Getting started with compression therapy

An introduction to the treatment of venous disease

medi. I feel better.

The prelude to successful compression therapy

As the global leader in medical compression therapy, we at medi® feel it is important for our customers to understand the underlying principles behind the use of our compression products prior to prescribing, dispensing or wearing. When people understand the “why” treatment success with medi products is increased.

Venous disease impacts 20% of the population at some point in their lifetime. It is a progressive disease that escalates over time when left untreated. In this piece, you will learn about the venous system, venous disease itself, how to identify symptoms, and the treatment options including compression therapy.

my first compression stocking

The circulatory system

The circulatory system in the lower extremity is comprised of the arterial system that delivers nutrient and oxygen rich blood to the tissues through the arteries and capillaries. The venous system is made up of a network of veins that have the distinctive function to return blood back to the heart for re-oxygenating and refueling.

Superficial veins

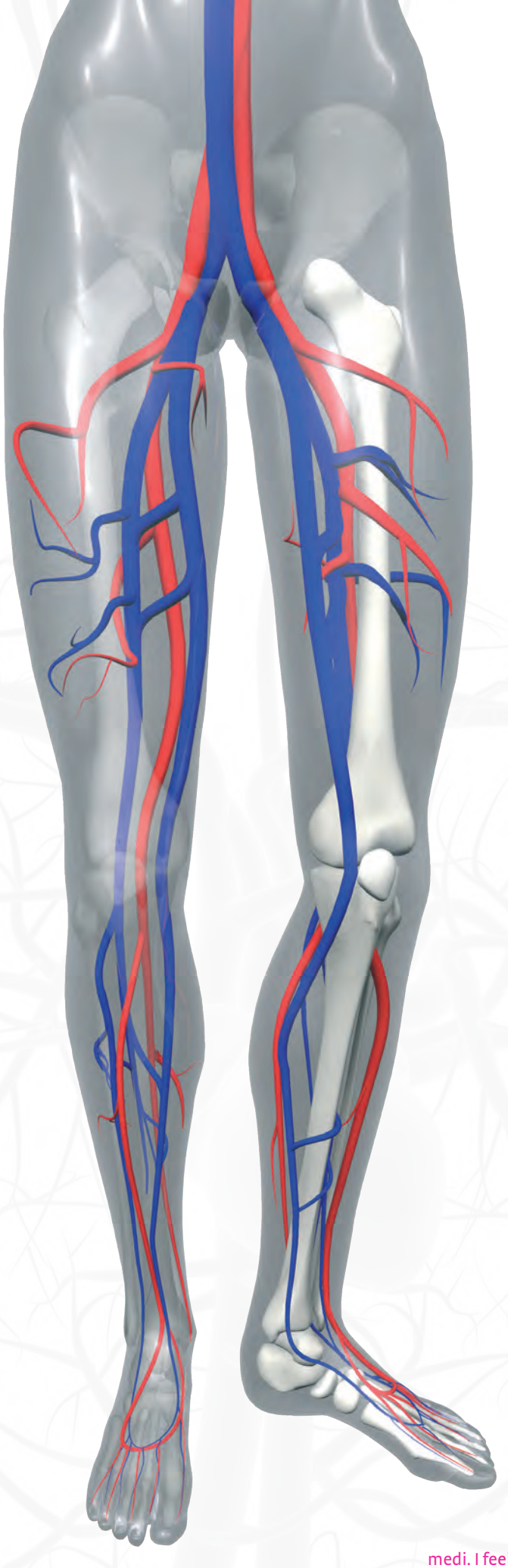
The ***superficial veins*** are visible just below the surface of the skin. The longest and largest of these veins, called the ***great saphenous vein***, is connected to the ***femoral vein*** and courses down the medial (inner) aspect of the thigh and leg. The ***smaller saphenous vein*** begins behind the knee and runs down the posterior (back) of the calf. Like the great saphenous, it has branches that extend under the skin in several directions.

Deep veins

Greatest percentage of blood from ***deep veins*** are veins that run deep inside your leg muscles. These veins carry the greatest of blood from your legs to your heart.

