

The Effect of Habitually Incorrect Usage of Elastic Stockings on Resting and Working Pressures

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Abstract

Background: Elastic stockings constitute one of the most important forms of treatment of lymphovenous diseases, but their use requires special attention. **Aim:** The objective of the current study was to evaluate the effect on the treatment of common mistakes, such as folds and creases during the use of these stockings. **Method:** Twenty evaluations were performed with 10 randomized volunteers including students and patients who used 20/30 mmHg elastic stockings. Three of them were men and seven were women with ages that ranged between 22 and 56 years old and a mean age of 42 years old. Creases and folds were artificially created in elastic stockings of different brands of stockings used by these individuals. Variations of static and dynamic pressures were measured before and after the creation of the creases and folds. An apparatus that uses a balloon catheter connected to a sensor and records pressure variations at half-second intervals was employed. **Results:** The creases and folds created either when dressing the stocking or during its use increase the resting and working pressures in the region of the irregularity. **Conclusion:** In conclusion, it is essential to give good guidance to patients about the correct use of stockings without creases or folds, as well as showing the effects of their incorrect usage.

Key words: Elastic stockings, dressing, complications.

Introduction

Compression is a treatment method which, applied to the body surface, exerts a pressure by means of elastic or inelastic material on the enveloped tissues. The resting pressure is conferred by the compression of tissues and the working pressure is a result of muscle activities on contention¹. Elastic stockings maintain a constant pressure on the limb and so muscle activity causes changes in the pressure, the working pressure². Elastic stockings are designed with the exerted pressure decreasing from the distal to proximal limits thereby favoring lymphovenous return.

Recent Publications have reported that elastic stockings improve the hemodynamics of venous return during walking and that the habitual use of Class 1 elastic compression (10 to 15 mmHg) for a period of only 15

days is sufficient to provide a significant improvement of the symptoms and in the overall discomfort caused by pain, thereby improving the quality of life of patients^{3,4}.

Over the long term, elastic compression stockings may even prevent post-thrombotic syndrome in patients with deep venous thrombosis (DVT)⁵⁻⁷.

On the other hand, there are warnings that signs and symptoms may not improve with the use of elastic stockings during exercising in patients suffering from deep venous thrombosis.

Nowadays elastic stockings are indicated for a wide range of diseases in the clinical practice however their utilization demands care by the doctor when prescribing and by the patient whilst wearing.

The aim of this study was to evaluate the interference of irregularities, such as the formation of creases and folds, during the use of elastic stockings.

Method

Twenty evaluations were performed with 10 randomized volunteers including students and patients who used 20/30 mmHg elastic stockings. Three of them were men and seven were women with ages that ranged between 22 and 56 years old and a mean age of 42 years old. Irregularities were created in the stockings including creases and folds as illustrated in Figures 1 and 2. The resting and working (dynamic) pressures were evaluated. To assess pressure changes caused by these irregularities, an apparatus manufactured using a balloon catheter connected to a sensor that measures the pressure at half-second intervals and stores the data, designed at Braille Biomédica in São José do Rio Preto, Brazil, was utilized. For statistical analysis minimum and maximum pressures and the mean pressure were considered.

Figure 1. A fold in the stocking.



Results

The mean variations of pressures when the limb was motionless were 4 mmHg when there were creases in the elastic stockings and 9 mmHg when there were folds.

A fold in the stocking did not double the initial pressure as would be expected (Figure 3 and 4) in any of the evaluations. The working pressure is affected by creases or folds.

Creases generate minor variations (Figure 5), which vary from 13 to 31 mmHg, but folds generate much greater variations (Figure 6) of from 20 to 53 mmHg.

Thus, creases and folds can interfere both in resting and working pressures when using elastic stockings, highlighting the necessity to consider the fitting of stockings and their correct use.

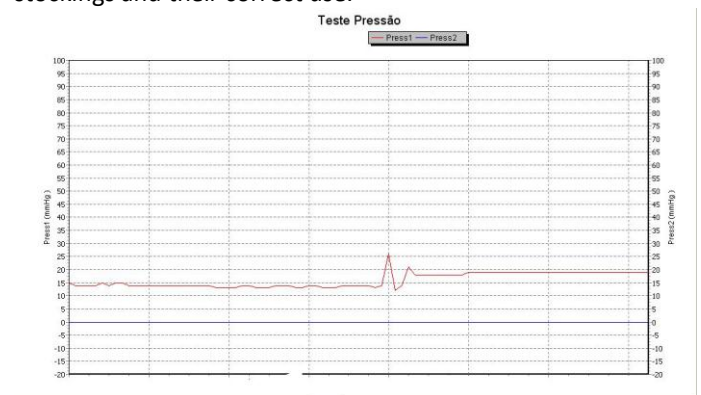


Figure 3. Illustrates variations in the resting pressures in a static study when a crease is created in the stocking, the red trace. The pressure increases from 14 mmHg to 19 mmHg.

