



There are a variety of conditions of the lower limb that can be successfully treated with the use of compression garments, and there has been remarkable progress in the manufacturing, quality, and effectiveness of these products in recent years. In fact, the untrained individual would be hard pressed to tell the difference between regular hosiery and medical compression stockings.

Compression therapy: Treating venous disorders

The human circulatory system is a pathway of arteries, capillaries and veins that is responsible for supplying the body with oxygen and nutrients. It is also required for the elimination of waste product, and the storage of blood reserves. Veins are the pathways for these vital functions. In the lower extremities, the body must battle gravity as it attempts to return blood cells and waste product to the heart and lungs to be metabolized. When this system of venous return is compromised, the result can be a one of a number of conditions termed venous disorders.

A healthy venous pathway contains three groups of veins. Superficial veins are closest to the surface, perforating veins pass through tissues, and link with the deep veins, which are responsible for moving the blood up to the trunk of the body. Each of these veins contains valves that are designed to prevent backward flow of blood on its way back to the heart. When these valves fail to function, a collection – or pooling – of blood can occur. If this condition continues over a

period, the elasticity of the vein is compromised, and an ever-increasing amount of metabolic waste product can accumulate.

The accumulation can cause painful congestion, edemas, inflammation, and leg ulcers. The body is designed with a built-in pump to aid in the return of blood up the pathway to the heart. The muscle pump increases pressure around the veins of the legs, and combines with the functioning venous valves to force the blood upward through the veins. Contraction of the musculature of the legs through walking, postural change, and static contraction causes the pressure on deep veins to increase, squeezing the blood upward through the system. As the contraction ceases, a negative pressure occurs in these vessels, pulling blood from the superficial veins into the deep veins.

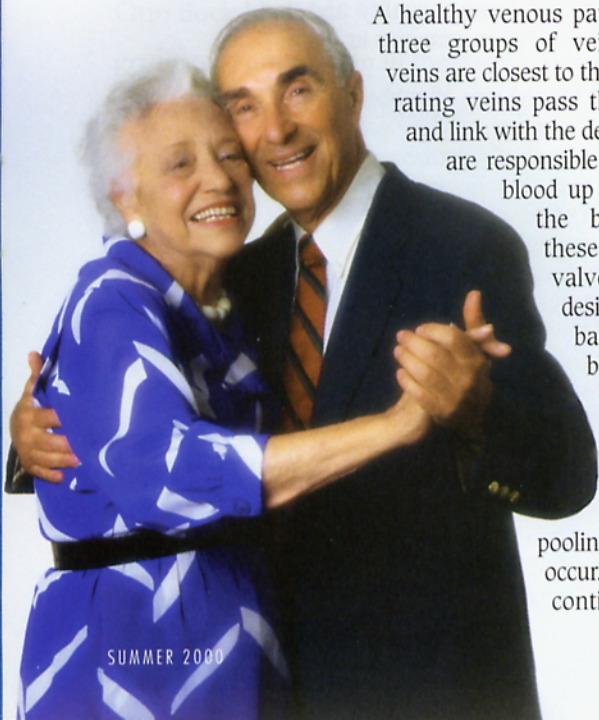
Varicosity, thromboses and ulceration

Venous disorders can be caused by a number of factors, including heredity, obesity, hormonal influences, or a lack of motion in the lower limbs. How these factors affect the venous return system are dependent on the individual. A compromise in the venous valves of superficial veins can cause a pooling of blood and distension of the vein commonly referred to as a varicosity. Varicosities can occur as a primary or secondary reaction. Primary varicosity occurs from a failure of the valve of a saphenous vein, and permeates downward. As the valves of these main veins fail, the increased volume of fluid being

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A Certified Pedorthist is an individual who is trained in the manufacturing, fitting and modification of foot appliances and footwear for the purposes of alleviating painful or debilitating conditions and providing assistance for abnormalities or limited actions of the lower limb.



The most commonly used and successful form of compression therapy are medical compression stockings.

dealt with strains the valves of smaller veins further down the system. Indications of this failure can be seen at an early age, and if ignored the cumulative effects can be quite debilitating. Secondary varicose veins are the result of failure of a perforating vein, causing the higher pressure deep veins to vent some of that pressure backwards into a superficial vein. This varicosity progresses in a bottom up fashion.

