

**COMPARATIVE STUDY OF THE EFFICACY OF  
TWO COMMERCIALY AVAILABLE  
TRANSCUTANEOUS BIOREVITALIZERS.**



**MD. Noura Lebbar**

**Aesthetic & Plastic Surgeon Milan, Italy**

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# COMPARATIVE STUDY OF THE EFFICACY OF TWO COMMERCIALY AVAILABLE TRANSCUTANEOUS BIOREVITALIZERS.

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## BACKGROUND

The treatment and/or prevention of skin aging is one of the main reasons for consultation in our offices. As people grow older, the skin gradually ages, particularly in the facial region. Such aging is evidenced by certain physical indicators, including laxity, dryness and diminished elasticity of the skin, as well as the appearance of wrinkles and colour irregularities. Given the barrier function of the skin, and therefore the limited cutaneous absorption of topically applied products, stimulation of the extracellular matrix requires an internal stimulation strategy. In this regard, different techniques and compounds are available that act upon the extracellular matrix, favoring its renewal and affording the nutrients required for regeneration of the skin.

## OBJECTIVE

To compare the efficacy of two types of marketed revitalizers with a similar composition, using different application techniques: a) intradermal injection into the superficial dermis (mesotherapy); and b) a novel electroporation technique combined with microabrasion that act simultaneously.

## INTRODUCTION

Aging is the result of two biologically independent processes. On one hand, intrinsic or innate aging is an unavoidable phenomenon that affects the skin in the same way that it affects all the internal organs of the body. On the other hand, extrinsic aging is the result of exposure to external factors, mainly ultraviolet (UV) radiation, in the context of a process also known as photoaging [1]. Intrinsic skin aging is influenced by hormonal changes that occur with advancing age [2]. It has been well established that estrogen and androgen deficiency results in the degradation of collagen, dryness, loss of elasticity, epidermal atrophy and skin wrinkles [3]. Mesotherapy is a technique that involves micro-injections of therapeutic substances, such as hyaluronic acid, vitamins, minerals, and amino acids into the superficial papillary dermis of the skin. This allows active and essential ingredients to come directly into contact with the dermal fibroblast cells that are key to the more favorable appearance of younger skin, and (in theory) have a beneficial effect on metabolic processes. [4] The injections have two serious disadvantages: pain and needle phobia. There are electrical methods, which allow certain substances to painlessly cross the transdermal barrier without the need for injections, contributing to their regeneration. [5]

## MATERIALS/ METHOD

A prospective efficacy and safety study was made of 5 volunteers of both sexes, with different grades of aging in the facial zone based on the Glogau scale.

The following exclusion criteria were considered:

- Pregnancy
- Breastfeeding
- Treatments in the 6 previous months
- Autoimmune diseases
- No collagen topical use or ingestion
- No history of Covid-19

## REFERENCE

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2. Makrantonaki E, Adjaye J, Herwig R, Brink TC, Groth D, Hultschig C, et al. (2006). Age-specific hormonal decline is accompanied by transcriptional changes in human sebocytes in vitro. *Aging Cell.* 5:331–44.
3. Brincat MP. Hormone replacement therapy and the skin. (2000). *Maturitas.* 35:107–117.
4. Tosti A, De Padova MP. *Atlas of Mesotherapy in Skin Rejuvenation.* London: Informa; 2007
5. Carl M Schoellhammer, Daniel Blankschtein & Robert Langer Skin permeabilization for transdermal drug delivery: recent advances and future prospects *Expert Opin. Drug Deliv.* (2014) 11(3):393-40

### Material used

The biorevitalizers used consisted of two highly commercialized brands composed mainly of vitamins and minerals, in addition to including amino acids and hyaluronic acid.

Photographs were obtained with a high-resolution system (QuantifiCare®, Biot, France), at baseline and at the end of the study.

Skin firmness and elasticity in turn were assessed with the Cutometer®, based on the skin suction and relaxation action of the probe of the device, where an optical system measures the level of skin penetration into the probe aperture, as well as its deformation and return to the original state prior to deformation.

For the present study we selected the variables R0 (to characterize skin firmness) and R5 (to characterize net elasticity).

