A Lymphedema Self-Management Programme: Report on 30 Cases

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ABSTRACT

Purpose: Compression therapy is the most important element in the treatment and long-term management of moderate and severe lymphedema, but it is not universally accessible in Canada. For those unable to access private lymphedema treatment, physiotherapists at the McGill University Health Centre (MUHC) Lymphedema Clinic began teaching patients and caregivers how to use compression bandages safely and effectively. **Methods:** A retrospective chart review was combined with structured telephone or in-person interviews with 30 people who had attended a self-bandaging clinic in the MUHC Lymphedema Clinic between 2011 and 2012. Patients were monitored weekly until limb volume plateaued, and a compression garment was then fitted for ongoing maintenance. Monthly or quarterly surveillance continued for 1 year. Follow-up interviews were conducted 3 to 18 months after patients had received their garments. **Results:** The majority of participants had moderate to severe lymphedema; all achieved reduction of edema in the range of 48% to 92%. More than three-quarters of participants reported a global rate of change (GRC) of $\geq 80\%$. Themes derived from the interviews included the importance of bandaging, the feeling of being in control, and difficulties with compression garments. Participants spontaneously expressed satisfaction about having tools to manage their condition themselves. **Conclusion:** For selected patients with lymphedema, a self-bandaging programme can be a route to lymphedema reduction, independence, and self-efficacy.

Key Words: compression bandages; lymphedema, self-care.

RÉSUMÉ

Objectif : La compressothérapie est l'élément le plus important dans le traitement et la gestion à long terme du lymphœdème modéré à grave, mais elle n'est pas universellement accessible au Canada. Pour ceux qui n'ont pas accès à un traitement privé contre le lymphœdème, la Clinique de lymphœdème du Centre universitaire de santé McGill (CUSM) a commencé à enseigner aux patients et aux fournisseurs de soins la façon d'utiliser les bandages de compression de façon sûre et efficace. **Méthodes :** Un examen rétrospectif des dossiers a été combiné à des entrevues téléphoniques structurées auprès de 30 personnes qui avaient assisté, en 2011 et en 2012, à l'atelier sur l'exécution de bandages de la Clinique de traitement du lymphœdème du CUSM. Les patients ont fait l'objet d'un suivi hebdomadaire jusqu'à ce que le volume de leur membre atteigne un plateau; un vêtement de compression a ensuite été ajusté à leur membre pour l'entretien continu. La surveillance mensuelle ou trimestrielle s'est poursuivie pendant un an. De 3 à 18 mois après que les patients aient reçu leur vêtement de compression, on a mené des entrevues de suivi pour le présent rapport. **Résultats :** La majorité des participants souffraient de lymphœdème modéré à grave; ils ont tous réussi à réduire l'œdème dans une mesure de 48% à 92%. Plus des trois quarts des participants ont signalé un taux global de changement (TGC) $\geq 80\%$. Les thèmes tirés des entrevues étaient notamment l'importance du bandage, le sentiment de maîtrise, et les difficultés posées par les vêtements de compression. Les participants ont exprimé spontanément qu'ils étaient satisfaits de disposer d'outils pour gérer eux-mêmes leur état. **Conclusion :** Chez certains patients souffrant de lymphœdème, un programme leur permettant d'effectuer eux-mêmes leurs bandages peut favoriser la réduction du lymphœdème, l'autonomie et l'autoefficacité.

Lymphedema is chronic swelling in a limb or body region caused by the accumulation of protein-rich fluid in the interstitial spaces and subcutaneous tissues.¹ Lymphedema may progress over time, leading to skin changes, fibrosis, and cellulitis,² and it may cause pain, physical discomfort, functional impairment, psychological complications, and deterioration in quality of life.³ The

etiology of lymphedema may be a primary dysfunction of the lymphatic system; it may also be secondary to cancer treatments that include the removal of lymph nodes and/or radiation therapy (e.g., breast, gynecological, or prostate cancers; melanoma; sarcoma) or to venous insufficiency, deep vein thrombosis, orthopaedic trauma, and more.^{1,4} The incidence of cancer-related lymph-

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dema varies by etiology and definition and is considered to be between 6% and 63%.⁵

