

# Improvement in quality of life and speech: Case study of a head and neck cancer patient using manual lymphatic drainage and bioelectric massage therapy

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## Key words

Lymphoedema, head and neck cancer, manual lymphatic drainage, TENS, bioelectric massage therapy, radiation, side-effects of radiation, fibrosis, lymphoedema management, quality of life, speech

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**L**ymphoedema and manual lymphatic drainage (MLD) often emphasise volume reduction, but improvements in skin texture and the softening of adhesions are equally crucial. Up to 75% of head and neck cancer (HNC) patients who undergo radiotherapy exhibit lymphoedema symptoms. Additionally, the prevalence of psychosocial issues in these patients post-radiotherapy is estimated at around 63% (Nayak et al, 2022).

Lymphoedema involves the accumulation of protein-rich fluid in tissues, leading to swelling in various body regions, including the limbs, trunk, breast, head, neck or genital areas.

HNC patients undergoing radiation therapy often suffer from severe early and long-term side-effects, including permanent loss of saliva, osteoradionecrosis, radiation recall myositis, pharyngoesophageal stenosis, oral cavity necrosis, fibrosis, skin changes, lymphoedema and damage to neck structures. The likelihood and severity of these complications depend on various

## Abstract

Head and neck cancer (HNC) patients undergoing radiation therapy often suffer from severe early and long-term side-effects, including permanent loss of saliva, osteoradionecrosis, radiation recall myositis, pharyngoesophageal stenosis, oral cavity necrosis, fibrosis, skin changes, lymphoedema and damage to neck structures. These side-effects present significant challenges, necessitating lifelong strategies to mitigate their impact on overall quality of life. Conservative treatments, including lymphatic support through complete decongestive therapy, can be effective for managing fibrosis, lymphoedema and skin changes. Manual lymphatic drainage (MLD) is a widely accepted conservative treatment for lymphoedema. This case study investigates the efficacy of MLD combined with bioelectric massage therapy (BMT)/transcutaneous electrical nerve stimulation for HNC patients post-radiotherapy. The use of non-invasive multi-modal treatments for managing lymphoedema can lead to volume reduction and significant improvements in swelling, skin texture and symptom-related outcomes in the affected areas and improved quality of life for HNC patients as is evidenced by this case study. The patient also reported increased optimism about his condition, improved range of motion, ease in swallowing and speaking, increased saliva production, and reduced swelling. This case underscores the need for further experimental research on the effectiveness of MLD combined with BMT for managing lymphoedema in HNC patients.

factors, such as the total dose of radiation, the duration of the treatment and the specific areas of the head and neck that received radiation. These side-effects present significant challenges to patients and their caregivers, necessitating lifelong strategies to mitigate their detrimental impact on basic life functions and overall quality of life. Conservative treatments, including lymphatic support through complete decongestive therapy, can be effective for managing fibrosis, lymphoedema and skin changes (Brook, 2020). Manual lymphatic drainage (MLD) is a widely accepted conservative treatment for lymphoedema. This case study investigates the efficacy of MLD combined with bioelectric massage therapy (BMT)/transcutaneous electrical nerve stimulation (TENS) for HNC patients post-radiotherapy. The use of non-invasive multi-modal treatments for

managing lymphoedema can lead to volume reduction and significant improvements in swelling, skin texture and symptom-related outcomes in the affected areas and improved quality of life for HNC patients as is evidenced by this case study. During the study, patients also reported increased optimism about their condition, improved range of motion, ease in swallowing and speaking, increased saliva production, and reduced swelling. This study underscores the need for further experimental research on the effectiveness of MLD combined with BMT for managing lymphoedema in head and neck cancer patients.

Previous studies have demonstrated the benefits of MLD for limb reduction and quality of life improvement in lymphoedema patients (Williams, 2010). However, to date, no case studies have examined the effectiveness of MLD

## Case report

combined with bioelectric massage therapy (BMT)/transcutaneous electrical nerve stimulation (TENS) for HNC patients with lymphoedema.

BMT uses a bioelectric device (ABMMA Pro; *Figure 1*) that generates a small electrical signal, which is transferred to the client's body through the therapist's hands. The ABMMA-Pro is a TENS device (TENS causes muscle contraction by stimulating  $\alpha$ -motor neurons; Kang, 2015), but instead of using the pads as conduit, the therapist's hands are the conduit. During the treatment, the therapist stands on a conductive mat (silicone mat with a damp towel and a conductive pad placed under the towel). A small current is transmitted via the therapist's hands.

This case study explores the use of MLD combined with BMT in treating lymphoedema for a HNC patient post-radiotherapy.

