

The Results of Depressomassage in Patients with Chronic Venous Insufficiency: A Preliminary Report

Kronik Venöz Yetmezliği Olan Olgularda Depressomasaj Sonuçları: Ön Çalışma

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ABSTRACT Objective: Chronic venous insufficiency is a major health problem that may adversely affect quality of life and may cause significant morbidity unless early recognition of the problem and developing and testing new treatment techniques are considered. Depressomassage is a new type of reflexotherapy technique which has a large range of applications from rheumatology to functional problems, dermatology, circulation problems and plastic surgery. This study presents preliminary results of depressomassage technique on edema, pain and activities of daily living in patients with chronic venous insufficiency. **Material and Methods:** Fifteen cases with mean age: 47.67 ± 12.11 years were included in this study. Investigated parameters were as the following: physical properties, duration of the complaint, leg circumference, pain intensity, impact of the problem on activities of daily livings and distance of pain-free walking. The depressomassage was applied by the "Skintonic" device to the whole extremity at the affected side for a total of 12 sessions, three sessions a week. **Results:** Pain intensity, limb volume, pain-free walking distance and the impact of the problem on activities of daily living improved significantly with the treatment ($p < 0.05$). **Conclusion:** As the technique has massage and lymphatic drainage effects, depressomasage is thought to be beneficial in treatment of cases with chronic venous insufficiency and deserves to take place in further investigations including higher case number and long term results.

Key Words: Venous insufficiency, edema, pain, reflexotherapy

ÖZET Amaç: Kronik venöz yetmezlik, erken tanı konulmadığı ve yeni tedavi teknikleri geliştirilip denenmediği takdirde yaşam kalitesini olumsuz etkileyebilecek ve önemli morbiditeye yol açabilecek majör bir sağlık sorunudur. Depressomasaj romatoloji, dermatoloji ve plastik cerrahi alanları başta olmak üzere, dolaşım bozukluğu ve bazı fonksiyonel problemlerde yaygın olarak kullanılmakta olan yeni bir refleksoterapi tekniğidir. Bu çalışmada, kronik venöz yetmezliği olan hastalarda depressomasaj tekniği ile uygulanan tedavinin, olguların ödem ve ağrı şikayetleri ile günlük yaşam aktiviteleri üzerine olan etkileri sunulmuştur. **Gereç ve Yöntemler:** Yaş ortalamaları 47.67 ± 12.11 yıl olan toplam 15 hasta tedaviye alınmıştır. Olguların fiziksel özellikleri, venöz yetmezlik şikayetlerinin süresi, bacakların çevre ölçümü, ağrı şiddeti ve venöz yetmezlik probleminin günlük yaşam aktiviteleri üzerindeki etkileri ve ağrısız yürüme mesafeleri incelenen parametreler arasındadır. Depressomasaj tedavisi, "skintonic" cihazı ile etkilenen ekstremitenin tümünü içerecek şekilde, haftada üç seans olmak üzere toplam 12 seans süresince uygulanmıştır. **Bulgular:** Uygulanan tedavi sonrasında, olguların ağrı şiddetlerinin, ödemlerinin ve problemin günlük yaşam aktivitelerine olan etkisini değerlendiren görsel analog skalası değerlerinin anlamlı şekilde azaldığı ($p < 0.05$), bunun yanı sıra ağrısız yürüme mesafelerinin arttığı ($p < 0.05$) görülmüştür. **Sonuç:** Uygulanan bu tekniğin masaj ve lenfatik drenaj etkilerinden dolayı, kronik venöz yetmezliği olan olguların tedavisinde faydalı olabileceği ve daha fazla sayıda olgu ile uzun dönem sonuçları içeren çalışmalarda yer alması gerektiği düşünülmektedir

Anahtar Kelimeler: Venöz yetmezlik, ödem, ağrı, refleksoterapi

Chronic venous insufficiency (CVI) is costly and a major health problem which can be described as the functional disorder of the venous system of the lower limb and affect 10-20% of the population with the increasing age.¹ The basis of the pathology is always the venous hypertension caused by valvular insufficiency and reflux with or without venous outflow obstruction. The consistent venous hypertension is the initiating factor in alterations in the microcirculation and leads to various pathologies including pain, swelling, edema, skin changes, and ulcerations.²⁻⁵

