

## **ELECTRO-MUSCULAR STIMULATION WITH VEINOPLUS® FOR THE TREATMENT OF CHRONIC VENOUS EDEMA**

Also presented at: *European chapter of the International Union of Angiology, Paris 2010*  
*Russian Association of Phlebology, Moscow 2010*  
*Mediterranean Congress of Venous Pathology, Nice 2010*  
*DGP, Berlin 2010*

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**Objective:** Electro-stimulation with VEINOPLUS® has recently emerged as a new technique to activate the calf muscle pump and improve symptoms of venous disease. The aim of this study was to determine in patients suffering from chronic edema of venous origin the efficacy of VEINOPLUS® treatment in terms of reduction of evening edema, diminution of pain, improvement of quality of life and also evaluate the durability of the treatment and its impact on venous hemodynamics.

**Patients and methods:** 30 patients (32 legs) aged 19-50 (mean 45.2 ±1.3) classified CEAP C3 with chronic evening venous edema were recruited (22 limbs: C3SEp and 10 limbs: C3EsPr). All patients were treated with CE-registered VEINOPLUS® neuromuscular stimulator during 30 days: 3 sessions per day (each session being 20 minutes) during 10 days, then 2 sessions per day during 10 days and one per day during the last 10 days. Main criteria was the circumference of the supramalleolar shin segment, measured with a tape in the evening, before treatment, daily and as control 5 days after treatment. As secondary criteria, patients were assessed on day 0 and 35 regarding pain on the Visual Analog Scale, Quality Of Life (QOL) according to CIVIQ questionnaire and venous Refilling Time (RT) measured by Photoplethysmography. Three months after the treatment, evaluation of symptoms was made again. No other means of treatment or prophylaxis were used.

**Results:** VEINOPLUS® treatment was well tolerated by patients. There was not drop out and patients did not change their lifestyle. After treatment, a total or partial reduction of evening edema was shown in 93.8% of limbs, the circumference of the supramalleolar shin diminished by 20,3mm (p<0.001), the number of painful legs reduced from 28 to 12 and the severity score was cut from 8.3 ±1.1 to 3.8 points ±0.9 (p<0.001), QOL was improved significantly as the score dropped from 34.5 ±7.8 to 17.2 points ±4.6 (p<0.001) and RT increased from 17.3 ±0.9 to 21.5 seconds ±1.1 (p<0.001). Three months after VEINOPLUS® treatment a total remission of symptoms was observed in 50% of legs, despite absence of other treatment.

### **Discussion and conclusion:**

VEINOPLUS® stimulation is an effective and well-tolerated therapeutic method for the treatment of chronic venous disease when it comes to treatment of chronic edema, for reducing pain and improving quality of life. VEINOPLUS® can be used as additional means in the treatment and the prevention of symptoms of chronic venous insufficiency.

This study also reveals that stimulation of calf muscles with VEINOPLUS® can improve venous hemodynamics leading to a remission of symptoms. This finding should be investigated and confirmed in further studies reduction in pain severity, VCSS score and ankle edema, as well as a 3-fold increase in the number of healed venous ulcers.