Graduated External Compression and the Prevention of Deep Vein Thrombosis

Stephen Thomas B. Pharm., Ph.D., M.R.Pharm.S.
Nicole Toyick H.N.C. (App. Biol.)
Bruce Fisher B.Sc., Pharm., M.R.Pharm.S.

Surgical Materials Testing Laboratory, Princess of Wales Hospital Bridgend.
SMTL, Bridgend 2000

CONCLUSIONS AND RECOMMENDATIONS

The proposed design criteria for an antiembolism stocking based upon a review of the literature are shown on Page 24.

Essentially these suggest that the ideal stocking should produce graduated compression with a target value over the calf region of approximately 14-15mmHg.

These pressure values should be achieved consistently by each brand of stocking on legs of different lengths and girths. The construction of each stocking should also be such that application to a limb a little larger or smaller than the nominal size should not result in major variations in the resultant pressure. This size-related variation in pressure is termed ‚stiffness' and this can be an important parameter when selecting stockings for clinical use. A brand with a low stiffness value will accommodate small errors in limb measurement of changes in limb circumference with little effect upon the pressure applied. A stocking with a high stiffness value, however, will be less forgiving and will require more accurate measurement of the limb and a larger range of stocking sizes in order to consistently achieve the required levels of graduated compression.

The results of the current investigation suggest that when tested in the manner described, the six stockings examined varied considerably in their ability to meet these basic requirements. It is completely possible, however, that all the stockings may actually comply with the much lower and potentially ineffective compression requirements of BS 7672 which permits a stocking to produce a pressure as low as 8 mmHg at the calf, (see page 25).

It must be emphasised that although the pressure equipment used in this study was that described in the British Standard for antiembolism stockings, because of differences in methodology, the results obtained cannot be used to determine compliance or otherwise of a particular brand of stocking with BS 7672.

The decision to set aside the advice on pressure profiles contained within the British Standard has not been taken lightly but only after careful consideration of the results of clinical studies and investigations contained within the literature review. It seems to us unacceptable that a brand of stocking that produces a pressure as low as 8 mmHg pressure on the calf meets the requirement of the standard when pressures of 14-15 mmHg have been shown necessary to produce a significant reduction in venous stasis.

A brief summary of the performance of the different stockings examined is shown overleaf. We strongly urge, however, that all potential purchasers or users of antiembolism stockings consider for themselves the results of this laboratory investigation in the light of the findings and recommendations of the literature review. It is our opinion that stockings that provide the higher levels of compression recommended by Sigel and Sparrow are likely to prove more effective in reducing stasis and therefore the formation of a DVT than those that produce significantly lower pressures but others may hold different views. Whatever level of pressure is considered appropriate, however, a stocking should be selected that delivers this chosen value across the full range of sizes. Large variations in pressure produced by different sizes of the same brand should not be considered acceptable.

TED (Kendall)
Both calf and ankle pressures very variable across the range of leg sizes ranging from 9-19 mmHg at the ankle and 9-13 at the calf. Reversed pressure gradients also noted. Stiffness results very poor.

Thrombexin (Medi UK Ltd)
Very consistent pressure values across the range of leg formers, good graduation and generally very good stiffness values.

Final Conclusions

In summary, the Thrombexin stockings performed best in the study, followed by Credalast and Brevet Tx.

Prevent stockings also produced consistent results although these were marginally outside the limits at the ankle region.

The performance of the Anti-EM and TED stockings left much to be desired in terms of their graduated compression profiles and stiffness values.

References: Thomas S. et al. Graduated external compression and the prevention of deep vein thrombosis. Surgical Materials Testing Laboratory, Bridgend 2000. Page 41 + 42