

Clinical evaluation of the effect of using a home compression pump for women with lipedema

Using a compression pump as a treatment for lipedema is an effective method to provide pain relief and facilitate self-care

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A clinical evaluation of the efficacy of using a home compression pump for women with lipedema.

Summary

Intermittent pneumatic compression (IPC) system as a treatment for lipedema is an effective method of providing pain relief and provides improved satisfaction in managing self-care with lipedema

The report presents a fitting process for prescribing IPC and its outcome for 66 women after one year of home use.

Pain is a prominent symptom of lipedema, and the report shows that out of 45 women who rated pain with VAS, 60% felt that their pain was more than halved at follow-up and more than 30% felt that their pain was reduced by more than 80%.

In the team's experience, part of the satisfaction of having IPC at home may be that people find it provides pain relief, more self-control over their symptoms, but also that they can be more active and more able to manage daily activities and participate in social life to a greater extent. 97% (64 out of 66 patients) estimate that self-care is easier after using a compression pump, with 85% indicating an improvement of more than 50%.

Background

The lymphoedema clinic at the Red Cross Hospital, later Rehabcenter Sfären within Bräcke diakoni, has a long tradition of treating lymphoedema in planned day and weekly care as well as within the framework of outpatient care.

The starting point of the clinic's treatment has been based on the concept of combined Complex Decongestive Therapy, CDT, which has included the compression pump as a treatment tool. In addition to treatments, training and information for individuals and groups, the emphasis has been on providing tools for self-care.

The medical clinic has received patients for evaluation of oedema patients from all over the country but preferably from the Stockholm region. Doctors have had the right to prescribe the Intermittent Pneumatic Compression (IPC) system, a medical device, on loan for home treatment.

Rehabilitation of lymphedema and lipedema

For a long time, women with lipedema, sometimes with co-morbidity with lymphoedema, participated in planned rehabilitation such as day or weekly care, for lymphoedema. After some time, the picture became clearer regarding the lymphoedema problem and people with lipedema were given their own diagnosis.

The major difference between lymphoedema and lipedema is that the former group is characterized by oedema, which can be detected by clinical tests and lymph scintigraphy. In lipedema, pain is the prominent symptom and measurable oedema to a lesser extent.

Both groups describe symptoms such as heaviness and increasing discomfort after prolonged static muscular strain. Both groups describe the negative impact of symptoms on daily activities as assessed by quality of life instruments. Both groups have described good treatment effects of rehabilitation, but the lipedema group has not had the same effect on limb volume as those with lymphedema.

In order to reduce or control symptoms in the long term and to improve health, performance of daily activities and quality of life, individuals need to be able to maintain good self-care.

Prescribing a compression pump is a way to give patients a tool for effective self-care without having to rely on visits to the hospital.

Compression pumps have been shown to reduce pain and tenderness in patients with lipedema, even in the absence of detectable swelling problems. Some patients cannot tolerate wearing compression due to pain, in which case the compression pump may initially be an alternative to compression garments. Compression pumps are also proposed as a treatment to prevent the progression of lipedema to lymphoedema, although there is no consistent scientific evidence for this.

Compression pump (IPC)

IPC is an effective clinical, non-invasive, and dynamic compression of the arms or legs. In this report, a 12-chamber pump has been used, as well as trouser cuffs in different sizes, with or without additional wedges.

The IPC pump creates a form of air pressure massage by pulsing graded pressure from a programmable pump through tubing to a 12-chamber cuff for the legs and abdomen. Graded pressure means that the air chamber furthest from the heart (at the toe/foot) receives the highest pressure in the cuff, the pressure then decreases in each subsequent chamber. The graded pressure can also be customized through software.

The cuff is loosely applied to the body which promotes air to circulate at the set pressure. A thinner elastic pant (not a compression garment) is used to protect the skin, the pant also protects the cuff from dirt. Compression garments are best used immediately after IPC treatment to best prolong the treatment effect.

In some people with lipedema, the pain is so pronounced that the tolerance to pressure is very low, which must be taken into account when using IPC and adjusting to light pressure. Sometimes materials have been used to provide point pressure by padding.

Prescribing a compression pump (IPC)

Between 2005 and 2008, a treatment and follow-up concept was developed with the aim of maintaining a medically safe method of compression pump treatment.

Prior to fitting, the doctor has made a medical assessment, then written a referral to an occupational therapist or nurse to begin the process of testing the IPC. The doctor has also prescribed the equipment, and the occupational therapist has adapted it when necessary. In the event that the person has participated in any form of intensive treatment, 3-6 months have been allowed to elapse before the first fitting of the compression pump to reduce the risk of lingering treatment effects from the intensive treatment.

Follow-up has taken place between 1 - 1.5 years after completion of the trial. Medical Equipment at Home (Medicinteknisk Apparatur i Hemmet - MAH) is responsible for purchasing, technical service, delivery, and collection from the person's home.

