Original article

Neck and décolleté regeneration in women over 45: Combined biostimulation protocol

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Abstract. *Objectives:* Patients over 45 years of age experience aesthetic medicine dynamically. The neck and décolleté represent an area affected by aging: roughness, laxity, redness and blemishes can cause social distress in patients who do not typically cover their neck. Due to the reduction of collagen and elastin, folds and wrinkles are formed with less elastic and toned skin. This is made more noticeable by the effect the sun's UV rays have on unprotected skin. The aim of the study is to evaluate a new neck and décolleté biostimulation protocol with hyaluronic acid, glycerol, and calcium hydroxyapatite. *Materials and methods:* 12 patients between 45 and 65 years old were subjected to neck and décolleté treatment with Hyaluronic Acid fillers (20 + 17.5 mg/ml) (*Belotero® Revive)*, for 3 sessions each spaced 20 days apart. One month after the final session, a 1.5 cc injection of calcium hydroxylapatite filler (Radiesse®), diluted at a ratio of 1:3, was administered. Patients were asked if they felt uncomfortable exposing their neckline. *Results:* Belotero® Revive improves hydration thanks to the combination of hyaluronic acid and glycerol which has hygroscopic properties. It promotes the absorption of water from the dermis to the stratum corneum; glycerol acts as a protective shield for hyaluronic acid, slowing down its degradation and prolonging its effect. Décolleté wrinkles can be effectively treated with calcium hydroxyapatite which provides an immediate filling effect, therefore reducing their prominence. The calcium hydroxylapatite microspheres contained in the filler stimulate the production of new collagen in the treated area over time. This process helps improve skin quality by promoting regeneration, increasing firmness and elasticity, and evening out skin tone, thereby counteracting the effects of aging and oxidative damage caused by sun exposure. After five months, 75% of the women reported feeling no discomfort when exposing their décolleté, compared to only 20% at the beginning of the treatment. *Conclusions:* The combined biostimulation protocol made it possible to obtain important results on the neck and décolleté, redefining the texture, improving brightness, hydration and tone, with extreme relaxation of fine wrinkles and reduction of redness and blemishes. Women over the age of 45 with visible signs of skin aging on the neck and décolleté can achieve significant improvements in this area. As a result, many feel more comfortable wearing necklines they had previously avoided, leading to a sense of rejuvenation, increased self-confidence, and greater self-awareness. The protocol significantly delays the skin aging process.

Key words: biostimulation, radiesse, platet-rich fibrin, face biostimulation, neck ageing

Introduction

In recent years, the interest in skin quality has become very important in women's lives, especially for areas of the body that are often neglected, such as the neck and décolleté. These areas are particularly susceptible to signs of aging and environmental impact, resulting in unfavorable skin and contributing to aging. In women over 45 years of age, the skin in these areas often tends to lose elasticity and firmness, making it

essential to adopt strategies that can counteract these alterations.

Wrinkles on the neck and décolleté are the result of complex events that affect not only the skin, but also the underlying layers. In fact, over the years and taking into consideration any changes in body weight, subcutaneous volume loss with a reduction in adipose tissue may occur, and the effects of increased muscle contraction can become visibly apparent on the skin. These processes are multifactorial and influenced by genetic, environmental, and behavioral factors[1].

Skin aging leads to a decrease in the production of collagen and elastin, proteins essential for the health and elasticity of the skin. Exposure to UV rays, smoking, oxidative stress and lifestyle can accelerate this process, contributing to the early appearance of wrinkles on the neck and décolleté.

During the aging process, the concentration of endogenous hyaluronic acid (HA) and therefore the hydration of the skin decreases, contributing to an increase in wrinkles and folds causing the presence of a less toned and elastic skin.

Objectives

The bioregeneration of the neck and décolleté therefore represents an innovative and multidisciplinary approach that combines advanced techniques of aesthetic medicine and regenerative dermatology, with the aim of restoring the skin's elasticity, firmness and youthful appearance.

