Compression after Sclerotherapy: What is the Evidence?
AVLS Sclerotherapy Course 2020

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No Disclosures

Introduction
Introduction

- Compression therapy utilized in conjunction with the treatment of venous disease has been documented since BC
- Hippocrates (460-370 BC) and Aurelius Celsus (25BC-AD14) used compression after venous therapy


Introduction

- Conrad Jobst made the observation that hydrostatic pressures in a pool relieved venous insufficiency symptoms
- The applied pressure was greater with depth
- In the 1950's, Jobst developed compression stockings to emulate those pressures


Introduction

- Modern medicine has considered compression therapy an integral part of treatment for lower extremity venous insufficiency
- This recognition is international
- Experts have made compression their life’s work
- There is an abundance of published research about the science of compression
- There also is a wealth of published research about compression and its role in treating lower extremity venous disease
### Introduction

- Studies advocate the use of compression in the presence of:
  - Active venous ulcer
  - Phlebitis – DVT and superficial
  - Post-thrombotic syndrome
  - Chronic and acute leg edema
  - Lymphedema

### Introduction

- There is some published literature about the use of compression therapy post lower extremity venous treatment:
  - Surgery
    - Ligation
    - Stripping
    - Open phlebectomies
  - Ambulatory/micro phlebectomies
  - Ablation techniques
  - Sclerotherapy

### Introduction

- Here, we will focus on the use of compression therapy after treatment of lower extremity veins with sclerotherapy
- We will study the literature to understand evidence for its efficacy
- We will also discuss the practitioner’s clinical experience using compression therapy after sclerotherapy treatment
Introduction

› In order to understand the purpose of and discuss the effectiveness of compression therapy after sclerotherapy treatment, we will discuss:
  ◦ CEAP and compression class
  ◦ Compression mechanism of action
  ◦ Evidence based research for compression use after sclerotherapy
  ◦ Practitioner clinical experience of compression use after sclerotherapy

Mechanism of Action

› Compression is thought to enhance the efficacy of sclerotherapy by reducing the formation of postsclerotherapy thrombi, as well as pigmentation and matting by minimizing inflammation and angiogenesis


Mechanism of Action

› The ankle intravenous pressure represents the weight of the column of blood leading to the right atrium
  › This pressure is low in the supine position, rising closer to 80-100 mmHg at the ankle level when standing
  › When vein valves work well, the use of the calf pump dramatically reduces this pressure
  › In the presence of venous insufficiency, compression stockings can help promote venous return and reduce ambulatory venous pressure

Two physical laws apply to compression:
- Pascal’s Law: External static pressure on a confined fluid is distributed evenly
- LaPlace’s Law: Pressure applied by compression is proportional to the tension at the interface with skin and inversely proportional with limb radius

Partsch and Partsch used ultrasound guidance to evaluate the small saphenous vein mid-calf in 14 patients with varicose veins.
- Narrowing was observed at 30-40 mm Hg
- Occlusion was at 70 mm Hg while standing

Lord and Hamilton evaluated the GSV in 30 patients using ultrasound and MRI:
- Waist high 20-30 mm Hg compression stockings did not compress the GSV
- Compression of the GSV was at 40-50 mm Hg

Partsch B and Partsch H. Which pressure do we need to compress the great saphenous vein to the thigh? Dermatologic Surgery 2008; 34: 1726-1728.

Mechanism of Action

- For telangiectasias, 80 mmHg compression is required to produce complete emptying of blood when the patient is standing.
- 20-30 mmHg compression stocking applies approximately 10–18 mm Hg compression at the thigh.
- For this reason, practitioners may question the efficacy of applying compression stockings after sclerotherapy of telangiectasias of the thigh.


CEAP

CEAP Classification

C = Clinical signs (pain, ulcer, etc.)
E = etiology (congenital, primary, secondary)
A = anatomy (deep, superficial)
P = pathophysiology (reflux, obstruction, both)
C of CEAP

<table>
<thead>
<tr>
<th>Class</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>C0</td>
<td>No visible or palpable sign of venous disease</td>
</tr>
<tr>
<td>C1</td>
<td>Telangiectases or reticular veins</td>
</tr>
<tr>
<td>C2</td>
<td>Varicose veins</td>
</tr>
<tr>
<td>C3</td>
<td>Edema</td>
</tr>
<tr>
<td>C4</td>
<td>Pigmentation or eczema</td>
</tr>
<tr>
<td>C5</td>
<td>Ulpodermatitis or atrophie blanche</td>
</tr>
<tr>
<td>C6</td>
<td>Healed venous ulcer</td>
</tr>
<tr>
<td>C7</td>
<td>Active venous ulcer</td>
</tr>
</tbody>
</table>

Note: CEAP = clinical, etiologic, anatomic and pathophysiologic.

