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Helpful advice relating to compression treatment in venous disorders



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Dear patient,

The treatment of the so-called “leg or venous disorders” is often very protracted and requires a great deal of patience and discipline. This fact is not always easy for the patient to cope with, which frequently also results in medical instructions only being partially followed, or the treatment even being discontinued.

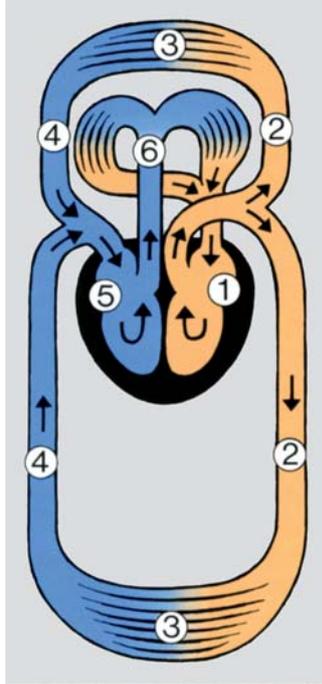
Particularly affected by this is compression treatment as applying the elasticated bandages is generally considered complicated and wearing the bandage or the stocking is felt to be a nuisance. However, without compression there is no noticeable improvement in venous disorders.

The aim of this brochure is therefore to set out the relationships between the disease patterns and the healing-promoting effects of a compression bandage in order to bring about an understanding of the sense and purpose of this measure. It may make it easier for you to find the necessary staying power and ability to actively cooperate in order to become symptom free.

How do venous disorders come about?

In order to be able to understand how venous disorders come about some knowledge about the blood circulation system is required first of all. Its main task is to supply the muscles and tissues with oxygen and nutrients and to remove the resulting metabolic waste, respectively.

To this end the oxygen and nutrient-rich blood is conveyed from the left ventricle via the arteries and arterioles to the outermost regions of the body, the capillary areas. Capillaries are ultra-fine capillary vessels that allow oxygen to be exchanged and at the same time act as links between the arteries and veins. Oxygen and nutrients are pressed through pores in the capillary walls and, vice-versa, breakdown products are absorbed again by the capillaries and transferred into the veins.



Schematic presentation of the blood circulation:

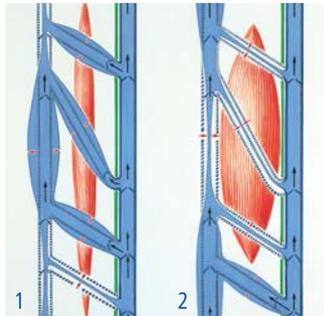
- 1) - left ventricle, 2) - arteries,
- 3) - capillary area, 4) - veins,
- 5) - right ventricle, 6) - pulmonary circulation

These transport the blood now carrying waste material to the right ventricle. From there it reaches the pulmonary circulation where it gives off the carbon dioxide resulting from metabolism, is enriched with fresh oxygen and returns to the circulation via the left ventricle.

However, within the blood circulation system the veins do not only have transporting tasks to fulfil. They also regulate the circulating quantity of blood, i.e. they must always supply the heart with sufficient blood, whereby the quantity varies depending on the respective physical stress on the body (e.g. at rest, working muscles, shock etc.). For this reason around 85 % of the total quantity of blood is found in the veins which in turn can only store it as they are very elastic and easily extensible.

Whereas the blood in the arteries is driven forward by the pumping action of the heart, various other auxiliary mechanisms are required for transporting it back as the cardiac output is no longer sufficiently effective in the venous part of the circulation. This applies particularly to the return of blood from the legs. Due to the upright posture of humans the blood has to be "conveyed uphill", so to speak, against gravity to the right ventricle.

Here the muscle vein pump comes into action as the most important and effective aid to transporting. During natural movement the calf muscles contract and relax in rhythmic alternation. During contraction the veins are constricted and the blood is forced upwards. But in order for it not to fall back again, the veins have venous valves at regular intervals that can close like a sluice gate so that the blood can only flow in one particular direction, i.e. towards the heart. When the muscles relax the veins expand again and the pressure in the emptied vascular sections falls, thereby sucking in blood again which during the next contraction is again forced upwards.



