

## **Increased skin oxygenation and antismelling effect of Stepit – an active foot pump system.**

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Step-it is a foot pedal, which when in use stimulates the calf muscle pump simulating ordinary walking and thereby emptying the calf muscle veins. Theoretically this should counteract swelling during long-term sitting and bed rest. Other measures stimulating calf muscle emptying have a preventive effect against the development of postoperative deep vein thrombosis. The aim of this study was to evaluate whether Stepit had an influence on the swelling tendency which is commonly seen in people with a sitting job. Furthermore, Stepit was used in patients with diabetes induced foot skin problems and skin oxygen tension measured. In addition Stepit was tested in patients with restless legs syndrome (RLS)

Twenty healthy persons (one male) with a median age of 50 years (range 29-64) with office job with much work in sitting position were studied. They had no history of previous deep vein thrombosis or leg fracture. The leg volumes were measured by using the largest calf circumference and the smallest ankle circumference using the formula of a truncated cone (this is linearly correlated with the volume obtained by water displacement. Persson, Takolander, Bergqvist. Acta Chir Scand 155;259:1989).

The volume was measured bilaterally in the morning whereafter Step-it was used on one side (random allocation) for at least 30-40 times hourly during six hours, whereafter bilateral measurements were again made. After around one week the procedure was repeated using the other leg for Step-it pumping.

On both occasions the leg using the Step-it showed less swelling than the contralateral unpedaled leg (2% vs 2.9% respectively and 2.5% vs 3.6% respectively). Of the 40 legs 30 showed less swelling in the pumped leg, 9 showed more swelling and in one there was no difference. This difference in favour of Step-it is statistically significant ( $p < 0.05$ ).

The optimal pump pattern (frequency and duration) has still to be defined as has the effect in patients with various types of oedema as well as if there is a thromboprophylactic effect. An interesting application would seem to be using

the pump in people sitting for long periods without the possibility to move around, for instance during long distance journeys.

To conclude, it is possible by using the foot pump Step-it to significantly reduce the day swelling in healthy persons with a mainly sitting job.

Using Stepit for 1 –2 minutes proved to increase oxygen tension in the dorsal foot skin in diabetic patients and 10% of restless legs patients experienced a relief after using Stepit before going to bed.

Niki Tebbutt who is Prosthetic Physiotherapist , National Health Service UK has studied 18 patients with peripheral artery disease (PAD)so far who have started the trial and continued.

Of these only 10 patients so far have completed their 3 month exercise trial. 60% of them have improved their claudication distance and max walking distance by up to 50%

The study will be performed on 45 patients and 45 controls.

**Conclusion:** Stepit – a pedal device can simulate walking in immobilized patients. Various categories benefit from using it regularly.