An Innovative Compression System Providing Low, Sustained Resting Pressure and High, Efficient Working Pressure

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Materials and Methods

First, an elastic compression bandage (Lundatex® medical by PressCise) providing and maintaining a certain pressure level was applied on the leg. The bandage is based on Laplace’s law, where the pressure is a product of the force, times the overlap, times the curvature. The bandage is provided with visual guidelines for correct stretch per each turn and correct overlap. Due to the specific elastic properties in the material the force is adjusted to the changes in curvature when the guidelines are followed. This results in a well-defined pressure, with minimal variability. Several patches (PressPatch™ by PressCise AB) made in a hook and loop material and with an optimal shape, were attached over the elastic bandage, creating a multicomponent compression system (Lundatex® system by PressCise AB). The patches adhere directly to the bandage material without any force being added; hence there is no increase of resting pressure. In the front of the leg a special patch was added (FixPatch™ by PressCise AB). This patch can be opened easily e.g. every morning, in order to maintain the pressure level over time. In one pilot-study interface pressures were measured on point B1 and C on patients with severe venous reflux in the great saphenous vein (CEAP C2-C5), during lying and standing (n=18). Three consecutive measurements were done: 1) the elastic bandage applied to the leg with a pressure of 20 mmHg, 2) the elastic bandage applied to the leg with a pressure of 30 mmHg and 3) after attaching the stiff patches to the elastic bandage. In a second pilot-study the pressure was measured on one healthy volunteer at B1, over seven days. Measurements were taken in supine, at dorsal flex and standing position, twice a day. The pressure-measuring device used was PicoPress® (by Microlab Italia).

Results

The elastic bandage provides a well-defined pressure, independent of placement or position. The patches add the stiffness to the underlying material and increase only the working pressure. With the patches, resting pressure is close to the same pressure as before, however working pressure increases significantly. As expected, there were a significant drop of working pressure in the evening day one in the 2nd pilot-study, due to some oedema reduction. The correction of the FixPatch™
Conclusions

The presented device is of considerable practical interest in order to achieve a quantified compression treatment. It may also be especially essential for those patients who should have a low controlled resting pressure, as e.g. patients with mixed arterial venous disease and for whom hemodynamically active pressures are desirable as soon the patient is active. The easy way to maintain the pressure level over time may also be of great benefit for self-management.

References