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Gas Countouring®

Synergic action on adipose tissue

THE EFFECTS ON CELLULITE, LOCALIZED ADIPOSITIES AND SKIN AGEING OF COMBINED CARBOXY THERAPY AND OXYGEN INFUSION WERE MEASURED ON 60 PATIENTS. IMPORTANT RESULTS WERE ALSO OBSERVED HISTOLOGICALLY AFTER TAKING BIOPTIC SAMPLES.

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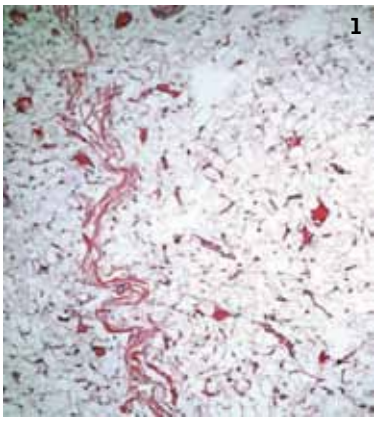
Cellulite, localised adiposity and wrinkles are problems which afflict most people. Different technologies - more or less effective - have been developed, over the years, to fight these conditions and pathologies.
As matter of fact, many doctors, although knowing the structure of the skin extremely well, underestimate the importance of the interstitial matrix (rich in GAGs), a tissue micro cosmos where vital exchanges occur.
The extracellular matrix is a gelatinous net of proteins and carbohydrates which acts as an infrastructure inside the skin's layers: derma, hypodermis, epidermis.
It is mainly made up of water, collagen, elastin, glycoproteins and carbohydrates; it contains a high number of specialized, non-collagenic proteins, which function as contact amplifiers between molecules, and create an infinite biochemical and biophysical network, able to generate, modulate and diffuse, even at a distance, enormous quantities of information. The **extracellular matrix** can, depending on the health conditions of the tissue, can be in a **sol** phase, which is highly instable (elevated number of hydrolysis) or in a, much more stable, **gel** phase (low number of hydrolysis).
When this micro cosmos is altered, vital processes are altered, toxic substances stasis increases and, consequently, fat tissue and tissue acidity in general increase, as do free radicals.

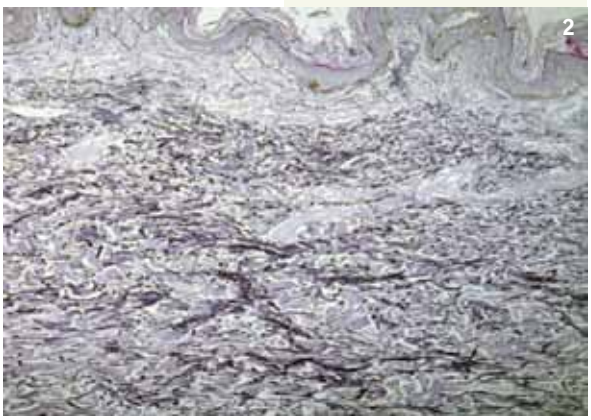
Materials and methods

The therapies used for this study are Carboxytherapy and Oxygen Infusion, combined in synergic action.
Meso-Carboxytherapy is the term used to describe medical Carbon Dioxide (CO_2) administered through micro injections of few cc of CO_2 (20-30) performed in different points of the area treated, either subcutaneously or intradermally.
This gas effects microcirculation, by reopening closed capillaries, reactivating the malfunctioning ones, increasing the percentage of oxygen in the tissues. In adipose tissues it breaks the adipose cells' membrane (lipoclasic effect) and reduces fat deposits. In the skin it improves skin elasticity and induces skin rejuvenation.
Carboxytherapy has a rehabilitating action on microcirculation system, intervening on microcirculation vis a tergo and correcting hyposphyxia of arterioles and meta-arterioles. This resolves the lymphatic venous stasis situation which causes edemas in the adipose tissue and determines a lipolytic action. This is due to the increased local tissue blood flow with receptor activation, consequence of the Bohr effect and of the Haldan effect.
Carboxytherapy also causes the **lipolysis of intra-adipocyte triglycerides** in fatty acids and glycerol as well as the increase of tissue blood flow. Increasing the quantity of oxygen, the oxidative processes of fatty acids are favored. Receptor activation liberates algogenic substances which stimulate lipolysis.
The medical device used for this study is MBE's VENUSIAN CO_2 therapy. The IIb class medical device, Venusian, is certified for the medical

Image 1: Well shaped adipose tissue rich in (E.E. X 100). Observe the fracture lines in the tissue, result of the lipolytic action produced by mesocarboxytherapy; the disassembled adipocytes, with destroyed membranes and the empty adipocytes caused by Oxygen Infusion.