### Case presentation

A 66-year-old man with a history of total glossectomy, anterolateral thigh flap reconstruction and bilateral neck dissection presented with submandibular swelling, fibrosis and severely limited cervical mobility, impacting his quality of life, speech and swallowing (*Figure 2*).

### Methods

For our sessions, we planned 45 minutes of bioelectric massage using the Casley-Smith (1992) method for MLD, following clearance of axillary nodes, sternal nodes, supraclavicular nodes and deep breathing technique.

Three sessions, each of 45 minutes duration, were scheduled, with one follow-up session. The initial three sessions were to be three consecutive sessions, each two days apart. The client was then asked to return for a follow-up session 13 days after the third session.

For this case study the day of the first treatment is referred to as day 1. The first three sessions were in close succession on days 1, 3 and 5, to take advantage of the cumulative effects of MLD with BMT.

The follow-up session was scheduled 13 days after day 5 (day 18).

For our sessions, we planned a course of treatment that would involve MLD with BMT, with the primary aim of reducing volume and circumference of neck as well as decreasing discomfort/pain and increasing



Figure 1. The bioelectric/transcutaneous electrical nerve stimulation (TENS) device used to perform the treatment on the patient. The green pads were applied with conductive cream to the patient's lower lateral buttocks.



Figure 2. Anterior view photographs of the patient's upper body on day 1 pre- and post-treatment, showing softening of scar/fibrotic tissue structure and postural changes.

range of movement.

The ABMMA Pro BMT device operates at two frequencies, high (50Hz) and low (12.5 Hz). Amperage can be controlled from level 1 to 40. For this case study, the low frequency at level 10 (4.53 mA) was used as we had used this frequency at a previous case study (Pluck, 2023)

A pad (the green pads in *Figure 1*) was applied with conductive cream on each of the patient's upper lateral buttocks (gluteus medius).

Starting with the patient supine on the treatment table. Pressure was applied to supraclavicular nodes, followed by pressure to axillar nodes on each side. The patient then performed three diaphragmatic breaths after pressure was applied to his sternal nodes.

Using the bioelectric device, MLD was applied, using the Casley-Smith method. Massage started at the top of the axilla over the pectoral muscles, then the base of the neck and moving upwards to the ear but always in a downward direction (*Figure 3*),

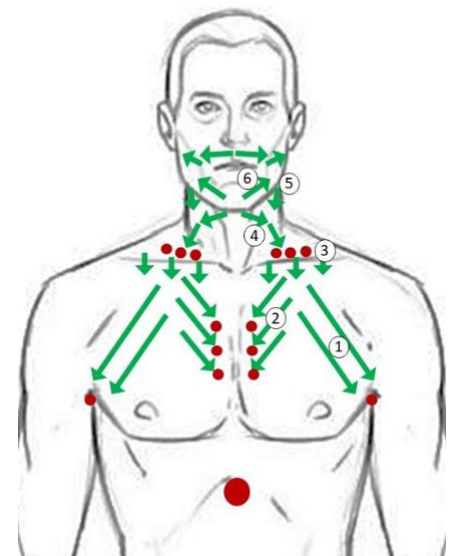


Figure 3. Red dots show areas where pressure was applied pre-manual lymphatic drainage massage, green arrows show direction of massage strokes. Number indicates sequence of stroke.



Figure 2. Close-up anterior view and lateral view of patient's head and neck, showing softening of scar tissue and increase in range of movement.

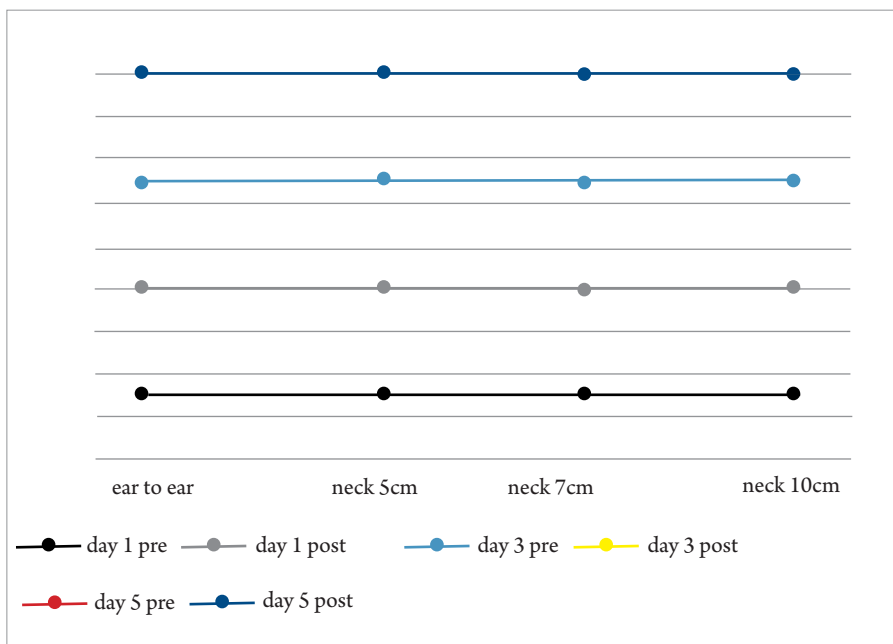


Figure 4. Measurements taken pre- and post-treatment.