It therefore aims to explore and analyze the combined effectiveness of two types of injection treatments, calcium hydroxyapatite (Radiesse®, Merz Aesthetics) and hyaluronic acid + glycerol (Belotero Revive®, Merz Aesthetics) , in the bioregeneration of the neck and décolleté.

Calcium hydroxyapatite as a biorestructuring agent: Radiesse

Radiesse is an injectable product composed of 30% synthetic calcium hydroxyapatite microspheres carried by a viscoelastic gel matrix that makes up the remaining 70% of the formulation. The Radiesse spheres have dimensions between 25-45 μm and are made up of calcium and phosphate ions. The product has a very high safety profile and, being 100% biocompatible, does not require any allergy test before treatment[2-4].

Injected into the subcutaneous tissue, Radiesse has a dual effect: the viscoelastic gel matrix, in which the calcium hydroxylapatite (CaHA) microspheres are suspended, provides an immediate corrective and filling effect—offering both lifting and volumizing benefits—that can last for several months. As the gel gradually degrades, the CaHA particles remain, continuing to stimulate collagen production over time.

Subsequently, these microspheres stimulate the production of endogenous collagen, compacting the dermis, maintaining volume, and providing support to the tissues. The CaHA microspheres form a scaffolding that stimulates fibroblasts to produce collagen for up to 12 months. A solid network of collagen fibers is formed in the dermis. The scaffolding formed by CaHA stimulates the production of elastin (up to 9 months)[5-12].

The CaHA microspheres are slowly metabolized through the process of phagocytosis; the calcium and phosphate ions released are equivalent to the physiological mineral part and are eliminated naturally by the body[13].

When volumizing is not the primary goal of the treatment, diluted and hyperdiluted forms of CaHa can bypass the first effect of volume increase, allowing to immediately exploit the biostimulation property of the product. It can be used in specific patient populations where the primary treatment goal is to address skin laxity and improve overall skin quality and tone. This is achieved by promoting a tissue-recompacting effect through biostimulation of neocollagenesis and angiogenesis[14].

In the literature there are three different types of dilutions (Figure 1):

- Pure CaHa: 0.5 ml of lidocaine is diluted in 1.5 ml of CaHa;
- the Dilution Densification (DD) technique: 1.5 ml of CaHa is diluted with 0.5 ml of lidocaine and 3 ml of physiological water,
- the Hyper Dilution Densification (HDD) technique: 1.5 ml of CaHa is diluted with 0.5 ml of lidocaine and 4 ml of physiological water.