Image 2: Well represented elastic dermal tissue (Weigert X 40). Important presence of elastic fibers, perfect integration and symmetry with the collagen fibers. In the reticular derma, the correct balance between the action of metalloproteinase and of their TIMP inhibitors is more obvious.





sector (CE0051), authorized by the Ministry of Health (aut. Min. n.520941/R) and is in compliance with communitarian laws regarding safety.
Venusian CO_2 Therapy allows total control of gas purity and quantity, of its administration speed and of the analysis of resistances within the tissues. Furthermore being able to control the gas' exiting temperature makes it practically painless for the patient.
In this study the gas was administered through skin inoculations at a variable flow between 100/120cc/minute in cellulite and localized adiposity affected areas, and 60/80 cc/minute for skin conditions.
The quantity of inoculated gas varies between 20 and 30 ccs per inoculation performed on the body and 3-5 ccs on the face. At the end of the treatment the max amount of gas infused is of 600-800 ccs in 10/20 minutes.
To perform this therapy 27 o 30G/ 11-13 mm needles were used, inserted for their entire length in cellulite and localized adiposity treatments and at a 45° inclination in the dermal tissue for face pathologies.
Oxygen Infusion is a therapy performed with an MBE medical device: **Oxy Xtra Med.**
Oxy Xtra Med is the only medical device of Oxygen Infusion and it is certified for the medical sector(CE0476); is authorised by the Ministry of Health (n. 391918) and is in compliance with communitarian laws regarding safety.
Oxy Xtra Med is able to generate oxygen taking it from external atmosphere and filtering it until it reached a purity between 94 and 98 %.
After the CO_2 inoculation, oxygen is ejected directly on the skin, at a pressure higher than 2 atmospheres, thanks to the specific handpieces which are equipped with disposable

Images 3a, 3b Abdomen – Before and After the treatment

hyperbaric mini-chambers .
Oxygen Infusion allows the gas to pass transcutaneously, through glandular annexes (pilosebaceous apparatus and eccrine glands), and through intercellular and/or transcellular paths.
During the emission phase, propelled oxygen in contact with the skin has a latency period in which the gas reaches an equilibrium with the epidermis. Once reached a constant penetration flow begins. It's entity is proportional to the concentration and the atmospheres at emission of the gas. The latency period is of 8 minutes.
Greater the exiting pressure , greater the penetration (Fich's first Law). The therapeutic action of Oxygen Infusion has angiogenetic properties and determines long term regulation of the tissue blood flow.
It increases the entity of tissue microcirculation's vascular bed creating a real angiogenesis.

Aim of the study and procedure

The aim of the study is to evaluate the effects of the combined action of Carboxytherapy and Oxygen Infusion on the following conditions: cellulite, localized adiposity and skin aging.
The sample of female patients taken into consideration is made up of: 60 Caucasian patients between 21 and 56 yrs of age (Average age 38 yrs old).
The treated areas were: saddlebags abdomen and face.
Each patient was subjected to 4 biopsies on saddlebags and abdomen: week 0 (beginning), week 4, week 8, week 12; and 2 biopsies on the faces temporal region: at week 0 (beginning) and at the end of the treatment.
At the same time photos were taken of the treated area and abdomen and saddlebags were measured for: elasticity, hydration, sebum and cm.
The biopsies were performed with a 2.0 mm diameter punch, and were observed and photographed by two independent observers.
The biopsies were coded per patient and group, and were performed always on the same area of treated skin.
Each sample was fixed by immersion in 4% pFA in a PH 7.2-7.4- 0,1 saline phosphate buffer for 24 hours to block the biochemical reaction of the tissue.
The biopsy samples were dehydrated in a series of ascending alcohols and infiltrated initially with organic solvents and then with warm liquid paraffin, which when it cools, solidifies, giving support to the tissue.
The pieces where then sectioned with a rotary microtome in 5-8 micron sections.
The adopted staining for the slides were chosen according to evaluation specifics:
H&E stain, Verohef, Weigert, Blu Mallory.
To stain the obtained sections we solubilized paraffin with organic solvents and rehydrated the tissue in a descending series of alcohols.
The slides were observed and photographed with a Zeiss Axiophot photomicroscope equipped with a Nomarsky differential interference contrast.
For the measuring of the elasticity and hydration of the skin we used a Callegari SPA probe system which allowed us to perform an objective evaluation.
The value of the two parameters measured was taken at a environmental temperature between 15° and 30° and the patient's body temperature was within normal values.