The fitting process

To ensure that treatment results came from the IPC, that the person learned how to use the equipment, and that different variations in symptoms could be addressed with different program settings, the treatment period included 10 sessions (in single cases 5-7 times) at an interval of 2-3 times/week.

Follow-up was done to ensure that the equipment was being used, that no undesirable effects had occurred and as an opportunity to further adapt its use to the person's needs.

At the first and last treatment session, there is registration of:

- Weight, blood pressure, volume measurement
- VAS, Visual Analog Scale, estimation of tension and heaviness respectively.
- For the patients with lipedema, VAS assessment of pain was added.

Follow-up was carried out using the same method as during the fitting procedure with the nurse and doctor, with the addition that the occupational therapist participated with follow-up of satisfaction with using the IPC at home. This evaluation was carried out using Quest 2.0 (Quebec User Evaluation of Satisfaction with assistive Technology), an instrument for evaluating satisfaction with assistive technology. In addition, two supplementary questions were asked about self-care performance, which were assessed with the Visual Analog Scale (VAS).

In addition to this described method, the women filled in a supplementary questionnaire before a follow-up with the doctor:

1. Questions about wearing compression, bandaging, or visiting a lymphologist.
2. Questions about frequency, time and pressure when using the compression pumping equipment at home

Prescribing a compression pump for lipedema

Between 2012 and 2020, IPC was prescribed to more than 90 women with lipedema via the GP clinic. At the doctor's visit, it was found that 70 of these women could be considered to have lipedema without clinical symptoms of lymphoedema. For 23 of these there is documentation of negative lymph scintigraphy, i.e. without remark. The average age of users is 54.5 years. The oldest was 68 years and the youngest 24 years old at the time of fitting.

Compression and other treatment

From the answers to the questions about the use of compression and other treatment it appeared that:

25 women wear compression daily and then it varies between 3-6 days a week and most with 3-4 times a week. 3 women do not wear compression at all or sporadically.
2 women practiced bandaging. 10 women visited a lymphatic therapist regularly.

Frequency, time, and pressure

When asked about the frequency, time, and pressure they used when treating themselves with IPC at home, complete answers were recorded for 50 women:

24 individuals treat themselves 3-5 times a week, 6 individuals treat themselves 6-7 times a week and 20 individuals treat themselves at least 2 times a week.

The pressure setting varied between 36 mm Hg and 60 mm Hg and the time spent in the compression pump varied between 20 and 60 minutes. Please note that pressures between 50 and 60 mm Hg were not tested during the fitting process.

