

Oedema mechanism of action - facts sheet

Oedema is an accumulation of extracellular fluid in the interstitial space that occurs as the capillary filtration exceeds the limits of lymphatic drainage, producing noticeable clinical signs – swelling and related symptoms.

Oedema impairs wounds healing through several mechanisms¹:

- Extracellular fluid (Oedema) causes a distance to form between cells and impairs the delivery of oxygen, resulting in lower tissue oxygenation.
- Oedema acts as a barrier to growth factors and nutrients, making them relatively dilute in the oedematous fluid and less available to the cells that form blood vessels – impeding oxygen delivery and wound healing.
- Subsequent infection increases the production of degradative enzymes caused by immune cells and bacteria, disrupting healing and weakening wound tissue.²

Oedema blocks nerve to muscle signals diminishing quadriceps strength.

Swelling can contribute to quadriceps muscle inhibition after joint surgery, caused by a change in the discharge of sensory receptors.³

- Oedema can reduce excitatory input of the surrounding muscles by activating several mechanisms within the central nervous system that can change the discharge of sensory receptors in or around the knee joint, preventing the quadriceps muscles from being fully activated.⁴
- Abnormal output from knee joint afferents can alter the excitability of multiple spinal reflex and supraspinal pathways that then combine to limit activation of the quadriceps a-motoneuron pool.⁵

Activation of the calf muscle pumps increases blood flow volume and velocity through the capillaries, which in circumstances of lower limb trauma, can assist in reducing the net filtration (or further leakage) from the capillary bed. In these circumstances, through a unique mechanism of neuromuscular electrostimulation, the gekoTM device can prevent oedema build-up, but equally enable oedema clearance by local reabsorption of excess interstitial fluid into the vasculature and lymphatic systems.⁵

The gekoTM device gently stimulates the common peroneal nerve activating the calf and foot muscle pumps increasing blood flow in the deep veins⁶ of the calf at a rate equal to 60%⁷ of walking without the patient having to move.

References

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