

BIORESURFACING WITH DERMOELECTROPORATION TREATMENT

Facts observed during treatment

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Abstract:

The term “Bioresurfacing” signifies a treatment procedure aimed at rejuvenating the face by non-surgical, “soft”, out-patient treatment means.

This procedure is suitable in subjects exhibiting the effects of acne, initial stages of skin ageing without tissue yield, and upkeep of aesthetic surgery.

The treatment requires bi-monthly or monthly sessions – a total of four to eight – of a procedure consisting first in superficial microdermabrasion performed with corundum crystals, intended for the removal of the corneus layer and for vascularization. These crystals are then used with a manual massage to promote further mechanical smoothing of the skin. Immediately afterwards, active substances such as collagen, jaluronic acid, amino acids or elastine are introduced by means of the Dermoelctroporation treatment, a new method for this purpose, consisting of a device that exploits an electric wave characterized by the possibility of creating the opening of “intercellular gates” that allow the passage of the molecules.

The equipment for Dermoelctroporation treatment also makes use of a vibrating action that stimulates the Merkel corpuscles to greater connective restructure of the tissue itself.

The session can be concluded with the application of pulsating light which introduces energy and stimulates the regenerating properties of connective tissues.

A home treatment with moisturizing and re-generating creams ends the treatment which is used, with interesting results, also for the aesthetic therapy of stretch marks and hypertrophic scars.

Introduction :

Rejuvenation of the face remains one of the most frequent requests of customers of Clinics for health therapy and the cure of aesthetic pathologies. Both male and female users desire aid in maintaining a cared-for look and to correct, whenever possible, whatever traces of skin problems such as acne, skin relaxation, irregularities, facial wrinkles, etc.

A number of treatments are suggested for this purpose, among which medical Bioresurfacing with Dermoelctroporation treatment is one more option available to the medical aesthetics specialist.

Anatomic and functional bases:

Dermo-epidermic tissue consists of various structures characterized by

- CORNEUS LAYER
- GRANULOUS LAYER
- “MALPIGHI” MUCOUS CORPUS
- BASAL LAYER

Particularly there are various layers with different functional action:

- 1) Epidermis
- 2) Corneus layer
- 3) Derma
- 4) Papillary derma
- 5) Reticular derma
- 6) Hypoderma
- 7) Collagen fibers
- 8) Lobular collagen fibers
- 9) Adipose lobules
- 10) Adipose cells
- 11) Vessels
- 12) Sensorial nerves

With respect to innervations, a typical organization of the sense of touch exists, i.e.:

- 1) Mechanical stimulation

(characterized by corpuscles that are sensitive to Pressure, Vibration, Suction)

- 2) Thermic stimulation

(characterized by corpuscles that are sensitive to Cold and Hot variations)

- 3) Painful stimulation

(characterized by corpuscles that are sensitive to painful stimulation)

These corpuscles are connected to the central nervous system and they send back information at a local level through various receptors:

- **Peripheral receptors:**
 - Sensitive to external alterations that are changed into nervous signals
- **Sensitive nervous fibers:**
 - Conductive of information. Afferent or centripetal fibers, known as “dendritic” because they are “T” shaped, they convey signals to the cortex. The dendritic nervous terminations are the most numerous in the subcutis to supply the deep dermic and then the under-epidermic plexus.
- **Nervous centers:**
 - Transforms the signal into perception, it is behind the *Roland scissure*

Corpuscles:

The innervations system is extremely sensitive and innumerable corpuscles that are present in the dermo-epidermic and hypodermic system, and each aimed at a function. There are.

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- 1) Free epidermic terminations
- 2) Free in derma terminations
- 3) Messner corpuscle
- 4) Vater Pacini corpuscle
- 5) Krause corpuscle
- 6) Ruffini corpuscle
- 7) Merkel corpuscle
- 8) Golgi corpuscle
- 9) Surface nervous plexus
- 10) Deep nervous plexus
- 11) Keratinocytes
- 12) Merkel cells
- 13) Schwann cells

Touch organization:

There are various functions of receptor corpuscles:

- MECHANICAL RECEPTORS, sensitive to mechanical stimulation
- THERMO RECEPTOR, sensitive to thermal stimulation
- NOXIOUS RECEPTORS, sensitive to pain stimulation

Among mechanic receptors are the following:

MEISSNER corpuscles

- sensitive to light stimulation (typical in fingers and toes)

Vater-PACINI corpuscles

- present in deep derma and sensitive to deep pressure. They stimulate fibroblast activity and are extremely useful in defense and healing processes.

