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Vascularizing action of the compressive microvibration endospheres

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Abstract

The aging processes of the face and body are mainly linked to the cellular characteristics referred to the lower use of oxygen and reduced mitochondrial activity with tissue purification deficiency and activation of inflammatory or degenerative processes that lead to fibrosis and to female evolutive fibroadenoma, so-called cellulite. All medical and aesthetic methods are today aimed, first of all, at improving tissue vascularization with an increase in temperature and consequent activation of metabolic activities, reducing inflammatory and regenerative processes. Compressive Microvibration Endosphères uses 55 rotating microspheres to create particular vibratory stimuli on the energy points and on the tissues in order to obtain optimal functional responses to vascularize, drain and regenerate, finally to reduce the pain of the tissues with fibroadenoma and lymphatic stasis. In 2007, the preliminary studies of this method were presented; since then and up to now, there have been interesting studies and

clinical experiences that show a constant and typical vascularizing action and thermal tissue increase that opens interesting reflections about the relationship between microvibration and vascularization. In light of current scientific knowledge, the retrospective study is the aim of this work

Introduction

In 2008, a new noninvasive physiotherapy strategy was presented to the scientific world, alongside the traditional method that used the principle of "Suction -Traction" to activate some metabolic reactions useful to reduce the fibrosis in the lipodystrophy or in other forms of the female cellulite. Normally, this "Suction-Traction" is obtained by a "vacuum" that aspirates and moves tissues to "stretch" connective fibers and stimulate particular receptors (1-3).

Defined "Endosphères Therapy", the new strategy changed the "Suction-Traction" with a new concept of "Compressive Microvibration" aimed at diffusing "microvibrations and microcompressions" produced using 55 soft silicone spheres, with a diameter of 19.5mm which, by rotating inside a cylinder at different speeds, transmit different mechanical vibratory frequencies in the tissues. These microspheres have an active mechanical rotating movement induced by the motor of the roller inserted in the cylinder and managed by the handpiece, while sphères rotate on their own axis in a passive movement induced by sliding on the tissues.

Associated with the different types of frequency and with the particular direction of rotation of the spheres, the compression exerted by the operating cylinder contained in the handpiece produces various elastic responses on the tissues, also stimulating various mechanoreceptors and energy points capable of activating different vascularizing, draining, toning or analgesic functional reactions (4, 5).

In those years, Endosphères Therapy was a revolution in vascular, sports medicine, and aesthetic physiotherapy, the novelty lay in the new particular action's mechanism of the methodology based on the variation of the rotation's speed of the rotating microspheres in soft silicone, which determine the frequency of the produced vibrations, from 40 to 450 Hz. The direction of rotation of the spheres and the pressure exerted by the handpiece on the tissues creates a "compressive microvibration" that manages to transmit a complex pulsed and rhythmic action that finally produces a "positive/ negative pump" effect (Fig. 1).

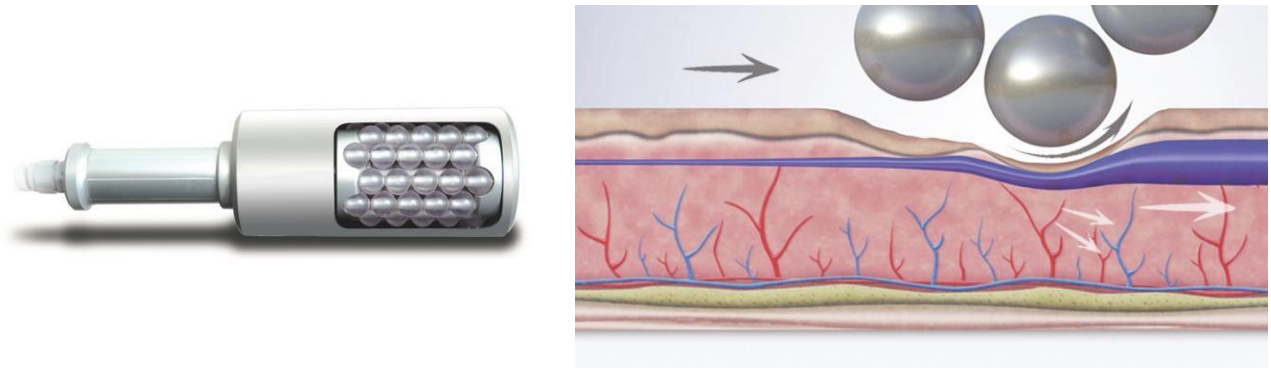

Fig. 1. *On the left, the 55 rotating soft silicone spheres housed inside the cylinder, on the right the rotation of the spheres (Courtesy FenixGroup).*

The right combination of the used microvibrational and microcompressive forces is the one that finally determines the intensity of the treatment that can be adapted to the different clinical conditions of the patient. For these reasons, the method proved immediately interesting for the treatment of pain in neuromuscular pathologies, but also in the clinical and aesthetic treatments for cellulite, lipodystrophy, lipoedema, and lipolymphedema.

Among the most interesting effects of the "Endospheres Therapy" treatment, we find an important lymphatic drainage action, a significant action of tissue vascularization with an increase in skin temperature, a constant reduction of tissue pain with reduction of inflammatory processes, a restructuring tissue tropism with reduction of superficial adipose layer, especially in the anterior part of the thigh and in the abdomen (6-8).

The first clinical observations were carried out between 2000 and 2007 by Professor Raoul Saggini, Director of the Postgraduate School of Physical Medicine and Rehabilitation at the "G. D'Annunzio University" of Chieti, which highlighted new interesting therapeutic perspectives to be used in orthopedics, sports medicine and physical medicine, including actions on the hyperexcitability of the nerves and muscle, where it produces a continuous and prolonged tensile action arranging the fibres in series and determining elongation of the connective tissue making it more elastic and more ready to reduce muscle contracture (9, 10).

In the same years, we observed other possible developments of the Endosphères methodology in aesthetic medicine and phlebolymphology starting from the significant vascularizing effect with the constant physiological increase in temperature due to an improvement in the quantity of blood circulating at a greater speed in a larger number of open vessels and capillaries. All these actions end up favoring the cell mitochondria activities that produce greater energy, greater oxygenation, greater tissue purification, and improved activity of the operating cells in the repair or regeneration processes (11, 12). In addition, we can find the positive effects on pain reduction thanks to the "compressive microvibration" induced stimulating different "mechanoreceptors" with a kind of "desensitization" that leads to the analgesic effect in a short time, creating a

therapeutic synergy that can be used in painful cellulitis, in the pain of lipolymphedema, in traumatology and sports medicine (13, 14).