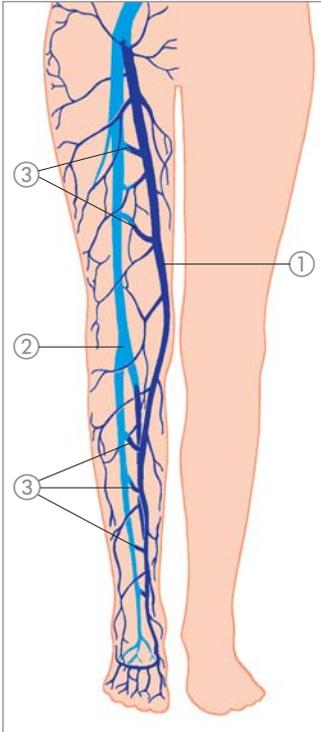
The principle of the muscle vein pump:

When the muscle is relaxed the relevant vein section fills with blood (1) which during the next contraction is again transported further upwards (2). The venous valves prevent the blood from falling back.

If the veins or venous valves are altered by certain causes and influences, they lose the ability of adapting elastically to the varying quantities of blood. The veins remain permanently dilated and the venous valves can no longer close. The return of blood to the heart is considerably impaired resulting in dangerous blood congestion in the veins. Fluid and metabolic waste materials that have not been removed collect in the body tissues bringing about increasing "swamping". This condition is initially experienced as heavy, swollen legs. Then skin changes gradually become visible until finally, if not treated in time, eczema and lower leg sores, the so-called "ulcerated legs", appear.

The causes which bring about such pathological changes in the venous system can be various in nature. They include hereditary or age-related loss of elasticity of the vein walls, hormonal influences during pregnancy and, in the case of predisposition by taking the "pill" (oral contraceptive), changes in the coagulation properties of the blood with the risk of clot formation and subsequent phlebitis, e.g. as a result of operations, injuries or serious infectious diseases.

However, all these processes are accelerated by a civilisation-related phenomenon which is lack of exercise. The useful effect of the muscle vein pump is so impaired by this that even minor additional stresses can often lead to serious disorders in the venous system.



Schematic presentation of the venous system of the legs

- 1) - superficial veins (dark blue),
- 2) - deep veins (light blue),
- 3) - communicating veins

The various disease patterns of venous disorders are also assessed in accordance with the area of the veins which is affected by the disorder, how severe it is and how long it lasts. In the case of diseases of the superficial veins, the so-called varicose veins or varices occur, which are easily recognised by their typical winding course. If such diseases remain restricted to the superficial system, the healthy veins deeper down are usually able to make up for this deficiency in the return of blood. However, if the disorder spreads via the communicating veins into the deep veins within the leg muscles, ever more serious disease patterns occur, in the worst case up to the formation of ulcers.

The situation where a disease of the deep veins is caused by a previous leg thrombosis has just as serious consequences. During the "healing process" scarring changes occur on the vein walls that also hinder the return of the blood to the heart. The consequences such as blood congestion and inability of the venous valves to close in time again lead to swamping of the tissue and to leg sore.

In principle in all forms of venous disorder there is the problem that although the secondary symptoms can be influenced, the causes of the disease itself cannot. For example, in the case of superficial varicose veins an improvement can be brought about by sclerotization or surgery, but the trigger factor, such as predisposed loss of elasticity of the vein walls however remains and requires constant medical supervision.

The aim of every venous treatment, particularly in the case of diseases of the deep veins that cannot be operated on, is therefore to eliminate the acute effects such as congestion, ulcers etc. and to prevent progression of the disease. Indispensable in this case is the correct compression of the leg: during the acute treatment with a compression bandage and subsequently, in order to maintain the achieved results, with a bandage or an individually adapted compression stocking.

To support this, vein drugs are usually prescribed that can help make the development of congestion more difficult or in the case of existing oedemas to promote the elimination of fluids.

Last but not least adopting an appropriate lifestyle protects against progression of the disease.

How does the compression bandage work?

The effect of a compression bandage is easy to understand. It encloses the leg with such firm pressure that the pathologically dilated veins are constricted. In this way the venous valves can close again, the flow-rate of the venous blood increases and the return is normalised.

With the restored return flow of the blood the fluid accumulated in the damaged tissue and the waste products are also removed. Swellings and oedemas disappear. Open ulcers can heal. The risk of new inflammations and blood clots occurring is considerably reduced.



However, at the same time the compression bandage acts as a firm support for the leg muscles and thereby helps and improves the action of the natural vein pump, the muscles and joints. In conjunction with movement the compression bandage therefore brings perceptible relief as soon as it is applied.

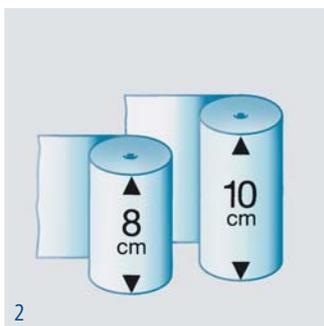
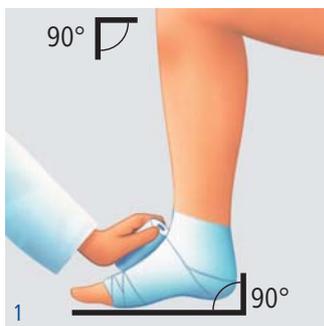
In a pathologically dilated vein the venous valves can no longer fulfil their valve function. The blood falls back resulting in congestion and finally swamping of the tissue.