GOLGI corpuscles

- present in cells and sensitive to light pressure. They stimulate fibroblast and collagene connective regeneration, not in a cicatrization sense, but toward a functional anatomic restructuring.

MERKEL corpuscles

- they respond to vibration stimuli and propagate them to nervous plexi. They control metabolic activity and hydro-lipidic adjustment.

Among thermo-receptors there are:

KRAUSE corpuscles

- responding to the COLD stimulus

RUFFINI corpuscles

- responding to the HEAT stimulus
- Useful in defense and healing processes

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Stimulation of the different receptors causes reactions at matrix and interstice levels that may be used in the different stages of the therapies.

The different reaction of Golgi or Vater Pacini corpuscles justifies the good results or complications obtained using wrong or in incorrect indications such active physiotherapeutic methods as *Endermologie®*.

The function of skin

Skin has various functions, including:

- 1) **Protection**
- 2) **Exchange**
- 3) **Thermoregulation**
- 4) **Sensorial**
- 5) **Metabolism**

Also to be mentioned is the immunologic function due to the presence of the Langerhans cells with their immuno-qualified activity. After seizing the antigen, they abandon the epidermis and submit it to the T lymphocytes which react when necessary.

Exchange function

The skin also has an exchange function with the outside environment, which is also used as a means of pharmacological introduction.

Endermic diffusion is a passive phenomenon, in fact the skin behaves like a passive membrane. Penetration of the substances takes place in two stages characterized by:

- 1) Dormancy stage, in which the dermic layer is charged, usually electrically
- 2) Flow stage, in which the flow becomes constant

Dermelectroporation Treatment:

In aesthetic pathologies characterized by skin irregularities and dystrophies, such as acne, wrinkles, stretch marks, sagging of the skin, the Dermelectroporation treatment is preceded by a surface microdermabrasion treatment performed by a system using corundum powder crystals (aluminum oxide in a sterile, disposable package) which produces a process of removal of the corneous layer with simultaneous vascularization of the tissue by mechanical stimulation (light suction – light pressure – dermabrasion)

When the dermabrasion treatment needs to be deeper and might cause pain, a session of Dermelectroporation treatment is used first to introduce an anaesthetic (2% *transdermal lidocaine* without adrenalin).

Removal of the corneous layer smooth the skin and facilitates the process of Dermelectroporation treatment which is performed immediately after microdermabrasion applying substances containing elastine, collagen, and aminoacids.

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Dermelectroporation Treatment:

The treatment is aimed at improving the outer appearance by stimulating reconstitution of new collagenous and matrix tissue.

There are several stages in attaining this end:

1. Lymphatic drainage and vascularization performed with Endermologie®
2. Skin smoothing performed by superficial microdermabrasion with corundum powder crystals (Ultrapeel Transderm® By Mattioli Engineering). After being made aseptic by means of non-alcoholic detergents, the skin is smoothed without being traumatized. Abrasion depth depends on the pathological case under scrutiny. At the end of the session, the crystals remaining on the skin are used to perform a final regularizing “gommage” with the fingers, and then the skin is washed with physiological solution.
3. Electric and Pharmacological stimulation, using the Dermoelectroporation treatment with Ultrapeel Transderm® By Mattioli Engineering. See figure below:



In Europe, Dermoelectroporation is carried out by means of sterile gauzes embedded by collage. Over the clean skin a sterile gauze pad is applied and on it is poured a sterile solution of elastine, collagene and aminoacid whose transdermic introduction is helped by the Dermoelectroporation treatment. The procedure usually lasts 5 minutes per area, until the substances are absorbed. At this point the skin is washed with physiological solution and a soothing treatment is performed.

See figure below



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4. Energizing stimulation, performed, when required, using a low-power Intensive Pulse Light

(Quantum 560 or 695 nM). This energizing action is made more active by removal of the corneus layer.

Sometimes the Photoresurfacing session is performed after 5-6 days when the connecting tissue regeneration has a marked stimulating effect.