Perforating veins

Perforating veins connect the superficial veins and the deep veins. Because the blood flows faster through the deep veins, the blood in the superficial veins is pulled and emptied into the deep veins.



how do veins work?

Valves

Valves play a critical role in helping blood flow through the veins to the heart. Like swinging doors, valves float open to allow blood to flow toward the heart and flap closed again to prevent the flow of blood back down the extremities. Vein walls are made up of elastic fibers that are supported by a muscular layer that can become overstretched, or dilated, that prevent the valves from closing completely. The result of this incompetent valve is called venous reflux, or the "back flow" of blood. This insufficiency can cause symptoms of swelling, pain, itching, burning, skin discoloration, and even leg ulceration.

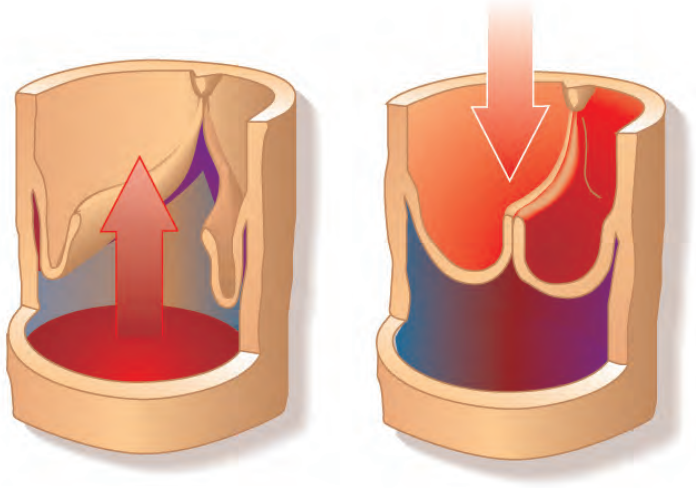
The role of gravity and vein disease

To understand this problem, think of a city water tower. More specifically, the taller the tower, the greater the water pressure that it creates. A vein follows the same principles. Think of the veins and arteries in the body as "columns" of blood. When standing, the columns of blood are at their tallest. Without considering any factors other than gravity, the pressure inside the veins of the leg, at the ankle, of a 5'10" individual while standing would be approximately 80 to 100 mmHg. When lying down, the pressure inside the same veins, at the ankle, would only be about 10 mmHg. The increased pressure inside the veins while standing decreases the normal return of fluid from the tissues into the circulatory system. That is why standing causes swelling of the feet and ankles.

Creating blood flow with calf pump

The flexion and extension of the calf muscle initiates blood flow back to the heart for replenishment. This action compressed the vein walls that pushed the blood through the vessels. With repetition, the blood essentially climbs back to the heart through the support of the valves.

This is why it is recommended to not sit for long periods at work, school, or during travel. The continuous movement allows the blood to recirculate preventing pooling that may lead to clots, or thrombi. People with compromised conditions, or if they are inactive for long periods of time, can develop Deep Vein Thrombosis, which can be dangerous and even life-threatening.



Open venous valve *Closed venous valve*

Contributing Factors	Everyday Causes
Impedes the upward flow of blood from the legs.	• tight clothing • pregnancy • sports involving stomach pressure and heavy lifting • chronic coughing or constipation (straining causes strong backward pressure in the leg veins) • prolonged sitting or crossing of the legs • obesity
Relaxes the wall of the veins.	• hormones (birth control medications, menopausal hormones, pregnancy) • alcohol • heat
Impedes or eliminates the muscle-pumping action.	• standing or sitting for prolonged periods • high heels • paralysis

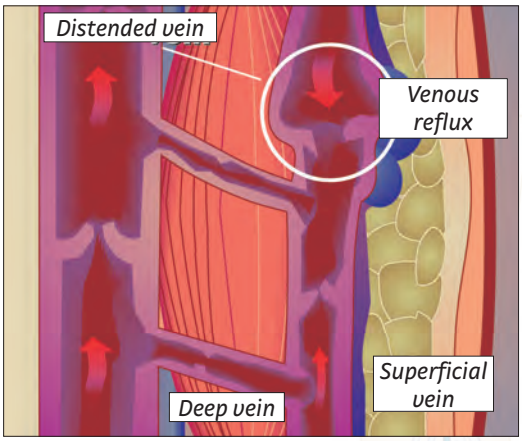
Main contributing factors involved in the development of vein disease, excluding genetics.