Deep venous insufficiency can also be present. Partially incompetent deep vessels will cause a slowing in the draining of the lower limb and can effect the perforators initially, followed by the superficial veins, and then result in telltale skin changes. A thrombosis, or complete blockage within a deep vein, can effectively cease the movement of blood through a deep vein, resulting in stasis. No amount of muscular contraction will eliminate this stasis. Deep vein thrombosis (DVT) is a very serious matter. Thromboses low in the venous return system can lead to ulceration in the compromised area. Higher up in the system, towards the thigh, a thrombosis will cause all of the signs of chronic venous insufficiency throughout the entire leg. A thrombosis higher into the pelvis region will often result in the swelling of the limb and some skin changes.

The use of compression therapy

Compression therapy can be divided into three categories. The first two are compression bandaging, and pneumatic devices. While bandaging is the oldest form of compression treatment, various techniques and material affect the success and goal of the treatment. Pneumatic devices are a newer treatment, with use confined mainly to clinical settings. The use of pneumatic devices is currently being studied for effectiveness.

The most commonly used and successful



TABLE 1

Classification of medical compression stockings

Class I:

Feelings of tiredness and heaviness in the legs; mild varicosities without any significant tendency to edema formation; early varicosis of pregnancy.

Class II:

More severe symptoms; marked varicosities; moderate edema; more pronounced varicosis in pregnancy; mild post-traumatic swelling; after healing of minor ulcerations; after superficial thrombophlebitis; after sclerosant treatment and operations on varicose veins.

Class III:

All serious sequelae of chronic (post-thrombotic) venous insufficiency; marked edema formation; white atrophy; induration of the skin; following healing of ulcers of the lower leg.

Class IV:

More severe degrees of class III, lymphedema

form of compression therapy is the use of medical compression stockings. These medical aids are the easiest to use of all the conservative treatments for venous insufficiency.

The use of compression as a medical treatment dates back to the time of the Egyptians; however, there has been a remarkable step forward in the manufacturing, quality and effectiveness of compression garments in the last few centuries.

As early as 1820, the use of rubber leg-gings for the treatment of leg pain is documented. While these garments were moderately effective, they became stiff and brittle, and would cause damage to the skin of the wearer. Improvements in the use of rubber were later completed by Charles Goodyear, allowing rubber garments to evolve over the next two decades. Vulcanization of rubber was later developed, and the ability to cut this rubber into thin strands allowed it to be incorporated into textiles.

The term elastic surgical stockings was introduced in 1861 by William Savile, when the ability to contour the rubberized yarn, allowing compression of various shapes of legs. Modifications and improvements in the hand-knitting frame advanced the design

**TIRED HEAVY LEGS?
 ACHING LEGS?
 SWELLING?
 SPIDER VEINS?
 VARICOSE VEINS?**

All of these complaints could be signs of venous insufficiency consider the natural alternative...



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and function of the garments over time. Eventually the development of the flat knitting machine allowed a finer seam and textile development into the 1920's meant finer elastic yarns. Rubberless elastic stockings were also gaining fame around this time, with unique seamless stitching techniques being used. It was the discovery of elastomers in the 1960's that began the techniques and styles still present in today's compression garments.

Today, garment manufactures are getting to a point that the untrained individual would be hard pressed to tell the difference between regular hosiery and medical compression stockings.

In the early days, medical compression stockings had numerous detractors. Complaints of bulkiness, difficulties in putting them on, and cost were common. Finally, physicians, manufacturers, orthopaedic technicians, and textile engineers got together to devise a classification system based on the severity of the patient's condition. This was devised to raise the level of professionalism in the industry, and to standardize the treatment given to the patient. To this day, the Quality Seal Association for Medical Compression Stockings is recognized as the classification determinant for these products.

A system of classification

Classification of medical compression stockings is now standardized throughout the world. While each manufacturer uses a variety of textiles, the actual compression is standardized into the following classifications, related to specific symptoms and diagnoses (see Table 1).

An understanding of the classification of stockings is paramount. The style or configuration of the garment is also very important. Medical compression stockings are graduated, meaning that the highest amount of compression is at the ankle, and progressively decreases as you move up the leg. Depending on the type of venous insufficiency, and the level at which it occurs, specific lengths are required.

Prescribing and fitting

The prescribing of medical compression stockings is done by a competent physician who is educated in their use.

The fitting of medical compression stockings is performed by a "certified fitter", an individual that has completed course work on the fit, function, and design of the product. With knowledge, well-designed techniques and tools supplied by the manufacturer and experience, comfort in fitting can easily be achieved. Knowledge of landmarks, underlying anatomy, and the reason for the use of a particular class of style of garment not only makes the job of the fitter easier, it demonstrates a level of professionalism and competency with the client.

Stocking manufacturers are generally committed to educating physicians and health professionals and can be contacted for information and educational material, programs etc.

If you have questions regarding the use of medical compression stockings, contact your local stocking company representative. ■



References available on request.