

DSM Intermittent Pneumatic compression systems



Introduction

DOCTOR LFIE Intermittent Pneumatic Compression (IPC) therapy system is total solution devices applying air compression to help recovering from or preventing various diseases like atherosclerosis, DVT/PE, Lymph edema, Chronic venous insufficiency (CVI), Varicosis, Post-paralytic (post-stroke, spinal cord injury), Post-mastectomy * Post-traumatic (post-cast, fracture, amputation shoulder-hand syndrome), Spinal cord injury, Sprains, Cellulite, etc

- IPC was proved suitable for blood circulation. It is remarkably effective to promote venous return, to strengthen arterial infusion, to remove edema, and to weaken coagulation. In addition, it is helpful to ameliorate anemia and to heighten oxygen combination.

Applicable Symptoms

Lymphedema

Cirsoid Tumefaction

Intermittent Claudication

Peripheral Neuritis

Diabetes

Crural Ulcer

Anticoagulant Effect

Prevention of Thrombokinosis

Concrete Use

1. Vein and Lymph

A Lymphedema

B Chronic venous insufficiency and cirroid tumefaction

C Ulcer

2. Thrombus

A Total symptoms after thrombokinesis

B Supplement to the efficacies of streptokinase, anticoagulant
s and blood-activating drugs

C Prevention of thrombi formed in the process that circulated
blood newly generated after vascular transplantation

3、 Arterial Anemia

A、 Intermittent claudication

B、 Diabetes and peripheral neuritis

Venous Return

In normal cases the venous return of the lower limb is caused by heartbeat and the related contractile force and by the pumping action that works the deep vein surrounded by the deep fascia.

And the pressure, applied to the inside of the pleural cavity, synergistically acts to 3 parts. Normal blood return is restrictively operated by the venous valve that makes blood run only in one direction.

Cirroid Tumefaction

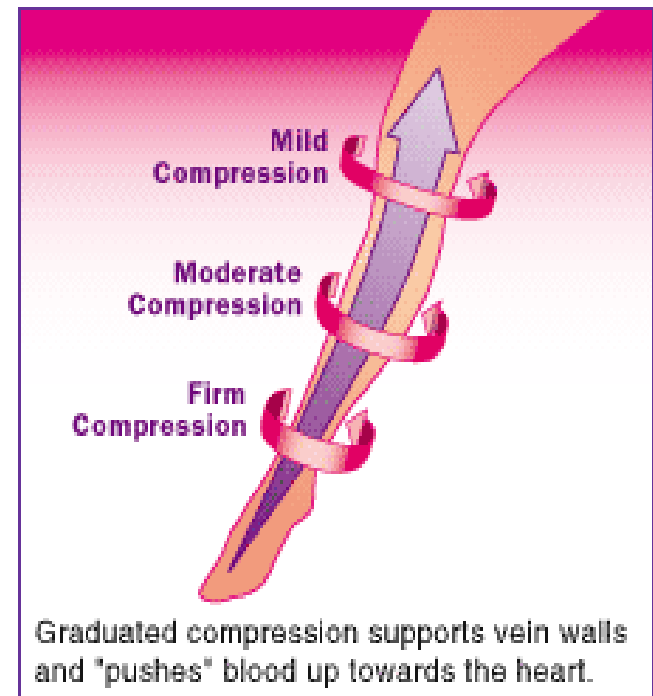
The defective valve cannot let the blood flow only in one direction. In this case, blood flows backward and a collision occurs against the stipulations on the following first-grade venous valve, and the lower-grade valve will be broken. In case the venous valve is broken, blood backflow applies high pressure to the venous wall. Then, the weaker region becomes swollen.



Also, keeping the legs, heavy labor, pregnancy, chronic cough and long-term constipation increase intravenous pressure, and the shocker power to the valve becomes stronger and the higher pressure is applied to the venous wall. In result, cirroid tumefaction occurs. In case cirroid tumefaction and blood stasis last long, sedimentary dermatitis may occur and it is developed into pigmentation and chronic indurative phlegmone or ulcer.

