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Compression Bulletin 11
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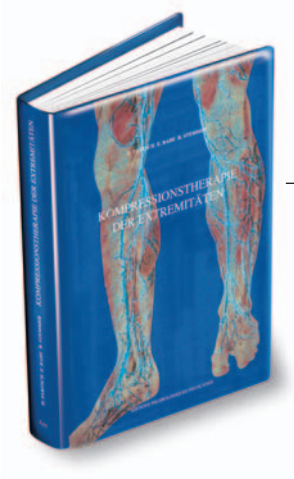
Robert Stemmer Library on Compression Therapy



Compression Therapy of the Extremities

This book, available in English, French and German, contains the most complete collection of compression references.

Continuous literature update

Scientific articles on compression therapy worldwide are collected and quoted on Internet **www.sigvaris.com**

Compression Bulletin

A selection of some interesting articles is extracted and discussed in the Compression Bulletin (available by fax or e-mail).
It is translated into following languages: Chinese, English, French, German, Italian, Japanese, Portuguese, Russian, Spanish, Turkish.

Table of contents:

Identical chapter-titles in the continuous literature update and in the Compression Bulletin

Special edition: DGP 2006 Rostock

Clarke M, Hopewell S, Juszczak E, Eisinga A, Kjeldstrøm M.

Compression stockings for preventing deep vein thrombosis in airline passengers.

Cochrane Database of Systematic Reviews 2006, Issue 2.

Background:
There is a possible link between prolonged air travel and venous thromboembolism. Wearing compression stockings might reduce this risk.

Aim:
To assess the benefits of wearing compression stockings among travellers on flights lasting at least four hours.

Methods:
Several registers, Medline, Embase and other literature sources were searched for randomized controlled trials comparing the effect of wearing compression stockings versus no stockings on flights lasting at least four hours. The most recent searches were done in January 2006.
Ten randomized trials (n = 2856) were included. One trial (Loew D, Gerlach HE, Altenkämper KH et al Phlebology

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1998;13(2): 64–7) reported on 35 passengers, another trial (Scurr JH, Machin SJ, Bailey-King et al. Lancet 2001; 357: 1485–9) on 200 passengers. All the other reports came from eight papers published by the group of Belcaro and co-workers, among them 2 Kendall, 2 Scholl and 2 Travenostudies. (The product names are quoted in the title). Seven trials included people judged to be at low or medium risk (n = 1548) and two included high risk passengers (n = 1273). All flights lasted at least seven hours.

Results:
From 2637 participants with follow-up data available fifty showed a DVT on Duplex examination without clinical symptoms. Three wore stockings, 47 did not (OR 0.10, 95% CI 0.04 to 0.25, P < 0.00001). No deaths, pulmonary embolism or symptomatic DVT's were reported. Six trials showed a significant reduction of leg oedema. No significant adverse effects were reported.

Conclusion:
Compression stockings are able to reduce the incidence of asymptomatic deep vein thrombosis and of leg oedema. Very large number of passengers would be needed to assess the outcome concerning symptomatic DVT, pulmonary embolism and death.

Comment:
This systematic review is based on data of which 92% came from one institution. Although these authors reported an incidence of proximal DVT up to 6% in control groups without prophylaxis, it is astonishing to note that among 2800 passengers no single symptomatic case was observed.
Other authors who performed Duplex investigations of the leg veins after long-haul flights in 964 passengers and in 1213 non-travelling control-subjects, all of them without any prophylaxis, reported a calf DVT in 2,1% of the passengers and in 0,8% of the controls. Seven passengers (0,7%) and 2 controls (0,2%) presented with DVT.
(Schwarz T, Siegert G, Oettler W, et al. Venous Thrombosis After Long-haul Flights. Arch Intern Med 2003;163: 2759–64)

Andreozzi GM, Cordova R, Scomparin MA, Martini R, D'Eri A, Andreozzi F:

Effects of elastic stockings on quality of life of patients with chronic venous insufficiency

Int Angiol 2005; 24: 32–329

Aim:
Even though compression therapy is the most recommended treatment for chronic venous insufficiency (CVI) in the national and international guidelines, its application, at least in Italy, is lower than the estimated need from the prevalence of CVI in the epidemiological studies. Since we believe that the measurement of the impact of compression therapy on quality of life (Qol) could improve the compliance for this precious treatment, we carried out this study on 50 patients with CVI.

Method:
50 patients (23 CEAP C2 and 27 C 3-4-5), selected (within a larger study on QoL in CVI) received a prescription for compression therapy. Before treatment and 4 months assessment. The score scales have been adjusted to poorest QoL as 0 and best QoL as 100.

Results:
Baseline QoL of patients in class C2 did not show significant difference with the healthy Italian Population, except fort he physical role item. The patients in C3-4-5 showed significant reduction of QoL. After 4 months all the items of the utilized instrument showed significant improvement in all CEAP-classes.

Summary:
The study unquestionably shows that the compression therapy improves the QoL of patients with CVI, and should be included in the CVI treatment covered by the Public National Health Insurance. Finally, the QoL measurement could be utilized as the scientific method to assess the effectiveness and efficiacy of different therapeutic devices.