The International Society of Lymphology defines four stages of lymphedema: latent (no noticeable swelling), stage 1 (visible swelling that resolves with elevation), stage 2 (visible swelling that does not resolve with elevation), and stage 3 or elephantiasis (progression to fibrosclerotic changes of the skin).⁶ When only one limb is affected, the level of severity is described by comparing the volume of the affected limb to that of the healthy limb: a volume difference up to 20% is considered mild, between 21% and 40% is considered moderate, and above 41% is considered severe lymphedema.⁷

The gold standard treatment of lymphedema is decongestive lymphatic therapy (DLT). DLT is administered by a specially trained and certified lymphedema therapist and consists of an intensive phase (Phase I: swelling reduction) followed by a long-term maintenance phase (Phase II: self-management) that aims to preserve the results of the intensive treatment phase. In Phase I, DLT has four components: (1) skin hygiene (to prevent infections); (2) manual lymph drainage (a light massage that moves fluid to healthy, functioning areas); (3) exercise (to assist lymphatic system function); and compression therapy.⁸ Compression therapy is considered a key component of DLT, both in reducing the swelling during Phase I and in helping to control the condition during Phase II.^{9,10}

Compression helps resolve edema by reducing capillary filtration, increasing lymphatic flow, shifting fluid to non-compressed areas, and breaking down fibrosclerotic tissue.¹¹ Multi-layer compression treatment of lymphedema is applied according to the following principles: Compression is applied in a graduated manner, from high pressure distally to low pressure at the root of the limb. This compression gradient is achieved by applying more layers of bandaging with greater overlap distally and with the use of progressively wider bandages (e.g., 6 cm to 10 cm) when moving from the distal to the proximal. Higher pressure (for severe or stage 3 lymphedema) can be achieved by applying a second layer of bandages over the first. For effective and safe compression (i.e., compression without pressure points that could produce pain and other symptoms), the bandaging should follow the principles of the law of Laplace (see Appendix 1): pressure applied to a segment with a small radius will produce high pressure and vice versa. For example, because the lateral aspects of the first and fifth metatarsals are vulnerable to high pressure, padding material is used to change the shape of the foot to a more cylindrical curve, reducing the danger of harm and improving the effectiveness of the bandage. Special short-stretch (non-elastic) bandages are used; when the bandaged limb is moved, the resistance of the bandages produces a pressure sufficient to counteract the hydrostatic pressure of the venous system, thus helping the muscle pump to

propel the fluid in the lymphatic and venous vessels proximally. At rest, when the venous pressure is low and the muscles are inactive, the bandage pressure on the tissues is low and thus tolerable for the patient.^{9,11–13} Compression is required to achieve clinical and cost-effective treatment outcomes and to help patients maintain function and improve appearance.^{3,9}

The degree of edema volume reduction reported after intensive DLT varies. In a 2011 systematic review of randomized controlled trials (RCTs), McNeely and colleagues reported an average reduction of 17% to 60% in both upper limb lymphedema (ULL) and lower limb lymphedema (LLL) following DLT.¹⁴ Larger reductions of 62.8% in ULL and 68.8% in LLL were reported in a systematic review by Lasinski and colleagues that included all study designs, from case series through to RCTs.¹⁵ However, edema will worsen over time without high adherence to self-management (including exercise and compression). Vignes and colleagues¹⁶ found that after 12 months, the risk of volume increase (defined as an increase of $\geq 10\%$) was $>50\%$ for women with breast cancer-related lymphedema who did not bandage or wear a compression garment compared to those who did.¹¹

Although effective, DLT is criticized as being time consuming, costly, and under-researched.¹⁵ In Canada, provincial health care systems provide little coverage for lymphedema management; in Quebec, for example, limited services are offered in only a few hospital centres. It has been reported that without appropriate treatment, patients with secondary lymphedema are twice as vulnerable to complications that can lead to costly medical and hospital interventions.¹⁷ Some patients may have access to private supplementary insurance plans, but many bear the treatment costs themselves¹⁷; because lymphedema is a chronic condition, ongoing costs associated with treatment, compression garments, and supplies may be prohibitive for the patient.

The purpose of this report is to describe the educational and surveillance processes and the results of an innovative lymphedema self-management programme.