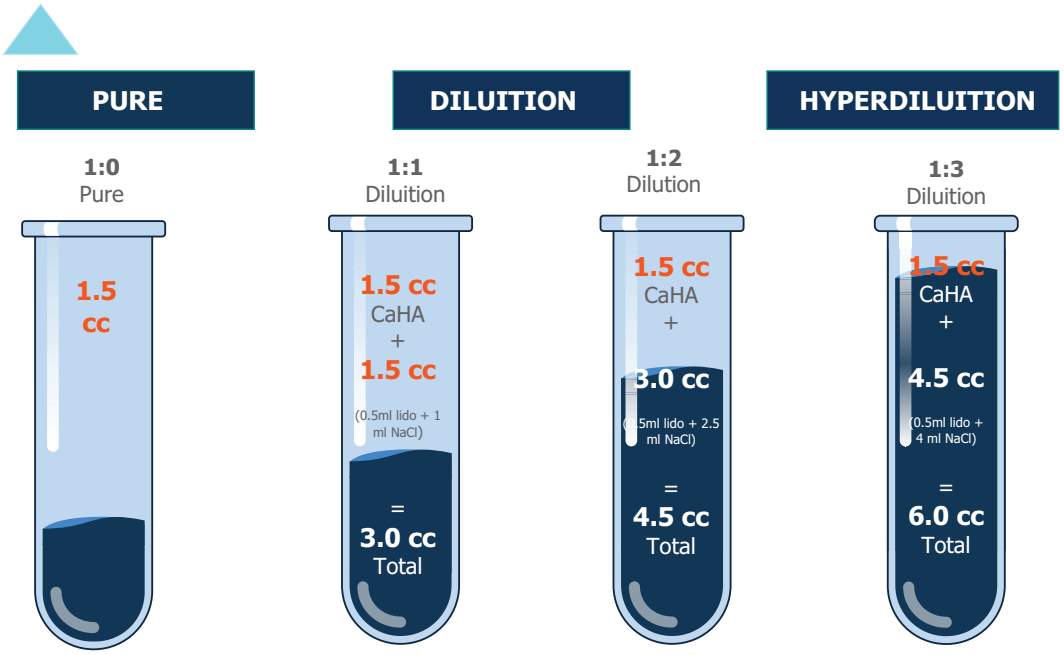

Figure 1. A Hyperdilution permits even distribution of microspheres over a larger surface area. CaHA, Calcium hydroxyapatite; cc, cubic centimeters. Lorenc ZP, Black JM, Cheung JS, et al. Aesthet Surg J. 2022;42(1): NP29-NP37.

The dilutions established by scientific literature are: 1:2 in the case of normal skin, 1:4 for thin skin, 1:6 for atrophic skin[15,16].

Biostimulation with hyaluronic acid and glycerol: Belotero Revive (CPM®-HA20G)

A wide variety of HA dermal infiltratives have been developed in recent years, including Belotero Revive, which is lidocaine-free[17,18].

This injectable product is composed of Hyaluronic acid with weakly cross-linked CPM (Cohesive Polydensified Matrix) technology (20 mg/ml), and Glycerol (17 mg/ml). The synergy between these two substances, hyaluronic acid and glycerol, allows for the creation of a highly hygroscopic filler capable of significantly increasing skin turgor. CPM®-HA20G is considered an effective and safe injectable HA for skin revitalization in patients suffering from signs of skin aging and loss of skin elasticity.

Through a multidisciplinary approach that encompasses dermatology, psychology and aesthetics, a comprehensive picture of the effectiveness of these combined biostimulation treatments is provided, as well as evaluating the social implications related to the use of these techniques in the context of skin rejuvenation. This serves as a response to the growing demand for anti-aging treatments for the neck and décolleté and promoting a holistic approach that recognizes the beauty and well-being of women over 45 as a fundamental priority in contemporary society.

Materials and Methods

For this study, 12 Caucasian female patients, between 45 and 65 years of age, were selected and subjected to an infiltrative treatment of the neck and décolleté with Calcium Hydroxyapatite CaHa, 1.5 cc with a 1:3 dilution.

After a month, they were subjected to an injective treatment based on Hyaluronic Acid and Glycerol (20 + 17.5 mg/ml), with the following protocol: a total of 3 sessions, 20 days apart, for a total of 1 ml on the neck and 1 ml on the décolleté for each single session. The patients were given a questionnaire before undergoing

the treatment and after 5 months, in which the following question was asked: do you feel comfortable wearing a low-cut dress and/or showing your décolleté?

All patients underwent a clinical check-up after 5 months.

All patients signed an informed consent form to participate in the study and for the use of their images. They also gave consent for the publication of their images.

Injection techniques

the infiltrative treatment of hyperdiluted Radiesse was performed using a fan technique with a retrograde linear injection using a 25*50mm cannula, in the hypodermic area. On the décolleté the tunnels created crossed each other in the so-called crosshatching technique (Figure 2).

The amount of product injected in each area was the smallest possible (0.05 ml per tunnel). All sessions required intense massage of the treated area. The contribution of the massage allowed to cover the largest possible area and to facilitate the distribution of the product within the targeted tissues.

No local anesthetic cream was applied. In some cases, 0.5 ml of local anesthetic was used to reduce the discomfort of the treatment. For treatment around the neck using hyperdiluted Radiesse®, a fan technique with a cannula was employed.

As for the Biostimulation sessions with hyaluronic acid and glycerol, the treatment involved injections with an intradermal micro wheal technique on the neck and décolleté. The wheals remain visible for 24/48 hours on the neck and décolleté (Figure 3).