Venous disease conditions

Varicose veins

The word *varicose* is a medical term used to describe unnaturally and permanently distended veins. These veins will never regain their natural elasticity, which makes them unable to transport the blood properly.

Varicose veins may not cause any symptoms at all. When they do, the symptoms are usually limited to mild aching, a feeling of heaviness, or leg cramps. However, vein disease is progressive in nature and if symptoms are left untreated, veins can become irreversibly damaged.



Chronic Venous Insufficiency

Chronic Venous Insufficiency (CVI) is defined as an inability to pump venous blood back toward the heart. This usually indicates major defects in the deep veins. With CVI, the vein walls can become permeable, allowing blood to pool in surrounding leg tissue, which can cause skin discoloration, open sores called ulcers, and blood clots.

A clot may cause immediate swelling of the leg because the major mechanism to transport blood out of the leg is blocked. When the clot is at least partially resolved, more normal blood flow is restored, and the swelling subsides, but the damage may have been done. Where there was a clot, the valves in the deep veins may have been destroyed. If so, blood will accumulate in the deep veins, increasing pressure at each lower level. Veins may be damaged from the original thrombophlebitis or from the constant exposure of the perforator veins to the high pressure in the deep veins. That affects the superficial veins, and it also allows venous blood to accumulate under high pressure in the outer tissues of the leg.