5. Soothing action, performed by applying compresses of cold water and soothing substances

after applying an anti-herpetic cream (in our practice we use Zovirax® or Aciclin® as anti-herpetic and Biafin® or Biolenil Medestea® as soothing substances).

6. Cosmetic action. The patient may put on makeup before going out to protect the skin from the cold and the sun, using a fatty substance containing sun-screen.

6. Home treatment is recommended with a moisturizer containing Vitamin C and *Phytin acid* (in our experience Stand-by cream 5% MacPharma®) and sun screen.

The treatment is usually performed every 15-20 days twice or three times, and then a maintenance treatment every 2-3 months.

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The treatment is usually performed every 15-20 days twice or three times, and then a maintenance treatment every 2-3 months

Indications:

The treatment is recommended for:

- Effects of Acne
- Start of skin sagging
- Skin stimulation
- Stretch marks
- Pigmentation
- Skin unevenness

ESTIMATED INSTRUMENTAL PARAMETERS

A) FACIAL WRINKLES (CROW'S FEET)

20 patients, 14 women and 6 men, between the ages of 31 and 47 (average age 32.3), were treated with the Dermoelectroporation integrated treatment in four sessions:

1. D0
2. D15
3. D30
4. D60

The estimate was made at D0 and at D75 with examination of clinical parameters, after which the average statistic variation is examined.

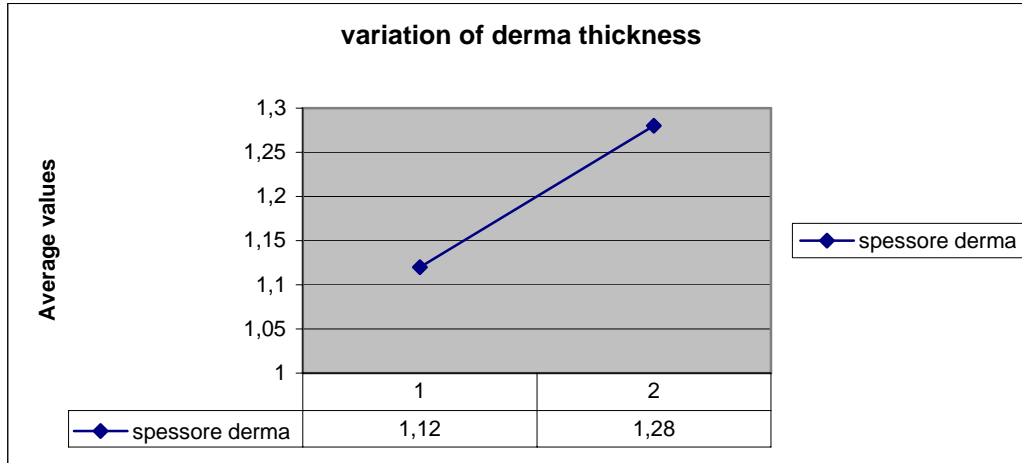
Face wrinkles (crow's feet standard)

AVERAGE WRINKLE %	- 24 +/- 4,8 % (p<0,05)
MAXIMUM DEPTH	- 36 +/- 8,6 % (p<0.05)

Dermal thickness (crow's feet standard)

(ultrasound technique 10 Mhz)----- **+ 14 +/- 5,1 % (p <0,05)**

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Comment: The parameters show a marked average improvement of crow's feet wrinkles with an increase of skin thickness after just four sessions (14.8%). The significance of the test demonstrates the importance of monthly or bi-monthly maintenance sessions to stimulate connective tissue and interstitial matrix regeneration associated with lymphatic cleansing of the tissue.