METHODS

In 2013, following approval of the MUHC Research Ethics Board, we conducted a retrospective chart review and telephone or personal interviews with patients who had attended self-bandaging clinics in our centre between January 2011 and June 2012.

Context

Lymphedema treatments, including compression bandaging and compression garments, are not covered by provincial health plans at this time, but treatments are available in the private sector. The MUHC Lymphedema Program operates a charitably funded clinic that offers diagnosis, assessment, advice on treatment options, and ongoing patient follow-up. Patients receive education on

skin care and risk reduction and a basic introduction to self-massage and exercise. The clinic does not have sufficient resources to treat the more advanced stages of lymphedema for which clinician-applied daily compression bandaging is deemed appropriate.⁷ Therefore, the MUHC Lymphedema Program provides a once-weekly self-management clinic to teach people with lymphedema and their caregivers how to apply compression bandages themselves. The service is free to patients, and supplies are sold at a cost or donated according to need.

Participants

We chose patients for the self-bandaging clinic who (1) needed a period of daily compression bandaging but could not afford DLT, (2) were unable to commit to traditional intensive therapy but had a desire to treat themselves, or (3) had previously been treated with DLT with unsatisfactory results and wanted to try self-bandaging. We approached a total of 33 patients; three did not complete the programme (one found bandaging too onerous, one withdrew to pursue private lymphedema therapy, and one was hospitalized with a complication of metastatic disease). Thus, as Table 1 shows, 30 people with unilateral or bilateral lymphedema of the upper or lower extremities completed the programme.

Intervention

Once a week, over a 2-year period (2011–2012), a certified physiotherapist specializing in lymphedema therapy taught patients and caregivers how to bandage with multilayer lymphedema bandages. The programme included an intensive course of self-bandaging, spanning a period of 3 to 12 weeks. Participants were told to keep the bandages on 24 hours a day, 7 days per week; the bandages were removed briefly to allow daily bathing or showering and then immediately reapplied. During this phase of treatment, patients were assessed weekly for limb volume, functional range of motion, and pain.

Initial teaching session

The initial one-on-one teaching session started with a detailed explanation of the theory and principles behind safe and effective bandaging. Thereafter, the therapist demonstrated the bandaging technique in a sequence of steps, using a diagram to aid in comprehension. After each step, the therapist removed the bandage, and the patient imitated the technique (Figure 1).

Patients were educated on the warning signs and symptoms of inappropriate application of compression bandages, including pain, discomfort, discoloration of digits, and tingling or numbness of toes and fingers. If any of these signs or symptoms occurred, patients were advised to move the limb; if the symptoms did not subside with movement, they were advised to remove one layer of bandaging, and if this did not resolve the symptoms, they were advised to remove the bandages com-

Table 1 Baseline Characteristics (*n* = 30)

Characteristic	No. (%) of cases*
Etiology	
Breast cancer	19 (63.3)
Melanoma	3 (10)
Sarcoma	2 (6.7)
Chronic venous insufficiency	2 (6.7)
Gynecological cancer	2 (6.7)
Obesity	1 (3.3)
Primary	1 (3.3)
Sex	
Female	27 (90)
Male	3 (10)
Area of lymphedema	
Unilateral arm	19 (59)
Unilateral leg	7 (22)
Bilateral legs	4 (13)
Duration of lymphedema, median (range) y	3 (1–20)
Stages of lymphedema	
Stage 1	0
Early stage 2	4 (13)
Late stage 2	21 (66)
Stage 3	5 (16)
Severity†	
Mild	3 (10)
%RLV, mean (SD) [range]	15.3 (4.5) [11–20]
Moderate	13 (43.3)
%RLV, mean (SD) [range]	27.8 (4.1) [22–36]
Severe	10 (33.3)
%RLV, mean (SD) [range]	61.3 (21.1) [41–100]

*Unless stated otherwise.

†Reported according to the most severe limb segment.

RLV = Relative lymphedema volume.

pletely. In some cases, patients re-applied the bandages after adding an under-layer of extra padding to the limb.