Compression Class & Pressure

<table>
<thead>
<tr>
<th>Class</th>
<th>Pressure</th>
<th>Support</th>
<th>Indication</th>
</tr>
</thead>
<tbody>
<tr>
<td>OTC</td>
<td></td>
<td>Minimal</td>
<td>Asymptomatic, used for comfort</td>
</tr>
<tr>
<td>I</td>
<td>&lt;15 mm Hg</td>
<td>Mild</td>
<td>Minor varicocities, tired achy leg, minor ankle, leg, or foot swelling</td>
</tr>
<tr>
<td>I</td>
<td>15-20 mm Hg</td>
<td>Moderate</td>
<td>Moderate to severe varicocities; following vein ablation</td>
</tr>
<tr>
<td>II</td>
<td>20-30 mm Hg</td>
<td>Firm</td>
<td>Severe varicocities, severe swelling; management of active ulceration; following DVT, postsurgery lymphedema</td>
</tr>
<tr>
<td>III</td>
<td>&gt;30 mm Hg</td>
<td>Extra Firm</td>
<td></td>
</tr>
</tbody>
</table>


Evidence
Evidence

While there is a wealth of literature that studies the efficacy of compression therapy for treatment of chronic venous disease and venous ulceration, there is limited research on the efficacy of compression therapy following venous disease procedures, specifically sclerotherapy treatment of reticular veins and telangiectasias.

We will review the research available to determine if there is evidence for its use.

Evidence

Weiss et al.

In 1999, Weiss et al. addressed the duration of compression following sclerotherapy of telangiectatic webs associated with reticular veins.

Objective:

- To perform a controlled study comparing the effects of different durations of compression following sclerotherapy of reticular veins and telangiectasias in similar locations.


Evidence

Weiss et al.

Method:

- The study consisted of 40 patients, 30 who received compression therapy and 10 control patients who did not receive compression therapy.
- The compression group consisted of 3 duration groups: 3 days, 1 week, and 3 weeks.
- Patients were evaluated at 1 week, 2 weeks, 6 weeks, 12 weeks, and 24 weeks for degree of improvement and side effects.
Evidence
Weiss et al.

- **Results:**
  - Strong correlation between the length of time compression was applied and degree of improvement at 6 weeks, 12 weeks, and 24 weeks of clinical follow up
  - The patients treated with compression for 3 days and 1 week had more improvement than the control group
  - The patients treated for 3 weeks of continuous compression had the most improvement
  - The 1 week and 3 week compression groups experienced the least amount of post-sclerotherapy hyperpigmentation

Evidence
Weiss et al.

- **Conclusions**
  - Compression enhances the results following sclerotherapy in a statistically significant way and is directly correlated with duration of compression
  - Three weeks of compression leads to the best results, although even three days of compression results in better outcomes than no compression
  - Compression leads to a statistically significant reduction in post-sclerotherapy hyperpigmentation

Evidence
Kern et al.

- Kern et al. studied compression after sclerotherapy treatment with a randomized controlled study
- The study objective:
  - To determine the relative efficacy of compression following sclerotherapy and to determine its impact on general quality of life in a prospective randomized open-label trial

Evidence
Kern et al.

Methods:
- Female patients
- Treatment of telangiectasias and reticular veins C1A
- Lateral aspect of thigh
- Randomized to wear medical grade compression stockings 23-32 mm Hg (Class II) daily for 3 weeks
- Or no compression
- This following one single session of standardized liquid sclerotherapy
- Outcome assessed by patient satisfaction analysis and quantitative evaluation of photos taken of lateral aspect of thigh before and again at 52 days on the average after sclerotherapy
- Evaluated by 2 blinded expert reviewers

Evidence
Kern et al.

Results:
- Data of 96 of 100 randomized patients could be evaluated
- Patient satisfaction with outcome of treatment was similar in both groups
- Treatment had no impact on general quality of life
- Objective assessment of clinical vessel disappearance revealed a benefit of wearing stockings
- Compression was well tolerated
- Micro-thrombi rarely observed in either group, but less prevalent in the compression group
- Rate of pigmentation and matting low in both groups

Evidence
Kern et al.