Preliminary study

The preliminary studies of 2007 were followed by many experiences and studies, but already from the first clinical observations, we can well understand how the new methodology achieves a particular synergy between the "microvibrations" transmitted in the tissues and the "microcompressions" exerted on the receptor corpuscles. This synergy exploits the particular "honeycomb" arrangement of the spheres rotating in the cylinder to favour vascular and metabolic actions. The new mechanism of action is based on the elastic responses of the tissues to the stimulations transmitted by the rotating microspheres; these compressive microvibrations create micro-lifts and positive/negative translations that ultimately generate a "vascular gymnastics" useful for microcirculatory improvement (Fig. 2).

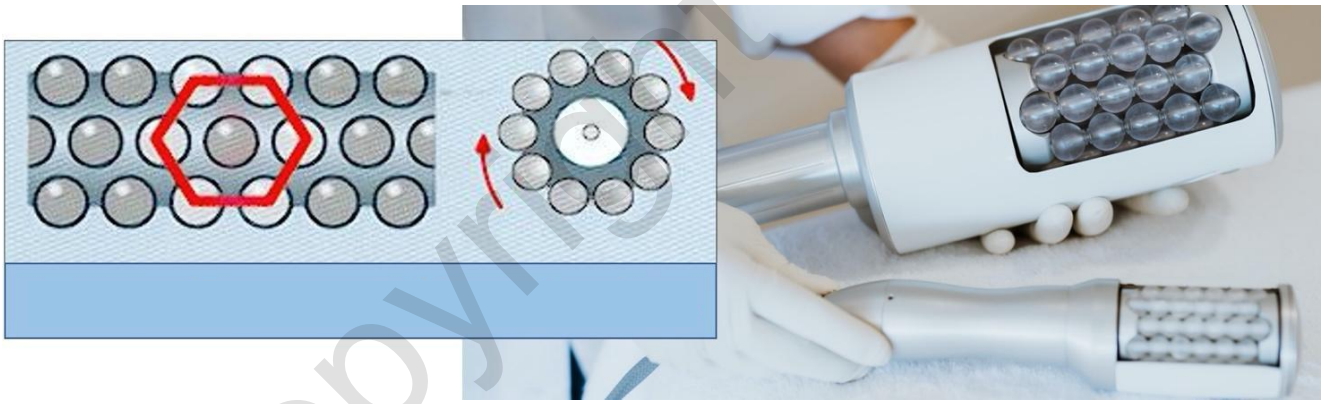

Fig. 2. *"Honeycomb" arrangement of the rotating spheres that generate micro-lifts and microvibrations (Courtesy FenixGroup).*

The variation of the rotation's frequency associated with the microcompressions, causes the opening of microshunts and new vessels with the consequent arrival of blood which increases the skin temperature with a significant effect on vascular hemodynamics and oxygenative microrheology.

In the Digital Telethermography Centre of the Institute for Advanced Biomedical Technologies "ITAB" at the University of Chieti, in 2007, some studies were carried out aimed at evaluating the thermal effects caused on tissues by the low-frequency microvibrations induced by the new Endosphères methodology (15). The investigation was based on digital telethermography, which detects the spontaneous thermal emission of the body, recording and then quantifying these emissions with appropriate thermal imaging

devices to convert them into digital graphic maps that ultimately demonstrate the distribution of skin temperature.

Twelve female volunteer patients between the ages of 18 and 55 who presented first, second and third stage cellulite in the lower limbs were monitored. Three telethermographic investigations were carried out for each patient: the first at the beginning of the treatment, the second halfway through the treatment (after six sessions), and the third at the end (after 12 sessions).

Images were acquired with an AEG256 PtSi digital camera with F50-f1 / 5 lens. The camera operated in the 3-5 micron band and recorded temperatures in a range between 5 and 50C° with NETD = 0.1C°. In this imaging method, each image is the average of 31 images acquired at a temporal resolution of 20ms which allows, in post-processing, to lower the temperature resolution down to 0.04, with images of 256x256 pixels and a spatial resolution of approximately 4mm linear per pixel.

The images in the visible band, corresponding to the field-of-view of each telethermographic image, were acquired with a 7.5 MPx HP digital camera, while the recordings were performed in a controlled air-conditioned environment (T = 23 +/- 0.5C °), relative humidity 55/60%, absence of direct ventilation, absence of direct radiation with expected acclimatization times of the patient in the measurement room.

Good results of treatments were evident both in the medical clinic and in the telethermography, where it showed greater vascularity with an average thermal increase of 3.14%. The significant final thermal increase detected "can certainly be the result of increased skin perfusion and oxygenation, of the increased metabolism of the tissues, of the breakdown of adipose aggregates as well as of the activation of anti-inflammatory repair processes of the tissue alterations present", this is how prof. Arcangelo Merla, Ordinary Professor in Applied Physics and Director of Advanced Biomedical "ITAB" at the University of Chieti, concluded (Fig. 3).

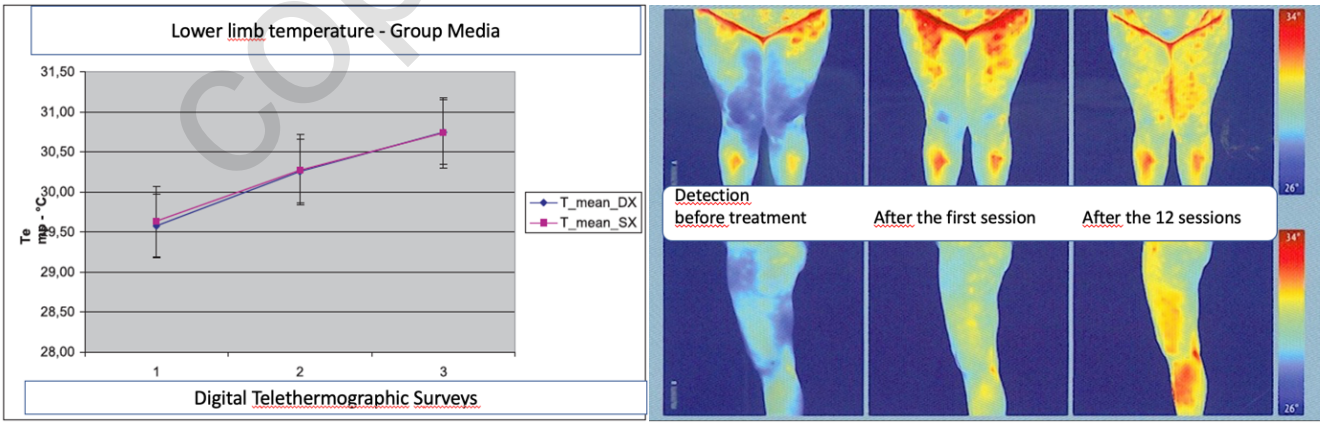

Fig. 3. *Post-treatment thermal increase evaluated graphically by the ITAB Institute (Courtesy FenixGroup).*