Figure 2. A crease in the stocking

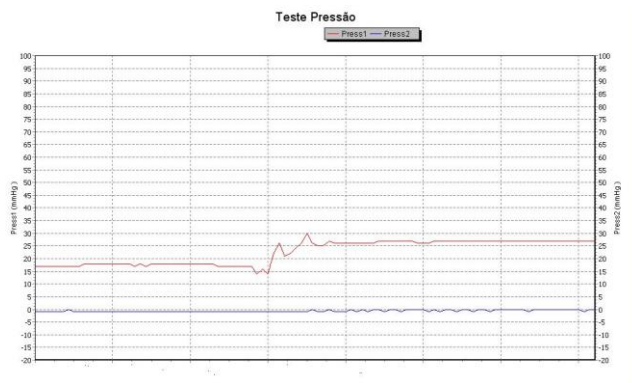


Figure 4. Illustrates pressure variations in a static study when the stocking is folded, the red trace. The pressure increases from 18 mmHg to 27 mmHg.

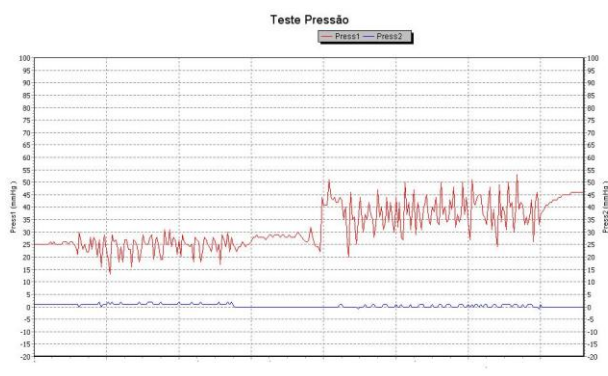


Figure 5. Illustrates pressure variations in a dynamic study when walking without any folds in the stocking giving pressure variations of from 13 to 31 mmHg. After a fold is created, the pressure variations produced are from 20 to 53 mmHg.

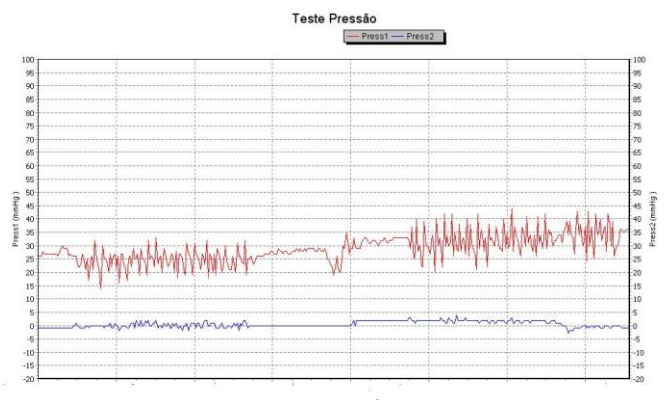


Figure 6. Illustrates resting pressures during walking and resting. Then a crease is created and a new evaluation was performed with the individual walking showing an increase in the pressure variations

Discussion

Elastic stockings constitute an important form of clinical treatment for patients with venous diseases. The current study shows the precautions which are essential when using stockings for the treatment to be effective. Vicious habits such as folds and creases are frequently observed and generally used to adapt stockings with incorrect sizes. Another aspect observed was those stockings exerting greater pressures cause larger pressure variations when these irregularities occur. Sometimes when the stockings are larger than recommended, the patient tries to adapt the size by folding the stocking. Thus, assessing the use of stockings is very important. This study shows that the working pressures are affected when this type of irregularity is used; even small irregularities such as creases may significantly interfere with the working pressures. No studies investigating these aspects were identified in the Medline, Scopus, ISI and Scielo databases, even though knowledge of the effect of folds and creases is essential in the guidance of patients. Correcting these irregularities may improve the results of treatment and acceptance of treatment by patients using stockings.

Conclusion

Irregularities when wearing elastic stockings interfere both in the resting and working pressures and so caution with the size of these stockings and with their correct usage is essential.

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