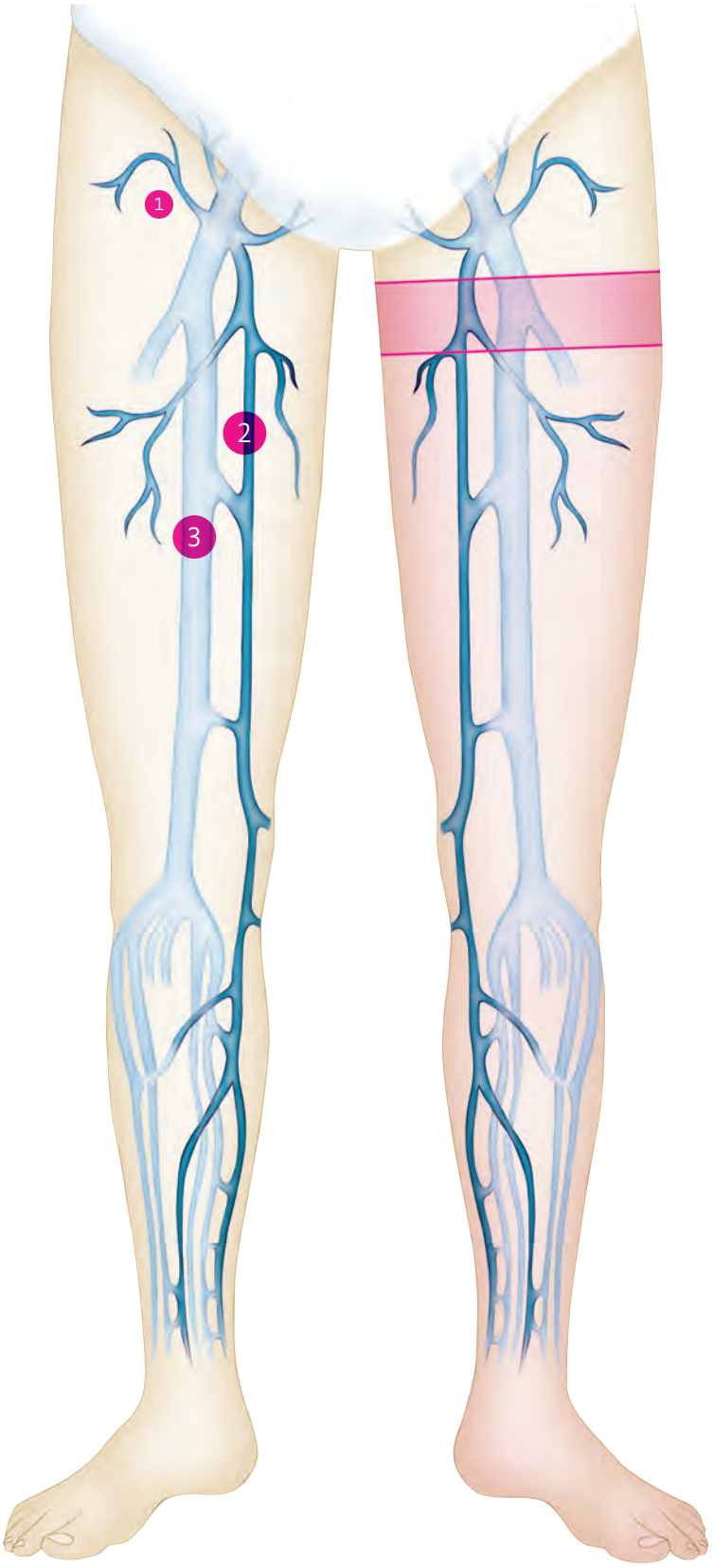
The result

Even a mild case of vein disease can affect your overall health. Because your blood flow is less efficient than before, it's harder for blood to be re-oxygenated and re-circulated. Cells throughout your body may not receive the oxygen and nourishment they need. As a result, vein disease can rob you of the energy you need for everyday activities. So, if you've been wondering why your legs hurt or your ankles swell, or you just don't seem to have any get-up-and-go lately, vein disease may be the reason.

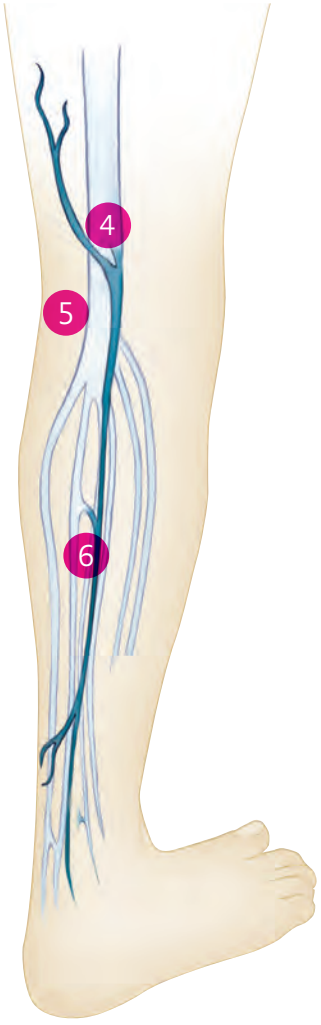
Diagnosing vein disease

It may be easy to see if a person has varicose veins, but it is not so simple to determine the state of the underlying deep venous system. This is important in terms of management and treatment. Please consult your doctor if you have any questions or visit www.mediusa.com to find a physician provider near you.

In simplified terms - Your venous system



Front view



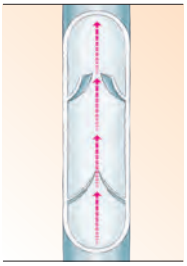
Back view

Superficial venous system

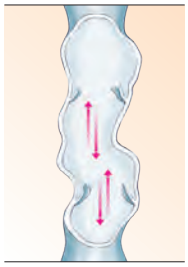
Deep venous system

1. Arch of the saphenous vein (“Magna-Krosse”)
2. Great saphenous vein (Vena saphena magna)
3. Femoral vein (Vena femoralis)
4. Confluence of the short saphenous vein
5. Popliteal vein (Vena poplitea)
6. Short saphenous vein (Vena saphena parva)

Normal Vein



Affected Vein



8 warning signs of vein disease

In an effort to help people learn about vein disease and determine if they need to seek treatment, medi has created a campaign to identify the early symptoms.