On the left, figure 3 shows the digital telethermographic images with an evident

increase in vascularity and temperature. On the right, we can observe the average variation detected by the group of patients, which shows a general increase in the average temperature of the lower limbs bilaterally, with a statistically greater than the average pretreatment temperature (ANOVA, $p < 0.05$).

Figure 4, on the other hand, indicates the group variance of the skin temperature of the lower limbs, hence a general decrease in the temperature variance bilaterally as the treatment proceeds.

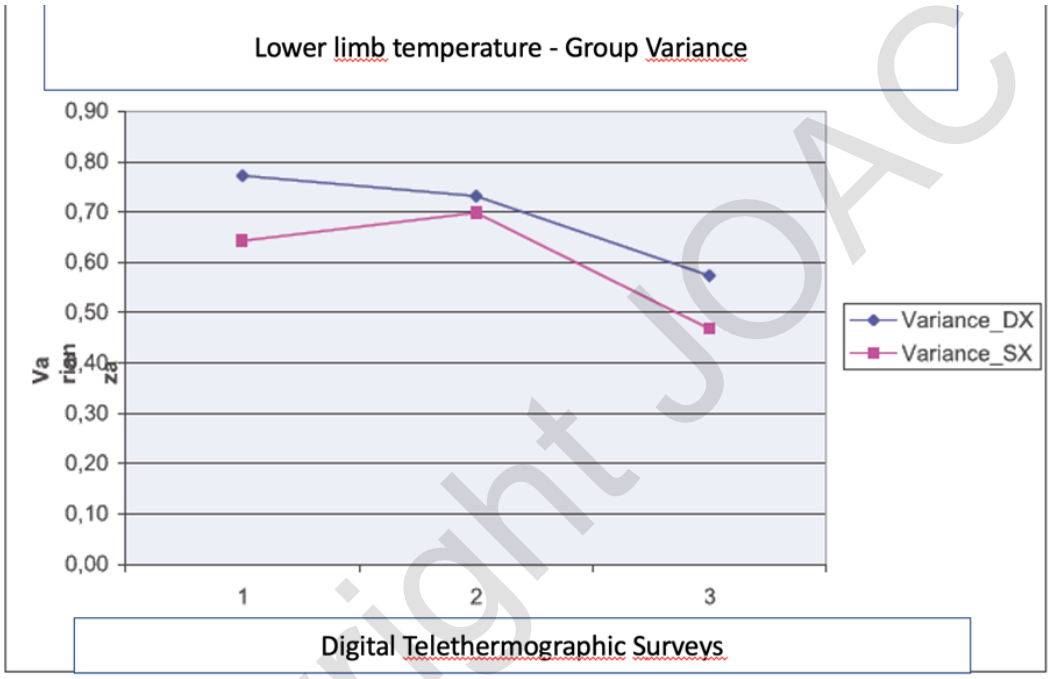

Fig. 4. *Evidence of the variance of the temperature in the Endosphères treatment progress (Courtesy FenixGroup).*

This result is very significant as it indicates the decrease of "cold hypoxic areas", which are typical of cellulite or lipodystrophic processes. In cases of second-third stage cellulite, it is typical to observe in the thermographic plates of the mottled leopard-skin images, with alternation of bright or dark parts to indicate the vascularized areas and the hypoxic and fibrosclerotic areas. Digital telethermography measures the thermal changes induced by the treatment but does not quantify, if not indirectly, the measurement of the thermal processes that occur in the deeper tissues that may occur for various causes, such as increased perfusion and metabolism, the disintegration of aggregates adipose and/or the regulation of inflammatory processes with activation of repair or regeneration reactions.

In the study performed by Dr. Merla, there is no doubt that the Endosphères method has highlighted the harmonization capacity of the tissue vascularization, which proves to be more homogeneous and symmetrical. These results on the thermal and vascular effects of the new strategy agreed with the observations in the

same period, in 2007 at the Aesthetic Pathologies Medical Centre in Arezzo, on sixteen patients with twelve sessions of Endosphères treatment in the trochanteric region (culottes de cheval), where an average temperature increase of 7.14% was shown.

This greater thermal increase is justified by the use of laser thermometry, by the presence of superficial steatomeric adipose tissue in this area, and by the bone base that enhanced the vascular treatment (Fig. 5).

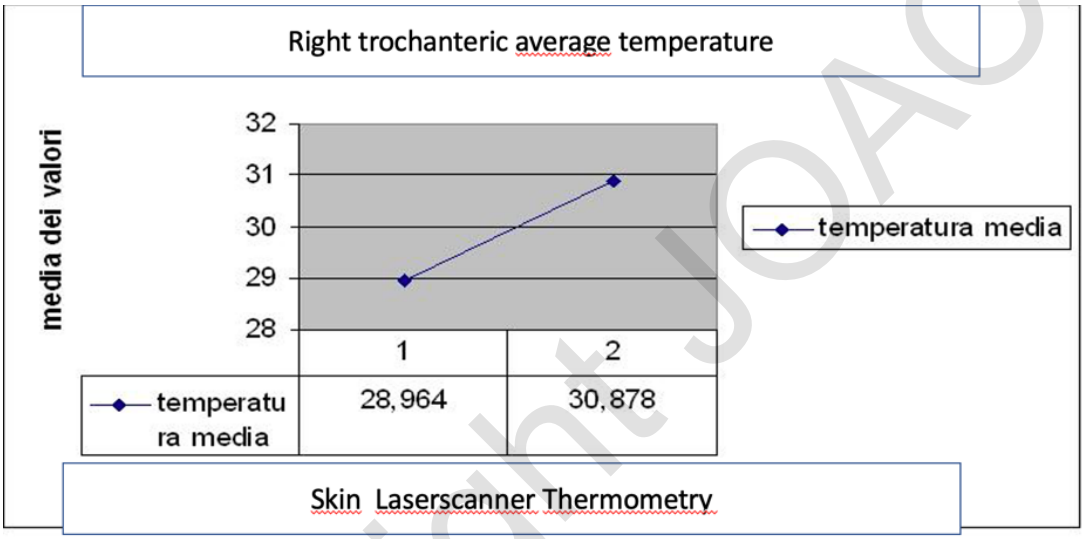

Fig. 5. *Average post-treatment thermal increase assessed in the trochanteric regions with a thermolaser (Courtesy Prof. Bacci).*