CVI is a progressive disease that may adversely affect quality of life and may cause significant morbidity. Early recognition of the problem and developing and testing new treatment techniques are welcome trends.⁶ Treatments, including supportive medication, compression therapies, sclerotherapy, surgical interventions and physical therapy methods such as massage, exercise, application of bandage and elevation generally aim to control the retrograde flow of blood, venous pooling, and the associated complications.^{4,7}

In recent years, negative pressure applications have also been preferred in the treatment of circulation problems and the associated ulcers.^{8,9} Depressomassage; also known as “dermatonie”; is a new treatment technique which was first developed by a French doctor (Dr. Serge Karagozian) and frequently used for cosmetic purposes such as lipodystrophy and scar treatment, but also has a large range of applications from rheumatology to functional problems, dermatology, circulation problems and plastic surgery.¹⁰

In depressomassage the treatment is directed towards the skin as it is considered as an organ from all sides as having multiple functions: protection, exchanges, thermoregulation, sensation and metabolism. It is a real interface between the interior and the exterior body and it constitutes the mirror of the individual, reflecting both physical and mental state. Treatment is applied by using the Skintonic device which performs continuous and intermittent vacuum with a pump, whose flow rate is regulated by a series of electrovalves, and has

various effects on skin, underlying tissues and circulation.¹⁰ In addition, the movement of the probe on the treatment area generates a positive pressure, as in manual massage application, thus offering us the chance to apply an alternative pressure treatment.¹⁰

Depressomassage has a special feature in its acting way. The mechanism of the technique is based on a neuro microcirculatory unit (NMU) concept which was presented by Dr. Serge Karagozian in 1995 at “Congress de Bichat (Paris)-Les journées de rééducation” (Bichat Congress- *The Days of Physiotherapy-mechanisms of apparition of the reflex dermalgy*). NMU is an entity made up of vascular elements on the one hand and on the other hand of nervous elements; and corresponds to a functional structure which groups together the sympathetic nervous system, the nervous fibres terminations, the mechanoreceptors, the arterioles, the veinules, the met-arterioles, the lymphatic collectors and the interstitial conjunctive tissues.

NMU, on a microscopic scale, associates with a ramifications network of the autonomic sympathetic nervous system which maintains a vasoconstrictor tonicity as well as on the arteriole and venule level as arteriovenous anastomosis.

While applying the continuous low-intensity mode, in addition to hyperemia, optimal lymphatic draining also occurs. At higher intensity, it tones the walls of the veins and capillaries, improves cutaneous trophicity and tissue elasticity. However, intermittent vacuum yields a true myogenic reflex stretch of the arteriovenous shunts and effectively stimulates the lymphatic ganglions, thus with the continuous form, leading to lymphatic drainage. Both vacuum forms create a skin fold and a gravitational effect in the vascular structures and the interstitial gel.¹⁰

Although numerous studies appear in literature about the non-pharmaceutical treatments of CVI, there exists no sample related with the application of depressomassage in this problem to our knowledge. Therefore, this preliminary study was planned in order to investigate the results of dep-

ressomassage in CVI, as a different technique than the traditional physiotherapeutic methods.

MATERIAL AND METHODS

This prospective study was approved by the ethical committee of Hacettepe University Faculty of Medicine and carried out at Hacettepe University, High School of Physical Therapy and Rehabilitation. The procedures followed were in accordance with the Helsinki Declaration.

A total of 15 patients (11 males and 4 females) with mean age of 47.67 ± 12.11 years and having chronic venous insufficiency in one of their lower extremities were included in the study between July 2006-December 2006.

Patients were diagnosed as CVI by the same cardiovascular surgeon according to the anamnesis, physical examination and Doppler ultrasound findings. All limbs were classified as C1 to C4 according to CEAP (*Clinical-Etiology-Anatomic-Pathophysiologic Classification System for Venous Disorders*) (C1: Telangiectases, C2: Varicose Veins, C3: Edema, C4: Lipodermatosclerosis or Hyperpigmentation).⁵ Cases having painful ulceration, active local infection, deep venous thrombosis and uncompensated cardio-respiratory insufficiency were not included to the study.

All of the patients were being followed by the same cardiovascular surgeon and were having similar anticoagulant medication. The cases were also recommended to use compression stockings, elevate their lower limbs and perform active ankle dorsiplantar flexion and circumduction exercises three times a day, including 10 repetitions for each, but failed to indicate a marked improvement in the subjective symptoms at the end of a three months of follow-up period, thus were referred to High School of Physical Therapy and Rehabilitation in order to attend the therapy.