1 Tired, heavy-feeling legs

One of the first signs of vein disease is your legs feeling chronically tired and heavy in the evenings. This is a clear indication that the return flow of blood from the legs to the heart is impaired. The main cause is gravity. After a long day of standing on your feet, your weakened veins are less able to carry the blood back up to your heart efficiently. The result is oxygen depletion in your legs, giving you that heavy, tired feeling.

2 Leg pain from prolonged sitting or standing

The muscles in your legs play an important role in massaging the veins and helping them "pump" blood. During long periods of sitting or standing, when the muscles are at rest, blood may collect in the legs and ankles. The leg veins stretch easily and may become enlarged by the pressure of the pooled blood. This in turn can cause dull, aching pain.

Note: *If you have continuous pain in one or both legs, you may have a Deep Vein Thrombosis, which is a life-threatening condition. Always report any sharp or continuous pain to your doctor* immediately.

3 Swollen ankles at night

Thick, swollen ankles are definite signs that blood or other fluid is congested in the leg and/or leg veins. Over time, damaged vein walls can become even more stretched out and permeable, allowing fluid and protein to filter from the veins into surrounding leg tissue, which causes the swelling. When you lie down at night, the pressure from gravity is equalized across your leg.

8 warning signs of vein disease

4 Varicose or spider veins, especially during or after pregnancy

One of the main factors contributing to vein disease is pregnancy. During pregnancy, the amount of blood greatly increases throughout the body to almost double the normal volume, stretching leg veins far beyond their normal capacity. Even though the visible signs of varicose veins may disappear after giving birth, the damage done to veins during pregnancy is permanent and may cause pain and discomfort later in life. These problems can be avoided if compression therapy is prescribed during pregnancy. Women with a history of vein disease in their family or who experience swelling, pain, or varicosities in their legs during pregnancy are strongly urged to talk to their doctors about medical compression therapy.

5 Tingling, numbness, burning, or cramping in legs and feet

Since vein disease can cause serious circulation problems, your lower legs and feet may not be getting the oxygen they need. In essence, they may be “falling asleep” more often than usual, or suffering from muscle cramps.

8 warning signs of vein disease

6 Discoloration of the skin

Over time, leakage of blood into the area surrounding the veins can cause tissue to die. The resulting pooling of blood in the tissue causes a darkening of the skin. It is at this stage that the skin is actually stained by your own blood.

7 Open sores or ulcers on the lower leg

When Chronic Venous Insufficiency reaches its most serious point, ulcers may appear on the lower leg. These are the result of blood leaking into the leg tissue and damaging the skin. These open sores are often very difficult to heal, but many physicians will prescribe the mediven® dual layer stocking system or the circaid® juxtalite® lower leg system as part of the treatment. Once the ulcer heals, the patient should wear mediven® medical compression stockings, such as mediven® plus, to prevent recurrence of the ulcer.

8 History of vein problems in the family

There are many causes of vein disease, but the main one is heredity – the condition runs in families. If someone in your family suffers from serious vein problems, you are at a higher than average risk. The earlier you take precautions and treat the problem, the better chance you have of avoiding serious complications.

Endovenous and surgical treatment options for venous disease

Endovenous laser treatment (EVLT) is a minimally invasive, in-office treatment alternative to surgical stripping of the great saphenous vein. Instead of removing the vein, it is sealed closed in place using a small laser fiber. Patients are able to walk immediately after the procedure, and most individuals are able to return to work the next day.

Endovenous radio frequency ablation is another minimally invasive, in-office treatment performed with local anesthesia. This procedure also uses a catheter inserted into the vein and uses heat to collapse the vein, verses a laser in EVLT. Patients can usually resume normal activities the following day.

Ultrasound-guided sclerotherapy is performed with either a liquid or "foamed" sclerosant, while the doctor visually monitors the vein with ultrasound. Ultrasound imaging is used to guide a needle into the abnormal vein and deliver medication to destroy the lining of the blood vessel to collapse the vein.

Traditional ligation and stripping of the great saphenous vein is usually performed in a hospital or an outpatient surgical center under general anesthesia. This vein removal procedure is not common practice in most clinics today.