Conclusion:
Wearing compression stockings 23-32 mm Hg (Class II) for 3 weeks enhance the efficacy of sclerotherapy of leg telangiectasias by improving clinical vessel disappearance
Evidence
Hamel–Desnos et al.
- Hamel-Desnos et al. performed a randomized controlled trial studying foam sclerotherapy of the saphenous veins with and without post-treatment compression
- Objective:
  - To compare the efficacy and side-effects of foam sclerotherapy of the saphenous veins with and without post-treatment compression using graduated compression stockings


Evidence
Hamel–Desnos et al.
- Design:
  - Prospective open randomized controlled trial conducted in 2 centers
- Patients and Methods:
  - Sixty patients with incompetent GSV or SSV underwent ultrasound guided sclerotherapy
  - Randomization was conducted after sclerotherapy to 2 parallel groups
    - One with compression Class I for 3 weeks
    - One without compression
  - Ultrasounds were performed, efficacy, side effects, QOL, symptoms, patient satisfaction were all assessed

Evidence
Hamel–Desnos et al.
- Results:
  - On day 28 at time of ultrasound, abolition of venous reflux and occlusion of the vein was obtained in 100% of the cases in both groups
  - There was no difference in symptoms, QOL
  - Side effects were few, patient satisfaction scores were high in both groups
- Conclusion:
  - There was no difference between compression and control groups when comparing efficacy, side effects, satisfaction scores, symptoms, and QOL
Evidence
El-Sheikha et al.

- El-Sheikha et al. performed a systematic review of compression following treatment for varicose veins

Background
- Consensus regarding compression following treatment has not been reached. This systematic review aims to establish the optimal compression regimen after venous treatment


Evidence
El-Sheikha et al.

Methods:
- A systematic review of research databases was performed to identify randomized clinical trials investigating different compression strategies following treatment for superficial venous insufficiency

Evidence
El-Sheikha et al.

Results:
- Seven randomized clinical trials comparing different durations and methods of compression fulfilled the inclusion criteria
- Included open surgery, foam sclerotherapy, EVLA
- Quality of studies was variable
- Significant sources of potential bias
- The compression regimens were heterogeneous
Evidence
El–Sheikha et al.

- Conclusion:
  - There is currently little quality evidence upon which to base any recommendations concerning compression following treatment of varicose veins

Evidence
Compression Consensus Statement

- An evidence based consensus statement looking at indications for medical compression stockings in venous and lymphatic disorders was published in 2018 by the International Compression Club
- The aim of the consensus document is to provide up-to-date recommendations and evidence grading on the indications for treatment based on evidence accumulated during the past decade


Evidence
Compression Consensus Statement

- Methods:
  - A systematic literature review was conducted
  - Evidence extracted from the publications was graded initially by the panel members individually and then refined at the consensus meeting
- Results:
  - Based on the current evidence, 25 recommendations for chronic and acute venous disorders were made
- Conclusion:
  - The beneficial value of applying compression stockings in the treatment of venous and lymphatic disease is supported by this document
Consensus Statement

Recommendation 14
We suggest the use of MCS (medical compression stockings) after liquid sclerotherapy of C1 veins to achieve better outcomes.

While there is not enough evidence based research studying the efficacy of compression therapy after sclerotherapy, the majority of research that is available suggests that it does enhance the success of treatment.
Evidence

- We need more research on this subject with:
  - Consistent variables
  - Uniform methods
  - Consistent compression duration
  - Study replication
  - Randomized controlled studies

Practitioner’s Experience

- Even though there is not a wealth of literature to convince us to use compression after sclerotherapy, many practitioners strongly recommend it to their patients
- This recommendation may be based on personal clinical outcomes, as well as advice from experienced practitioners
- Use of compression and its therapy regimen and duration varies among practitioners

Conclusion

- Compression therapy is an accepted form of treatment for various issues related to lower extremity venous disease
- There is not much evidence based literature to show efficacy of compression therapy after sclerotherapy treatment
- Indeed, there is some research that concludes that compression does not make a difference in sclerotherapy outcomes
- However, Kern et al.’s and Weiss et al.’s randomized studies do show that compression therapy after sclerotherapy does enhance the success of the treatment
Conclusion

› The Compression Consensus Statement also recommends the use of compression therapy after sclerotherapy
› More research needs to be done in this area with standardized consistent variables and methods and replication to add validity to the results