BACKGROUND: Head and neck lymphedema (HNL) is a frequent late complication in patients treated for head and neck cancer (HNC) affecting up to 75% of survivors. Effects of surgery and/or radiation either obstruct or destroy lymphatic vessels and damage surrounding soft tissue. The lymphatic disruption and tissue damage leads to fluid accumulation in interstitial spaces in affected areas. This high-protein fluid activates chronic inflammatory responses and skin and subcutaneous tissue fibrosis further impairing lymphatic function. Although HNL is associated with substantial chronic symptom burden, functional deterioration, disfigurement and poor quality of life in HNC survivors, it remains under-recognized and undertreated. Based on demonstrated clinical benefits of advanced pneumatic compression to treat lymphedema in other body areas, a device incorporating similar principles and mechanism of action was developed for use on the head and neck. The goal of the present study was to evaluate its utility in treating HNL.

METHODS: This study was a single arm, prospective, functional usability study that included 44 subjects with secondary HNL who had previously been treated for HNC. Lymphedema stage, based on tissue characteristics, was assessed using the MD Anderson Cancer Center Head and Neck Lymphedema rating scale. All subjects received a single 30-35 minute treatment with the head and neck garment-based pneumatic compression device. The device is intended to treat HNL by stimulating axillary lymphatic tributary regions and directing fluid from affected areas to healthy, functioning regions. Patient-reported garment and treatment comfort were assessed using a five category survey. Patients also reported how they felt post-treatment and the likelihood of continuing home use. Pre-to-post treatment edema changes were evaluated via tape measurement which included the sum of seven standardized face metrics (FACE Composite) and the sum of three neck circumference measurements (NECK Composite). Statistical significance of these changes were assessed with a paired T-test and subjective changes assessed via chi square analyses.

RESULTS: A single treatment produced statistically significant reductions (mean ± SD) in both FACE Composite (82.5 ± 4.3 cm vs. 80.9 ± 4.1 cm, p<0.0001) and NECK Composite (120.4 ± 12.2 cm vs. 119.2 ± 12.1 cm, p<0.0001). Beyond these quantitative reductions, no adverse events were reported and no patient found the treatment to be uncomfortable with 36/44 (82%) reporting treatment to be either very or somewhat comfortable. Most patients (27/44, 61%) reported feeling much or somewhat better after treatment. Nearly all patients (41/44, 93%) reported they would be likely to use this therapy at home.

CONCLUSION: These pilot data suggest advanced pneumatic compression treatment for head and neck lymphedema is promising. Results found the treatment to be safe, easy to use and well tolerated while demonstrating edema reduction at initial treatment. Advanced pneumatic device treatment has the potential to reduce symptom burden in this population.