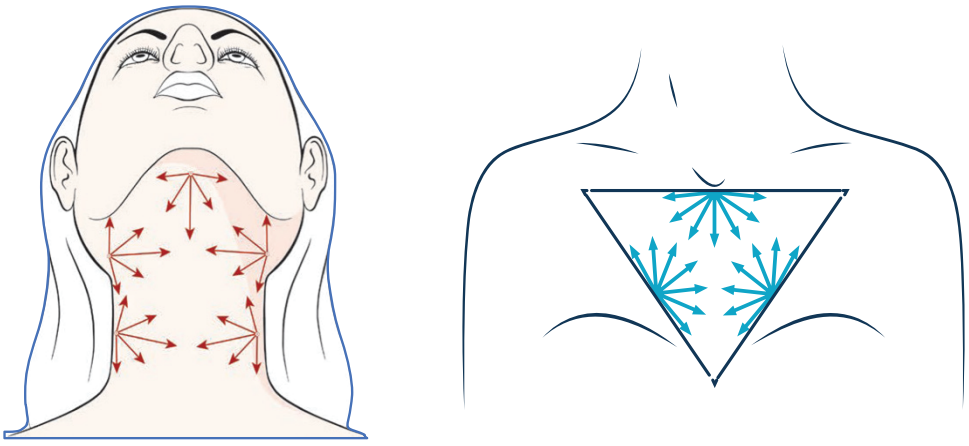

Figure 2. CaHa fan technique for the neck and cross-hatching technique for the décolleté.

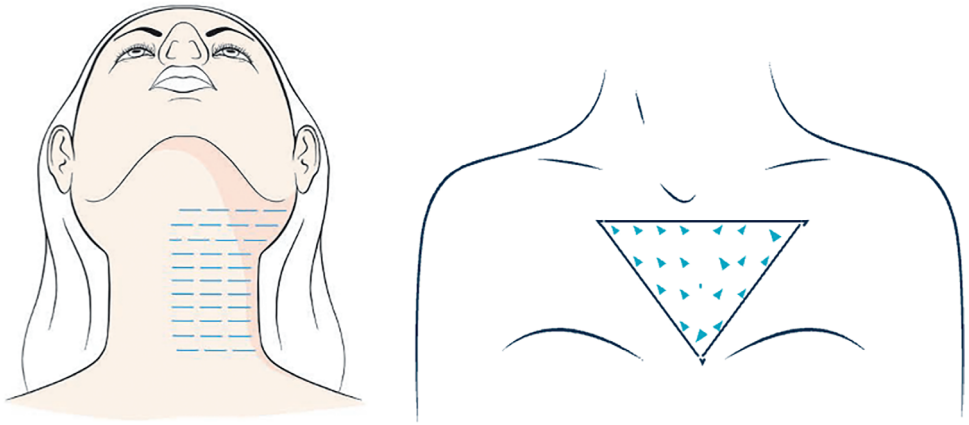

Figure 3. Ha + Glicerole intradermal micro wheal technique.

Table 1. "Do you feel uncomfortable wearing a neckline or showing your décolleté?"

	Yes	No
Before	10	2
After 5 month	3	9

Results

The combined action of the products of this protocol has allowed us to obtain very positive clinical results and excellent satisfaction of the treated patients.

The outcomes seen in the check-up performed after 5 months presented a clear improvement of the décolleté with attenuation or disappearance of wrinkles and a good improvement of the neck in almost all cases. It was possible to appreciate, in all cases, an improvement of the skin texture, elasticity and hydration, with a reduction of hyperchromia and redness, especially in the décolleté area. Only in one case was it considered necessary to repeat the protocol 1 month after the last biostimulation session, due to poor results obtained on the skin's roughness.

The data collected from the questionnaire (Table 1) to which the patients were subjected before and after 5 months showed that 75% of women did not feel discomfort in wearing a low-cut or showing their décolleté after 5 months from the protocol, compared to approximately 20% initially (Figures 4, 5 and 6).