Ambulatory phlebectomy is a method of surgical removal of surface varicose veins, usually performed in a doctor's office using local anesthesia.

Conservative treatment of venous disease

Compression therapy

Conservative therapy for vein disease can improve your conditions with non-invasive treatments like compression therapy, exercise and medication. Conservative treatments will not cure or reverse venous conditions. They will treat the negative symptoms of pain, swelling and discoloration that are associated with venous disease while helping prevent future progression when practiced regularly.

Graduated Medical Compression therapy

Compression garments that are graduated have more pressure at the ankle and decreases up the calf and thigh. This pressure profile helps with calf pump efficiency and promotes positive venous return. Additionally, the external pressure on compression therapy forces dilated vein walls with incompetent valves into a more efficient position reducing the reflux in superficial veins.

Medication

Though there is no pill that cures varicose veins, medication can be used as a sensible supplement to therapy. Vein tonics are medications that activate the muscles in the vein wall, which may accelerate return blood flow by increasing the elastic force of the vein.Edema protective agents may be prescribed, which are designed to make the vein wall less permeable and thus prevent an increased collection of fluid in the tissue. These medications can be used to complement the use of compression therapy when recommended by a physician.

mediven® comfort

What type of compression therapy is available?

There are numerous types of compression therapy delivery methods that are effective depending on both patient ability and disease factors.

Compression bandaging

Bandaging products come in rolls that are manually applied to deliver the desired compression levels. Bandaging comes in the form of elastic and inelastic based upon the level of edema control. Bandaging is typically used during the acute treatment of patients.

Compression garments

Known as the “Gold Standard for conservative treatment of venous disease”, compression garments are primarily used as long-term solutions for ambulatory patients. These products come in elastic and inelastic materials and are constructed in off-the-shelf or custom-made.

Compression pumps

Compression pumps come with multi-chamber sleeves that are inflated to specific compression levels to manipulate edema and blood flow. Most compression pumps are used for recumbent patients who have difficulty ambulating or for short term treatments.

circaid® ankle wrap

circaid® juxtalite

medi PCS brio

Elastic compression VS. Inelastic compression

A garment's flexibility or "stiffness" is another contributing factor in product efficacy and selection. The more resistance of a product to stretch typically creates more resistance to the body. The stronger the "wall of resistence", the more efficient the calf muscles work for enhanced blood flow and edema control.

What are elastic compression products?

Depending on the materials and the construction of elastic products, some can stretch to over twice their original size. Elastic products rely on the memory of the material to return to their original size delivering the compression therapy. Most elastic compression products come in the form of a stocking or a bandage.

What are inelastic compression products?

The products offer very little to no stretch. The compression therapy is delivered by the person conducting the application. The more tension that is applied, the greater the compression therapy. Most inelastic products come in the form of Velcro® wraps or short stretch bandaging.

mediven® vitality

circaid juxtalite HD

compression garment FAQs

Why are medical compression stockings sold by prescription?

The correct fit is very important for safe and effective compression therapy. Medical compression stockings are designed to provide graduated compression and come in different pressure levels, measured in millimeters of mercury (mmHg). A physician who understands your venous condition will prescribe a specific compression strength. Then, carefully measuring your legs, a professional fitter can provide you with the best compression garment for your individual needs.

What is the difference between medically graduated stockings and support or anti-embolism stockings used in hospitals?

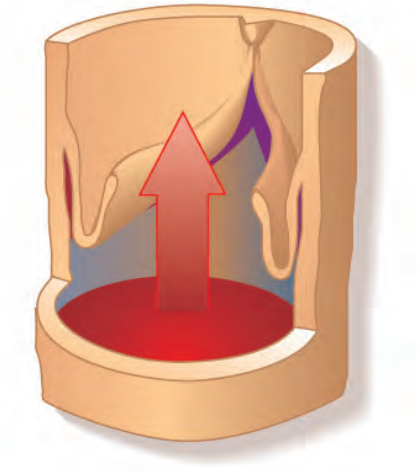
Support stockings can be worn for prevention of vein disease, but they do not provide the graduated compression needed for the most effective prevention and treatment, and they are not subject to regulated standards.