Follow-up sessions

For follow-up sessions, patients were asked to arrive at the clinic with the bandages applied so that the therapist could assess their wrapping technique. Patients then removed the bandages and washed their limbs. At each follow-up session, the physiotherapist re-measured the effected limb. Patients or caregivers then applied a moisturizing lotion (as well as wound dressings when needed) and re-applied the bandages, incorporating any changes in application that might be required (e.g., bandaging higher at the root of the limb if bandages had a tendency to fall or changing padding material/applying it differently).

Once the volume of the reduced limb stabilized, the patient was referred to a garment fitter to be measured for a custom-made flat-knit compression stocking or sleeve. Figure 2 charts a typical interval of self-bandaging, illustrating stabilization and continued bandaging to compression garment arrival. Patients returned to the clinic for an assessment of garment fit, and only after

Figure 1 A woman bandaging her arm using multilayer lymphedema bandages.

the therapist had re-measured the limb(s) to ensure that the edema was still stable did the patients try on their garments. Follow-up visits continued monthly for approximately 3 months, then quarterly for 1 year. All patients were asked to return for a regular annual follow-up, even if they considered their lymphedema stable.

While wearing their compression garment during the day, some patients continued bandaging at night to maintain volume reduction. Night bandaging was recommended if (1) a large reduction in edema volume had been attained, and skin compliance was an issue; (2) the skin was dry and fragile; (3) daytime use of a compression garment was not sufficient to maintain limb volume (and refill occurred at night); or (4) fibrosclerotic skin changes were present and necessitated further care.⁹

Measurements

Limb volume and relative lymphedema volume

At each follow-up session, the therapist took circumferential measurements of the limbs using a non-stretch tape measure, and, for lower extremities, a measurement

board. Eight points were chosen to capture areas of swelling along the lower extremities (mid-metatarsals; lateral malleolus; 3 points at 10 cm intervals [myotendinous junction, widest part of the calf, tibial tuberosity]; knee; mid-thigh; and highest point at the groin area); the mid-patella was used to differentiate between thigh and calf segments. Circumferences in the upper extremities were measured at six points (mid-metacarpals, ulnar styloid process, mid forearm, lateral epicondyle, mid upper arm, and axilla). This measurement method has been found to be valid, reliable, and more accurate than circumferential measurements based on distance from fingertips.¹⁸

Measurements were entered into Microsoft Excel (Microsoft Corp., Redmond, WA), and the volume of each limb segment was calculated using the truncated cone method, which is highly correlated with the water displacement method (ICC > 0.95)¹⁹ but is not interchangeable with it.²⁰

For patients with bilateral lymphedema, since they had no normal limb for comparison, we compared the total volume changes of each limb at subsequent visits. For unilateral lymphedema, relative lymphedema volume (RLV) was used to calculate severity by applying the following formula:

$$\text{Relative Lymphedema Volume (RLV)} = \frac{(\text{Edema Volume}) \times 100}{\text{Volume of Contralateral Limb}}$$

Calculating volume by limb segment (thigh/calf, upper arm/forearm) decreases measurement error while revealing differences in segmental responses to treatment.²¹ These segmental volumes were used to determine severity of lymphedema.

For therapists measuring ULL using a tape measure, the standard error of measurement (SEM)²² has been reported to range from 11.46 to 81.7 mL.^{20,23} The therapist's SEM is used clinically to decide whether an actual change (beyond SEM) has occurred. The SEM (30 mL) of our therapist (DT) was tested before the programme began, as reported elsewhere.²⁴

Global rate of change (GRC) score and qualitative data

Global rate of change (GRC) scales, commonly used in clinical research, are designed to quantify a patient's improvement or deterioration over time. We used the 15-point scale (−7 to +7), which has high face validity (Pearson's r 0.72–0.9).²⁵ Based on clinical observation that patients with smaller change scores continue to seek treatment, Stratford and colleagues defined the following cutoff points: important improvement = 5 or more; important deterioration = −5 or less.²⁶

To obtain GRC ratings and to determine ongoing use of compression garments and/or multilayer lymphedema bandages, we conducted a final in-person or telephone interview with each participant 3 to 18 months after com-

Figure 2 An example showing change in %RLV over time in a woman with upper limb lymphedema (lower arm severe) who participated in the self-bandaging programme. Stabilization was achieved after 4 weeks of bandaging. Bandaging continued until arrival of compression garment (week 10).

pletion of intensive bandaging using a structured questionnaire. The interviewer recorded verbatim responses, including spontaneous comments, during the interviews.