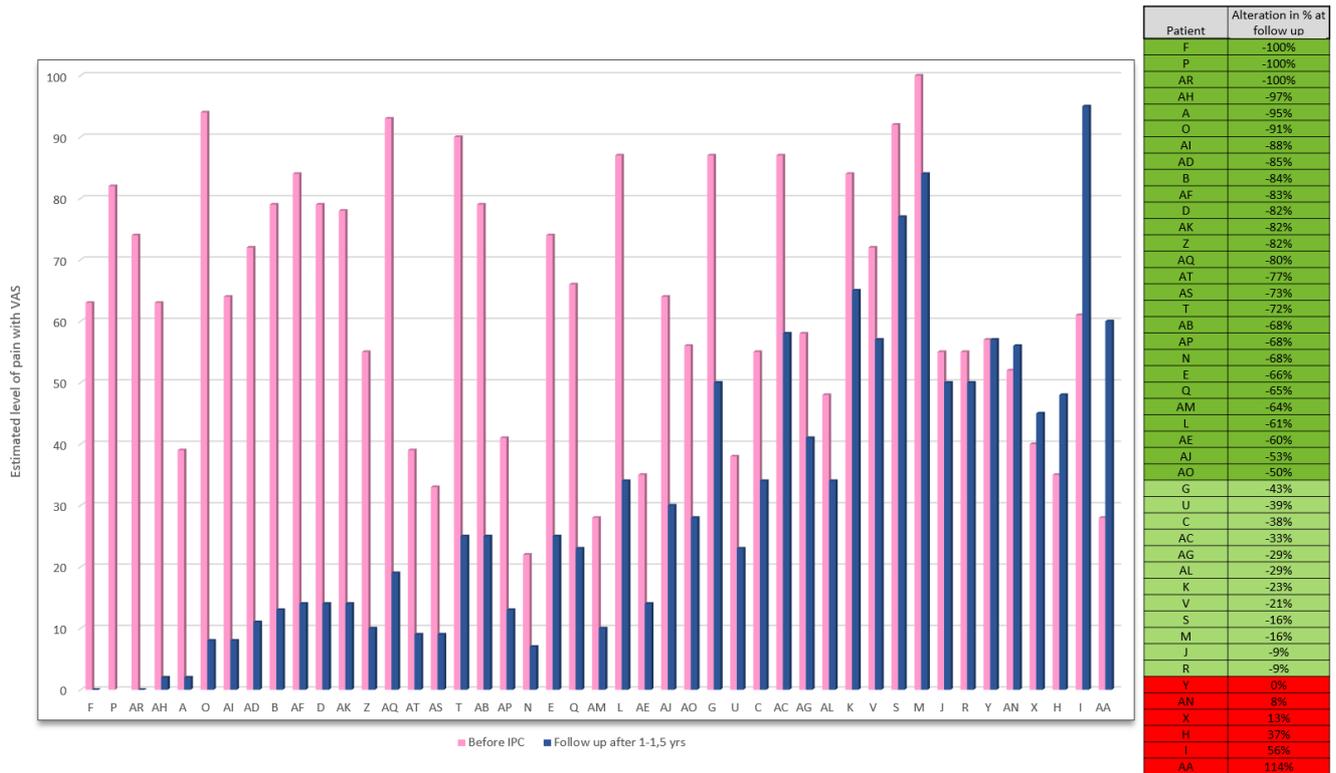
Evaluation

The main symptom of lipedema has been shown to be pain, detectable oedema was less common, therefore volume calculation and volume reduction are not presented in this review. Causes of pain in lipedema are considered multifactorial and are described in more detail on the platform www.alltomlipodem.se or in various studies: best practice and consensus documents listed in the reference list. The type of pain is not specified in the material below.

The summary that follows includes VAS ratings of pain, heaviness, and tension. Estimates were made at the first fitting, at the last fitting and at the follow-up after 1 - 1.5 years. Pain assessment was added after a few years of testing compression pumps. The reason for adding pain assessment was that more evaluation variables were needed in addition to weight, tension and volume, as the problem of lipedema was different from that of lymphedema. Complete data are available for 45 individuals and are presented in Figures 1-5.



Figure 1: Pain estimation. Comparison between the pre-trial measurement and the follow-up one year later

