Case Study: **Head and Neck Lymphedema**  
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I. **Reason for Presenting Case Study**  
The incidence of secondary lymphedema affecting the head and neck has been reported to be between 22% and 56% \(^1\), however both clinicians and patients have limited resources available when trying to find information on how to address this complication of cancer treatment. Complete decongestive therapy has slightly different applications when it involves the head and neck and the purpose of this case study is to illustrate some of these special considerations.

II. **Medical History**  
Forest is a 53-year-old male who presented with a mediastinal mass and was diagnosed with Hodgkin’s lymphoma in 1992. He was treated with eight cycles of chemotherapy and mantle field radiation. Forest was clinically without evidence of disease and in his usual state of good health until he started to experience left ear pain in the summer of 2006. The pain progressed to include the left oropharynx and the right ear as well. A CT scan performed in June 2007 revealed increased activity in the left base of the patient’s tongue and submandibular salivary gland area. A biopsy revealed adenoid cystic carcinoma and he was diagnosed with a second primary oropharynx cancer. In September 2007, Forest underwent left neck dissection with resection of left base of tongue, partial mandibulectomy, and skin flap reconstruction (Figure 1.). The patient also received an additional twenty-five days of radiation therapy which was initiated in mid December 2007.

![Figure 1. X-ray revealing the surgical instrumentation used for preservation of bone structure.](image)

III. **Lymphedema Diagnosis**  
Because Forest had unilateral neck dissection, it would be reasonable to expect that he would not present with significant lymphedema \(^2\). Forest had immediate post-operative edema which slowly improved but not to the point of complete resolution. Ten days after initiating radiation therapy, the swelling appeared significantly exacerbated. The patient’s oncologist diagnosed Forest with lymphedema in February 2008 and subsequently referred him for therapy. Unfortunately the patient was not evaluated until May 2008 because of a waiting list at the hospital where he was to be treated.

IV. **Examination**  
Upon initial evaluation, Forest presented with swelling that affected the left aspect of his neck, the anterior neck, and left mandibular region. He exhibited “trapdoor deformity”, which is an outward bulging of circumscribed skin from curvilinear scarring \(^3\). Forest’s scar extends from the mentum to the angle of mandible, submandibularly. Fibrosis was palpable along his incisions. Skin was firm with marked pitting edema throughout the anterior and left aspects of the neck. The patient reported intermittent clicking of the temporomandibular joint however experiences no pain or discomfort. Lymph nodes of the head and neck were palpated and found to be without abnormality. Facial strength was within normal limits: the masseter, temporalis, and pterygoid bilaterally presented with no deficits. Cervical strength and range of motion in all planes were within normal limits. Intraoral examination revealed lingua villosa (Figure 2.) and xerostomia (dry mouth). Dentition seemed to be fairly well maintained. No mobile teeth or...
signs of mucositis were observed. Forest did present with poor posture having a forward head, protracted shoulders, and slight kyphosis.

Figure 2. Lingua villosa (hairy tongue)

V. Functional Limitations
Forest experiences difficulty with eating and drinking. Thicker liquids like milk shakes are easier to swallow than thin liquids such as water. Numbness is most significant submentally and on the left side of his cheek and mouth. This compels Forest to always chew on the right side of his mouth. Decreased sensation also causes food to become lodged on the left side of Forest’s mouth without his awareness. Because he cannot feel food particles or liquids on the left half of his mouth, he frequently aspirates and needs to cough to clear his airway. He either is unable to taste the food that he eats or has a distorted sense of taste. Xerostomia results in solid food taking much more time to swallow. Impaired swallowing has resulted in marked weight loss.

Forest’s speech is also impaired. When speaking at a common or normal pace, he exhibits slurred speech. Slow conversation helps him to control the formation of his words and therefore speak with improved clarity.

VI. Psychosocial History
Forest is a real estate investment banker, married, has two dogs, and enjoys skiing, biking, and hiking. Due to his condition, Forest experiences psychosocial dysfunctions in addition to those physical dysfunctions mentioned above. Forest reports that decreased cosmesis has significantly impaired his quality of life. His performance at work has suffered dramatically. He is no longer able to speak to a large audience, as is often required, because his muscles for phonation fatigue make it difficult to control the formation of his words. This along with xerostomia results in poor diction.

VII. Pre-Treatment Goals
1. The patient will demonstrate an understanding of lymphedema precautions so as to avoid infection.
2. The patient will be independent with self-MLD (manual lymphatic drainage) in order to facilitate continuous lymph flow.
3. The patient will be independent with applying elastic tape in order to help minimize scarring and establish new lymphatic pathways.
4. The patient will be independent with therapeutic exercises designed to improve posture and counteract the long-term negative side effects of radiation therapy.
5. The patient will be provided with compression garments and will be independent with proper donning and doffing techniques in order to prevent further accumulation of lymph fluid.

VIII. Treatment
In order to effectively treat a patient with head and neck lymphedema, the treatment must address posture, scarring, and functional training in addition to the four main components of lymphedema therapy which are: risk reduction, manual lymphatic drainage (MLD), compression therapy, and exercise.
Risk reduction
A substantial portion of Forest’s treatment consisted of education. Risk reduction practices were carefully reviewed. Lymphedema precautions related to skin care for the extremities are similar for the head and neck, however, with slightly different applications. While cellulitis in the head and neck area are not particularly common, infections affecting the ears, eyes, and intraoral cavity are not unusual.

