## SUMMARY
The use of PhysioTouch® in a 2-phase treatment protocol, directed exclusively in the affected lymphatic territory, increases the mechanical function of ILs, thereby enhancing fluid volume dynamics and long term fluid homeostasis, observed initially by circumferential volume reduction followed by a decrease in L-Dex Biolimpedance.

## BACKGROUND
Early 2-phase treatment for successful conservative treatment of lymphatic injury in patients with breast cancer related axillary lymph node dissection (BrLND) must include restoring physiological function to the locally impaired lymphatic system. “The lymphatic vasculature is essential for fluid homeostasis and transport of immune cells, inflammatory molecules, and dietary lipids.” (Rockson, 2003) PhysioTouch®'s negative suction pressure on the skin surface increases radial tension on anchoring filaments of the initial lymphatics (ILs), dilating their lumens to a greater diameter and opening endothelial cell junctions greater than traditional manual lymphatic drainage (MLD). (Livarnien, JT, 2013) As a result, there is:

1. Increased lymph fluid movement into ILs that reduces interstitial overload
2. Removal of stagnant nitric oxide molecules which disable the contractility of collector vessels (Chakraborty S, 2015)
3. Appropriate functional transition of pro-inflammatory cytokines to anti-inflammatory cytokines to optimally transition healing phases (Nase, 2009)

Without early intervention and optimal restoration of physiological function of the local lymphatic system, patients are at risk for healing phase transition failure, which leads to prolonged inflammation and proteolytic activity resulting in deposition of adipose tissue and fibrosis. (Rockson, S., 2014)

## CASE DESCRIPTION
HR was diagnosed in 2012 with (R) sided Stage 3c ER+ PR+ Her2+ Breast Cancer. Neoadjuvant chemotherapy resulted in 0/30 axillary lymph nodes positive. Patient underwent (B) mastectomy and expander placement, followed by external beam radiation therapy to the (R) tissue over expander/pectoral area. At 6 months, expanders were replaced with implants. HR had immediate severe infection (R) implant. Implant was removed within 48 hours. IV antibiotics were administered.

(R) UE developed Stage 2 lymphedema at onset of infection. CDT was initiated, but with minimally successful results. At 6 months post surgery, circumferential volume reduction plateaued. PhysioTouch® was introduced into the treatment plan in January 2015 and combined with subfascial intervention. At this time, L-Dex measurements were collected concurrently with circumferential volume measurements of the (R) UE.

## INTERVENTION
### Phase 1 Subfascial Intervention
Lymph Collectors divide into two sections:
1. The superficial system - drains cutis and subcutis
2. The deep (subfascial) system - out of deeper structures namely joint synovia, nerves and muscles

The superficial and deep systems are linked by perforating vessels, most of which move lymph from the deep to the superficial system. (Fold & Fokk, 2006)

### Phase 2 Superficial Intervention
NITRIC OXIDE MOLECULES DISABLE CONTRACTILITY OF COLLECTOR VESSELS
FUNCTIONAL TRANSITION OF PRO-INFLAMMATORY CYTOKINES TO ANTI-INFLAMMATORY CYTOKINES TO OPTIMALLY TRANSITION HEALING PHASES

### RESULTS
HR - Volume Measurements: Circumferential with Tape Measure vs. L-Dex Biolimpedance

The circumferential size of the (R) UE decreased over time, and then plateaued, however Phase 1 and 2 treatment interventions positively affected fluid volume reduction and fluid homeostasis, promoting the following:
1. Reduced fluid inflammation
2. Reduced proteolytic activity
3. Reduced deposition of adipose tissue and fibrosis

## CONCLUSION
This case study provides a clinical template for treatment success in patients with BrLND who receive early intervention with both subfascial and superficial territorial lymphatic treatment, in conjunction with PhysioTouch®, to reduce protracted transition of lymph fluid to solid phase lymphedema.

The specific leverage in effectiveness of subfascial neuro-musculoskeletal release work is to reduce lymphostasis in the nerve/joint/muscle complexes in the affected lymphatic territory and to release occlusion pressure on the perforating lymph vessels communicating between the subfascial and superficial lymph systems within the territories.

The specific leverage in effectiveness of treatment with the PhysioTouch® is its increased strength, greater than that of LMD (lymphatic manual drainage), in creating radial tension through the anchoring filaments of the ILs, thereby increasing fluid movement from the Interstitium into the ILs. This success in treatment can be objectively measured by both circumferential volume using a tape measure and L-Dex Biolimpedance, the latter giving a more accurate clinical picture of relative limb fluid volume.

In this way, we will have the opportunity in oncology patients with both subclinical (stage 0-1) lymphedema and chronic (stage 2-3) lymphedema conditions to create and stabilize physiological homeostasis in lymph fluid as optimally as possible. (Tammela T, 2010) (Scallan J, 2010)

## REFERENCES