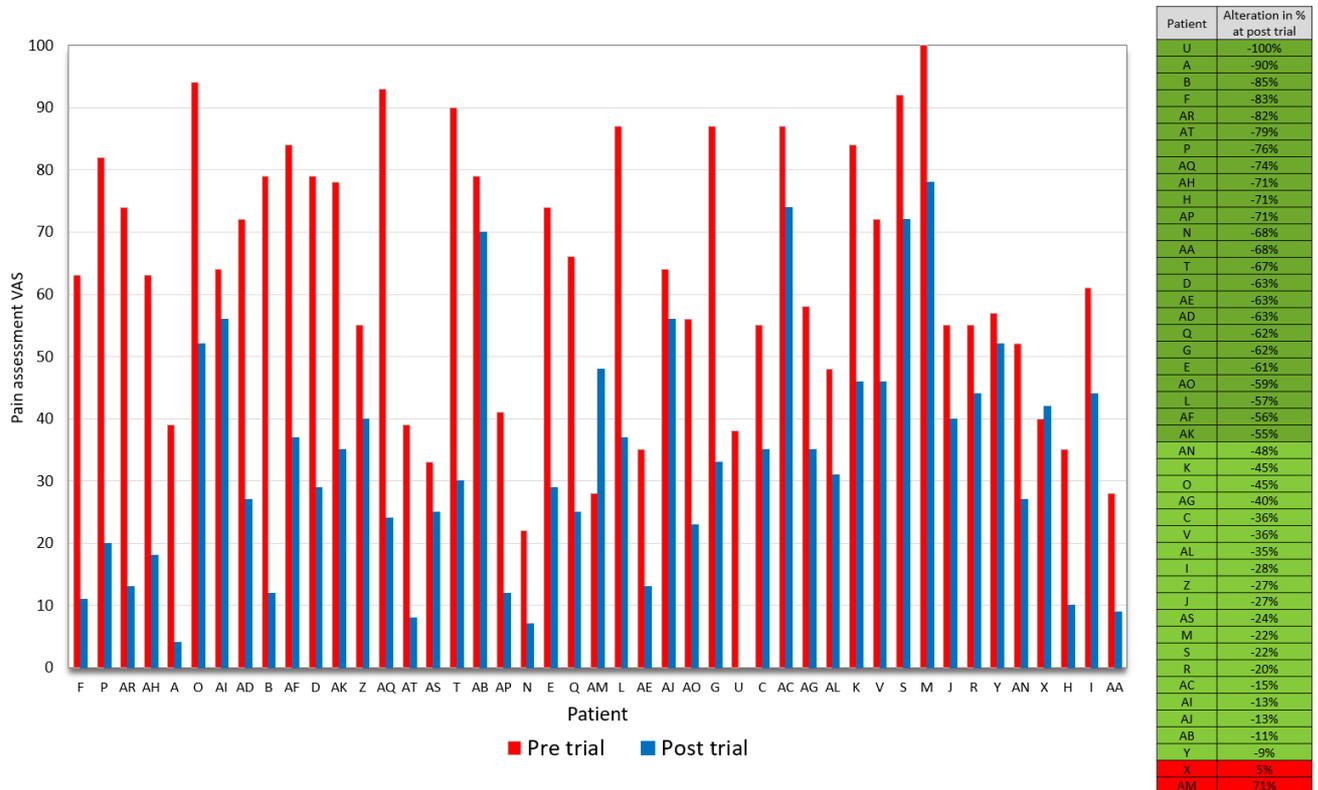


The graph shows a significant improvement in pain after using the compression pump. The red bars show the values given at the pre-trial measurement and the blue bars show their estimation at the follow-up one year later.

According to the table next to the chart, 60% feel that their pain has decreased by 50% or more at the follow-up. More than 30% feel that their pain has decreased by more than 80%.

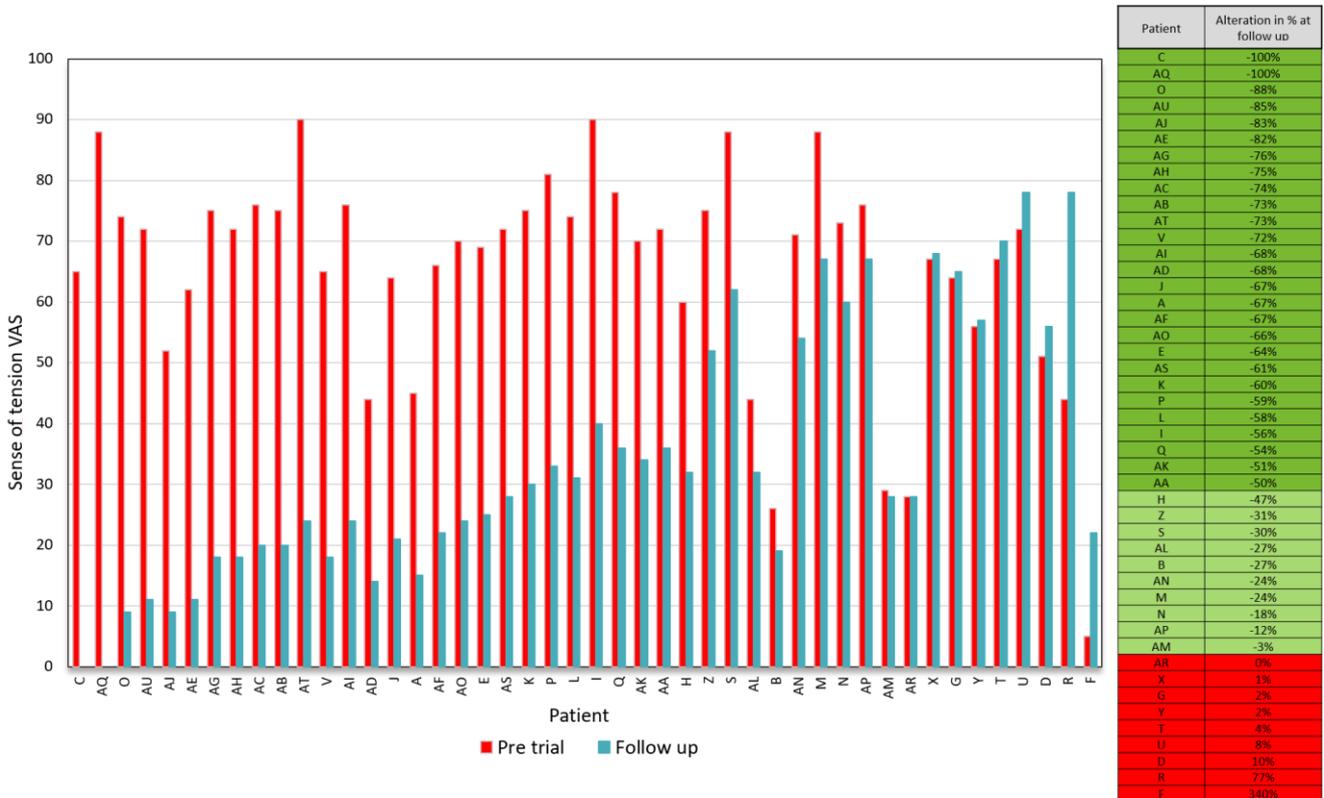
However, 13% report that their pain experience is the same or has increased at the one-year follow-up.

Figure 2. Pain assessment. Comparison between pre-trial measurement and post-trial measurement during the trial period.