By way of the compression bandage the veins are constricted, the venous valves close again, the return of the venous blood is normalised.

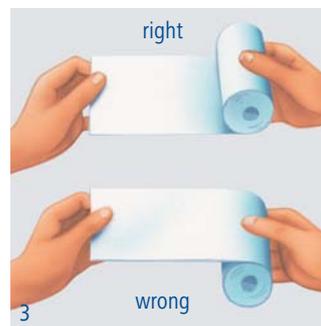
General tips for applying a compression bandage

Applying a well-fitting compression bandage is an art that can be learned but which admittedly requires a certain amount of practice. The following tips are intended to assist you and to help avoid making mistakes.

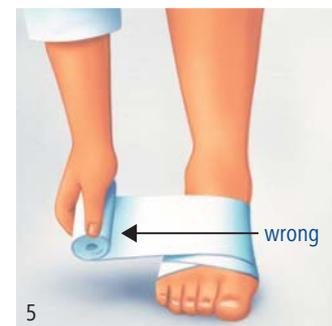
- The compression bandage must be applied in the morning immediately after getting up. Do not walk around first otherwise the decongestion of the leg that has taken place during the night is cancelled out. Incidentally, for effective decongestion you should raise your legs during the night, whereby the hollows of the knee should not sag. Therefore raise the bed, a wedge at the foot end is not enough.



- To apply the bandage the foot must always be placed at a right angle (1).
- Depending on the size and circumference of the leg, 8 cm or 10 cm wide bandages for compression bandages are best suited on the lower leg (2).

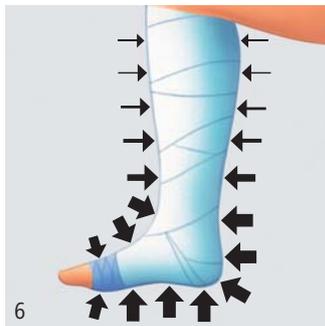


- The bandage is picked up so that the rolled up part of the bandage is on top and points outward. Only in this manner is it possible to unroll the bandage on the leg (3).

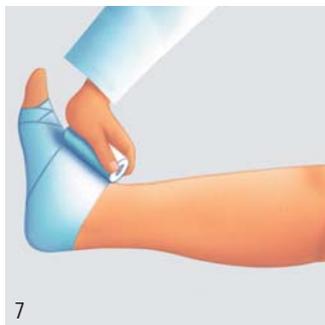


- Unroll the bandage directly on the skin during application (4) and pull both edges evenly in the direction of application. Never pull away from the leg otherwise the two woven edges are unevenly tensioned and straggling furrows are created (5).

■ The pressure exerted by the bandage must be strongest in the ankle area and gradually decrease towards the knee. Too great pressure in the calf area causes dangerous congestions. Therefore tighten the bandage more at the ankle and decrease the pressure slowly in accordance with the shape of your leg (6).

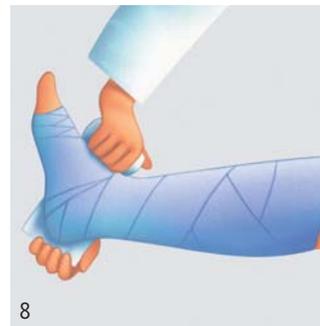


■ How to check if the correct level of compression has been produced: when the bandage is initially applied the toes should take on a slight bluish colour, but return again to their natural skin colour when walking.



■ Also always covered by the bandage is the foot area from the metatarsophalangeal joints and the heel so that all congestions can only be pressed upwards (7).

Seen overall, a properly applied bandage should give you a feeling of a firm hold, and the pain must recede. If this is not the case or if even new pain occurs that does not disappear when walking, the bandage must necessarily be removed and then reapplied.



■ Generally finished bandages remain effective over a longer period of time when a second bandage is applied over the first bandage in the opposite direction of application (8).

Walking should be enjoyable again. And the more you move about in the bandage the better the treatment success. However, for this you do of course need the right footwear that fits well and has flat heels. Remember that with too high heels the joint muscle pump is brought to a standstill again.

■ It is beneficial if another person (relative, neighbour) can apply the bandage for you as in this way the pressure distribution and fit of the bandage can be better regulated than when applying it yourself.