IPC's Promoting Venous Return

IPC applies pressure to muscles and contracts them, so that the muscular pump can take returning action on venous blood and the pressure, applied to the valve and the venous wall, can be reduced. Thus, venous return can be remarkably promoted and the venous valve can be functionally recovered.



Test Results of Medical School at Imperial College London

In the leg, to which IPC was applied, and the foot and leg to which IPC was applied, venous blood flow rate was divided. In result, the case where IPC was used in foot/180mmHg was 2 to 2.5 times and 3 to 3.5 times higher.

As a result of the test, it was found that IPC foot/120mmHg could hasten blood flow as compared to IPC foot/120mmHg. However, even the difference was limited.

Lymphedema

Lymphedema means that a tissue or an organ becomes swollen due to the disorder of lymph discharge.

The application of intermittent pressure to venous and lymphatic dysfunction has been proved to be an effective physiotherapy.

Conclusion: IPC is a very safe and economical therapy, but has been neglected all the while. It has produced noteworthy results in many patients with lymphedema, and actually it has been scientifically proved.

Health Center, Reuters, New York, December 13, 2002
Medical School at Stanford University
Dr. Stanley G. Rockson

Intermittent Claudication

Intermittent Claudication:

After walking a distance, a patient may feel palsy, tingle, tumefaction, pain, cramp or inertia in the peroneal or foot muscles. If the symptoms worsen, the patient should stop walking and should rest a while. Then, the pain is rapidly relieved and the patient can continue walking. However, such symptoms recur later. This is called ‘intermittent claudication’, which is a typical symptom that occurs when blood is not sufficiently supplied to the arteries of the lower limbs.

Ordinarily it is known that intermittent claudication is caused by the accumulation of acid metabolites (lactic acid, etc.) related to blood circulation disorder, and the pain by peripheral nerve stimulation.

Some regard intermittent claudication as melalgia caused by the fall of arterial pressure after arteriostenosis, the overpressure of the intramuscular artery caused by muscular contraction related to brachio-crural movement, the decrease of local blood flow and the relevant melalgia.

Diabetic Foot

The principal symptoms of the diabetic foot are melosalgia and dermal ulcer. In the incipient stage, the patient tends to feel pruritus in both legs and to avoid something cold. Also, the skin becomes whitish or purplish and the patient may have twinges in their arms and legs. Moreover, paralysis, hypoaesthesia or sense deprivation may occur. In some cases, the patient may have a difficulty in walking due to melosalgia, and may feel melosalgia even at recess, and may fail to get to sleep. In case a complication occurs, the foot may fester and a wound may not be healed up for a long time. In the worst case, a ligament or sclerotin may be necrotized and thus excision may be performed. In result, the patient may be disabled.

According to statistical data, the symptoms of the diabetic foot occur in 15% of patients, 10 to 14.5% of whom undergo excision. The patients, who come to die within 30 days after excision, account for 10%.

According to national and overseas data, the patients with the diabetic foot account for 47% of all the inpatients related to diabetes.

Cause of Diabetic Foot

Diabetic crural anemia is the principal cause of the diabetic foot. Diabetes may cause pathologic changes in peripheral nerves and blood vessels and causes hypoesthesia in the diseased limb. A complication, caused by the blood circulation disorder, may cause pathologic changes and malnutrition in brachio-crural tissues.

The diabetic foot blood is usually accompanied with deficiency, neuropathologic changes and infection.

- The air cuff of IPC is filled orderly from the distal end to the proximal end, which remarkably promotes venous return. When it is deflated, intra-arterial infusion may be more strengthened.
- IPC is an internationally-authorized apparatotherapy to prevent coagulation, thrombin-like enzyme and thrombokinesis, and is effective to improve blood circulation.

“Running water is not corrupt, and working axis is not moth-eaten.”

