncommon than lower limb primary lymphoedema. Where does fluid accumulate in primary upper limb lymphoedema? What happens to the fluid when compression is applied? The aim of this case study was firstly to explore how fluid distribution in primary upper limb lymphoedema differs from the upper limb with no lymphoedema. The second aim was to explore the effect of compression on fluid distribution in an upper limb with primary lymphoedema compared to one with no lymphoedema.

Method: This age and gender matched case study assessed two 11-year-old girls, one with and one without primary upper limb lymphoedema. Direct (percent water content by MoistureMeterD Compact, extracellular/intracellular fluid by bioimpedance) and indirect (low echogenic pixels by high frequency ultrasound) measures of fluid distribution were completed before and after application of a standardized dose of intermittent pneumatic compression (IPC) (50mmHg for 40 minutes).

Results: At baseline, measures of bioimpedance and percent water content demonstrated higher fluid accumulation distally in the hand than in the forearm and in the affected limb than the control limb. As well, measures from high frequency ultrasound demonstrated higher dermal fluid accumulation in the forearm of the affected limb than the control limb. However, this was not the case in the hand. Following compression, the forearm with primary lymphoedema showed reductions in all measures, but the hand both with and without lymphoedema responded differently, showing an increase in extracellular/intracellular fluid and low echogenic pixels.

Conclusion: Conclusions from a case study are limited. The response of the hand to one application of intermittent pneumatic compression raises questions about lymph drainage from the hand with primary upper limb lymphoedema and its treatment with compression. Further investigation using larger numbers is warranted to determine the response to compression in upper limb primary lymphoedema, particularly in the hand.