Equally, sitting or standing too long should be avoided. However if for occupational reasons this cannot be avoided you should try to put your legs up every now and then or to do foot exercises.

Applying a compression bandage



Keeping the foot at right angles the first turn of the bandage starts at the metatarsophalangeal joints and runs outwards.



After 2 – 3 turns around the midfoot, the bandage then covers the heel and comes back to the instep over the medial malleolus.



With another two turns the edges of the first heel wrap are additional fixed. The bandage initially goes over the top edge around the ankle, ...



and afterwards via the lower edge into the arch of the foot. After a further circular turn over the midfoot, the bandage is taken back to the ankle across the ankle joint line, ...



and then following the contour of the leg it encloses the calf in steep turns.



It should be noted that the bandage is unrolled with the hand flat on the lower leg and only tightened in the direction of unrolling. The bandage must not lose contact with the skin.



From the hollow of the knee, the bandage is wrapped one time around the leg and from there follows the contour of the leg back down, covering any gaps in the bandage.



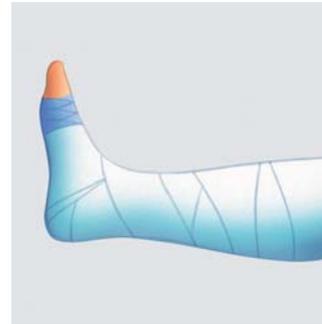
The second bandage is in the opposite direction from outside to inside on the ankle, the first turn running over the heel to the instep.



Two further turns fix first the upper and then the lower edge of the heel wrap.



Then the bandage is taken once again over the midfoot and then in the same manner as the first one, steeply upwards and then back again.



The finished bandage is secured with adhesive tape.

The bandaging technique illustrated here is a modified Pütter bandage consisting of two short-stretch bandages applied in the counter-rotating technique. This technique ensures high strength and better durability of the bandage.

Facts worth knowing about compression bandages

An effective compression bandage must firmly enclose the leg so that the pathologically dilated veins are narrowed. The more rigid the bandage material is the stronger the pressure that is exerted inwards on the veins.

The most rigid are zinc paste bandages. After application, they produce semi-rigid, unyielding bandages. Because of their non-elastic properties, among all the bandaging materials these are the ones which can offer the greatest resistance to active muscles. They therefore exert a working pressure so intense that it extends deep into the subfascial regions and rapidly reduces swelling. The zinc paste bandage is therefore used both in the acute phase of treatment as well as to maintain the achieved results and can only be properly applied by a physician.

Short-stretch bandages, such as Lastobind, Idealhaft or the Pütter bandage, exert an equally high pressure. Due to their relatively low extensibility they produce a high bandage compression which is also sufficient to influence the pathological conditions in the deep vein areas.

They also adapt well to the changes in the circumference of the leg as the congestion reduces.

Bandages consisting of short-stretch bandages are used to initiate and continue treatment, e.g. until complete decongestion or healing of an ulcer. Such bandages are applied by a physician, but after appropriate instruction during the course of treatment this can also be learned and carried out by the patient or a helper.

Long-stretch bandages, such as Lastodur straff (tight) and Lastodur weich (soft), have the highest extensibility of all bandage materials. They adapt well to the shape of the leg and exert a uniform continuous pressure that acts on the superficial vein area. Bandages comprising long-stretch bandages are thus well suited for follow-up treatment after the acute symptoms have eased off as well as for treatment to maintain the achieved condition. The bandage can be applied by the patient himself/herself.

In principle, however, in the case of bandages consisting of long-stretch bandage it must always be ensured that they are removed at night and after longer periods of rest as otherwise the fine blood vessels in the skin are too strongly compressed by the high continuous pressure.

Dear patient,

As a supplement to the personal explanations by your physician, this small brochure is intended to give you a comprehensive overview of the causes, the consequences and the treatment of venous diseases. An overview that makes it clear that even with all the medical skill available your own active cooperation is essential for the success of the treatment and that without compression there can be no decisive improvement in venous leg disorders.

Particularly important in this connection is the aftercare that is usually required even after the alleviation of the acute symptoms and after epidermisation of an ulcer. After all, it is a case of you as the patient accepting the fact that in spite of everything you are not by any means “cured” as the deep-down underlying problem cannot be eliminated.

Thus everything would start all over again if the development of new congestions is not prevented by the compression bandage or the compression stocking.

Even if wearing a bandage or a stocking is not very pleasant in certain situations, compared with renewed symptoms and pain it finally remains the lesser of two evils.

If this brochure has been able to contribute to forging a greater understanding for the need for compression treatment and has encouraged you to assist in determining your future medical well-being yourself, then it has fulfilled its intended purpose.