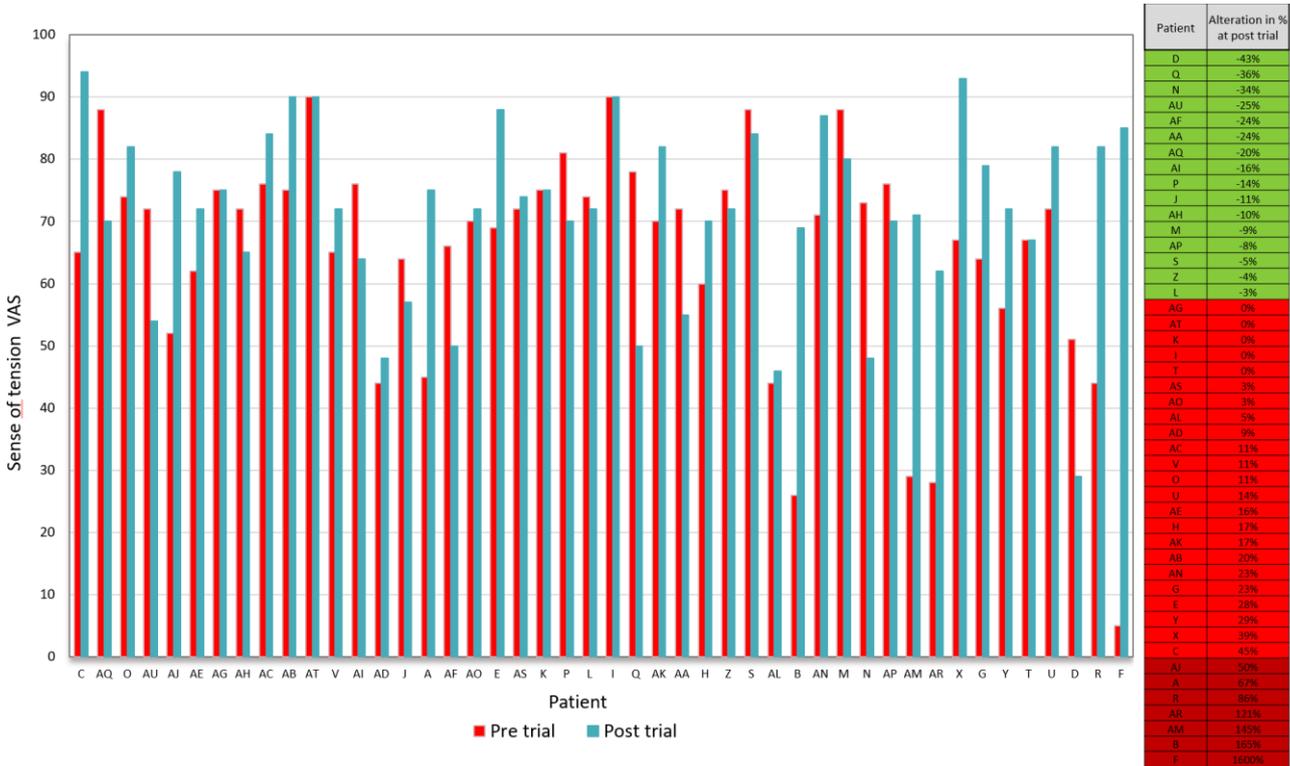
The chart is arranged in the same order as in Figure 1, while the table is sorted by the amount of improvement estimated at the post-trial measurement. The graph and table show that pain ratings after the trial period generally are significantly lower. The table shows the difference between the pain estimation at the time of the pre-trial measurement compared to the post-trial measurement and that **53% report a reduction of 50% or more**. However, 2 out of 45 (**4%**) report a **worsening**, i.e. a higher pain rating after the testing period.

Figure 3: Sense of tension. Comparison between the pre-trial measurement and the follow-up one year later



The graph shows that the feeling of tension in the legs has improved significantly when comparing the pre-trial measurement with the follow-up one year later. The table shows that **59% say that the feeling of tension has decreased by 50% or more. 20% report an increase in tension, with 2 patients reporting a significant increase.**

