# Using the Juzo® Adjustable Compression System during the intensive phase of lymphoedema management

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**Key words**

Adjustable Compression System, compression, cost savings, short-stretch bandaging

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## Abstract

It is widely accepted that lymphoedema management fluctuates between patient-led maintenance therapy and specialist-led intensive therapy, but with advances in fabric construction and pressures on funding and time within clinic settings, it is becoming both possible and important to consider alternate ways to offer intensive treatment. Could the Juzo® Adjustable Compression System (Juzo UK) provide a viable, effective answer?

*Declaration of interest: Author works for Juzo UK Ltd.*

Lymphoedema treatment is focused around skin care, exercise, massage and compression. These elements of treatment are split into either maintenance or intensive therapy. The maintenance phase of treatment is a self-care regimen without the daily input of a lymphoedema specialist with the appropriate level of training and skills. Maintenance therapy is considered to be the mainstay of lymphoedema treatment with the emphasis on patient-led therapy. The intensive phase (also referred to as decongestive lymphatic therapy; DLT) should be carried out by a skilled lymphoedema specialist (Wigg, 2009). The primary purpose of intensive therapy is to reduce and reshape the limb, by softening the underlying tissue, addressing any shape distortion and underlying skin conditions and reducing the overall limb volume, thereby enhancing function and mobility. Generally, a course of intensive therapy is carried out over a 2–4 week period with the patient attending a lymphoedema clinic daily (International Society of Lymphology, 2003; Lawrance, 2008).

The current thinking of the International Lymphoedema Framework (ILF) (2012) is that all patients with digit swelling, lymphorrhoea, shape distortion or moderate to severe lymphoedema should undergo a course of intensive therapy. The ILF also suggests that issues such as skin condition and integrity, ability to wear compression garments and commitment to treatment should be considered (2006).

In practice, these two phases of lymphoedema treatment blend together to offer a complete treatment package, with patients moving from one to the other as needs and circumstances demand.

## Background

In the lymphoedema world, it is widely accepted that intensive therapy utilising short-stretch bandages as part of multi-layer bandaging is an integral component of treatment, however, such inelastic bandaging systems have limitations and can quickly lose pressure following application (Mosti et al, 2015). The ILF Best Practice document (2006) states that multi-layer lymphoedema bandaging is a key element in intensive therapy and consider it best practice for all patients with International Society of Lymphology stage II, late-stage II and stage III lymphoedema (*Box 1*). In recent years, there has been a variety of developments in bandaging technology that are leading to a change in practice. There has been a move from daily application of tradition short-stretch bandages to twice weekly application using a cohesive bandaging system. Although, the application of cohesive bandaging systems still requires the input of a skilled lymphoedema specialist. These changes to bandaging systems are fuelled by advances in technology, but are also being pushed by the changing economic climate. By reducing clinic visits there is an obvious cost saving for clinics and time saving for the clinic, therapists and the patients. Intensive therapy requires a degree of commitment from the patient and the specialist and it is not uncommon for patients to decline the offered course of therapy as their individual circumstances make undergoing daily or even twice weekly treatment more problematic than they perceive their oedema to be. It also needs to be highlighted that some lymphoedema clinics are unable to offer the gold standard intensive therapy as defined by the ILF (2006).

Ultimately, the challenges and problems faced by both patients and clinics during intensive therapy led to development of alternative ways of offering short stretch graduated

**Table 1.** Treatment findings.

| | |
|---|---|
| Arm ACS | 4 including one where a leg system was also issued |
| Leg ACS | 14 including 5 bilateral systems and one where an arm system was also issued |
| Mean Day 1 Excess Limb Volume | 32.4% (22.7-54.1%) |
| Mean Day 10 Excess Limb Volume | 22.1% (16-33.6%) |
| Largest percentage loss | 20.5% (54.1% pre treatment – 33.6% post treatment) |
| Smallest percentage loss | 2.4% (23.1% pre treatment – 20.7% post treatment) |
| Mean Excess Limb Volume at Follow Up | 21.1% (14.8-32.4%) |

