

# Inelastic compression narrows/occludes the veins in a tolerable way demonstrated magnetic resonance imaging (MRI)

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## Introduction:

In patients with severe chronic venous insufficiency (CVI) venous reflux in superficial and deep veins may be reduced by external compression. In the upright position this can only be achieved using compression material with high pressure.

## Aim:

...to investigate the reduction of the diameter of leg veins and of venous reflux in different body positions under the influence of different compression systems.

## Material and Methods

MRI was used to measure venous diameter in a total of 22 patients with severe CVI and oedema under the influence of inelastic\* compression material and with a multilayer compression system\*\* applied with different pressures.

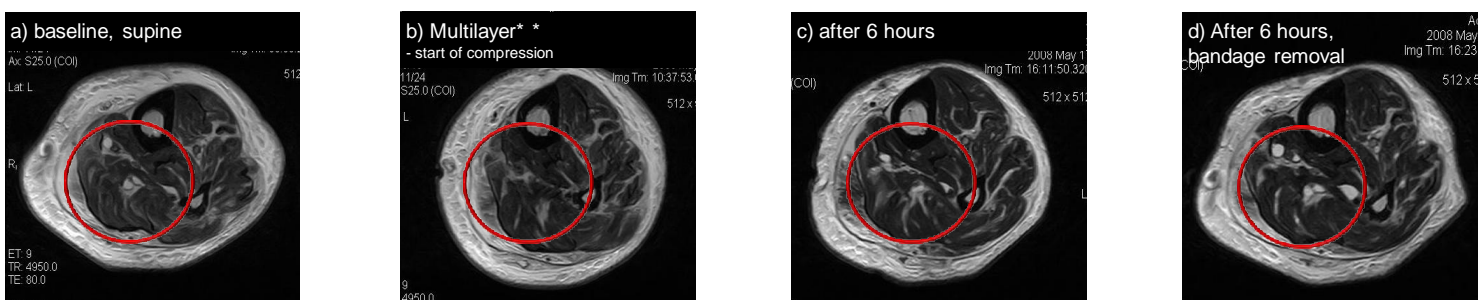
## Results

- 1) In supine position an inelastic compression\* exerting a resting pressure of 40 mmHg is able to narrow the veins (Fig. 1a, b). With dorsiflexion the pressure arises to 62 mmHg and the veins completely occluded (Fig. 1c).
- 2) In the standing position inelastic multilayer compression systems\*\* with a pressure (standing position) of 83 mmHg, corresponding to a pressure of 51 mmHg in the supine position led to a nearly total occlusion of deep veins in the lower leg (Fig. 1 e).
- 3) An inelastic multilayer bandage material\*\* is able to reduce significantly leg oedema after six hours (Fig. 2a-d).

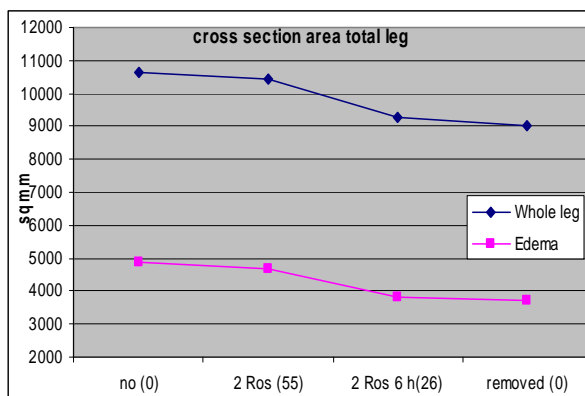
For the experiments inelastic material was intentionally applied with high stretch in order to obtain a very high standing pressure. However, such high pressure is tolerated only with short stretch material but not with elastic bandages. The main reason is that elastic material will keep the high pressure also during rest while inelastic material shows an immediate pressure reduction.



**Fig. 1:** MRI cross-section showing the narrowing of veins in the area of largest calf diameter in two patient patient 1: a) without compression (baseline), b) lying down and, c) lying down with dorsiflexion, both with an inelastic compression material\* patient 2: d) without compression (baseline) and e) standing with a multilayer compression system\*\*- complete occlusion of the veins



**Fig. 2:** MRI cross-section showing edema reduction in the area of largest calf diameter in a patient with massive venous oedema. a) without compression (baseline), b) compressed with an inelastic multilayer compression system\*\* c) after 6 hours compression with an inelastic multilayer compression system\*\*, d) after 6 hours compression with removed bandage



**Fig. 3:** Oedema reduction (bandage pressure in brackets)

## Conclusion

A hemodynamically effective narrowing of leg veins in the upright position that will be well tolerated by the patients also during rest can only be achieved by inelastic compression.

\*Rosidal® K, \*\*Rosidal® sys, Lohmann & Rauscher

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