B) REJUVENATION OF THE FACE AND ACNE EFFECTS

20 patients, 14 women and 6 men, between the ages of 31 and 47 (average age 32.3), were treated with the Dermoelectroporation integrated treatment in four sessions:

5. D0
6. D15
7. D30
8. D60

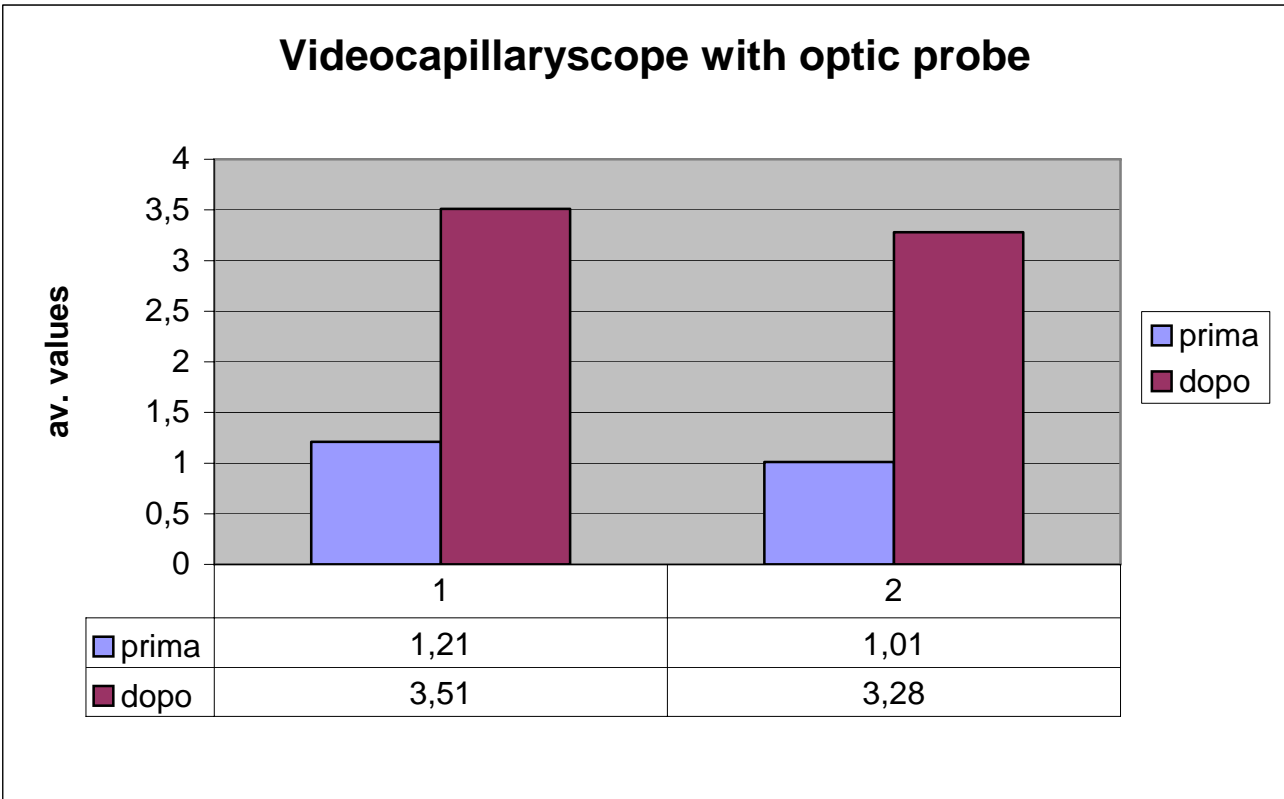
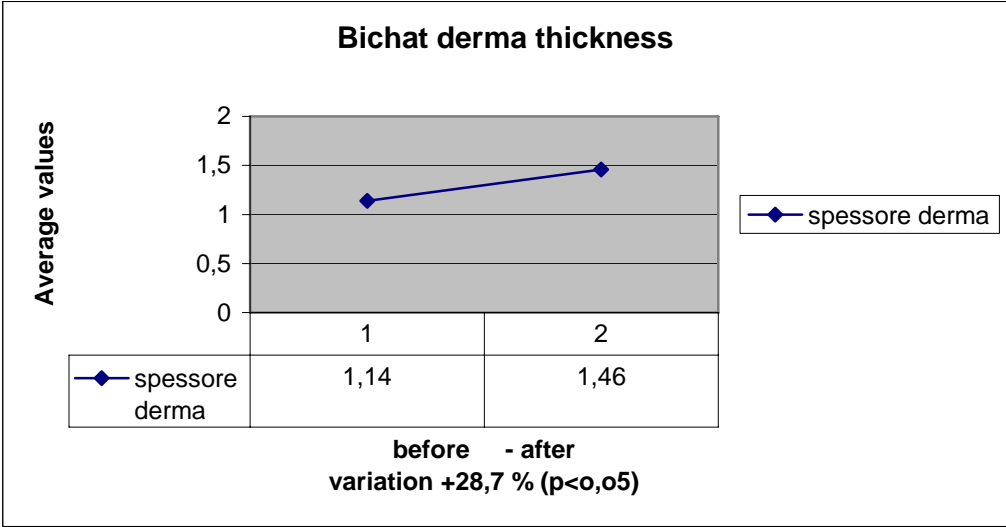
The estimate was made at D0 and at D75 with examination of clinical parameters, after which the average statistic variation is examined.

