



Assessing the Effectiveness of the Long-Term Use of Juzo's Soft Compress Leg Liner to Manage Lower Extremity Lymphedema: A Case Study

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Case Report

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Abstract

Background and Purpose: Lymphedema is a chronic condition most commonly seen within the arms or legs. This condition causes tissue to swell secondary to a genetic disorder, excessive fluid loads in the body, or poor circulation or drainage of lymph fluid. Compression garments have proven to be a beneficial component of rehabilitation when treating patients with lymphedema. The Juzo Soft Compress Garment is a specific type of compression garment that can selectively increase the compression pressure for particularly localized edema. The purpose of the following case study is to analyze and share the outcomes related to long-term use of the Juzo Soft Compress Leg Liner with short stretch bandages to manage lymphedema across three episodes of treating lower extremity lymphedema.

Methods and Procedures: An 80-year-old-female patient presented to physical therapy with a medical diagnosis of lymphedema (ICD-10: I89.0). The patient reported left lower extremity swelling, heaviness, and decreased mobility/difficulty ambulating on the first visit of each episode of treatment. The clinician discussed the examination, evaluation, and plan of care process with the patient. The clinician obtained permission to use gathered data to write a case study. To determine the effects of the treatments, the clinician used the following tests and measures and outcome measurement tools: Lower Extremity Girth Measurements, the Lower Extremity Functional Scale (LEFS), Numeric Pain Rating Scale (NPRS), and the Two-Minute Walk Test. The clinician took and reassessed objective lower extremity (leg) girth measurements using a tape measure at each treatment session as well as at each initial examination and discharge. The patient's treatment sessions primarily included manual lymph drainage (MLD), Soft Compress Leg Liner and short stretch bandaging application, and self-care and patient education. The clinician had over 10,000 hours of practice as a certified lymphedema therapist prior to each episode of treatment. The clinician thoroughly discussed the examination, evaluation, and plan of care process with the patient.

Results: From the patient's first initial evaluation session of the first episode of treatment to the third discharge of the third episode of treatment, the patient's total left lower extremity (leg) girth measurements had improved from 176.7 centimeters at the initial evaluation of the first episode of treatment to 160.1 centimeters at discharge of the third episode of treatment.

Discussion: The results for the patient in this case study utilizing Juzo's Soft Compress Leg Liner with multiple short stretch bandages for long-term use to manage lower extremity lymphedema proved to be effective in reducing girth measurements

and in improving lymphatic circulation. Adjunct treatments and outlying factors, such as manual lymph drainage techniques and patient compliance with lymph drainage therapeutic exercises, could have affected or influenced the outcomes of this case study. In addition, Juzo's Soft Compress Leg Liner proved to be durable being that the patient used the same Soft Compress Liner for each episode of care.

Conclusion: The results of this case showed that the long-term use of Juzo's Soft Compress Leg Liner with multiple short stretch bandages could be an effective treatment to manage lymphedema in lower extremities. However, these results could differ between patients depending upon compliance and the utilization of other adjunct treatments. Further studies are highly recommended with a larger sample size for generalizability.

Keywords: Lymphedema; Complete Decongestive Therapy; Compression Bandaging; Manual Lymph Drainage; Exercise; Self-Care

Background and Purpose

Lymphedema is a chronic condition most commonly seen within the arms or legs. This condition causes tissue to swell secondary to a genetic disorder, excessive fluid loads in the body, or poor movement or drainage of lymph fluid [1]. There is currently no cure for lymphedema, but interventions such as Complete Decongestive Therapy (CDT) which include patient education, self-care education, compression therapy, exercise, and manual lymph drainage (MLD) can manage the condition [2-7].

As previously mentioned, lymphedema can result from a variety of conditions. Some controversy does exist, but in general, primary lymphedema results from a congenital defect in the lymph transporting system [8]. Secondary lymphedema results from an obstruction or disruption of the lymphatic system. Effects from a malignancy, surgery, trauma, radiation therapy, or infection could all contribute to a patient having secondary lymphedema [8]. Effects after the treatment of solid tumors, such as melanoma or genitourinary malignancies, have resulted in secondary lymphedema as well [8].

Due to the chronic nature of the condition, patients may experience an accumulation of adipose tissue. This addition of tissue could contribute to the inability of some limbs to return to their pre-morbid size. With the addition of adipose tissue, lymphedema also has the potential to affect the physical and psychological well-being of patients due to possible physical limitations or negative body image some patients will experience [7].