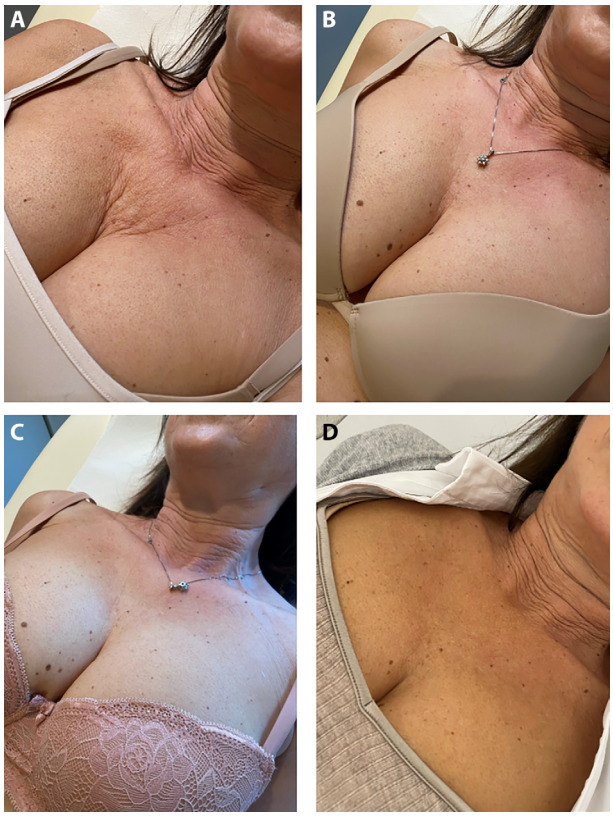

Figure 4. Female patient, 53 years old, ex-smoker, moderate sun exposure: A) Before the treatment; B) 20 days after CaHa; C) After ha + glycerol; D) 5 months follow up.

Discussion

Women over 45 years of age are a category of patients who care about their image, but their neck and décolleté represent a major worry and they are often unable to wear even slightly low-cut clothes due to the embarrassment caused by their imperfections, which makes them feel insecure and uncomfortable with their bodies. Aesthetic medicine has traditionally focused more on the face, often overlooking the neck and décolleté-areas that can reveal signs of aging and undermine the rejuvenated appearance achieved through facial treatments. Despite knowledge of the aging process, it is difficult to effectively treat a neck damaged by chrono and photo-aging with a single treatment, if not by using different protocols, techniques and products. Even in this study, despite a clear improvement in the texture and laxity of the treated area, it is not possible to significantly resolve the imperfections of the neck in almost all cases. It is therefore considered necessary to integrate this protocol with different products, such as botulinum toxin at the level of the platysmatic bands, chemical peels, or the use of electromedical technologies (laser, ultrasound, radiofrequency, etc).

Wrinkles on the décolleté can be effectively treated with a calcium hydroxyapatite-based filler that provides an immediate filling effect, reducing them. The calcium hydroxyapatite microspheres contained in the filler stimulate the production of new collagen in the treated area over time, helping to improve the quality of the skin, regenerating it, making it more

Figure 5. Female patient, 54 years old, smoker (20 cigarettes/day), mild sun exposure: A) Before treatment; B) 5 months follow-up.

toned, elastic and uniform, counteracting the effects of aging and oxidative damage induced by solar rays.

In fact, Radiesse stimulates a natural and gradual rejuvenation of the skin by acting directly on the fibroblasts, stimulating the activation of key components of the extracellular matrix: type I collagen and type III collagen improve the thickness, texture and tone of the skin, and elastin increases elasticity and firmness; proteoglycans provide hydration and radiance; angiogenesis supports the long-term health of new tissue (Figure 7).

Radiesse increases the contractility of senescent fibroblasts to a level almost equivalent to that of a normal fibroblast, it can also transform fibroblasts into myofibroblasts, the optimal fibroblast conformation for collagen and elastin production[14,19].