Data Analysis

Patient characteristics such as etiology of lymphedema, area of swelling, and gender are displayed as frequencies in Table 1. Continuous variables, including %RLV and volume, are presented as mean, standard deviation, and range. Variables that were not normally distributed are presented as median and range. Paired *t*-tests were used to compare volume and %RLV before and after intensive bandaging, with the threshold for statistical significance set at $p < 0.05$. All statistical analyses were performed using Statistical Package for Social Sciences (SPSS version 21.0, SPSS Inc., Chicago, IL, 2012).

We analyzed participants' responses to the structured questionnaire using grounded theory, a popular research method used by health researchers to describe and analyze qualitative data and classify relationships and processes.²⁷ Participant responses were recorded and coded manually by one researcher (PH), who, with a second researcher (AT), developed classifications and themes from the data.

RESULTS

A total of 30 people with unilateral or bilateral lymphedema of various etiologies and a range of severity completed the programme (see Table 1). Mean duration of lymphedema was 5.1 years (range 1–20 years). We

found no statistically significant differences between the groups with unilateral LLL or ULL ($p = 0.30$). The median length of intensive self-bandaging (to the point of stabilization) was 6 weeks (range 3–12 weeks). Among all participants with unilateral limb lymphedema, mean edema reduction after intensive self-bandaging was 55% for the most severely affected limb segment. The four participants with bilateral lymphedema achieved an average reduction of 18% of the entire extremity ($p < 0.01$).

Table 2 shows the median reductions obtained in each category of severity. Participants with severe lymphedema achieved 48% reduction, while those with moderate lymphedema achieved 52% reduction (both $p < 0.01$). For those with moderate ULL, mean reduction was 44%, while mean reduction for those with moderate LLL was 65%; there was no statistically significant difference between the two groups ($p = 0.25$). Reductions were greatest for the four participants with mild lymphedema (92%; $p < 0.07$). Severity cannot be compared in bilateral lymphedema; only percentage of volume reduction is reported.

Two patients died of cancer-related causes during the follow-up period. The remaining 28 patients responded to interview questions between 3 and 18 months after finishing the intensive part of the programme. Adherence to compression garment use was high (85%). Participants were asked whether they presently continued to bandage their arm or leg. Nearly half (48%) of participants were no longer bandaging, for a variety of reasons: they did

Table 2 Reduction of Edema after Intensive Self-Bandaging in Unilateral Limbs

Severity	No. of cases	Duration of intensive self-bandaging, weeks, median (range)*	Baseline RLV, median (SD) %	End of study RLV, median (SD) %	Change, median (SD) %	p-value
Total	26	6 (3–12)	22.4 (4.4)	16.8 (3.3)	–55.2 (32.1)	<0.01
Mild	3	4 (3–4)	15.3 (4.5)	3.3 (1)	–92 (60)	0.07
Arm	2	4 (–)	13 (2.8)	–2 (7)	–119 (54)	0.13
Leg	1	3 (–)	20	14	–38	
Moderate	13	7 (4–12)	27.8 (4.1)	14.3 (9.1)	–52 (30)	<0.01
Arm	8	6.5 (4–8)	27.6 (3.4)	16.8 (8.5)	–44 (29)	0.006
Leg	5	7 (6–12)	36 (5.5)	22 (9.5)	–65 (31.3)	0.009
Severe	10	6 (4–8)	61.3 (21.1)	34.1 (17.1)	–48 (18)	<0.01
Arm	9	6 (4–8)	57 (17.2)	31.7 (16.4)	–48.3 (18.6)	<0.01
Leg	1	4 (–)	100	55	–45	

*Median duration in weeks from initiation of self-bandaging to stabilization of volume.

RLV = relative lymphedema volume.

not need bandages because they were stable without them, they had pain unrelated to their edematous limb, or they found bandaging too onerous. Of the 15 (50%) who continued to bandage, seven bandaged 2–3 times a week, and eight did so nightly. Three used a compression device as a bandaging equivalent. The majority of participants with ULL (83%) and 40% of those with LLL had bandaged themselves; all the others were bandaged by a family member or by a community nurse. GRC scores were positive for all patients; the majority (77%) rated +4 or above.