Lastly, skin hydration was evaluated with the Corneometer®. This system consists of a probe, which in contact with the skin measures the water content of the latter based on the principle of capacitance of a dielectric medium.

### Protocol

The method used was split face. On the right side, used the Compound 1 (international reference among biorevitalizers) was injected on the right side of the face using the point-by-point mesotherapy technique with a 4 mm 30G needle, while compound 2 was vehiculated on the left side of the face with a system that merges the electroporation and microabrasion techniques (Pulse Booster).

The parameters used:

- Electroporation: Level 5
- Product dosage: Level 3
- Contact degree: Level 4
- Contact frequency: 4 Hz

A total of 5 sessions were performed every 15 days.

The **home** treatment consisted of use of a sunscreen with a sun protection factor (SPF) of 50, up on demand.

## RESULTS

### 1) Net elasticity

Net elasticity is defined as the capacity of the skin to return to its original position following deformation induced in this case by suction with the Cutometer® probe.

On the right side where compound 1 was injected using mesotherapy, net elasticity improved 27.7% with respect to the baseline situation.

On the left side where compound 2 was vehiculated using electroporation combined with local microabrasion, the net elasticity improved 43.8%.

Figure 1 shows the results obtained (mean ± SEM).

### 2) Firmness

Firmness is defined as the resistance of the skin when it is sucked with the Cutometer® probe.

On the right side where compound 1 was injected using mesotherapy, firmness improved 2.2% with respect to the baseline situation.

On the left side where compound 2 was vehiculated using electroporation combined with local microabrasion, firmness improved 8.3%, with respect to the baseline situation.

Figure 2 shows the results obtained (mean ± SEM).

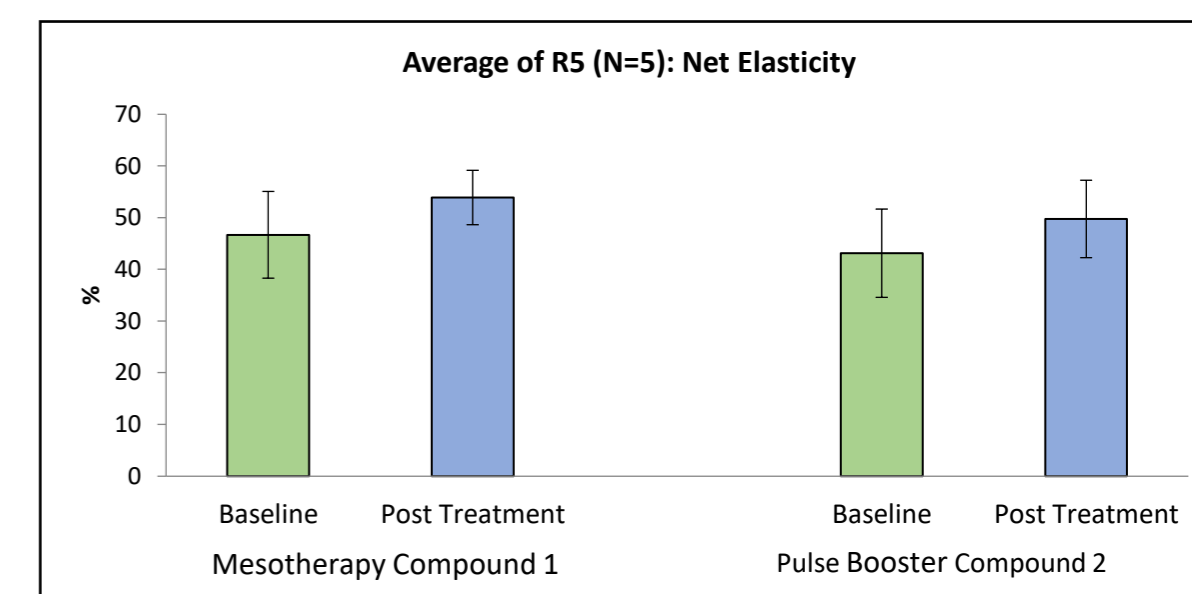


Figure 1. Net elasticity (mean ± SEM) at the two study timepoints, measured in the preauricular zone.