A pilot study showed that a hyperdiluted Radiesse implant in the neck led to an increase in skin elasticity (78%) and dermal thickness (88%) after 5 weeks.9 This highlights that hyperdilution does not cancel the effects of the calcium hydroxyapatite implant, whose characteristics on neocollanogenesis remain unchanged[20].

Biostimulation with calcium hydroxyapatite is therefore diluted, so that it can be distributed over larger areas and consequently achieve an improvement in skin quality. In fact, the hyperdiluted CaHa technique can be considered, in all respects, a powerful and effective biostimulation treatment that clearly leads to an improvement in skin texture and an increase in skin volume.

Belotero® Revive can improve hydration thanks to the combination of hyaluronic acid and glycerol.

Glycerol, which has hygroscopic properties, promotes the absorption of water from the dermis to the stratum corneum and acts as a protective shield for hyaluronic acid, slowing down its degradation and prolonging its effect[21].

The combined use of these products has made it possible to expand and implement their individual medium- and long-term benefits. Hyaluronic acid improves the quality and consistency of the skin, also stimulating the production of new collagen.

Despite the presence of weakly cross-linked hyaluronic acid, it does not have a volumizing action. Intradermal skin microinjections containing hyaluronic acid (HA) and glycerol have been shown to significantly improve skin quality[22-25].

Clinical improvements can be assessed in skin quality parameters: skin hydration, skin elasticity, skin roughness, and skin tone[26-30].

Additionally, multiple, microdosed injections of HA into the mid-deep dermal layers of the skin demonstrate increased hydration and cellular activity, collagen and elastin synthesis, and maintain and/or restore healthy, youthful skin texture with firm, luminous, and hydrated skin[17,31].

The treatment protocol effectively promoted skin regeneration and hydration, resulting in an improved overall appearance while counteracting the effects of skin aging and oxidative damage caused by sun exposure[32-33].

The skin laxity and roughness on the neck is significantly reduced, as well as wrinkles and imperfections of the décolleté. It was also possible to observe a reduction in areas of hyperpigmentation and redness.