Lymphedema can be categorized into three stages, but a fourth stage (stage zero) can be included as a subclinical stage [2]. Stage zero occurs when swelling is not visible, but lymphatic transport is impaired. Subtle changes may be noted within this subclinical stage. Stage one is known as early lymphedema. Swelling is visible but goes away with

limb elevation. Pitting can be evident during stage one as well. Stage two is also referred to as moderate lymphedema and presents with pitting and progressive tissue fibrosis. Stage three is known as late lymphedema and skin changes are evident. Thickening of the tissue can occur as well as hyperpigmentation and fatty deposits. Tissue can become more fibrotic and pitting is absent.

When treating lymphedema conservatively, compression garments have proven to be a beneficial component to rehabilitation, particularly in patients who have had breast cancer [3]. Compression therapy accomplishes a reduction in swelling by reducing capillary filtration, increasing lymphatic drainage, and transporting fluid from compressed areas of the body to less compressed areas [4].

According to the clinical practice guidelines for interventions for breast cancer related lymphedema, compression garments have a moderate recommendation (Grade B) for early post-op care for individuals who have undergone axillary lymph node dissection [2]. A weak recommendation (Grade C) is given for the use of compression garments, patient education, and self-massage during stage zero. A strong recommendation (Grade A) is given during stage one for patients to be fitted with an individual garment. For stages two and three, compression bandaging and exercises are identified as core components of complete decongestive therapy (CDT), and were also given a strong recommendation (Grade A).

In a published case study, a 55 year-old female patient was diagnosed with secondary lymphedema in 1987 in her left lower extremity [6]. The patient was prescribed a variety of compression garments to wear. She wore a class 3 flat-knit garment worn with class 2 circular-knit tights over the top. The patient was also given a Juzo wrap to try, but she felt the wrap did not offer enough support. The patient was educated in deep breathing techniques, squeezing of an exercise ball at 3 node points, and the fill and flush technique of lymphatic

drainage. The patient stayed active each day and avoided prolonged sitting. When the patient did sit, she made sure her leg stayed elevated. The patient was then introduced to easywrap in 2017, a lower limb garment consisting of overlapping; single-layer textile bands attached with easy to use fasteners. Prior to her easywrap usage, the patient's left leg excess was 2860 mL. After 21 days of using easywrap, the left leg excess had reduced to 2353 mL - a total reduction of 507 mL. The patient stated "...after the 21 day measurements [she] was very happy with her easywrap... and is now confident in playing tennis in light sports leggings".

In a systematic review from 2004-2011, 26 articles were analyzed in order to understand the current research covering complete decongestive therapy (CDT) techniques and adjunct components when treating lymphedema [5]. CDT is currently viewed as the gold standard of care when treating patients with lymphedema [5]. CDT typically consists of a combination of manual lymph drainage (MLD), multi-layer, short-stretch compression bandaging (CB), exercises, skin care, and/or fitting of appropriate compression garments (CG) [5]. In a case-control series study involving 29 participants, short-stretch CBs were applied to normal legs and legs with lymphedema over a 24-hour period. A 48% decrease of original pressure under the bandage due to loss of limb volume under compression was noted. In a separate study involving 36 patients with moderate to severe breast cancer related lymphedema, patients were split into high pressure bandages (44-58 mm Hg) and low pressure bandages (20-30 mm Hg). No significant difference in edema volume reduction was noted between the high and low pressure bandage groups. However, sub-bandage pressure drops were the same in both groups in a 2 hour follow-up and a 24 hour follow-up. This finding supports the idea of daily reapplication of short-stretch bandages in order to provide optimal compression for the patient. Lastly, a review article cited within the systematic review states that MLD is not an effective stand-alone treatment option.⁵ Lead et al states that CB is needed in combination with MLD to achieve optimal results.

When undergoing treatment procedures and therapy sessions for lymphedema, patient compliance will also affect results. Typically, a trained healthcare professional will apply elastic bandages to a patient's limbs in the appropriate manner [10]. Some patients may find the bandaging uncomfortable and remove the bandaging. Other patients may have difficulty reapplying their bandages each day. As a result of this difficulty, adherence may be poor and may negatively impact treatment outcomes [10].

The purpose of this case study was to analyze and share the outcomes related to wearing a Juzo Soft Compress Leg

Liner with short-stretch bandages to manage lymphedema across three episodes of lymphedema therapy treatment. The Juzo Soft Compress Liner is a specific type of compression garment that can selectively increase the compression pressure for particularly localized edema [1]. The short-stretch bandages that will be used in adjunct to the Juzo Soft Compress Liner will be less harmful for the patient's well-being due to the elastic properties being limited [1]. The tension will decrease over time in addition to, ideally, the limb decreasing in girth [10].