Those who participated in this study gave informed consent.

EVALUATIONS

Data about physical characteristics [age, body weight, height and body mass index (BMI)] and duration of the complaint were recorded.

Circumference measurements of the limbs were performed in order to estimate the extremity volumes by using conical frustum model.¹¹ Foot circumference measurement started from the first metatarsophalangeal joint and progressed to medial malleolus by 3 cm intervals; and circumference of the leg was assessed at fourteen 5 cm intervals proximal to medial malleolus, to a total of 70 cm. Foot and leg volume was calculated by frustum model and summed up to determine the total limb volume.

Intensity of pain due to CVI and impact of the problem on activities of daily living (ADL) were both assessed by 100 mm length visual analogue scales (VASs) where 0 mm meant "no pain" and 100 mm meant "unbearable pain"; and 0 mm indicated "no difficulty in ADL" and 100 mm indicated "great difficulty in ADL", consecutively.

Pain-free walking distance was determined by a treadmill test, based on a standart protocol (constant speed: 3 km/h, slope: %12), where the distance before the onset of pain in the leg was recorded in meters.¹²

All of the assessments were performed by the same therapist before and after the treatment program.

TREATMENT PROCEDURE

Depressomassage technique was applied to the anterior and posterior sides of the affected extremity when patients were lying, by using the "Skintonic", a French made device which was maintained by the Hacettepe University Research Fund. An initial stimulus mode with intermittent vacuum was followed by a continuous mode for the massage effect. Lymphatic drainage was maintained at a continuous low-intensity after stimulating inguinal and popliteal lymph nodes with the intermittent vacuum mode. Patients were left to rest for a few minutes after the end of the session.¹⁰

The duration of each session was 45 minutes and the whole program lasted for a total of 12 sessions, three sessions a week.

All of the cases went on using their drugs and compressive stockings and doing their active ank-

le dorsi-plantar flexion and circumduction exercises at elevation during and after the treatment program.

STATISTICAL ANALYSIS

Statistical analysis was accomplished on a personal computer by using statistical program for social sciences version 12.0 (SPSS 12.0, demo, SPSS Inc. Chicago, Illinois). Wilcoxon signed ranks test was used to analyze the differences of pre and post-treatment values. Level of significance was set at $p < 0.05$.

RESULTS

Mean age of the cases was 47.67 ± 12.11 years and the mean duration of CVI complaint was 6.07 ± 3.35 years. Mean BMI value was similar during the treatment period (28.62 ± 3.83 kg/m² before the treatment and 28.53 ± 3.77 kg/m², after the treatment) ($z = -1.683$) ($p > 0.05$).

All of the cases had edema in their legs (C3-CEAP) and five of them had color changes in their foot and/or crus skin (C4-CEAP).

Table I presents pretreatment and posttreatment mean values of the pain intensity, edema of the affected limb, pain-free walking distance and impact of CVI on ADL. Statistical analyses revealed that all of the above mentioned parameters improved after 12 sessions of treatment ($p < 0.05$).

All of the patients tolerated the therapy very well and stated that they felt relieved in a surprising manner after the initial treatment session. No adverse affects have been observed during or after the treatment sessions.

CONCLUSION

This study examined the results of depressomassage in patients with CVI in their lower limbs. Ac-

ording to the findings, this technique seemed to be beneficial in reducing the CVI symptoms such as edema, pain and difficulty in walking and the impact of CVI on ADL.

We think the improvement in the investigated parameters might be due to the massage and the lymphatic drainage effects of the technique, which was previously explained in the introduction section.

Chronic deep venous insufficiency leads to chronic venous hypertension; the increased venous pressure is transmitted to the venules and the pathologic process affects the skin and subcutaneous tissues. In chronic venous insufficiency the capillary network is altered. The increased exchange surface is due to elongation and dilatation of the capillaries, which assume a glomerular-like appearance with thickening of the capillary wall. The increased hydrostatic pressure in the microcirculation causes the edema.¹³

CVI is traditionally treated with elevation, compression stockings, resting, exercises and local dressings in a non-pharmacological manner.⁴ Some patients are well treated, however many patients have recurrent symptoms on the basis of severity of the disease or the application technique preferred.

