

Influence of removal of saphenous vein on postural control in patients diagnostic with chronic venous insufficiency

Summary

In industrialized countries, chronic venous insufficiency (CVI) is one of the most common cardiovascular diseases. Its commonality stems from an increase in risk factors present in developed countries, such as obesity, lack of physical activity, sedentary lifestyle and genetic predispositions. When untreated, it may lead to multiple ailments connected with chronic pain and more severe health issues such as ulceration and slow-healing wounds. This, in turn, generates significant costs connected with treatment and incapability for work caused by many sick leaves. Signs of CVI in the lower limbs intensify while standing, which may have resulted in the frequency of their strain and the character of the deflection of the center of gravity of the body.

The aim of this work was to determine what impact a surgical procedure, which removes the saphenous vein, has on balance control.

The group of subjects composed of 99 patients aged between 54 and 83 with a diagnosed CVI on the CEAP scale of C2-C3. Women comprised 67% and men 33% of the total number of subjects. Patients were qualified for the surgical procedure based on medical referrals. 56 lower left limbs and 43 right limbs were operated on. The control group was 64 students aged between 21 to 23 (90% women and 10% men).

Balance control requires the coordination of input from the musculoskeletal system, the sight, and the vestibular system and constant supervision from the central nervous system. The functioning of the balance system was assessed by an examination on the force plate (Promed® size 50 by 50 cm), in an upright position. The examination consisted of two measurements conducted in a static condition with eyes open (EO) and eyes closed (EC) and a measurement in a visual feedback (FB), where the patient was asked to move his or her body so that the center of feet pressure (COP) stay in the square field (10 x 10mm). Each statokinesiogram was assessed parametrically, using the following variables:

- Average sway radius

- Average velocity and the velocities of sways in frontal plane – along the mediolateral (ML) direction (X axis) and sways in sagittal plane – along anteroposterior (AP) direction (Y-axis)
- Staying in quarters of the XY coordination system – the share of time to locate the COP point in individual quadrants of the XY coordinate system
- only for a visual feedback measurements: K – coefficient of coordination, namely the percentage of COP samples within the plane of the virtual square.

With each patient, the examination was done three times in different conditions.

- Before the procedure of surgery
- 48 hours after the surgery.
- 6 weeks after the surgery.

Patients avoided straining the affected limb before the surgery and in the 48 hours after the procedure in all the types of measurements (EO, EC) and especially in the visualfeedback (FB). In a distant post-operation time, that is 6 weeks after the procedure, postural parameters have improved significantly, especially in the visual feedback. In the examination, after recovery, patients preferred putting on a strain on the limb that underwent the surgery.

Conclusions:

1. Posturographic analysis did not show the effect of the surgery of the saphenous vein removal, on the balance control.
2. Posturographic analysis allowed to determine the frequency and the preference of the strain on the left and right lower limb during physical activity in a standing position in measurements with the visual feedback. It proved to be an adequate method allowing to quantitatively determine the differences between pre and post-operative ailments.