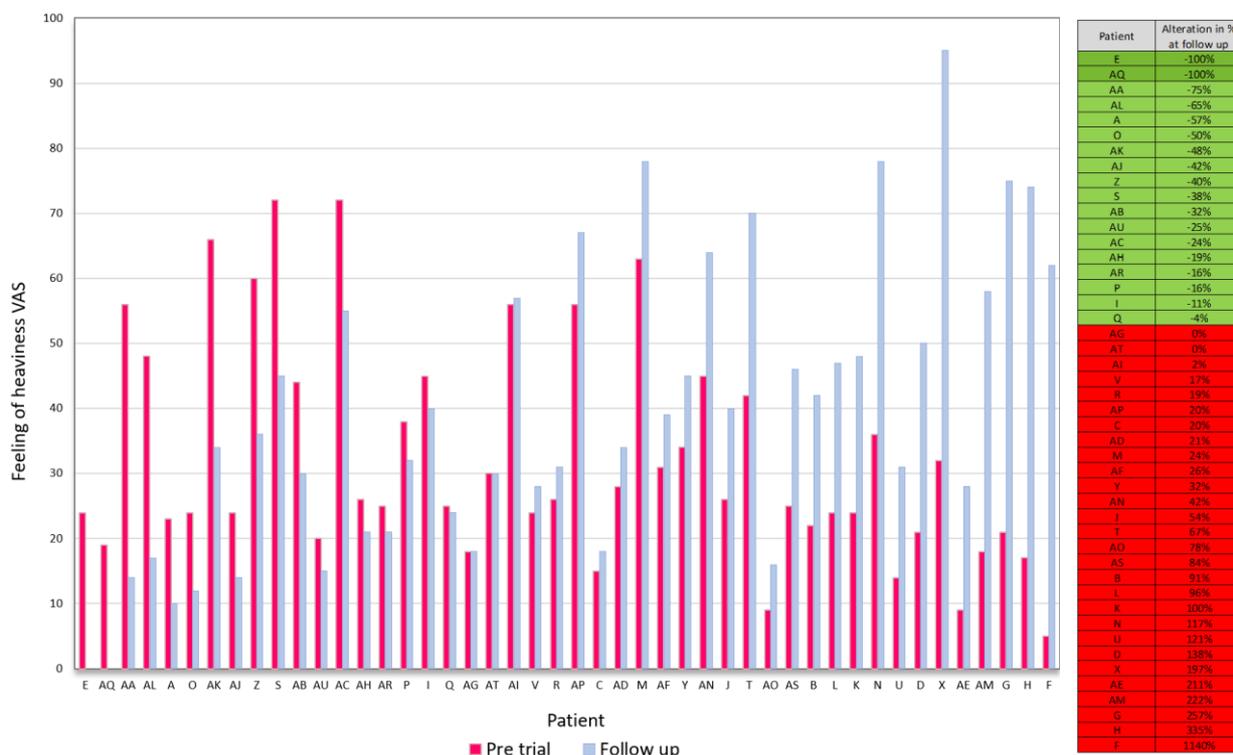
Figure 4: Sense of tension. Comparison between pre- and post-trial measurements after the trial period.



The graph does not show any major improvement in the feeling of tension. As shown in the table, only 35% estimate some kind of improvement. 65% indicate no difference in feeling of tension or a higher tension than before and 15% indicate that feeling of tension has increased by 50% or more.

Comparing the results at post-trial measurement with the follow-up one year later, Figure 3, we see a big improvement after the follow-up. This may indicate that prolonged treatment with a compression pump is needed to experience a difference in the feeling of tension. One can also see large improvements in the estimation of tension when looking at individuals and comparing measurement after the trial period and at follow-up one year later.

Figure 5: Feeling of heaviness. Comparison between pre-trial measurement and follow-up one year later



The graph and table show that compression pump treatment for the group did not improve the feeling of heaviness over time. Rather, the measurement shows that the feeling of heaviness has increased for the majority of participants at the follow-up one year later. **Only 13% report at follow-up that their feeling of heaviness has decreased by 50% or more. On the other hand, 61% reported that their feeling of heaviness has remained the same or has increased.**

Already when estimating the feeling of heaviness at the time of measurement after the trial period, 39% indicate no major difference (+/- 20%), 15% indicate an improvement (more than 20% improvement) and 46% indicate an increase in the estimated feeling of heaviness (+20% or more).

Based on the above summary of the estimates of heaviness, it can be concluded that for this group, compression pumps have not been an effective treatment to reduce heaviness. However, it can be argued whether there may be sources of error in the results. For example, the feeling of heaviness may not always be measured at the same time of day, which may affect the results as many people with lipedema describe that the feeling of heaviness increases during the day and is often related to exertion.

Evaluation of satisfaction with using a compression pump with trouser cuff at home.

The aim of the compression pump trial has been based on a client-centered approach. Common to all client-centered models of occupational therapy is that such an approach involves respecting the autonomy and choice of the client.

The client describes their goals and what is meaningful to them, and it is these goals that the occupational therapist then focuses on achieving with the client.

However, the aim of occupational therapy is to enable the individual to manage as independently as possible using their own abilities.

The trial process offers the person time to form an opinion about the effects of the treatment in relation to their own symptoms and daily routine, to carefully consider the disadvantages in relation to the home environment and daily routines, and to create the confidence to control the treatment themselves.

The treatment team and the patient together decide whether a compression pump is an appropriate device to prescribe. There have been cases where people have not been prescribed a compression pump after the trial process or have declined to be prescribed one.

There have also been cases where the equipment was recalled at the time of the follow-up.