Results

From the data obtained and observed it is obvious that the combined treatment of carboxytherapy and Oxygen Infusion determines:
- After 4 weeks, a 25.1% increase in skin elasticity and a 19.9% in hydration ; regularization in the production of sebum both on face and body; a cm reduction variable depending on morph type and not on age, on saddlebags and stomach. These values are the average of the results obtained. The response to treatments was obviously greater for patients in the age ranges from 20-30 and 30-40.
- After 8 weeks, 37.8 % average improvement in elasticity and of 25.6 % in hydration, sebum secretion values are normal and a reduction of more than 1 cm in saddlebags and stomach.
- After 12 weeks, a 53.6 % improvement in elasticity and a 39.4 % increase in hydration; secretion values are normal; and the average reduction in saddlebags and stomach is of 2-3 cms

Analyzing the sample of people who underwent the

Images 4a, 4b. Face skin ageing: Before and After

treatment, the interesting aspect is that all respond to therapeutic gas stimulation and that it is more effective on patients between 23-30 and 30-40 yrs old.
Excellent results are registered also in the adipose mass reduction, more obviously noted on saddlebags and abdomen.
Given the longitudinal nature of this data, the level measurements obtained at the beginning of the treatment and at the following stages of the application of the therapies should be compared(transversal analysis) with the variations observed from one moment to the other (longitudinal analysis) with a Multivariate Analysis of Variance (MANOVA)for applied measurements.
The transversal analysis has made it possible to check the existence of important differences between the groups considered and investigate if two or more groups of data were significantly different respect to others.
The results obtained allowed us to state that the proposed therapy is effective.
The statistical evaluation, the microscopic observation and the macroscopic one of the data obtained for elasticity, hydration, sebum production and the cm of the adipose panniculus on saddlebags and abdomen, have fully confirmed the effectiveness for the improvement in the percentage values of elasticity, hydration, sebum production and lipolytic effect on the adipose panniculum.
The therapy chosen has shown important consequences also for body contouring
Well shaped adipose tissue rich in (E.E. X 100).
Observe the fracture lines in the tissue, result of the lipolytic action produced by mesocarboxytherapy; the disassembled adipocytes, with destroyed membranes and the empty adipocytes caused by Oxygen Infusion. Well represented elastic dermal tissue (Weigert X 40). Important presence of elastic fibers, perfect integration and symmetry with the collagen fibers.
In the reticular derma, the correct balance between the action of metalloproteinase and of their TIMP inhibitors is more obvious.

Conclusion and discussion

The behavior of a tissues' cells depends on a series of internal and external variables which are constantly interacting with each other.
Every single cell's life needs a vast range of data o perform its basic activities.
This information concern mainly: oxygen pressure; carbon dioxide pressure; water and soluble concentrations; available energy; quantity of glucose present.
We have observed closely the histological slides produced to measure and study what happens in the skin and have noted incredible results in the production of collagen and elastic fibers, the quality of hyaluronic acid and lipoclasic and emulsifying effect .
At mitochondrial level, the cells increase their oxygen reception capacities, thus optimizing energy control and diffusion.
There is an increase in the quality of the extracellular matrix, indispensable for the vital exchange between cells; collagen and elastic fibers do not only increase in number, as generally stated, but thanks to zinc dependant metalloproteinase present in the dermal tissue, they rearrange themselves so as to better maintain skin functions.
Thanks to the therapy presented, skin cells can communicate in a interstitial matrix in which biochemical events, but even more so, electromagnetic events make it possible to maintain this natural state permanently.
The synergic action of carboxytherapy and Oxygen Infusion determine the synthesis of dermal FILLING fibers (Collagen I and III), intensify the synthesis of SOSTAINING fibers (Collagen IV and VII), tones the skin and FILLS the superficial micro furrows to give density and volume to the skin, stimulating the synthesis of GAGs (Glycosaminoglycans), of type I,III,IV,VII collagen types to restore skin density and cohesion, promoting the synthesis of amino acids which create the NMF to hydrate the skin.
It intervenes on Cell oxidation (cell ageing) and tissue glycation or caramelization (tissue aging) and contrasts the loss of dermal elasticity and tone and the consequent creation of F.E.F. and stretch marks.
The synergy of the gasses effects also the adipose tissue where carbon dioxide breaks the membranes of the adipose cells and Oxygen Infusion stimulates triglycerides scission into fatty acids, reducing fatty deposits.

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