**Box 1.** International Society of Lymphology Staging.

| | |
|---|---|
| Stage 0 | A subclinical state where swelling is not evident despite impaired lymph transport. |
| Stage I | Early onset of tissue fluid that subsides with elevation. The oedema may be pitting at this stage. |
| Stage II | Limb elevation alone rarely reduces swelling and pitting is manifest. |
| Late Stage II | There may or may not be pitting as tissues fibrosis is more evident. |
| Stage III | The tissues are fibrotic and pitting is absent. Skin changes, such as thickening, hyperpigmentation, increased skin folds, fatty deposits and warty overgrowths, develop. |

compression. The introduction of cohesive bandages and paddings that can remain in place for several days has gone some way to addressing the challenges. However, this system still requires the input of a skilled specialist to apply the bandages. The development of wrap systems over recent years has resulted in them beginning to be more widely recognised as an alternative compression therapy both in the maintenance and intensive phase of treatment (Elvin, 2015; Everett, 2016; Thomas, 2017).

There are several wrap systems available and for the purposes of this paper the device under consideration here is the Juzo® Adjustable Compression System (ACS; Juzo UK). The ACS has been designed and tested to apply compression following the principles used in short-stretch bandaging technology. This means that the ACS offers a high working and low resting pressure, the graduation is achieved by both the manufacturing process and the end stretch of the fabric, when the shape of the limb is taken into consideration, as well all the principles and theories of La Place's Law are followed (ILF, 2006). There is evidence to suggest that similar wrap systems have been useful in treating venous oedema (Bianchi et al, 2013; Mosti et al, 2015). Considering these factors, is it possible that the ACS could have a place in the intensive phase of lymphoedema therapy, as well as the maintenance phase of therapy?

When daily application of multi-layer lymphoedema bandages is replaced with twice weekly application of cohesive bandages and paddings, similar results in limb volume reduction are noted. Is it possible to replace bandaging altogether and replace it with the ACS and SoftCompress (Juzo UK) padding system?

## Method

Four lymphoedema clinics spread across the UK agreed to take part in this small study. These included two NHS funded clinics, one charity-funded clinic and one private lymphoedema therapist. Altogether a total of 12 patients, including five bilateral leg systems and one where both arm and leg systems were used, took part in this trial. Of the 12 patients who participated, 11 were female and one was male, ages ranged from 36–82 years. No exclusion criteria was implemented for the study and all of the patients who took part had previously undergone a course of multi-layer lymphoedema bandaging. The oedema was long standing in all cases, ranging from 24 months–38 years since initial onset of swelling, eight of the patients fell into the ISL late-stage II and 4 into the ISL stage III category (*Box 1*) and included two primary lymphoedemas, nine secondary to cancer and one secondary to trauma.

The clinics were asked to take pre-treatment measurements to obtain the correct size ACS and SoftCompress. Post-treatment and 1-month follow-up measurements were required to assess the clinical effectiveness of using the ACS as an alternative to either traditional short-stretch bandages or cohesive bandages. All the patients involved agreed to sharing their limb measurements and the author did not meet any of the patients at any point before, during or after the study. The correct application technique for the ACS was demonstrated to all therapists prior to them fitting it on patients, this involves "taking the bounce out of the straps" as they are applied, and the ease of adjustment explained. When applied correctly, the ACS is designed to provide 40 mmHg graduated compression from the distal end of the limb.

The therapists demonstrated the correct application of both the ACS and the SoftCompress to the patients and assessed their ability to correctly don and adjust the system before enrolling them on the study. The ability to adjust the ACS during the day allows the patient to chase the oedema as limb responds

**Table 2.** Patients comments.

| Arm | Leg |
|---|---|
| I could still work! | Felt protected |
| I felt that I was in control of my treatment | I felt more comfortable and the ACS felt secure during the day |
| My clinic has never been able to offer me this sort of treatment before | I didn't need to take time off work |
| | I can't believe how small my leg is |
| | Helped my balance |
| | So easy to adjust |
| | My walking improved |

Figure 1. Juzo ACS armsleeve and hand piece.