In 2008, a study was presented on five patients suffering from aesthetic cellulite pathology treated by Compressive Microvibration Endosphères. The patients did not have to do any other cellulite therapy, and the treatment involved a total of 18 sessions, two per week for six weeks (16).

All the patients presented third-stage cellulitis in the thigh and in the bitrocanteric region with adiposis in the buttock. Specifically, the first patient (N.1) was 44 years old and was in premature menopause, was taking hormone therapy, had leg length discrepancy, and had painful adiposity and lipodystrophy of the lower limbs. The second patient (N.2) was 39 years old, was slightly overweight, and was taking estrogen-progestogen hormones. The third patient (N.3) was 51 years old and was in menopause with diffuse adiposis, and the fourth patient (N.4) was 42 years old, medium overweight with lipodystrophy in the buttock and thigh (Fig. 6, 7).

Fig. 6. *Two patients with adiposity and lipodystrophy. On the left the patient N.1, 44-years-old after treatment we observe adipose reduction and skin improvement; - On the right the patient N.2, 39- years-old, after treatment we detect adipose and weight reduction with skin improvement.*

Fig. 7. *On the left, the patient N.3, 51-years old in menopause with adipose lipodystrophy, after treatment we detect reduction in adiposity with skin improvement; On the right, patient N.4, 42- years-old, overweight with adipose lipodystrophy, after treatment we observe weight and fibrose cellulite reduction with skin improvement.*

In all four patients, the treatment achieved a reduction in the adiposity of the hips, abdomen, and thigh, with skin toning and remodeling of the silhouette. The fifth patient (N.5), who was 25 years old and took estrogen-progestogen hormones, presented a typical advanced interstitial cellulite, treatment by Endosphères produced a marked improvement in skin tropism with the remodeling of the silhouette, thanks above all to the vascularizing effect that reduced hypoxia and tendency to fibroedema (Fig. 8).

Fig. 8. *Patient N.5, 25-years-old, with fibroedema and interstitial cellulite, after treatment we observe a real reduction in cellulite and dimpling skin with skin improvement.*

This study showed a significant improvement in aesthetic appearance for reduction of hypoxic fibroedema, with a greater amount of water, improvement of the dermal and subcutaneous matrix, reduction of alteration of adipose tissue, and better vascularization demonstrated by the thermal increase.

The relationship between reduction of cellular hypoxia for better vascularization and improvement of the aesthetic appearance of cellulite is a recurring fact that appears in many recent studies and on which most aesthetic medicine therapies are now based.

The succession of studies and experiences on the Compressive Microvibration also shows an interesting work relating to the assessment of skin thermal increase in the face of patients who are smokers, who underwent the Endosphères treatment (17, 18).

For the study, a dedicated Compressive Microvibration instrumentation, called "AK55 Face", was used to treat the face. The device was characterized by a handpiece containing an operating cylinder in which 66 soft silicone microspheres are inserted in various axes, smaller and softer compared to those used for the body. This treatment is usually aimed at rejuvenating the face by various actions: vascularizing, purifying, and restructuring (Fig. 9).

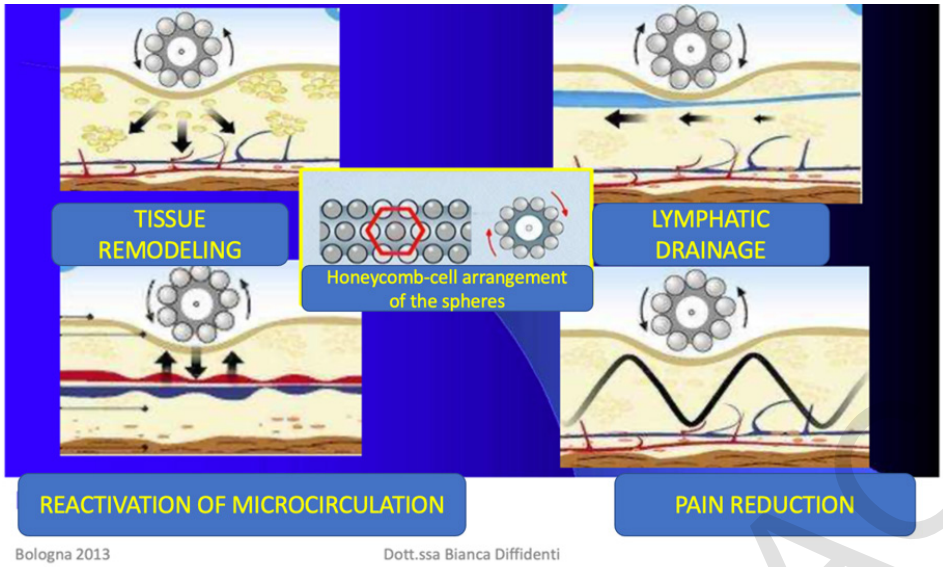

Fig. 9. *Actions sought of facial treatment with Endosphères AK55Face (Courtesy Prof. Diffidenti).*

In this study, the treatment foresaw that the cylinder was made to flow by the therapist along the tension lines of the face, especially on the forehead, cheek, and neck, with the speed of rotation of the microspheres suitable for obtaining specific actions of stimulation and vascularization. The increase in temperature obtained in a single session was evaluated by an infrared thermometer, detecting the gradient in the forehead, cheeks, and neck at the beginning of the treatment and at the end of the session, then every 10 minutes up to a maximum time of 60 minutes to evaluate the recovery time.