Effects of acne

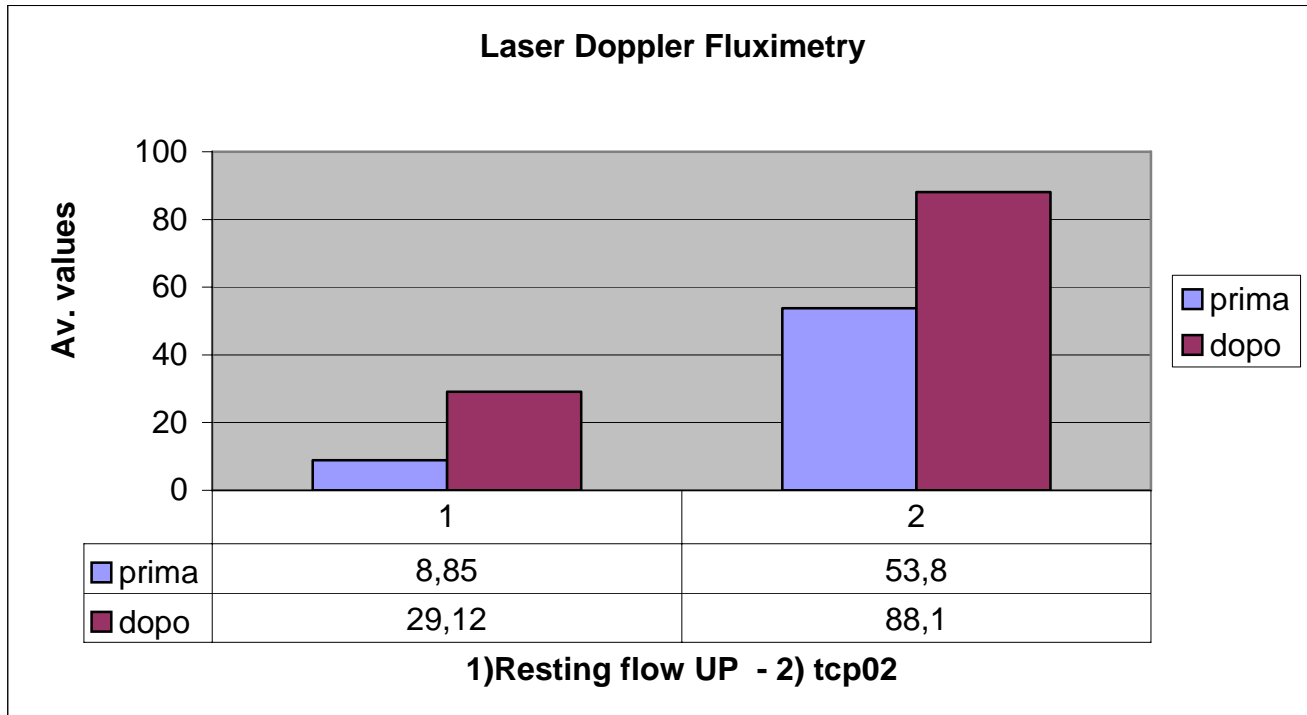
AVERAGE WRINKLED % - 71 +/- 6,9 % (p<0,05)
MAXIMUM DEPTH - 83 +/- 11,6 % (p<0.05)

Derma thickness (at Bichat blister level)

(ultrasound technique 10 Mhz)----- + 28.7 +/- 3,2 % (p <0,05)



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(photo 1)

Notice: in any legend dictation “Prima” stands for “Before” and dictation “dopo” stands for “after”

Comment: The parameters evidence a marked average improvement of the aesthetic appearance with marked reduction of skin wrinkled ness caused by acne effects and skin ageing process. A constant increase in skin thickness is noticeable after only four sessions (28.7%).