- IPC can help to rapidly supply blood to peripheral nerves when it is booted orderly from the proximal end to the distal end. And it has the inductive effect on the artery.
- IPC is effective to remove inflammatory pain-inducing substances in the process of venous return. Also in the process of arterial perfusion, it causes vasodilatation and increases oxygen consumption.
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Effect of New-Mode IPC

The new-type IPC remarkably strengthens the venous blood flow of the lower limb and the skin, and ameliorates arterial anemia. At the same time, it considerably heightens oxygen combination.

IPC for Neuropathological Changes in Diabetes

Neuropathological changes occur in 60-80% of diabetics, which is called ‘peripheral neuritis’. Principal symptoms are paralysis, contact pains, formication and unstable gait. In the worst case, excision should be performed. Skin temperature’s falling and the lesion’s growing cold frequently occurred in the incipient stage.

Application of IPC; The air pressure is applied orderly from to the distant region to the near region, so that lymph and venous blood may rapidly run to the proximal end of the limbs and the pressure in the limbs may be lowered. Additionally when it is deflated, arterial blood supply is rapidly increased so that blood and oxygen may be quickly supplied to brachioocrural tissues. To be specific, deficient blood and oxygen in brachioocrural tissues can be sufficiently supplied.

In case the pressure is sequentially applied to the limbs, local metabolites and inflammatory pain-inducing substances may be remove in the process that hastens venous return and lymph return, and peripheral neuritis may be relieved.

Table 1. Changes in Motor Nerve Conduction Velocity before and after Brachio crural Prssure Treatment for Diabetic Peripheral Neuritis

Checkpoints	Before Treatment	After Treatment	T Value	P Value
Ulnar Nerve	30.8 ± 5.1	41.2 ± 5.3	11.6	<0.01
Common Pero neal Nerve	29.9 ± 5.0	41.4 ± 5.2	12.2	<0.01

Table 2. Major Laboratory Indexes in Diabetic Peripheral Neuritis

Checkpoint	Before Treatment	After Treatment	T Value	P Value
Blood Sugar	12.31 ± 1.45	10.13 ± 1.39	8.34	<0.05
Glycosylation	9.98 ± 1.39	9.84 ± 1.40	0.55	>0.05
Cholesterol	6.39 ± 0.20	5.65 ± 0.16	6.75	<0.05
Triglyceride	2.62 ± 0.39	2.16 ± 0.38	6.48	<0.05

Significant of IPC for Patients with Diabetes

- Removing edema
- Ameliorating diabetes caused by the blood deficiency of the pancreatic artery
- Ameliorating gait
- Ameliorating blood supply to the liver and the kidney
- Ameliorating diuretic action
- Effective against anemic eye diseases
- Retarding arteriosclerosis
- Ameliorating oxygen deficiency in the cerebrum
- Effective for weight control
- Relieving fatigue

Nota Bene

- IPC should not be used in the case of acute necrosis accompanied with a fever and flush.
- IPC should not be used in the case of acute DVT.
- IPC should not be used in the case of severe cecilitas cordis.
- In the case of the diabetic foot, ordinarily the pressure should not be over the grade 4.
- On a wound or ulcer, the pressure should be minimized or set to zero.
- It is recommended that it should be set to 1+2+7.
- In case the patient in delicate health or having hypertension, IPC should be applied only to one of the limbs and the pressure should be minimized.
- Overlapping use may cause infection.

IPC for Vascular Transplantation

- Aiding the circulation of newly-generated blood
- Preventing thrombokinesis in newly-generated blood vessels
- Weakening coagulation
- Dilating blood vessels; Supplying arterial blood
- Ameliorating the gait of patients with claudication and who underwent vascular transplantation

IPC for Cardiac and Cerebral Blood Vessels

The new-mode IPC is very significant for cardiac and cerebral blood vessels. And it is expected to be applied to blood deficiency and oxygen deficiency in cardiac and cerebral blood vessels, as well as to weaken coagulation synergistically with drugs. However, it should not be applied to severe heart failure.