The measured temperature was compared with that evoked in another session on the same patient, under the same environmental conditions using bipolar or monopolar radiofrequency for the face (Fig. 10).

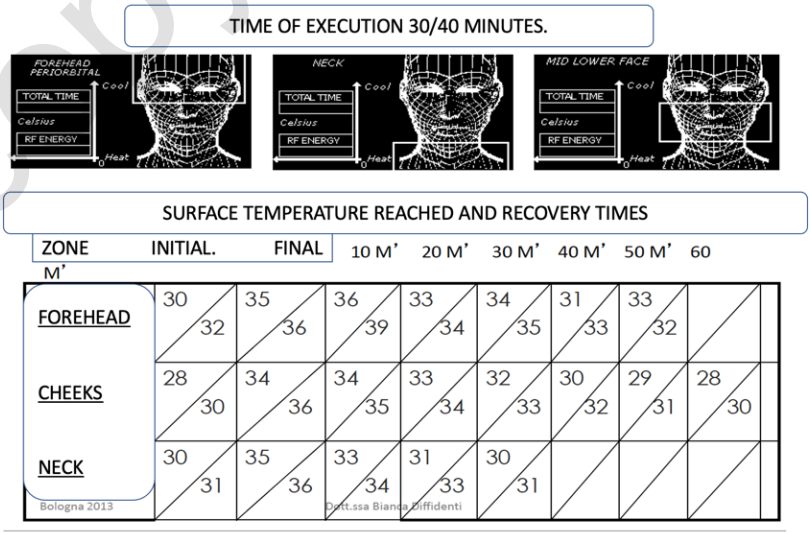

Fig. 10. *Temperature increases obtained and recovery times (Courtesy prof.ssa Diffidenti).*

The temperatures measured are related to the ability to create hyperemia and therefore increased vascularization and skin oxygenation. The results obtained show "a remarkable result for a noninvasive electromedical device and received with extreme pleasure and patient satisfaction," concludes Prof. Bianca Diffidenti, Professor in the Aesthetic Medicine Master at the University of Camerino.

Materials and Methods

In compliance with previous experiences, from March to May 2019, a new test was carried out by Endosphères Therapy to detect the increase in temperature and the improvement of aesthetic pathologies of cellulite of the lower limbs.

The study was carried out in the Centre of Phlebology and Aesthetic Pathologies in Arezzo, where sixteen female volunteers between the ages of 18 and 55 (average age 35.7) were monitored. All patients manifested cellulite at the first, second, and third stages. All patients did not have any current illnesses, nor did they take hormones, estroprogestins, cortisone, thyroid hormones, or other metabolic or vascular pharmaceuticals.

In order to facilitate the comparison of the results, the same protocol was used by a standard Compressive Microvibration using an "AKN Body Med 384Hz" equipment for a total of 12 sessions, of which three per week for two weeks and two per week for the other three weeks, monitoring every six sessions to evaluate the effect of the treatments and possibly adapt the protocol to new situations (19).

For each patient, the anterior region of the right thigh was investigated on four specific points, taking as reference the Hunter perforator and the saphenous femoral junction with the help of a 7.5/13MHz ultrasound probe: (Fig. 11)

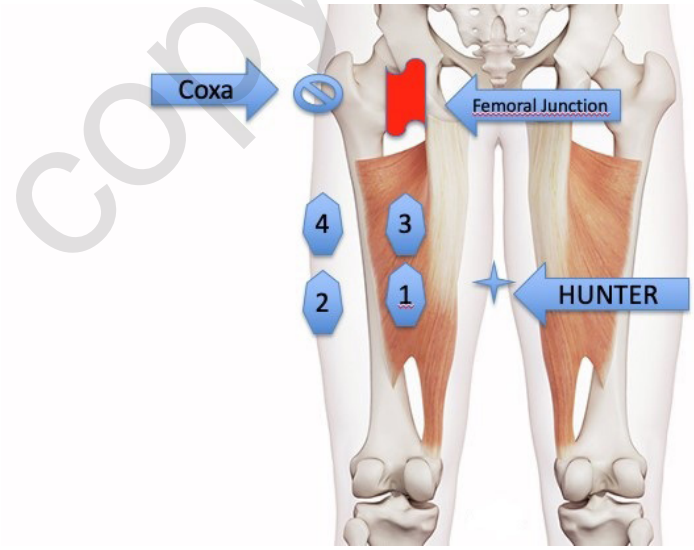

Fig. 11. *Thermal detection points with thermolaser.*
Point 1: At the height of the Hunter perforator on the vertical of the saphenous femoral junction.

Point 2: At the height of the Hunter piercing 10 cm outwards from point 1.
Point 3: In the midpoint between point 1 and the saphenous femoral junction.
Point 4: In the midpoint between point 2 and the right hip joint.

For each patient, four thermolaser measurements were made on the right thigh in the points described above; the first at the beginning of the treatment, the second after six sessions, and at the end of the treatment, measuring the temperature on the various points and then recording the average temperature.

The study was carried out by "AIDBUCKS Infrared Thermometer AD6530B" thermolasers with a range from -60C° to +600C°, with class 2 lasers compliant with ULSTD61010-1, Output <1mW and Wavelength 630-670nm, certified and CE marked. The measurements were taken the day after the last Endosphères treatment. The thermolaser is placed at about 5 cm from the skin, in a controlled air-conditioned environment (T= 24+/-0,5C°), relative humidity 55/60%, absence of direct ventilation, absence of direct irradiation, with expected patient acclimatization times in the measuring room.

The evaluations were made by a VAS Scale from 1 to 10 and by a TCD Code that evaluates the vascularization of the tissues, the state, and visibility of the orange peel and the tenderness of tissues, with a final number whose variation indicates the response obtained with the treatment performed (20). The "TCD Code", ("Temperature - Clinical - Pain"), integrates the clinical diagnosis by investigating the vascularization, degenerative evolutions, and painful symptoms of tissues affected by cellulite.

The "T factor" investigates the variation of vascularity and skin temperature with a liquid crystal plate system identifying 25 different thermographic pictures for different vascular situations, the "C factor" investigates the type of orange peel by identifying nine different referable states skin blemish with a dedicated VAS scale, while the "D Factor" investigates the pain symptom, identifying seven different states characterizing the symptomatology expressed by the adipose and tissue panniculus of the subcutis, thus dividing cellulite into painful and painless. Ultimately, using the sum of the numbers obtained from the "TCD factor", a final number is obtained, which is between 5 and 45 and which indicates the state of the cellulitic dermohypodermosic pathology (21-26).