66 women with lipedema have undergone the same compression pump trial process as described earlier, 51 of these have only lipedema, 15 also have symptoms of lymphedema according to a review of the medical records. The women have all seen an occupational therapist at the follow-up 1 - 1.5 years after the prescription of a home compression pump.

Evaluation of the compression pump as a medical technical aid

The level of satisfaction with using a compression pump with trouser cuff as an aid (eight questions) and the service provided during trial, delivery, and follow-up (four questions) were assessed using Quest 2.0, with a total of 12 questions.

Everyone then rated the 3 aspects she considered most important to her.

Figure 6: Summary of the three aspects considered most important when rating satisfaction with the prescription of the compression pump.

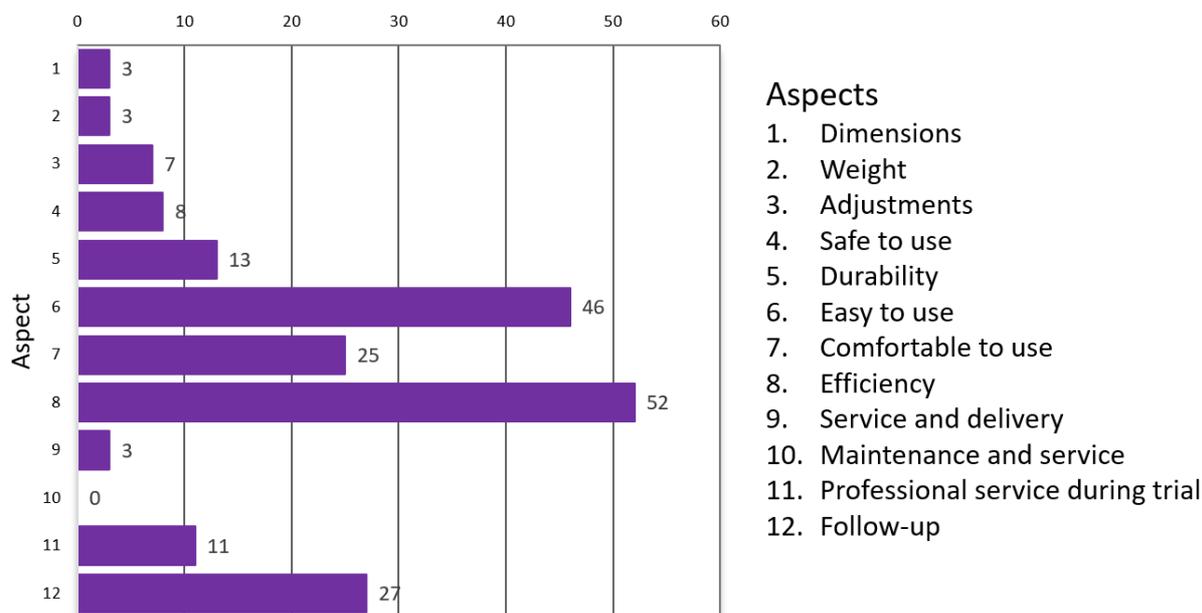


Figure 6 shows that the most important aspects were:

- Efficiency
- Easy to use
- Follow-up

Comments on aspects:

Aspect 5: Durability demonstrates a sustainable medical device. That it works over time.

Aspect 7: Comfortable to use; many say this is a prerequisite for wanting to use the equipment and some say that the treatment session provides a moment of relaxation.

Aspect 8: How efficiency is defined is individual. However, in general, the effectiveness of the device was reported to be assessed. 35 of the 44 people (80%) who assessed pain, and evaluated with Quest 2.0, cited effectiveness as an important aspect.

Aspect 10: Repair/service: Maintenance offered for your assistive device. The question has been rephrased by the occupational therapist at the follow-up, to ensure future repairs and service or, if necessary, the return of the aid. - Do you know what to do if you need service for your medical device? (Here it has been useful to again refer to the fact

that the compression pump and trouser cuff are on loan from the Region Stockholm and that MAH, (Medicinteknisk Apparatur i Hemmet), is responsible for service and delivery/pick-up of aids from the home.)

For the few individuals for whom repairs, or other measures have been necessary up until autumn 2020, it has been possible to turn to the trial unit for information or adaptations. It can for example have been an inlay of a material such as SoftCompress or similar. It has also involved adding gussets to slightly alter the shape of the trouser cuff, adapting zips to impaired hand function.

Aspect 12: Follow-up. There has been a varying degree of willingness to participate in the evaluation, but when it has happened it has been appreciated, as can be seen from the estimate. A closer examination of the data revealed that several of those with lipedema, without lymphedema, tended to include follow-up as one of the 3 most important aspects.