moving lymph towards the supraclavicular and sternal nodes. The gentle techniques used were to bring about changes in the tissue pressure and encourage lymphatic flow (Williams, 2010).

For the duration of the study, treatment was performed in the supine position only.

This course of treatment was expected to reduce the volume of the affected areas and increase the patient's mobility.

#### Treatment regime

The treatment involved 45-minute sessions of bioelectric massage using the Casley-

Smith (1992) method for MLD. The regime included three sessions scheduled over 5 days with a follow-up session 13 days after the third session. The ABMMA Pro BMT device was set to a low frequency at level 10 (4.53 mA), with conductive pads applied to the patient's upper lateral buttocks (Pluck, 2023). The frequency chosen was previously chosen for a different case study and was well tolerated by this patient.

#### Response to treatment

Circumferential measurements of the neck were taken before and after each treatment while the patient was upright. Patient-reported outcomes, including pain levels (using the numerical rating scale 0–10), self-reported quality of life and mobility changes (photos), were recorded. Photographs documented pre- and post-treatment conditions (Figure 4).

### Results

#### Subjective outcomes

Post-treatment, the patient exhibited increased range of motion, softened skin texture (this was observed by patient and therapists, although no actual measurements were taken), reduced tension in the temporo-mandibular joint, improved posture and ease in speaking. The patient's optimism and continued self-management with regular MLD were also observed.

#### Objective outcomes

Despite no change in circumferential neck measurements (Figure 5), significant improvements in range of motion were noted (photos taken pre- and post-treatments) and speech ability (patient reported and we were able to understand the patient better) were noted.

### Discussion

This case study demonstrates how MLD combined with BMT can enhance musculoskeletal and psychological outcomes in an HNC patient with lymphoedema post-radiotherapy. Gentle MLD techniques and BMT-induced muscle contractions promote lymph movement and reduce pain and inflammation (Kim, 2014; Kang, 2015). These non-invasive treatments offer a viable alternative to more invasive methods, highlighting the need for personalised treatment plans and further research on their effectiveness.



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### References

- Academy of Bioelectric Meridian Massage Australia (no date) Introducing the ABMMA Pro TENS Device. Available at: <https://abmma.com.au/introducing-the-abmma-pro-tens-device/> (accessed 20.08.2024)
- Australasian Lymphology Association (no date) What is Lymphoedema? Available at: <https://www.lymphoedema.org.au/about-lymphoedema/what-is-lymphoedema/> (accessed 20.08.2024)
- Brook I (2020) Late side effects of radiation treatment for head and neck cancer. *Radiat Oncol J* 38(2): 84–92
- Casley-Smith JR (1992) Modern treatment of lymphoedema. I. Complex physical therapy: the first 200 Australian limbs. *Australas J Dermatol* 33(2): 61–8
- Kang DH, Jeon JK, Lee JH (2015) Effects of low-frequency electrical stimulation on cumulative fatigue and muscle tone of the erector spinae. *J Phys Ther Sci* 27(1): 105–8
- Keser I, Esmer M (2019) Does manual lymphatic drainage have any effect on pain threshold and tolerance of different body parts? *Lymphat Res Biol* 17(6): 651–54
- Kim SJ (2014) Effects of manual lymph drainage on the activity of sympathetic nervous system, anxiety, pain, and pressure pain threshold in subjects with psychological stress. *J Korean Phys Ther* 26(6): 391–7
- Mendell LM (2014) Constructing and deconstructing the gate theory of pain. *Pain* 155(2): 210–6
- Nayak SG, George A, Sharan K et al (2022). Psychosocial distress of head neck cancer (HNC) patients receiving radiotherapy: a systematic review. *Asian Pac J Cancer Prev* 23(6):1827–35
- Pluck A (2023) Is manual lymphatic drainage with bioelectric massage therapy a good treatment combination for lymphoedema and lipoedema? A case study. *J Lymphoedema* 18(1): 66–9
- Williams A (2010) Manual lymphatic drainage: exploring the history and evidence base. *Br J Community Nurs* 15(4): S18–24