The significance of the examination and tests demonstrates the importance of monthly and bi-monthly maintenance sessions to stimulate connective tissue and interstitial matrix regeneration associated with lymphatic depuration of the tissue.

The association with *Intensive Pulse Light* may give excellent results.

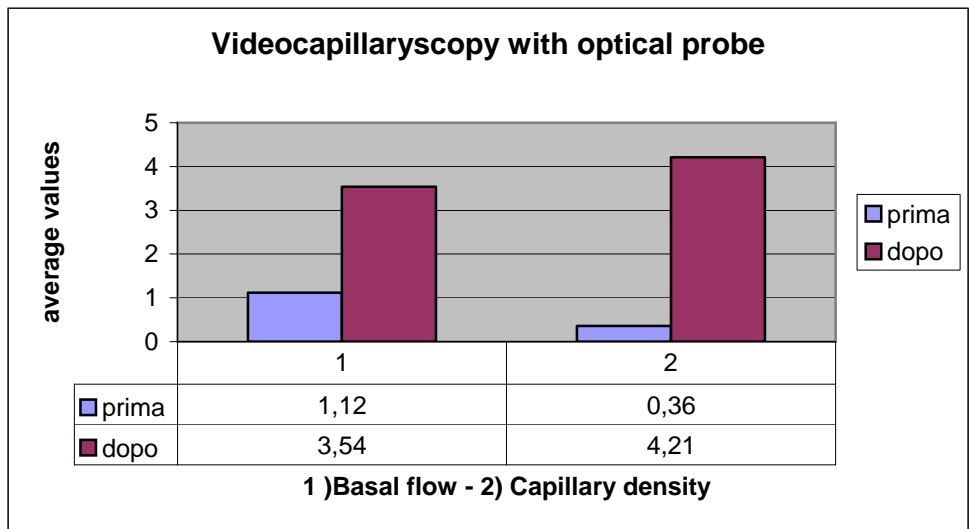
C) STRETCH MARKS

10 patients, 14 women between the ages of 19 and 37 (average age 27.4), were treated with the Dermoelectroporation integrated treatment in three sessions:

- 9. D0
- 10. D15
- 11. D30

The estimate has been made at D0 and at D45 with examination of clinical parameters, after which the average statistic variation is examined.

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Reduction of ecogene shadow (at stretch mark level)

(ultrasound technique 10 Mhz)---

- 21 +/- 3,4 % (p <0,05)

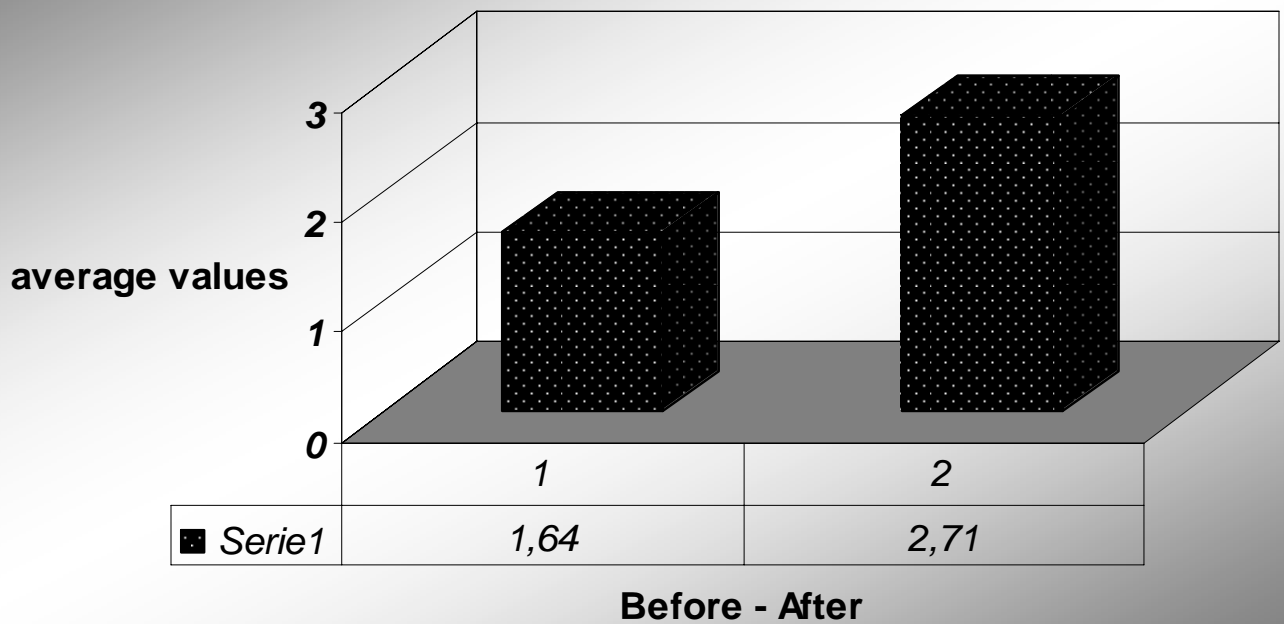
Vascularization of lesions and surrounding tissue