Alpagut and Dayıoğlu indicated that simple elastic stockings made active life possible in 345 cases having CVI without ulcers. They also applied external pneumatic compression therapy for 76 cases having ulcers due to the advanced CVI and pointed out that the adjunctive use of external pneumatic compression therapy lowers the therapy costs by shortening the therapy, decreases the need for antibiotics, and makes an active life possible earlier.¹³

TABLE 1: Pretreatment and posttreatment values of the evaluated parameters.

	Pretreatment	Posttreatment	z	p
Pain intensity (0-100 mm)	63.73 ± 29.58	24.33 ± 20.01	-3.300	0.001
Volume of the affected limb (mL)	5628.01 ± 888.61	5479.85 ± 843.09	-2.668	0.008
Pain-free walking distance (m)	89.67 ± 31.44	124.60 ± 32.05	-3.411	0.001
Impact of CVI on ADL (0-100 mm)	70.07 ± 20.39	28.20 ± 18.28	-3.352	0.001

Arcelus et al, in their preliminary pilot study, investigated the effect of a home use of impulse compression and elastic stockings in twelve extremities from nine patients and found out that the use of home foot impulse compression plus elastic stockings significantly reduced the residual volume fraction as measured by air-plethysmography and provided improvement in scores for swelling and pain in a group of patients with severe CVI.¹⁴

Abu-Own et al searched for the effects of leg elevation on the skin microcirculation in cases with CVI and in controls. They compared the results of laser doppler flux, blood cell velocity, and concentration of moving blood cells when the subjects lying in the supine position and after elevating the foot 30 cm above the heart level and concluded that limb elevation enhanced the microcirculatory flow velocity in liposclerotic skin of patients with chronic venous insufficiency.¹⁵ But the authors did not mention any information about the relationship between the change in microcirculation and the clinical symptoms.

Different than the techniques mentioned above, McCulloch and his colleague investigated the effect of vacuum-compression therapy (VCT) in a 30-year-old woman patient with severe arteriosclerosis and associated nonhealing fasciotomy wound. Outpatient physiotherapy management consisted of hydrotherapy and hydrocolloid dressings. But the authors stated that the treatment resulted in minimal success until combined with VCT. VCT was found to be useful in promoting capillary filling and most responsible factor for the wound healing.⁹

The only sample in literature about the efficacy of depressomassage in chronic venous insufficiency belongs to Laffont. He applied depressomassage to 12 woman with CVI for a total of 12 sessions during six weeks and found out that for all the patients treated, volumetric examination demonstrated a significant decrease in the leg volume and clinical improvement was approximately greater than 45% in parameters such as pain, heaviness, sensation of swelling and parasthesia which were evaluated with VASs.¹⁰

Our study results seem to be parallel to the ones that were achieved in Laffont's study. But the case number in this study was more and pain free walking distance which was not evaluated in the above study, improved in our patients.

In this study, Doppler ultrasound was used just for the diagnosis, so the effect of the treatment on circulation assessed was based on the symptomatic improvement, rather than an objective finding, thus formed a limitation of the study.

The patients neither had previous deep vein thrombosis history, nor suffered from claudication due to peripheral arterial disease. Although they were receiving anticoagulant medication, this restricted walking ability and the initial low pain free walking distances were surprising. This result is thought to be related with the physical activity levels of the cases, and should be evaluated.

Although the patients determined that they could not benefit from the treatment while they were under observation of cardiovascular surgery, this outcome was depended just on verbal statements and was far from the statistically proved findings. Therefore it became hard to appreciate the real advantage of adding depressomassage to the existent treatment clearly.

All of the cases included in this study had edema and five of them had color changes in their foot and/or crus skin, thus involved in different subgroups according to CEAP classification. But small case numbers in subgroups make an appropriate and a proper comparison impossible which may be achieved in further studies, including larger sample size, in order to find out which subgroup can benefit more from the technique.

However, in consideration of thinking that this was a pilot study which aimed to present the preliminary results of the technique; and the significant improvement in objective and subjective parameters, such as pain relief and increase in pain free walking distance, it can be concluded that; depressomassage is worth for research as being a new technique and the results are notable as they reflect the effects of negative pressure, different than the traditional applications.

Further controlled studies including higher number of cases and comparing the long term results of depressomassage with different treatment modalities by using objective signs such as pre and post treatment Doppler ultrasound results are thought to be required.

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