The "white stockings" in hospitals, also know as TEDs (thromboembolism-deterrent hose), are used when a patient is confined to bed for prolonged periods. They are also called anti-embolism compression class stockings because they prevent embolisms, or blood clots, from occurring when patients are lying in bed. They are meant exclusively for use by resting patients and are not for active, mobile patients.

When is it not appropriate to wear compression garments?

A compression garment must not be worn in the case of circulation disorders in leg arteries or for those with serious heart conditions. Caution is also recommended in the case of sensory impairments due to diabetes and neuropathy (nerve damage). Your physician will advise you on the best approach for using compression with specific underlying conditions.

Graduated compression supports vein walls and "pushes" blood up towards the heart.



compression garment FAQs

How to determine the appropriate compression level or class?

The severity of a venous disease determines the pressure required. There are four commonly recognized compression levels for various degrees of venous disease, explained in the table below.

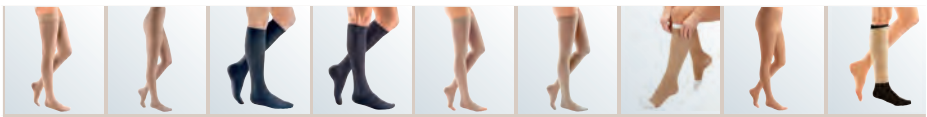
Description	Pressure	Application
Mild Compression	15-20 mmHg	Prevention of tired heavy legs caused by prolonged standing and during pregnancy.
Moderate Compression	20-30 mmHg	Pronounced varicose veins, swollen legs, after inflammation of veins, after sclerotherapy or surgery, in the case of varicose veins during pregnancy.
Firm Compression	30-40 mmHg	After deep vein thrombosis, constant leg swelling, after an open leg ulcer.
Very Firm Compression	40-50 mmHg	Very pronounced swelling, lymphedema.

mediven® compression garments:

For the best possible treatment of veins.

Caution: This is a general guideline only and indicates compression levels available. The attending doctor is responsible for selecting the compression stocking and compression class. The decision depends, above all, on the patient's individual factors and needs.

[1] CEAP = Clinical Etiology Anatomy Pathophysiology



CEAP[1]	Diagnosis	Objective of compression	Compression level	mediven® sheer & soft	mediven® comfort	mediven® for men classic & select	mediven® active	mediven® plus	mediven® forte	mediven® dual layer	mediven® flatknit products	circaid® juxtalite™
C0	No visible or palpable signs of venous disease	Prevent swelling, heavy legs, tension, pain	15-20	•	•	•	•					
			20-30	•	•	•	•	•			•	•
C1	Spider veins, teleangiectasias or reticular varicosis	Prevent swelling, heavy legs, tension, pain	15-20	•	•	•	•					
			20-30	•	•	•	•	•			•	•
C2	Visible or palpable varicosis (branches and saphenous veins); possibly varicosis in pregnancy	Prevent swelling, heavy legs, tension, pain	20-30	•	•	•	•	•			•	•
			30-40	•	•	•		•	•		•	•
C3	Venous edema	Edema reduction	20-30	•	•	•	•	•			•	•
			30-40	•	•	•		•	•		•	•
C4	a) Changes to the skin and the subcutaneous tissue in addition to CVD, divided into two sub-classes a) Pigmentation or eczema	Prevention of ulceration	20-30	•	•	•	•	•			•	•
			30-40	•	•	•		•	•		•	•
	b) Atrophie blanche, dermatosclerosis		40-50					•	•		•	•
C5	Resolved venous crural ulcer	Prevention of a new ulcer	30-40	•	•	•		•	•	•	•	•
			40-50					•	•	•	•	•
C6	Florid venous crural ulcers	Healing of the ulcer, pain relief	30-40							•		
			40-50							•		