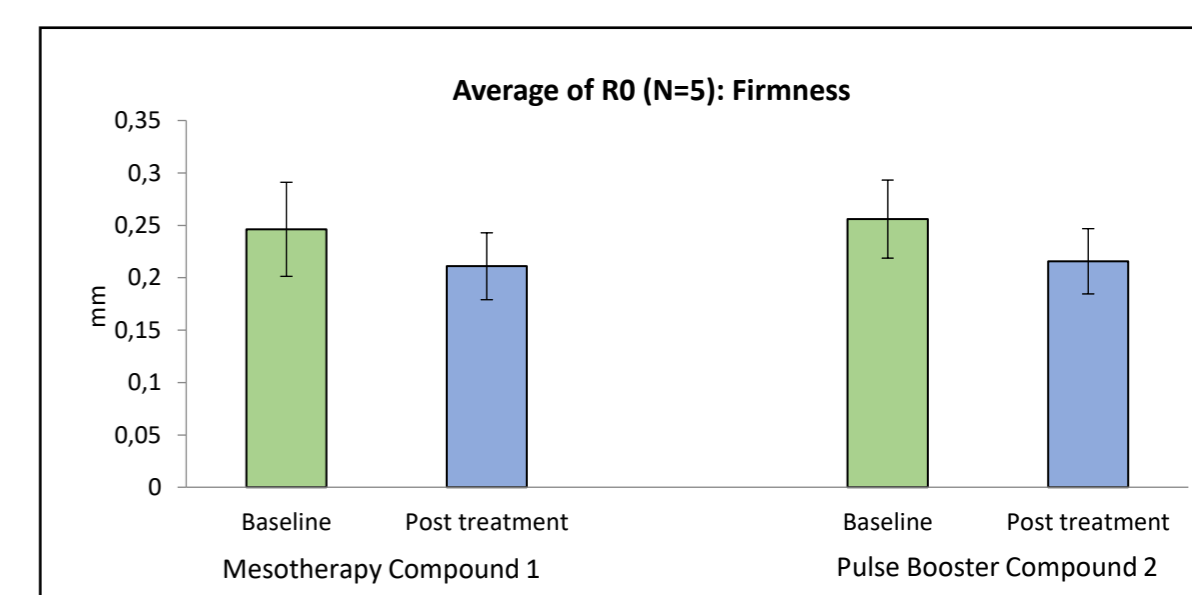


Figure 2. Firmness (mean ± SEM) at the two study timepoints, measured in the preauricular zone.