At the end of the twelve sessions, a questionnaire was added for patient satisfaction. In this satisfactory questionnaire, the patient had to give an assessment about the effects of the treatments, using a VAS Scale between 1 and 10, where 5 is the line of demarcation between satisfactory and unsatisfactory. For each question, the questionnaire asked at which session the improvement was perceived. The questions were on the following:

- Has the pain and heaviness of the legs improved? At which session you felt the improvement?
- Has the swelling of the legs decreased? At which session you felt the improvement?
- Has the aesthetic appearance of cellulite improved? At which session did you see the improvement?
- Has the tone of tissues improved? At which session did you see the improvement?
- Are you satisfied with the general results?

- All patients included in this study were volunteers and had expressly requested to undergo Endosphères treatment in the standard protocol. All data are protected by privacy and the informed consensus.

Results

The laser thermometry study showed a temperature increase of 3.05% after six sessions and 4.76% at the end of the treatment, while the results of the treatments showed the good clinical and vascular response of the therapy with patient satisfaction definable in 8.56 of the VAS Scale (Visual Analogue Scale) (Fig. 12).

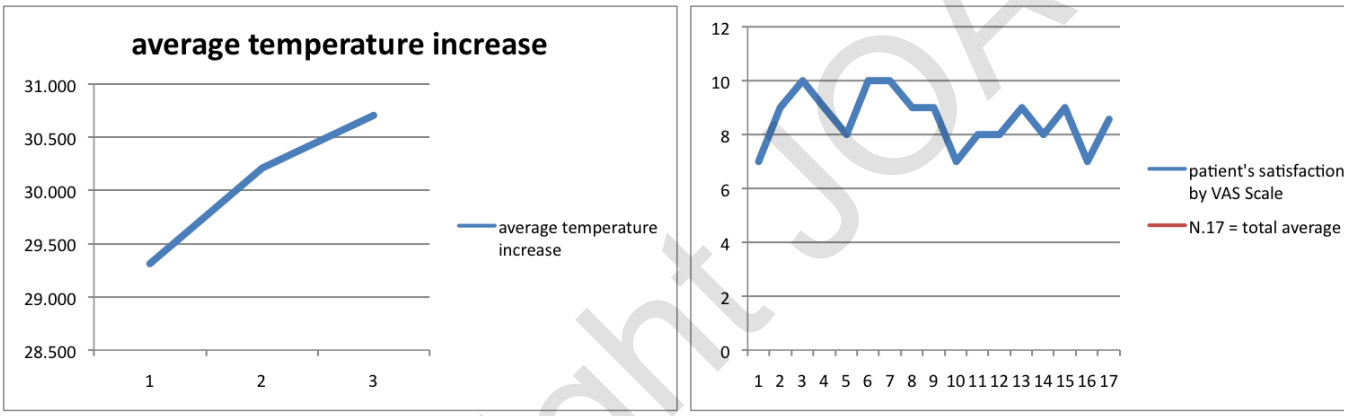

Fig. 12. *On the left, the increase in temperatures detected at the middle and end of treatment (t. = 5.94 with p <0.05). On the right, the patient satisfaction evaluation.*

The fundamental characteristic of the interstitial matrix is "plasticity", that is, the ability to adapt to various situations by changing the structure of the tissues and the action of the cells. This characteristic is altered when the tissue aging processes are activated with the formation of evolutive fibroadenoma; the propulsive thrust of the compressive microvibration treatment acts on the lymphatic system to eliminate excess fluids by activating the physiological, metabolic actions that bring the extracellular matrix back to physiology with the best vascularity.

The mechanism of action that exploits the rotating spheres allows skin and connective tissue remodeling with the physiological restructuring of the tissues that brings lightness to the legs, reduces pain and also improves the aesthetic appearance. For these aspects, it is interesting to observe the decrease in the TCD Number used to objectively evaluate the improvement of the patients' cellulite, where it went from an initial average value of 26.18 to a final TCD value of 12.93, with a TCD improvement of 50, 61% (Fig.13).

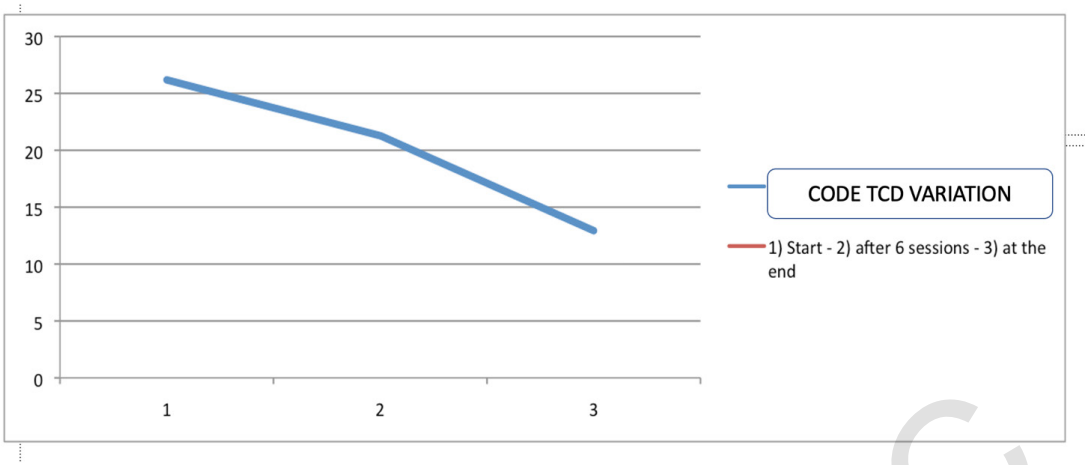

Fig. 13. *Clinical and aesthetic improvement evaluated with TCD code (tp <0.05).*

The subjective assessment questionnaire signed at the end of the treatments by the patient, highlighted the patient satisfaction defined in the Vas Scale with 8.65, as described on the right in Fig. 12.