Chemotherapy and radiation both target rapidly dividing cells such as nonkeratinized mucosal epithelial cells in the intraoral cavity. Consequently xerostomia and mucositis may develop. These factors impair speech as well as the ability to swallow, and may even progress to life-threatening sepsis. Because of this, dental hygiene and meticulous intraoral health cannot be overemphasized. Forest was advised to be extraordinarily diligent with brushing, flossing, rinsing, and maintaining good tongue health. It is well-known that in addition to traumatic injuries, surgeries alter lymph function and cause local edema via the inflammation promoting dynamic insufficiency component of lymphedema. By preventing dental caries, gum disease, and other intraoral conditions, dental surgeries and procedures that may tax the head and neck lymphatic system probably should be avoided unless absolutely necessary.

Skin covering either the affected area or an area at risk for lymphedema should be kept clean, dry, and well-moisturized. For the head and neck patient this also includes the scalp, cervical, and upper trapezius areas. Forest was advised to address seborrhea (dandruff) should it occur and to moisturize not only his face but also his entire neck and upper trapezius areas. Compared to dehydrated skin, well-moisturized skin is less prone to tears or injury. In addition, well-moisturized skin will heal faster than dehydrated skin following an abrasion or tear.

Sharp instruments used for grooming should be used with caution or replaced with those that do not pose any risk for skin injury. The application of sunscreen is important as the skin over the face is the most frequently exposed area of the body and therefore has the highest risk for sunburns. Similarly, insect repellents must be considered as well.

Manual Lymphatic Drainage
Forest received two weeks of intensive therapy which naturally included MLD. Although the whole head and neck sequence was performed, a majority of the MLD was spent on the left anterior neck. Even though the left side of the neck was the most involved, MLD was performed bilaterally because the surgical incisions crossed midline and caused mild lymphedema on the right side of the neck as well. In addition, the patient did not then have to apply any counter pressure against the therapist’s hands. It is important to note that the right and left aspects of the head and neck are most effectively drained into their respective lymphatic pathways. In other words, there are no contralateral anastamoses except perhaps with the possibility of cutaneous capillary connections. The therapist performed the MLD during the intensive phase of treatment. In addition, the patient was educated on a simplified self-MLD sequence in order to maximize the treatment effects.

Compression Therapy
After completing the intensive phase of treatment, Forest was provided with a custom-made mandibular soft fabric/foam alternative compression device. (Figure 3.) Prior to this, the patient
was provided with a fabricated “compression splint” made of 1-inch Velfoam straps and Velcro, a D-ring for ease of donning, blue medium density adhesive foam, and a Tubigrip stockinette to secure and cover the foam (Figure 4.). The foam was cut to cover the left submandibular area. The patient was instructed to place the foam over this area with the Velfoam strap secured over his mentum and crown applying pressure to the point of being comfortably snug. Compression over the carotid arteries was avoided with the compression splint primarily resting on the mandible.

*Figure 3.* Patient wearing custom fabric/foam Mandibular Unit

*Figure 4.* Patient wearing “compression splint”

**Exercise and Posture**

While wearing compression garments, Forest was encouraged not to refrain from cervical and facial movement but rather to continue with his activities of daily living. Additionally, he was provided with the following exercises with the instruction to perform each exercise ten times at least once daily: jaw depression, jaw lateral excursion, lip pursing, lip protrusion, platysma neck depression, cervical circumduction, cervical extension and flexion, cervical rotation, cervical lateral flexion, and cervical retraction. For improved posture he was instructed on the following stretches with the instruction to hold each stretch for thirty seconds at least once daily: cervical flexion, cervical lateral flexion, cervical rotation, and pectoralis (corner) stretch.

**Elastic taping**

A simple I-band was used for scar management and lymphedema. Usually a fan-shaped cut would more effectively address edema, however the primary concern was to decrease scar tissue in order to establish new lymphatic pathways. Forest was educated on how to apply elastic tape independently. The corners were rounded so that the edges would not retract and for improved cosmesis. The base of the elastic tape was applied at the clavicle and with 20% stretch pulled superiorly to end at the mandible. Elastic tape was applied parallel to the surgical scars for some sessions and on alternate visits perpendicular to the incisions.

**IX. Treatment Outcome**

A two-week treatment period consisting of intensive therapy followed by two months of self-treatment proved effective in addressing the above symptoms of head and neck lymphedema. Figures 3 and 4 offer pre- and post-treatment evidence of the decreased swelling. Additionally the patient experienced significant functional gains as a result of this intervention. The patient had less discomfort with swallowing which resulted in some desired weight gain. Cosmesis improved and this significantly improved the patient’s quality of life. The patient’s sleep also improved, perhaps due to decreased pressure on the trachea thus making for a more comfortable night’s sleep. The elastic tape has caused the submandibular scar to flatten and become more pliable. Elastic taping being more tolerable than compression bandaging, resulted in improved patient compliance. Diction remained unchanged. Overall the patient found this head and neck lymphedema treatment very effective.

*Figure 5.* Pre-treatment photo  
*Figure 6.* Post-treatment photo
X. Conclusion
Head and neck lymphedema significantly and negatively affects function and appearance. Effectively addressing this condition has a tremendously positive impact on quality of life. In this case study, the patient’s lymphedema was mild and isolated to the neck, therefore compression bandaging and intraoral MLD was unnecessary. The custom fabric/foam alternative compression device, the compression splint, exercise, elastic tape, and MLD were relatively easy for the patient to perform independently thereby enhancing compliance and effectiveness of treatment. Practitioners must consider how specific interventions will affect the patient in order to successfully treat head and neck lymphedema.

XI. References


Acknowledgments: Forest & Paul Zucker