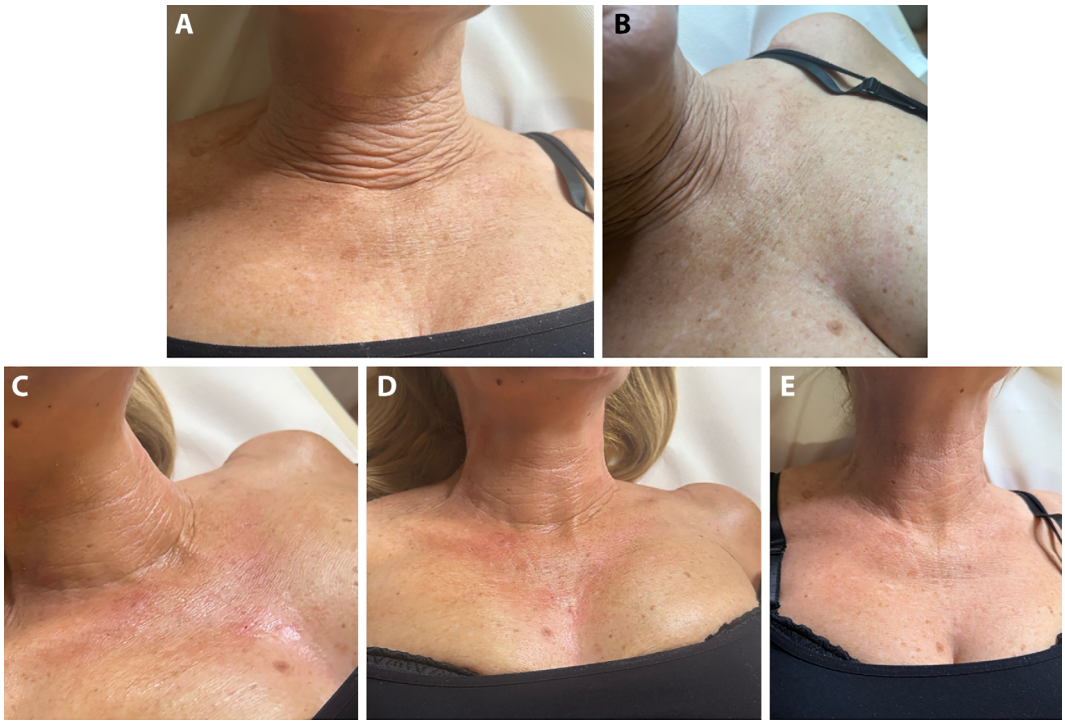

Figure 6. Female patient, 62 years old, smoker (15 cigarettes/day), moderate sun exposure: A-B) Before treatment; C-D) Immediately after CaHa; E) After 5 months follow up.

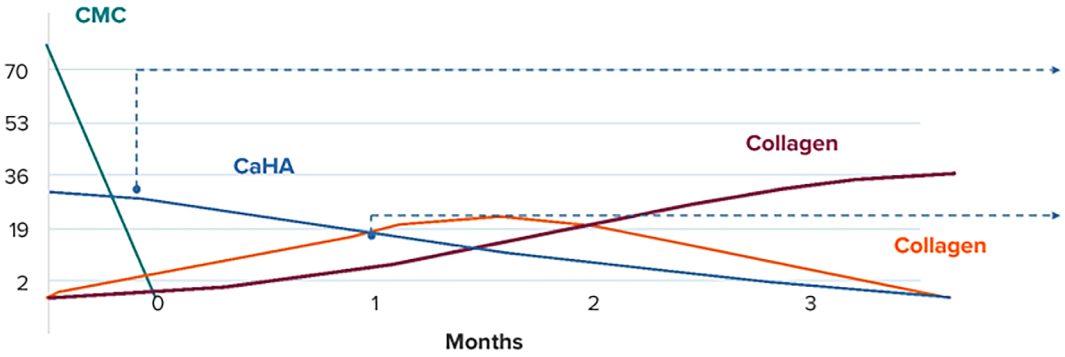

Figure 7. Temporal evolution of CMC carrier gel, calcium hydroxylapatite (CaHA) particles, and collagen production over a 3-month period after CaHA implantation. CaHA, Calcium hydroxyapatite; CMC, carboxymethylcellulose.1. Kim J., Clin Cosmet Investig Dermatol. 2019. 2:771-784. 2. Yutskovskaya, YA. et al., J Drugs Dermatol. 2017; 16(1):68-74.

The psychological aspect of the patients undergoing this procedure has an equally important role: the questionnaire demonstrated how 75% (10 out of 12) felt difficulty and embarrassment in showing their décolleté and/or wearing even a slightly low-cut garment due to the presence of blemishes in the area.

5 months after the treatment, the result of the questionnaire shows completely reversed data where the number of patients who still presented discomfort was reduced from 10 to 3, going from 75% to approximately 20% of cases. Therefore, 7 out of 10 patients have regained confidence and security by wearing low-cut clothing.

A limitation of this study is the absence of a split-design comparison between CaHA alone and the combined protocol with CaHA and Belotero Revive. Such a study design would have provided stronger scientific evidence. Future research should therefore include controlled split studies to further validate and expand the present findings.

Conclusion

The combined biostimulation protocol has allowed us to obtain important results on the neck and décolleté, redefining the skin texture, improving brightness, hydration and tone, with extreme relaxation of fine wrinkles and reduction of redness and hyperchromia.

Women over 45, with signs of skin aging on the neck and décolleté, can improve this area in an extremely visible way, feeling more comfortable with low-cut clothes that they have not worn for a long time, which makes them feel regenerated, determining a sense of security and awareness.

The protocol, which can be repeated after months, significantly delays the skin aging process.

Conflict of Interest Declaration: The author declares that he has no conflicts of interest related to the content of this publication. No financial or commercial relationships influenced the development of the study or the manuscript.

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Received: 19 February 2025
Accepted: 30 October 2025
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