Qualitative results

Four main themes emerged from the interview data: (1) a feeling of being in control, (2) recognition of the effectiveness of bandaging, (3) difficulties presented by health problems, and (4) problems with garments.

Feeling in control

At the time of the final interviews, only a few patients were still attending follow-up sessions. Patients reported that their use of various techniques to keep their lymphedema stable—wearing compression garments (daily or occasionally), wearing nighttime compression devices or bandaging, exercising (different types, various intensities), self-massaging and self-measuring—helped them to feel in control. Patients with LLL felt stronger, more flexible, and more active and had better balance as a result of combining different self-management techniques. One patient was delighted to be able to “wear real shoes again; it is fantastic!” Several patients commented that they felt “stable” or that they were “maintaining well.” One patient reported reduced pain. One wore her sleeve “5 days a week to keep my arm stable” and measured herself every 2 weeks.

Recognition of the effectiveness of bandaging

Participants generally acknowledged the effectiveness of bandaging. Many who did not bandage regularly told

us that their limb swelled when they stopped bandaging and improved when they did bandage. One participant found bandaging too time consuming and used other methods in addition to wearing a compression garment. One stated that “swelling was controlled or reduced with bandaging,” and another commented that her hand was “perfect” since bandaging.

Difficulties presented by health problems

Three patients stopped bandaging because of serious co-morbidities or the return of cancer and treatment-related fatigue, and one patient stopped because of pain in her breast and arm. Two other patients each reported an episode of cellulitis during the maintenance period of the study.

Problems with compression garments

During the maintenance phase, two participants reported difficulties with daytime compression garments that did not fit correctly. The usual waiting period for custom-made garments is 2–3 weeks, during which time bandaging must be maintained. One participant’s garment arrived two months after it had been ordered; such a long wait period makes adherence to constant bandaging difficult and may compromise stability. One patient remarked that she had achieved a “great change but the new sleeve is not good, not enough compression, and fluid returns.”

DISCUSSION

The majority of participants in this programme had moderate to severe lymphedema, which they succeeded in reducing to a level equivalent to that achieved by trained therapists administering DLT (total mean reduction of 55%).^{14,15,28} The cost savings of a self-bandaging programme can be substantial. Assuming that our population of patients with moderate to severe lymphedema would have required an average of 15 sessions of daily DLT by a lymphedema therapist to achieve a similar

volume reduction, at a hospital therapist rate of \$45 per hour, this would have cost \$675 for standard treatment. This is likely a conservative estimate, as Dayes and colleagues²⁹ reported \$1,500 for 20 sessions in Canada, Stout and colleagues³⁰ reported \$3,000 for 15 sessions, and Ryan and colleagues³¹ reported \$2,000 for a series of treatments in the United States. In contrast, the cost for the median of 6 hours' active treatment required per patient in our programme would be \$270. Although the time required to achieve lymphedema reduction is longer with self-bandaging, the estimated cost is less than 50% of hospital-based treatments, and participants learn a self-management method that is useful should they require further intensive treatment in the future. Given that repeated intensive treatments are often required every year or two for patients with moderate to severe lymphedema, the long-term advantage of reduced costs associated with this self-management approach could be considerable.

For most people with chronic lymphedema, compression therapy is the most important component of DLT,⁹ yet this treatment is not universally available to patients in Quebec. Lack of appropriate care can lead to further progression of the condition, with associated secondary complications.¹⁷ By providing subsidized tutorial sessions and close follow-ups, the MUHC Lymphedema Clinic enables people with lymphedema to treat themselves at a low or no cost. Financial and budgetary issues are being actively debated in Canadian health care systems; therefore, self-management programmes such as this one may be of particular interest to managers and programme funders.

In their systematic review, Lasinski and colleagues¹⁵ noted that it is often difficult to determine the contribution of each individual component of DLT because they are frequently bundled together. Although this case series is not a comparative study, it is the first report on patient self-application of compression bandages as a primary treatment to reduce lymphedema to our knowledge. Clinical trials are needed to evaluate the various options for lymphedema management, including self-application of bandages as a first-line therapy.