Comment:
Aside of the effectiveness of compression therapy in indications like venous ulcers or venous oedema the improvement of quality of life (QoL) is a very important factor. In this study the significant improvement of QoL, measured with SF-36, could be demonstrated after four month of compression therapy in venous patients. It is important that this result could be demonstrated not only in early stages (C2) but also in chronic venous insufficiency (C3–C5).

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COMPRESSION **Bulletin 11**

Satpathy A, Hayes S, Dodds S.

Is compression bandaging accurate? The routine use of interface pressure measurements in compression bandaging of venous leg ulcers.

Phlebology 2006; 21: 36–40

Background:
The achievement of a target pressure of 35–40 mmHg indicated to treat venous leg ulcers depends on the technique of application and the experience of the staff practitioners.

Aim:
To test the use of a low-cost, portable, battery-powered sub-bandage pressure monitor as part of a quality control for compression bandaging in leg ulcer clinics.

Methods:
25 healthy volunteers providing 50 legs and 16 patients (22 limbs) were bandaged with a 4-layer compression bandage system. Sub-bandage pressure was measured by placing three small Kikuhime balloons (4×3 cm) to the following points: 2 cm above the medial malleolus, on the widest part of the calf and on a point midway between them. Measurements were done in the supine and in the standing position. In the patients the bandages were reapplied when the target pressure was not achieved in the first attempt. Prior to the use of the sensors calibration experiments were done on leg models and by immersing the pressure transducer underwater showing an excellent correlation between the pressure values obtained by the sensor and by a sphygmomanometer.

Results:
The pressure in the gaiter area was found to be higher than that in the ankle in both standing and supine position ($P < 0.05$). The mean values in the gaiter area were 43,5 in the standing and 41,5 mmHg in the supine position. At the ankle the corresponding values were 38,4 mmHg in the standing position and 32,3 mmHg in the supine position. The target pressure of 35–40 mmHg at the ankle was achieved in 36% of healthy limbs only and in 48% in the 22 legs of patients by experienced practitioners. By switching on the pressure monitors and reapplication of bandages the target pressure was achieved in more than 78% of limbs.

Conclusions:
Measurement of sub-bandage pressure is an excellent tool as part of the quality assurance in connection with treatment and also for training how to apply a compression bandage.

Comment:
The fact of higher pressure findings in the gaiter area than at the ankle, both in the supine and in the standing position, can mainly be explained by the different curvature of the leg at these measuring points. (Due to the law of Laplace the local pressure is indirect proportional to the radius of the leg segment.) As a practical consequence a consensus conference[1] recommended to measure interface pressure preferably at the segment that shows the most extensive enlargement of the leg during dorsiflexion or by standing up, which is about 8–12 cm above the inner malleolus.
Surprisingly the pressure difference between standing and supine, the so-called „Static stiffness index[1]" was higher in the ankle region (6,1) than in the gaiter area (2,0). These values are in the range of elastic, long-stretch material.
The study demonstrates nicely that about half of the bandages applied are „too loose" and come closer to the target range after reapplication under pressure-monitoring.

1 Partsch H, Clark M, Bassez S et al. Measurement of lower leg compression in vivo: Recommendations for the performance of measurements of interface pressure and stiffness. Dermatol Surg. 2006; 32: 229–38

Tan J, Lockhardt S, Smith A, Burnand K

Venous haemodynamic effects of anti-thromboembolism stockings

Phlebology 2006; 21: 74–79

Aim:
The aim of the study was to assess the hemodynamic changes in the deep veins of 13 volunteers, following application of 13 made-to-measure graduated compression stockings all designed to exert different compression gradients along the limb.

Method:
The compression gradients were designed to apply pressures from 12–22 mmHg at the ankle to 9–20 mmHg at the calf and 5–10 mmHg at the thigh. These had been laboratory tested by the Hosiery Pressure Tester Mark II (HATRA). A medical stocking tester (MST) was subsequently used to measure the actual pressure measurements on the volunteers. A duplex scanner was used to measure the venous velocity in the deep veins at predetermined sites.

Result:
The application of all stockings increased the mean velocity in the popliteal vein by 38,7% but produced only a slight statistically insignificant increase in velocity in the femoral vein. No particular stocking profile gave significantly better results. A good correlation was found between the MST and HATRA tester measurements of the stocking pressures at the ankle and calf, but the MST method usually recorded higher pressure for the thigh measurements.

Summary:
All profiles of graduated stockings appear to increase the velocity of blood in the deep veins above the knee, but only four pressure profiles produced significant increases in velocity. There was no evidence to suggest that any one specific compression profile was superior to others at increasing the venous velocity in the popliteal vein.

Comment:
This study shows the positive effect of graduated anti-thromboembolism stockings on the blood velocity in the deep veins in healthy volunteers. This is especially for the popliteal vein. This effect may be responsible for the thromboprophylactic effect of these stockings. The effect of the above knee stockings on the blood velocity in the proximal femoral vein was not significant. This may be due to the the low pressure exerted in the region. The question appears if below knee stockings would also be sufficient in thromboprophylaxis. None of the used pressure profiles was superior to others.

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