As Fig. 14 shows, it is interesting to note that, the most important data obtained is the reduction of the pain symptom with an improvement of the sense of well-being of the legs. It is also interesting to observe how the sense of well-being is reported already from the first/second treatment sessions, compared to the eighth/ninth sessions reported for the improvement of orange peel of the skin, while the perception of tissue compactness is signed at the end of treatments.

Section A: TCD and Temperature

age	T1	TCD1	T2	TCD2	T3	TCD3
38	28,1	29	28,7	27	29,9	20
37	28,7	31	30,2	24	30,3	17
20	30,2	21	30,6	18	31,2	11
36	29,9	26	30,8	19	31,3	9
40	28,8	28	29,7	21	30,4	12
33	29,6	24	30,4	18	30,6	9
38	28,4	27	30,7	19	30,7	10
51	28,7	29	29,7	24	30,5	17
27	30,2	19	30,8	16	31,4	8
43	29,4	23	30,3	21	30,9	16
29	28,7	32	29,6	25	30,3	15
36	29,3	31	30,2	23	31,2	15
21	30,7	22	31,1	18	31,5	9
39	29,7	26	30,3	18	30,8	11
41	28,5	27	29,8	18	29,7	9
37	30,1	24	30,4	21	30,6	19
35,375	29,3125	26,1875	30,20625	20,625	30,70625	12,9375

Section B: Subjective judgment of the patient

Pain	sessions	Edema	sessions	cellulite	sessions	Toning	session	satisfaction
9	1	8	2	7	7	6	12	7
10	2	10	3	8	8	6	12	9
10	1	10	1	7	8	7	12	10
10	1	10	2	7	8	6	12	9
9	1	8	3	7	8	6	12	8
10	1	10	2	8	10	7	12	10
10	2	10	3	8	11	6	8	10
10	1	10	2	7	10	6	12	9
8	4	9	2	7	7	7	10	9
10	2	9	3	6	8	6	9	7
9	1	8	3	6	8	7	9	8
10	1	9	3	7	8	6	8	8
9	1	10	3	8	8	8	12	9
9	2	9	2	7	9	7	12	8
10	2	9	1	7	9	6	9	9
9	1	9	3	6	8	7	12	7
9,5	1,5	9,25	2,375	7,0625	8,4375	6,5	10,8125	8,5625

Fig. 14. *Subjective assessment of the patients after treatments.*

The study confirmed the main effects of vascularization and metabolic reactivation that allow the patient to also perceive a sense of "muscle revitalization". This is the most important result of compressive microvibration.

Discussion

This retrospective study about vascularizing effect of the Endosphères Compressive Microvibration has taken as a reference five different moments in the evolution of the new strategy, between 2007 at today, from the first clinical experiences to the actual practical knowledges, that are all connected by the same common thread indicating, as the main effect, the activation of tissue metabolism thanks to the vascularization induced by the microsphères rotating at precise frequencies.

It is therefore correct to speak of the "main effect" of this methodology, because all the other analgesic, draining or restructuring actions are consequent to this primary activity which uses the "microvibrations" and the "microcompressions" induced by the microspheres rotating at different frequencies, in order to achieve a characteristic elastic response of the tissues that favours a local positive/negative pump action able to open the microshunts and allow the arrival of a greater quantity of blood. This vascularising activity increase the speed of the blood in the vessels and capillaries, leads to a physiological increase in temperature and consequent better metabolic activity.

Reflecting on the images of the studies carried out in 2007 in the Centre of Digital Telethermometry of the ITAB Institute at the University of Chieti and in Aesthetic Pathologies Medical Centre of Arezzo, it is interesting to observe the little differences between the average increase of the thermal action obtained following thermographic or thermolaser measurements, that may be related to a possible more intensive treatment performed by the therapist or to laserscanner that tends to bring small differences in increase, but always we can observe a significant increase of the number of capillary vessels and arteriolar shunts with a greater quantity of circulating blood, therefore an increase in temperature and greater tissue oxygenation that stimulate metabolic activities with a best physiological purification.

The interesting data of all the surveys is not the "measured average increase in thermal action", but the "repeatability and constant response" in significant terms in statistics ($P<0.05$), together with subjective and objective clinical observations that demonstrate the constant relationship between physiological temperature rise and improved patient satisfaction, both clinical and aesthetic.

The study carried out in 2013 by Prof. Bianca Diffidenti is very interesting because show the different constitution between tight tissue and face tissues. In the first case we find a greater quantity of dermis, connective and fat tissue, beyond a strong deep muscle fascia, while in the facial tissues we have a finer skin, different vascularization and a particular adipose connective-muscular structure (known as SMAS) which replaces adipose, connective tissue and muscle fascia. In addition to this, in the fat tissue of the thigh, there are two alpha/adrenergic (lipogenetic) receptors for each beta/adrenergic (lipolytic) receptor, while in the face the situation is the opposite. That's why women increase more in the fat tissue of the thigh with respect to the face, but in the case of slimming, the face will lose weight before the thigh does. For these reasons, the face is the first to age because oxygen and metabolic or vascular activities are reduced, with a reduction of skin temperature as well.

Conclusion

With the backup of 20 years of experience and clinical observations, and in the light of modern knowledge, it can be deduced that the Endosphères Compressive Microvibration has continued to demonstrate the value of its actions obtainable with the rotating silicone spheres in the various protocols and in the various frequencies, acting today as a reference point for oedematous, adipose or lipodystrophic clinical and aesthetic pathologies of the lower limbs, body and abdomen.

The main problem of the aging processes always lies in the reduction of cellular oxygenation with a reduction in energy production due to reduced activity of the mitochondria and adipose cells. For these reasons, a precise basic physiotherapeutic treatment, associated with a correct purifying deacidifying diet, is always the best prevention and the basis of any corrective treatment (27-34).

All patients treated with Endosphères Therapy have always shown satisfaction right from the first sessions, with a significant reduction in painful symptoms and hypersensitivity of cellulite tissues, with improvement in orange peel and tissue compactness, and it is interesting to observe how there is a tendency to improve even after a few weeks of stopping treatment.

This typical effect not only improves the quality of life of patients but opens up new windows of reflection on the "cell regenerative activities" of the methodology, which are certainly favoured by particular frequencies and by stimulation of Trigger or TuiNa points created by the rotating microspheres.

At the beginning, Endosphères Therapy was certainly a revolution in the "treatment of orange peel and adipose cellulite" and is rightly still positioned both as a preventive therapy and as a basic corrective therapy for all forms of cellulite, which can be associated in cases indicated for other necessary medical therapies.