It should be noted that the outcomes of this programme could not have been obtained without proper training of the patient and/or caregiver. Self-bandaging techniques had to be monitored, corrected, and modified as needed by a physiotherapist to ensure that the day-to-day application of bandages was correctly performed by the patient or her/his caregiver(s).

We also observed that a longer follow-up period ensures volume stability and proper timing for daytime compression garment acquisition. Regular measurement and a graph of the results facilitated decision making and helped therapists avoid inappropriate early referral to a garment fitter. The graph helps the therapist visually explain to the patient when a plateau is reached and

maintained, thus ensuring optimal timing of compression garment fitting.

Lymphedema self-care is considered burdensome, yet many months after completing the programme, 85% of participants reported still wearing a garment, and nearly half continued to bandage at night. Sherman and Koelmeyer (2011) showed a link between perceived self-regulation, self-efficacy, and lymphedema risk reduction behaviours³²; it is plausible that patients' active and knowledgeable participation in their own care had a motivating impact on their continued use of compression. Success in edema reduction through self-bandaging may bring patients confidence and a sense of independence, as the theme of feeling in control suggests. The self-bandaging protocol, once learned, is a treatment method that patients can apply as needed at any time in their life. Long-term studies (>24 months) are needed to investigate predictors of adherence and their relation to quality of life. Three patients in our programme used nighttime compression devices in lieu of self-bandaging; as these new and easier-to-use nighttime compression devices become more widely available, such products may also facilitate greater patient involvement in self-care.

Limitations

Our case series illustrates that a self-management service that teaches patients and caregivers how to bandage safely and effectively is a feasible undertaking. Because our study is limited by its small sample size, mixed etiologies of lymphedema, varied length of follow-up, and retrospective design, we cannot generalize to a larger patient population; in the absence of a control group, we are also unable to report on the natural progression of lymphedema over time without intervention. A further limitation is that the limb measurements were taken by the treating therapist rather than an independent assessor. Finally, we did not gather detailed socioeconomic data; since financial and resource issues are of primary importance in this field, it would be important to collect such data in future studies.

The self-bandaging programme itself also has limitations. Those who cannot bandage themselves (e.g., cannot reach their feet) and have no one to help them (e.g., relative, community nurse, friend) will be unable to participate in this type of programme. The programme also generally takes longer (3–12 weeks) than a regular intensive DLT programme (2–5 weeks),⁸ because detecting a plateau is difficult when the patient is seen only once a week. With only one clinic visit per week (rather than 3 or more), patients save in travel time, but self-bandaging often takes considerably longer than the application of bandages by a trained therapist.

CONCLUSION

Appropriate long-term management is important in lymphedema care. Vignes and colleagues¹⁶ showed that

lymphedema worsens over time if adherence to compression therapy (day-time compression garments and compression bandaging) is less than optimal. This case series suggests that good edema volume reduction may be attained through self-management. Moreover, a self-bandaging programme may be a route to increased independence and self-efficacy. In regions where the cost of DLT is not covered by public or private funds or where availability of DLT is limited, a programme such as this may benefit patients without compromising the effectiveness of treatment. The results presented here should stimulate interest in future case-control studies or randomized controlled trials to investigate patients who bandage themselves versus those who receive a full protocol of DLT or bandaging performed by a therapist.

KEY MESSAGES

What is already known on this topic

To our knowledge, no study has described a self-bandaging programme and analyzed data concerning the results of such a programme. Compression therapy administered by a lymphedema specialist as part of DLT has been reported to improve lymphedema.¹⁵

What this study adds

The results of this case series suggest that patients with lymphedema who treat themselves can, at minimum cost, achieve outcomes similar to those published in the literature from traditional therapist-applied decongestive treatment.

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APPENDIX 1: LAPLACE'S LAW⁹

The following is the formula for calculating the sub-bandage pressure:

$$P \text{ (pressure)} = \frac{T \text{ (tension)} * N \text{ (number of layers)} * 4630}{C \text{ (circumference)} * W \text{ (bandage width)}}$$

In practice, we use the principles in which increasing tension and number of layers will increase pressure, and increasing circumference and width of bandage will decrease pressure.