



# Technical Brief

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## Managing Residual Limbs with Elastic Stockinette ----- by Yeongchi Wu, M.D., Prosthetist

Proper management of residual limbs improves the functional performance of the prosthesis. At Northwestern University Medical Center, Chicago, we have routinely used elastic stockinette for care of all residual limbs without bony prominence. This article describes the use of elastic stockinette for residual limb with no bony prominence. The residual limbs after transtibial or Syme's amputations are managed with removable rigid dressings, which will be described later.

### Elastic stockinette

Elastic stockinette is commercially available in the U.S.A. and Europe (Compresso-grip, by KNIT-RITE Co., 1-800-823-3094, or Tubigrip, 1-800-253-0684). It comes in rolls of various widths and can be cut in any length for any shape of residual limbs. In the low-income countries, with minimal set up of a knitting machine, production of elastic stockinette can be made locally.

Elastic stockinette can easily be stretched onto the residual limbs. The degree of compression is dependent upon how much it is stretched and how many layers are applied. Desired gradient pressure can be achieved by applying layers of elastic stockinette with various lengths. In order to avoid excessive pressure, the elastic stockinette is added gradually. Monitoring of pressure over bony prominence and distal circulation should be done frequently. Layers and various lengths of elastic stockinette can be used to control leg edema (Fig. 1).

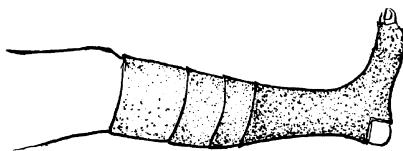


Figure 1, Layers of elastic stockinette, 10cm wide with various lengths and 2-3cm cut over the heel, can be used to achieve desirable gradient pressure and reduction of swelling.

### Shoulder disarticulation

Patients with shoulder disarticulation use elastic stockinette, 20 to 30 cm wide, to cover surgical area (Fig. 2, left). Double the stockinette or add more layers of stockinette to achieve necessary compression.

### Transhumeral and transradial amputation

Patients with transhumeral or transradial amputation use elastic stockinette, 10cm wide, by applying it proximal to the end of residual limb. The distal end is then twisted and folded upward (Fig. 2, right).

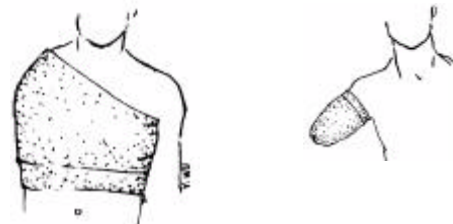


Figure 2, Elastic stockinette, 20-30cm wide, is used for patients with shoulder disarticulation (left) and transhumeral amputation (right).

### Hip disarticulation or hemi-pelvectomy

The surgical wound following hip disarticulation or hemi-pelvectomy is covered with elastic stockinette, 20 to 30cm wide, around the stump and the waist. The distal end is then twisted and folded upward to the waist, leaving two layers over the surgical area. Another layer can be added for more compression (Fig. 3). With this technique, a gradient pressure over the operated area is far more effective than that of the elastic bandaging. From our experience, support of the soft tissue by the elastic stockinette reduces downward pulling and thus minimizes the intensity of stump pain.

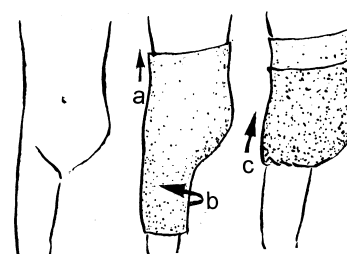


Figure 3, Elastic stockinette for hip disarticulation or hemi-pelvectomy. First, pull the elastic stockinette, 25-30cm wide for most adult patients, over to the waistline (a), then twist the distal end (b), and finally fold it back over to the waist (c). Another, shorter elastic stockinette can be added for more distal compression.

### Transfemoral amputation

Stump wrapping with elastic bandage, used for many decades and still described in recent books, is a complicated technique and requires reapplication at regular intervals.

A simple method using elastic stockinette can be easily applied after transfemoral amputation. A 20cm wide elastic stockinette with a 15cm longitudinal cut medially is pulled to waist level. The proximal end of the elastic stockinette is tied around the waist and the distal end is cut to proper length, twisted, and rolled back up to the thigh proximally. If more distal pressure is needed, additional layers of shorter elastic stockinette can be applied (Fig. 4).

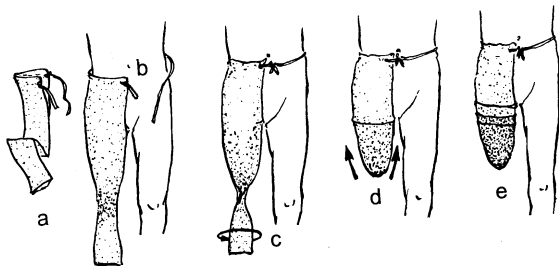


Figure 4, Elastic stockinette is used for patients with transfemoral amputation. Bring the stockinette with longitudinal cut (a) to the groin and secure it in place with a waist belt (b), twist the distal end (c), then fold it upward (d). Add more layers for more compression as needed (e).

### Through-the-Knee Amputation

The residual limb following knee disarticulation can be managed initially with a non-removable plaster cast and followed either by a removable rigid dressing as used in transtibial amputation or by elastic stockinette (Fig. 5). Rigid dressing, non-removable or removable, is preferred for stump protection.

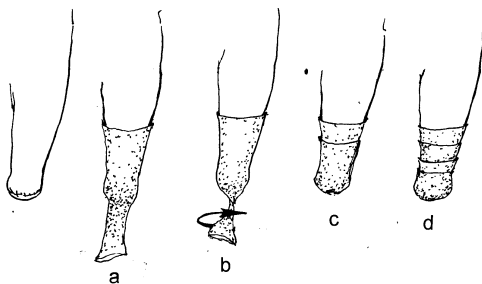


Figure 5, Elastic stockinette for through-the-knee amputation or any bulbous residual limb. Stretch and pull the elastic stockinette over the residual limb (a) twist the distal end of the stockinette about one third of a turn (b), and stretch it over to the residual limb (c). Other shorter elastic stockinettes can be added the same way (d) to increase the compression on the distal portion of the residual limb. Make sure not to cause excessive pressure over the bony prominence.

### Transtibial and Syme's amputations

The residual limbs from transtibial and Syme's amputations always need special care of the bony prominence. Pressure sores are often seen over the tibial tubercle and crest when elastic bandaging is used. To avoid this skin complication, the removable rigid dressing is preferred. A detailed description of fabrication and application of removable rigid dressing will be done in a future issue.

### Conclusion

If you are still using elastic bandaging for managing residual limbs, you may find the techniques described here simpler and more effective. Again, when managing transtibial and Syme's amputation, the removable rigid dressing is preferred.

### References

1. Wu Y. Post-surgical and early management of lower limbs amputations. In: Proceedings of 7th World Congress of the International Society for Prosthetics and Orthotics, 1992:454.
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**About the Author:** Dr. Yeongchi Wu, Director of Research, RERC and Associate Professor of the Department of Physical Medicine and Rehabilitation, for many years served as Director of the Amputee Program at the Rehabilitation Institute of Chicago and Veterans Administration Lakeside Medical Center Chicago. Dr Wu has written and lectured on the topic of postoperative and preprosthetic management for lower extremity amputations.

A video entitled "Postoperative and preprosthetic management of residual limbs" is available, in English, through the office of the Center for International Rehabilitation, 351 E. Huron, Suite 225, Chicago, IL 60611, U.S.A.

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