Methods and Procedures

First Episode of Treatment

An 80-year-old-female patient presented to a physical therapy initial evaluation on January 9, 2018 with a diagnosis of lymphedema. The patient complained of left lower extremity (LLE) swelling from the foot to the knee since having a total knee arthroplasty performed in 2007. The physical therapist used the numerical pain scale (NPS) to determine the patient's pain from 0 to 10 with 0 representing no pain, 5 representing moderate pain, and 10 representing severe pain. The patient rated her worst pain at 10 within the last week using the NPS. The patient rated her current pain at 3 within the last week on the NPS. The physical therapist took circumferential measurements at mid foot, heel, lower leg, mid leg, and upper leg to calculate total girth measurement in centimeters. The patient had a total LLE girth measurement of 176.7 cm. In comparison, the right lower extremity (RLE) girth was 172.1 cm. The physical therapist also obtained written and verbal permission to use gathered data to write a case report or case study, and the patient verbally agreed and signed the informed consent form to use gathered data without personal information to write a case report or case study.

At the initial evaluation, the patient received gait training to address decreased mobility secondary to lymphedema impairments. The patient also received patient education concerning self-care and benefits of compression wear along with handouts. The remaining 8 physical therapy treatment visits within the first episode of treatment continued through January 2018 until March 6, 2018. All remaining therapy visits included MLD using Vodder techniques and retrograde technique. In addition, at each therapy session, the physical therapist applied manual compression to the LLE using the Juzo Soft Compress leg liner and short stretch bandages from the foot to the knee in order to improve lymphatic circulation. At the conclusion of the first episode of treatment, the patient's LLE girth measurements had reduced from 176.7 cm to 168.7 cm. The RLE girth measurements had also decreased from 172.1 cm to 162.7 cm.

Second Episode of Treatment

The patient returned for a second episode of treatment lasting from September 6, 2019 to September 12, 2019. During this period, 3 physical therapy treatment sessions occurred to improve lymphatic circulation. The patient's diagnosis and initial complaints were the same as her first episode of treatment. The patient began her therapy session on September 6th with a LLE girth measurement totaling 169.8 cm. (Girth measurements were calculated using the same anatomical landmarks as previously listed.) The 3 sessions included MLD using Vodder techniques in addition to compression bandaging using the Juzo Soft Compress leg liner and multiple short stretch bandages (SSB's) from foot to knee. At the final treatment session on September 12, 2019, the patient also received patient education on the benefits of continued compression wear usage as well as home exercise program (HEP) compliance. By the conclusion of the second episode of treatment, the patient's LLE girth had decreased from 169.8 cm to 159.0 cm.

Third Episode of Treatment

The patient returned for a third episode of treatment lasting from October 21, 2020 to October 28, 2020. During this period, 4 physical therapy treatment sessions occurred to improve lymphatic circulation. The patient's diagnosis and initial complaints were the same as her first episode of treatment. The patient began her therapy session on October 21st with a LLE girth measurement totaling 166.6 cm. (Girth measurements were calculated using the same anatomical landmarks as previously listed.) The 4 sessions included MLD using Vodder techniques. Treatments also included the application of compression bandaging using the Juzo Soft Compress leg liner and multiple SSB's from foot to knee. The physical therapist provided patient education throughout the course of the third episode of treatment on benefits of compression bandaging and continued HEP compliance. By the conclusion of the third episode of treatment, the patient's LLE girth had decreased from 166.6 cm to 160.1 cm.

Analysis and Results

At the beginning of the patient's treatment on January 9, 2018, the patient's LLE girth measurement was 176.7 cm. At the conclusion of the patient's third episode of treatment on October 28, 2020, the LLE girth measurement was 160.1 cm. In addition to the patient's limb girth decreasing a total of -16.6 cm, the patient's NPS also decreased. The patient's worst pain went from a 10 to a 0. The patient's current pain level also decreased from a 3 at initial evaluation in January 2018 to a 0 on discharge in October 2020. In addition, the patient also reported feeling "a great deal better" with overall functional performance with functional activities of

daily living from the time physical therapy began until final discharge in 2020.

Discussion and Conclusion

The results of this case study support the continued usage of a Juzo Soft Compress leg liner with short stretch bandaging to manage lower extremity lymphedema. The patient within the case study displayed improvements in lower extremity girth measurements, improvement in functional activities of daily living, and improvement in a NPS. The effects and results may have been affected by patient compliance as well as unknown compression garment wear time between episodes of treatment. In addition, MLD and other adjunct manual therapy techniques completed at each physical therapy session may also have contributed to the positive results.

In conclusion, the patient used within this case study greatly benefitted from the continued and multiple usage of the Juzo Soft Compress leg liner with short stretch bandages on three different episodes of treatment in order to manage lower extremity lymphedema. However, more studies would further validate the long-term effects of the Juzo Soft Compress leg liner on lower extremity lymphedema with larger sample sizes and more controlled period of usage.

Conflicts of Interest

The authors declare no conflict of interest.

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