one Hertz, which is normal walking speed, we were able to calculate the dynamic stiffness index. With this model it has been proven that the dynamic stiffness index is dramatically higher than the static stiffness index of the same compression stocking. We also found that there is no correlation between a special type of knitwear or a special compression class and the amount of the dynamic stiffness index. So every elastic compression stocking has it's own inborn dynamic stiffness index.

To judge the effectiveness of medical elastic compression stockings it is also necessary to know this dynamic stiffness index and to add this to the other parameters in order to be able to prescribe the perfect elastic stockings for patients with phlebological diseases.

Measurement of the "static stiffness index"

H. Partsch
Medical University of Vienna, Vienna, Austria

Aim. The efficacy of compression therapy depends mainly on the exerted pressure and on the stiffness of the material. The aim of the study is to propose a simple method by which pressure and stiffness can be assessed in the individual patient.[1]

Methods. Using a pressure transducer the sub-bandage pressure is measured on the medial aspect of the lower leg at the transition of the gastrocnemius muscle into the Achilles- tendon. The pressure difference between active standing and lying is defined as the static stiffness index (SSI). The following compression bandages and stockings were applied to a total of 12 healthy legs from 10 volunteers:

Unna boot + short stretch, two short stretch, one long stretch, class III compression stocking flat knitted, class II compression stocking round knitted.

Results. The accuracy of the probe was tested by a blood pressure cuff connected to a mercury manometer. A mean percent deviation of 6% was seen. The coefficient of variation as a measure for precision was between 2.1% and 7.2%.

In the supine position the average pressure values of Unna boot, the double short stretch bandage and the long stretch bandage were in the same range between 55 and 60 mmHg. These values were statistically significantly higher than those of flat knitted class III and round knitted class II- compression stockings (30.6 + 8.2 mmHg and 25.5 + 4.1 mmHg respectively; P<0.001).

Unna boot bandages and multi-layer short stretch bandages show a significantly higher

SSI (23.8 + 11.1 and 28.3 + 10.6 mmHg) than long stretch bandages (5.1 + 4.1 mmHg) and round knitted class II stockings (3.2 + 2.8 mmHg), (P<0.001).

No statistically significant difference was found between the short stretch material and the flat knitted class III stockings(19.3 + 7 mmHg).

Conclusion. The static stiffness index is a simple parameter for the assessment of the elastic property of any compression system including the combination of different materials in multiple compression component kits in the individual leg. In future compression trials pressure and stiffness should be declared.

References

1. Partsch H. The static stiffness index: a simple method to assess the elastic property of compression material in vivo. Dermatol Surg 2005;31:625-30.

Changes of leg volume under different compression devices

G. Mosti, V. Mattaliano
M.D. Barbantini Clinic, Lucca Italy

Aim. The compression therapy effects are mainly due to two factors: the pressure exerted and the elasticity or the stiffness of the different bandages. The bandage stiffness is defined from the Comitè Europeen de Normalization as "the increase in pressure per 1 cm increase of leg circumference". The Static Siffness Index was proposed as stiffness index; it is calculated measuring subbandage pressure in supine and standing position at the point B1 of the calf; the calf circumference increase at this point is arbitrarily assumed 1 cm; ISS will be defined as the pressure difference between standing and supine position divided by one.

Methods. In 50 patients affected by chronic superficial venous insufficiency we measured the circumference in supine position and its change during foot dorsiflexion, in standing position and during tip toeing with strain gauge; the test was performed both in basal conditions (without any compression device) and after different bandage application (Dauerbinde K, Proguide, Rosidal Sys, Raucodur, Unna Boot); thereafter we calculated the Static Stiffness Index considering the real change of leg circumference. Dauerbinde K was applied on the leg with different technique (spiral, figure of 8, two bandages superimposed, at its maximum extensibility) in order to observe its possibile different stiffness depending on the application technique.

Results and conclusion. The leg circumference increases during all the test steps both in basal conditions and with compression devices; its increase is greater with elastic bandages (Dauerbinde K), indipendently from the application technique, than with stiff ones; Proguide has shown an intermediate behaviour. The Static Stiffness Index, calculated according to CEN stiffness definition, is £28 for elastic bandages and >28 for stiff ones. Other Stiffness Index (both during foot dorsiflexion and tip toeing) were calculated as well. Combining pressure and circumference measurements seems to improve the specificity of the Stiffness Indexes.

Improving cost efficacy for venous leg ulcer patient treatment

G. Mosti, A. Andriessen, M. Iabichella, A. Mattaliano, R. Polignano[1], M. Abel[2]
[1]Department of Cardiology and Angiology, Istituto Ortopedico Toscano (IOT), Italy; [2]Lohmann and Rauscher GmbH, Rengsdorf, Germany, [3]Andriessen Consultants, Malden, Netherlands

Aim. A clinical pathway (CP) and products (*Rosidal® sys, Suprasorb® A, Suprasorb® P and Suprasorb® C are products of Lohmann & Rauscher GmbH) for venous leg ulcers patients was tested, looking at clinical efficacy, quality of life and costs efficacy.

Methods. Clinical examination was performed, upon initial and at 2 week intervals for 12 weeks. The patients were then followed until ulcer closure. The study group (SG) received treatment with a short stretch compression system and a dressing, as defined in the CP. The control group (CG) received treatment (compression and wound dressing) as before implementing the CP. Statistic evaluation was performed using StatXact 5.0 – double sided – _ = 0,05 – paired sample with Wilcoxon-Test – unpaired with Mann-Whitney for N = 20 (10/10).

Results. After implementation of the CP, a statistically significant (P<0.005) shorter time for ulcer closure was demonstrated for SG when compared to previous treatment given to CG. 3/10 of the ulcers were closed within 12 weeks of treatment in the SG vs 3/10 in the CG. An improvement of quality of life was noted for SG (P<0.05 for the combined parameters and P<0.005 for pain), as well as cost savings (P<0.05). Treatment costs per patient for 12 weeks treatment for SG was 280,87 vs CG 630,02. Total cost per healed patient within the 12 weeks study period was for SG 262,40 vs. 400,40 for CG.

Conclusion. CP improved quality of treatment outcome, making cost effective use of resources and materials. The CP system was shown to be superior regarding speed of ulcer closure, quality of life and treatment costs per patient, when compared to the control group. Thirty patients from a second centre are to follow in a further analysis.

The study was supported by an educational grant of Lohmann & Rauscher GmbH.