Figure 2. Juzo ACS calf and foot piece.

Figure 3. SoftCompress full leg system.

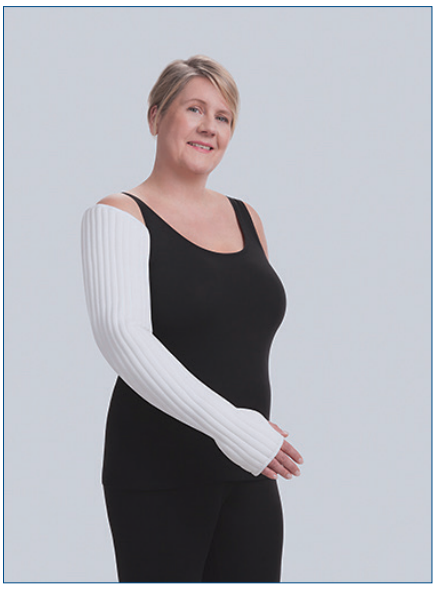

Figure 4. SoftCompress arm system.

to compression and can increase the acceptability of the system to patients. It is believed that this can improve overall compliance with treatment while reducing the need for specialist intervention (Thomas, 2017).

During the trial period, three of the four clinics asked the patients to attend on day 1 for fitting and demonstration of the ACS and SoftCompress system, day 5 to measure for custom made flat-knit garments for the end of the intensive phase and again on day 10. This reduced clinic visits to three rather than 10. The remaining clinic continued to see the patient daily, but reported shorter appointment times.

## Results

Over the course of the trial, four of the 12 patients stopped using the SoftCompress under the ACS by the day 5 appointment; various reasons were given for this and it was mainly down to function and mobility especially for those trying lower-limb systems. The removal of the SoftCompress made wearing shoes possible. Three of the four who removed the SoftCompress stated that they reapplied it under the ACS overnight. Despite this, it can be seen in *Table 1* that all the patients had good results using the ACS with or without the Soft Compress underpadding.

Although not requested, the patients involved in the study gave spontananeous feedback on the trial, of the 18 ACS and SoftCompress issued only one patient stopped using it, on questioning the clinic she had been non-concordant with all previous attempts to perform intensive therapy and was not a good candidate for the trial. The other 11 patients commented on how comfortable and adaptable the ACS and SoftCompress were to wear and liked the ability to adjust the ACS as the oedema responded over the course of the day, a selection of comments can be seen in *Table 2*.

## Conclusion

The Juzo Adjustable Compression System and SoftCompress offers a good alternative to both traditional multi-layer lymphoedema bandaging and cohesive bandaging. The added benefit is that patients are able to adjust the system during the day as the oedema

responds to the compression. This ability to "chase" the oedema could result in better volume reduction over the same two-week period than with traditional bandaging. The ACS can also be used post treatment as the therapist and patient deem necessary to reduce the potential of post-treatment rebound oedema. The cost- and time-saving implications for using the ACS are huge for both therapists and patients, the potential to reduce clinic time from the 20 units recommended in the British Lymphology Society (BLS) tariff document (2014) to between 4–6 units depending on complexity and needs of the individual patient, reducing the proposed cost for intensive phase treatment from a predicted £976.50 to £195.32–£292.98 based on the BLS costings (2014). These results prove it is as efficient alternative to multi-layer lymphoedema bandaging as an intensive phase treatment option. The ACS and SoftCompress treatment option also opens up the chance to undergo intensive phase treatment to patients who cannot attend daily appointments and would allow clinics that can not currently offer a five-day-a-week service to offer intensive phase treatment; ultimately benefiting more patients and offering considerable cost savings.

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