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(Hip and Knee).

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Cyclo-ssage Pro-Personal Therapy System (PPTS)
The prevention and treatment of Limb swelling (oedema)
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Introduction

Oedema or limb swelling is abnormal fluid collection in the limbs that causes an appearance consistent with swelling of the tissues. This swelling may result in the skin appearing indented when the surface of the oedematous limb is compressed. That indentation is described as pitting, as opposed to non-pitting oedema, which does not pit on compression. That distinction is crucial when considering the possible causes of the oedema.

Although oedema is often a marker of disease, oedema due to prolonged standing will affect most people in a lifetime due to the effect of posture induced tissue pressure elevation. This emphasises the fact that oedema is categorically a shift of normal fluid volume from any one compartment of the body to the limbs.

Fluid composition of the body

Water is an essential body fluid. The total body water of an adult male is approximately 60% of the body weight. Because of their relatively greater body fat content, the adult female has lower total body water approximating to 50% of her body weight.

The body water is distributed in tissues such as muscles, blood, skin, joints and other systems that are crucial to the daily functions of the body.

Fifty percent of the total body water is retained within muscles. This fact is manipulated in competitive sports such as, bodybuilding, boxing and MMA in-order to enhance aesthetic stage appearance, performance and during "weighing-in".

It is essential that the flow of water and body fluids through the body tissues is not impaired. For the balance of fluid to be maintained, there are established compartments within the body with specified functions and quantities allocated in each of the body compartments.

Body fluid compartments

The main body fluid compartments are the intracellular and extracellular fluid compartments.

The intracellular fluid compartment

This is the fluid within all cells of the body. It accounts for approximately 40% of the body weight, and amounts to 28L for a 70kg man. This compartment is the largest fluid compartment of the body. The intracellular compartment dictate cellular metabolic rates as its contents can be exchanged with surrounding fluids in other compartments.

The Extracellular fluid compartment

The extracellular fluid compartment amounts to 14L for a 70kg man. This body fluid compartment is subdivided into exchangeable systems consisting of blood and interstitial fluids.

Blood

Fluid within blood is called plasma and accounts for 3.5L (of the 14L). In relation to oedema, plasma is essential because it contains the special proteins known as plasma proteins. These proteins exert a fluid pressure the (oncotic pressure) within the lumen of the circulatory systems in-order to keep fluid in the appropriate compartment. When the concentrations of these special proteins are low in the body fluid moves out of the circulatory system into tissues abnormally, and oedema results.

Interstitial fluid

The fluid that surrounds cells also known as interstitial fluid accounts for 10.5L (of the 14L). The interstitial fluid status is that of the gel state. A vital component of the interstitial fluid is the lymphatic fluid.

Lymphatic fluid

Lymphatic fluid consist of fluid that are high in protein molecules particularly albumin. Because of its large size the albumin molecules that leave the main circulation cannot return to the main circulation without a pump activated system like the lymphatic system. The pump in this system is the skeletal muscle that contract with the mechanical force compressing the lymphatic vessels within the muscle. This system is crucial in-order that the body does not waste its albumin (special protein) content. Two hundred grams of albumin is returned to the main circulation daily via the lymphatic fluid. The lymphatic fluid flows through vessels that have a one way valve, with the direction of flow within the circulatory system being towards the heart.

Circulatory system

The circulatory system, consist of the heart which functions to pump nutrient rich blood and its plasma fluid through arteries to the tissues via capillaries. At the tissue levels, capillaries empty into veins which drain the nutrient devoid blood back to the heart.

Lymphatics vessels return lymphatic fluid and their protein rich molecules that escape from the circulatory system back into this complex scheme.

The significance of the protein molecules is due solely to their ability to exert the oncotic pressure that keeps fluid within the circulatory system.

Pathophysiology of oedema-Mechanics of body fluid flow

When the concentration of protein molecules is low the accompanying low oncotic pressure within the circulatory system manifest in certain conditions like kidney and liver diseases. In such states, fluid cannot be held in the circulatory system. The resulting extravasation of fluid to the compartments described above, results in abnormally elevated hydrostatic tissue pressures and oedema.

Other causes of oedema may arise from dysfunctions of the flow mechanics within the circulatory system.

- ✓ Impairment of blood pressure.
- ✓ Impairment of pressure within the vein (venous stagnation and engorgement).
- ✓ Impairment of protein content of blood and plasma.
- ✓ Permeability abnormalities of the filter systems within tissues.
- ✓ Impaired lymphatic drainage.

✓

Preventing postural oedema with Cyclo-ssage PPTS

An essential component of the prevention of oedema is the understanding of the need to reduce the hydrostatic tissue pressures described above, particularly after a long day on your feet. When we stand from the lying position, five hundred ml of blood from our trunk pools in the feet and ankles due to the gravitational force. This distention of the vessels in the feet ankle must be reversed on a regular basis by exercise to keep the pumping actions of the muscle consistent. That pumping action can be further augmented by regular therapy sessions on the Cyclo-ssage PPTS. The PPTS elevation platforms afford both the upper and lower limb drainage of excess fluid volumes back into the trunk during therapy sessions.

The importance of a healthy lifestyle, protein rich-balanced diet and regular exercise is vital to the prevention of oedema.

Cyclo-ssage in the prevention and treatment of oedema

When the diagnosis of oedema has been confirmed, it is essential to identify the rectifiable cause. Malnutrition, circulatory failure, kidney and liver failures need hospital admissions and specialist input.

Once the correct medical input has been commenced, Cyclo-ssage PPTS used on a regular basis will enhance the restoration of the internal fluid compartment environ.

The effect of the PPTS therapy on the pumping action of contractile tissues enhances tissue flow mechanics. Furthermore, PPTS therapy effect is superior and more reproducible than the effect of therapeutic massage.

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