(Videocapillaryscopy with optical probe x 200) -----43 +/- 2,8 % (p<0,05)

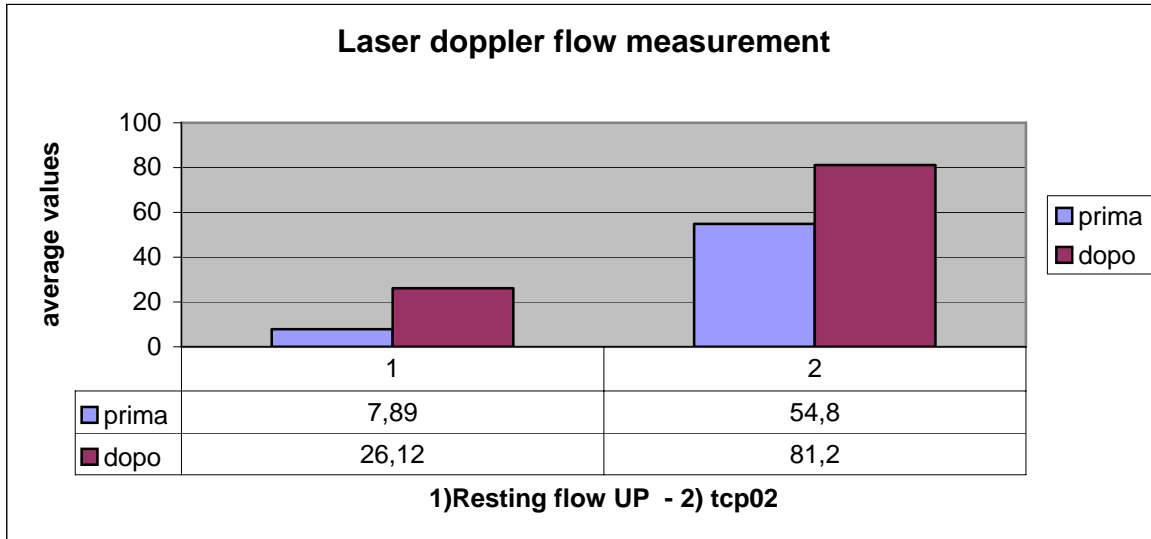
Please note in each graph, wording PRIMA stands for Before and DOPO stands for After.

(photo 2)

Standard Deviation - Videocapillaryscopy



(Photo 3)



(Photo 4)

Please note in each graph, wording PRIMA stands for Before and DOPO stands for After.

Comment: The parameters demonstrate a marked average improvement of the aesthetic appearance of the treated stretch marks, with a marked reduction in the difference in coloring. There is a significant increase in vascularization of lesions and surrounding tissue, meaning an improved microcirculatory return.

The improvement obtained after just one session demonstrates the importance of integrated treatments aimed at vascular, deep stimulation on connective tissue, along with reduction of surface unevenness.

The significance of the examination and tests demonstrates the importance of monthly or bi-monthly maintenance sessions to stimulate connective tissue and interstitial matrix regeneration associated with lymphatic depuration of the tissue.

The association with Intensive Pulse Light may give excellent results.

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