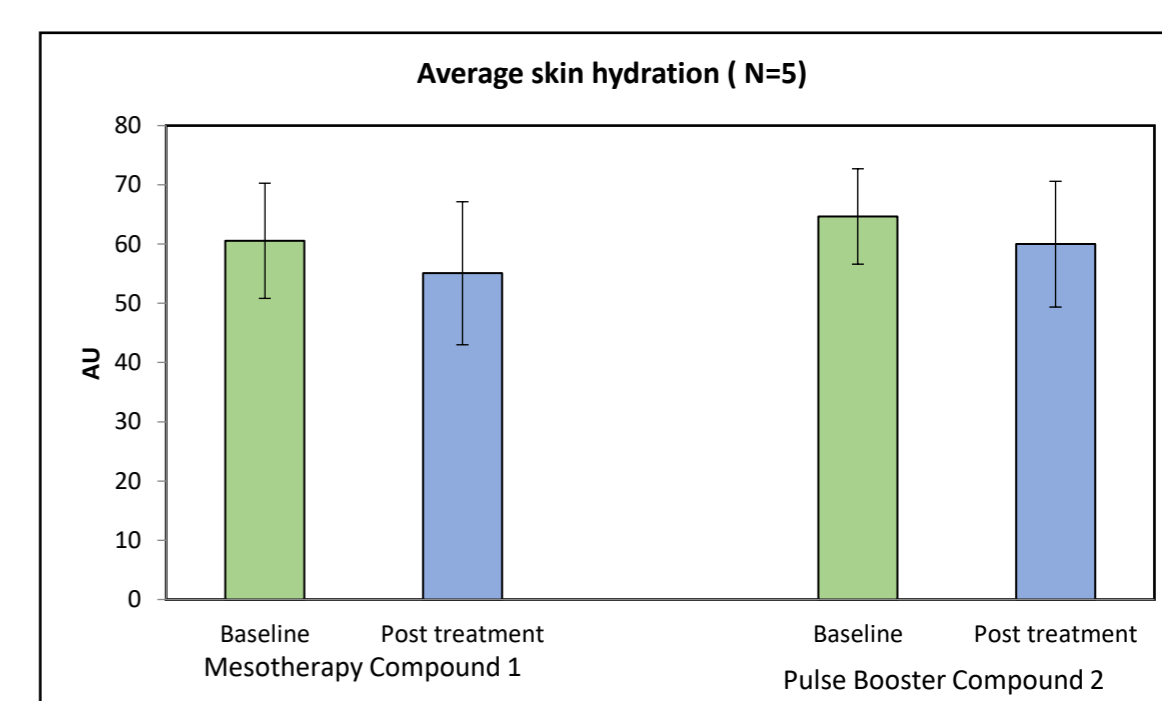


Figure 3. Hydration (mean ± SEM) at the two study timepoints, measured in the preauricular zone.

### 3) Hydration

On the right side where compound 1 was injected using mesotherapy hydration decreased 4.1% with respect to the baseline situation.

On the left side where compound 2 was vehiculated using electroporation combined with local microabrasion, the hydration decreased 7.5% with respect to the baseline situation.

Figure 3 shows the results obtained (mean ± SEM).

**Statistical analysis.** Data were expressed as mean ± standard deviation.

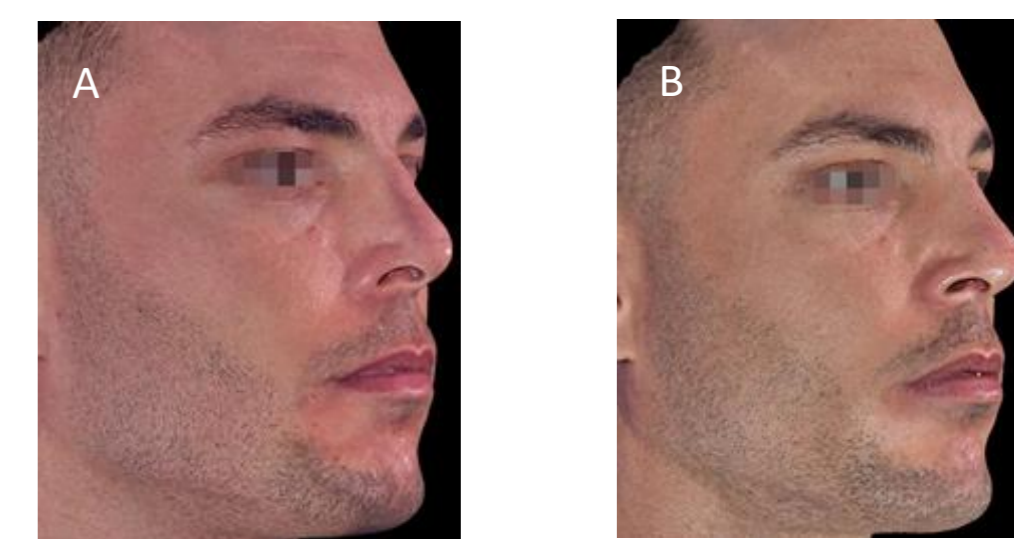


Figure 4. Lateral view **compound 1** of a 33-year-old participant. A: before the start of treatment. B: 30 days after the last treatment session



Figure 5. Lateral view **compound 2** of a 33-year-old participant. A: before the start of treatment. B: 30 days after the last treatment session.

## CONCLUSIONS

Despite the few volunteers enrolled in the study, it can be concluded that on using two products of similar composition and with actions and effectiveness directly dependent upon the administration technique employed, the results obtained with drug substance vehiculation using the electroporation combined with local microabrasion technique were better than those afforded by direct injection. This finding opens a range of possibilities for patients who do not tolerate intradermal injections, offering similar results with techniques perceived by the patient as being non-invasive and without side effects, and which allow an immediate return to normal activities of daily living.