HOW TO

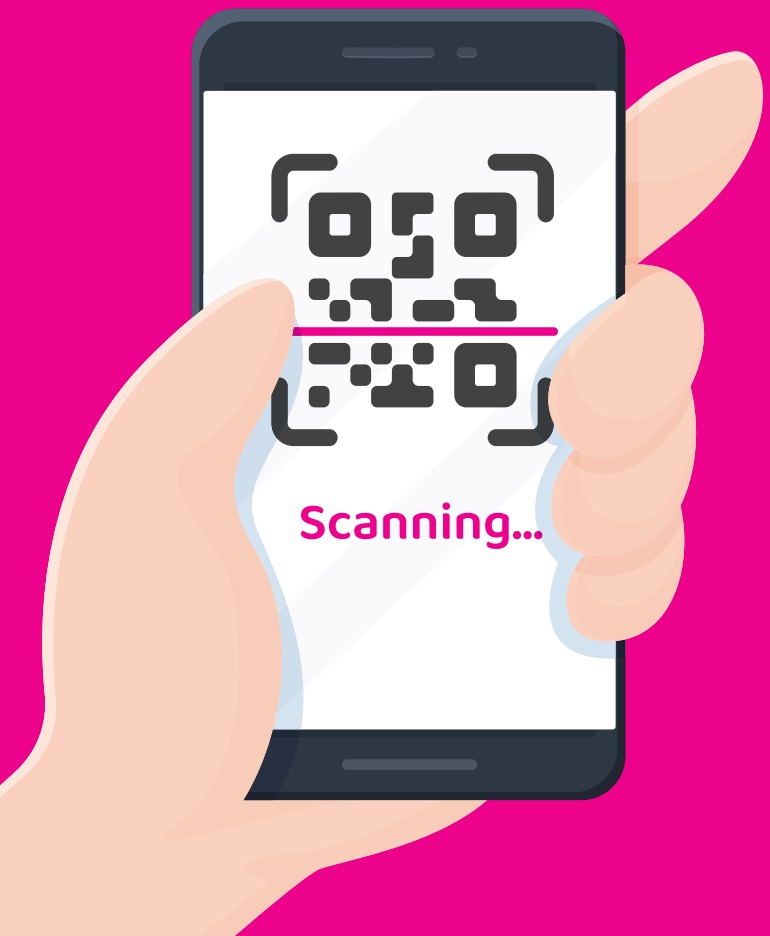
medi elastic stocking measuring and applications:

How to measure mediven elastic stockings

How to apply mediven stockings

How to apply elastic stockings with butler

How to remove elastic stockings with medi butler off



How to measure and apply inelastic compression garments:

How to measure inelastic compression garments

How to apply inelastic compression garments

medi compression garments for venous disease

mediven® sheer & soft

Timeless stocking for the fashionable woman.

Virtually indistinguishable from regular hosiery.

mediven® plus

Broad selection with enhanced containment.

A mainstay of medi for over 25 years, intended for the treatment of moderately severe to severe venous disease.

mediven® comfort

The most comfortable stocking in its class.

By combining unmatched softness with ease of application, medi accomplishes what other manufacturers can't.

mediven® active

Cushioned sock for active wear.

This product has extra cushioning throughout the foot and is ideal for long-lasting occupational and active use.

mediven® for men classic

Classic sophistication with extraordinary comfort.

A modern pattern sock for a more casual look.

mediven® for men select

A casual men's sock with flair.

A modern pattern sock for a more casual look.

mediven® dual layer

Two-layer stocking system provides accurate compression along with easy donning and doffing.

circaid® inelastic products

Inelastic compression for mild, moderate and severe venous disease with Built-In Pressure System™ for measurable, adjustable compression that is ideal for both day and nighttime use.

duomed advantage

Value-based elastic compression products by the most trusted manufacturer in the industry.

Rejuva

Fashionable compression leg wear to complement any wardrobe.

Questions? If you have questions about compression garments, please contact us at info@mediusa.com or visit www.mediusa.com.

medi USA
6481 Franz Warner Parkway
Whitsett, NC 27377
T 800-633-6334
F 888-570-4554
mediusa.com

PO112 REV F