The new treatment proposal "Endosphères" for skin orange peel and cellulite in its different forms responds to current scientific knowledge and is indicated for the current requests of patients about oedematous, adipose or lipodystrophic clinical and aesthetic pathologies of the lower limbs, body and abdomen.

References

1. Collis N, Elliot LA, Sharpe C, Sharpe DT. Cellulite treatment: a myth or reality: a prospective randomized, controlled trial of two therapies, endermologie and aminophylline cream. Plast Reconstr Surg 1999; 104(4):1110-4.
2. Chang P, Wiseman J, Jacoby T, Salisbury AV, Ersek RA. Noninvasive mechanical body contouring: (Endermologie) a one-year clinical outcome study update , Aesthetic Plast Surg 1998; 22(2):145-53.
3. Burkhardt BR. "Endermologie". Plast Reconstr Surg 1999; 104(5):1584.
4. Follador E, D'Angelo D, Marini F. La microvibrazione compressiva nel linfedema e lipoedema, 2007 (FenixGroup Archive).
5. Bacci PA. La microvibrazione compressiva con "Endospheres AK55", Scientific rationale and clinical observations. Archive of the Association of Doctors and Surgeons of Arezzo, 2008.
6. Saggini R, Di Pancrazio L, Iodice P, Bellomo RG. Trattamento del linfedema secondario mediante linfodrenaggio a vibrazione Endospheres, Cattedra di Medicina Fisica e Riabilitativa, Centro Universitario di Medicina dello Sport Università di Chieti, 2007 (FenixGroup Archive).

7. Goldman M, Hexsel D, Leisbahosgg G, Bacci PA. Cellulitis, physiopathology and treatment, Taylor and Francis, New York 2009.
8. Bacci PA. Cellulitis 2012. O&O Editor, Florence 2012.
9. Saggini R & Coll. Attività fisico sportiva e patologie neuromuscolari, Sport medicine congress, University of Chieti, June 2005.
10. Bellomo RG, Iodice P, Saggini R. Metodica Endosphères nel recupero muscolare dello sportivo, Bachelor of Science in Sport, University of Chieti, 2008 (Archive FenixGroup).
11. G. Maullu, A Pirino. Trattamento funzionale della cellulite con microvibrazione compressiva: dalla sperimentazione alla pratica clinica, Bachelor Thesis in the University of Sassari, 2019. (Archive FenixGroup).
12. Bacci PA. Compressive microvibration, preliminary study. Archive FenixGroup, 2007
13. Saggini R., Endospheres, protocolli. Corso di Laurea clinico-sperimentale di primo livello in Fisioterapia, Università di Chieti 2008.
14. Saggini R, Bellomo RG, Di Pancrazio L, Monteleone N, Lessiani G, Lolli A. Terapie a confronto nel trattamento delle lipodistrofie localizzate e dei linfedemi primari. Università degli Studi G. D'Annunzio di Chieti – 2007 (Archivio FenixGroup).
15. Merla A. Telethermographic investigation for the evaluation of the skin thermal effects of the Endoshphères Therapy treatment. ITAB University of Chieti, July 18st, 2007, (Archive FenixGroup).
16. Tamburlin N, Campanini L. Treatment of lymphedema associated with PEFS with compressive microvibration. Agorà Congress, Milan, October 10th, 2008 (FenixGroup Archive).
17. Mezzogiorno A. Compression microvibration in the treatment of facial wrinkles and sagging skin. University of Naples 2012 (FenixGroup Archive).
18. Diffidenti B. Rotating microsphères innovation, Congress of Italian Society of Aesthetic Medicine SIME, Rome 2014 (Archive FenixGroup).
19. Saggini R. Proposed protocol for Endosphères Therapy, Chieti University, 2007, Archive FenixGroup.
20. Rosas S, Paço M, Lemos C, Pinho. Visual Analog Scale and Numerical Rating Scale. Int Ortod 2017; 15(4):543-560.
21. Bacci PA. TCD Code, a new classification for cellulite, Congresso CIF Collegio Italiano Flebologia, Udine, 2003.
22. Bacci PA. TCD Code – IACS - International Academy Cosmetic Surgery Congress, Varna 2006, June 3rd.
23. Bacci PA. Il codice BIMED-TCD, Congresso Società Italiana Medicina Estetica, Roma, 2003.
24. Bacci PA. Code TCD, nueva classificacion por la cellulite, Sociedad Espanola de Medicina y Cirugia Cosmetica, Sitges, 2004.
25. Bacci PA. Clinical therapeutic classification: BIMED TCD. in Goldman M, Hexsel D, Bacci PA Leibashoff G, Cellulite, Taylor &Francis, New York 2006:115-141,1* edition.
26. Bacci PA. BIMED-TCD Code, in Bacci PA, Cellulitis 2012, Physiopathology and treatments, Officine Ed. Oltrarno, Firenze 2012.
27. Binazzi M, Grilli-Cicioloni E. A proposito della cosiddetta cellulite e della dermato-panniculopatia edemato fibrosclerotica. Ann It Derm Clin Sper 1977; 31:121–125.
28. Bacci PA, Physiopathology of FEF, in Bacci PA, Cellulitis 2012, Officine Editoriali Oltrarno, Firenze, 2012: 79-113.
29. Pishinger A, Matrice e regolazione della matrice, Ed. Haug Int, SIMF, Milano,1996.
30. Distante F, Bacci PA, Carrera M. Efficacy of a multifunctional plant complex in the treatment of the so-called 'cellulite': clinical and instrumental evaluation. Int J Cosmet Sci 2006; 28(3):191-206.
31. Zerini I, Sisti A, Cuomo R, et al. Cellulite treatment: a comprehensive literature review, J Cosmet Dermatol 2015; 14(3):224-40.
32. Terranova F, Berardesca E, Maibach H. Cellulite: Nature and aetiopathogenesis. Int J Cosmet Sci 2006; 28(3):157-67.
33. Rona C, Carrera M, Berardesca E. Testing anticellulite products. Int J Cosmet Sci 2006; 28(3):169-73.
34. Gelse K, Poschl E, Aigner T. Collagen: structure, function, and biosynthesis. Adv Drug Deliv Rev 2003; 55(12):1531-46.