The experience of performing self-care

Subjects were asked to rate two additional questions with VAS (Visual Analog Scale) 0 - 100, from very easy to very difficult. The aim was to be able to make a comparison with what it was like to perform self-care before the medical device was available for use at home.

Question 1. What was the last year of managing self-care like before you had your compression pump fitted for home use?

Question 2. How are you now managing your self-care with the tested home compression pump?

Figure 7: Estimation of the ability to perform self-care before and after the use of a compression pump

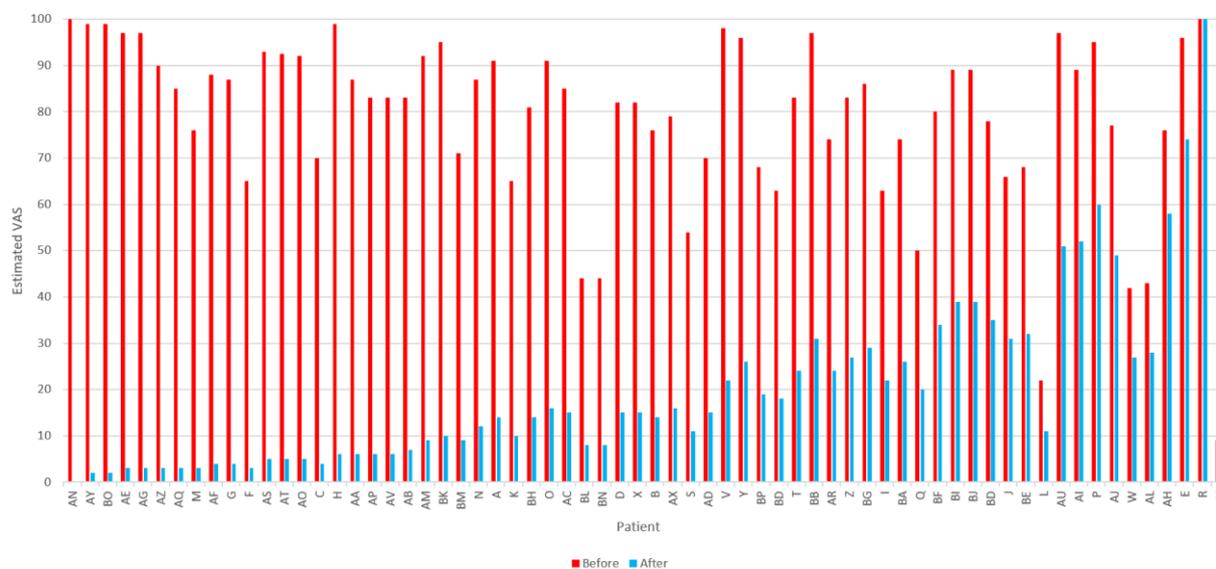


Figure 7 shows that **97% (64 out of 66 patients)** estimate that it is easier to perform self-care after access and use of a compression pump. A full **85%** report an improvement in self-care at home of **50% or more**.

Conclusion:

- Compression pumps provide great relief of pain in the lipedema over time.
- The compression pump also greatly improves the sensation of tension in the lipedema.
- The evaluation has not been able to show that the compression pump has a significant impact on the feeling of heaviness. However, it is important to point out that there may be other factors that can influence the results, such as the time of day/week of the evaluation.
- Participants have rated aspects related to the use, performance, and follow-up of the device the highest.
- The use of a compression pump has significantly improved participants' satisfaction with self-care.

The team concludes from discussions with the women that the satisfaction of being able to perform self-care more easily with the compression pump at home may be due to the fact that the people feel that it provides pain relief. The satisfaction of being able to use the compression pump is that they feel it provides relief, that they have more control over their symptoms, but also that they can and dare to be more active and can more easily carry out daily activities and participate in social life to a greater extent.

A closer examination of the data revealed that more of those diagnosed with lipedema, without lymphedema, listed "follow-up" as one of the important aspects of the Quest 2.0 assessment. One reflection on this may be that many people with lipedema had few other contacts in the health care system for their lipedema. They were thus to a greater extent at the mercy of taking responsibility for their own care and treatment.

The contact with the team, with the opportunity to discuss the outcome of treatment, talk about symptoms, etc., may then have greater significance, be valued as important, than for those who naturally meet different therapists regularly.

Final words

The IPC trial process, as described here, can be an inspiration and starting point for clinicians with IPC prescribing rights.

Collecting data, as we have done in a structured way at the Sphere Rehabcenter, is of utmost importance to show the impact of prescribing this device. There is a need to consider which measurement methods are relevant and best describe the varying symptoms of lipedema. Data is needed from many different sources as our experience shows that access to a compression pump improves quality of life and enables a more active life for people with lipedema.

Let's hope that our report can help more people see the importance of providing compression pumps to people with lipedema. It is an effective tool to reduce limiting symptoms and increase independence for people with lipedema.

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