

Treatment of deep wrinkles with superficial application technique of hyaluronic acid

Abstract

Introduction: Throughout the aging process, the skin is subject to continuous structural, cellular and molecular modifications that affect not only its mechanical properties but also its biological and physiological functions, which clinically, it manifests with dry skin, loss of elasticity and the consequent appearance of fine lines, wrinkles and creases, representing a therapeutic challenge with a difficult solution.

Objective: To describe the superficial application technique of cohesive polydensified matrix hyaluronic acid (Belotero soft®) for the resolute treatment of superficial perioral, periorbicular and lateral wrinkles and creases of the face.

Conclusion: The superficial and transversal application technique showed to be ideal for the treatment of wrinkles and superficial creases, without description of important adverse effects or Tyndall effect with the cohesive polydensified matrix hyaluronic acid that was applied.

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Introduction

Throughout the aging process, the skin is subject to continuous structural, cellular and molecular modifications that affect not only its mechanical properties but also its biological and physiological functions.^{1,2,3} Skin changes caused by chronological aging are the result of a normal physiological mechanism. They are characterized by skin thinning, which is aggravated by photoaging that is responsible for the appearance of spots, fine lines, dilated vessels, roughness and skin cancer.⁴

Structurally speaking, the epidermis becomes thinner and the dermo-epidermal junction flattens. The papillary dermis is particularly affected by impaired fibroblast activity. In other words, there is a reduction in the synthesis and an increase in collagen degradation due to the increase in collagenase levels, which impacts on the deposition, orientation and size of the fibers that appear more disorganized, compact and granular, whereas elastic fibers decrease in number and diameter. Reticular dermis becomes disorganized and degraded.⁵ Photodamage has the potential to worsen the process, especially in the papillary dermis, by reducing type I procollagen synthesis and increasing metalloproteinase-1 levels (collagenase), which, in turn, increases the amount of collagen degradation products and inhibits the synthesis of new collagen. Therefore, degradation in itself negatively regulates the neocollagenesis.

Chronological aging and photodamage also affect the fundamental substance by reducing the amount of mucopolysaccharides, glycosaminoglycans and proteoglycans, especially in the hyaluronic acid, a fact that alters dermal hydration and negatively influences the turgor, thus modifying the biomechanical properties of the skin.³ Clinically, it manifests with dry skin, loss of elasticity and the consequent appearance of fine lines, wrinkles and creases, representing a therapeutic challenge with a difficult solution since they not always disappear with the application of botulinum toxin, facial Volumization and/or technologies (Figures 1A-C).

Objective

The aim of this study is to describe the superficial application technique of cohesive polydensified matrix hyaluronic acid used in

50 patients over the period of 2 years for the resolute treatment of superficial perioral, periorbicular and lateral wrinkles and creases of the face. The technique was applied when traces of these wrinkles and creases were left after previous procedures for the improvement of expression wrinkles, facial Volumization with fillers or treatments with technologies were performed.



Figure 1 (A-C) Creases and lines caused by the reduction in skin thickness and dermal dehydration, which do not disappear with the application of botulinum toxin (A), facial Volumization (B) or technologies (C).

Technique

Applications of cohesive polydensified matrix (CPM) hyaluronic acid (Belotero Soft®) were performed at the site to be treated under topical anesthesia. The manufacturer's directions were followed accordingly, and, after the administration, cold compresses were used for a few minutes to minimize pain and bruising.

Applications were administered at the areas affected by wrinkles and creases, perpendicularly to the lines of treatment. Retro-injections were administered in the superficial dermis with a 30G 1/2 13 mm needle fully inserted at an angle of 10 to 12°, practically parallel to the skin surface, which allows for the visualization of the needle (Figure 2). The needle may be inserted with bevel up or down; however, in thin-skinned patients, administration in the superficial dermis may be limited when bevel is down. The multiple lines for the implant placement were drawn, leaving a space of 5mm from one line to the next, with a small deposition of the product (around 0.03ml) so that a small elevation was created. The procedure was repeated until all the affected area was covered. A light massage on the treated areas after the applications not only helps spread the product evenly but also makes the elevation disappear and provides better final correction. At the first sign of hematoma formation, digital compression was applied in order to prevent its progression.

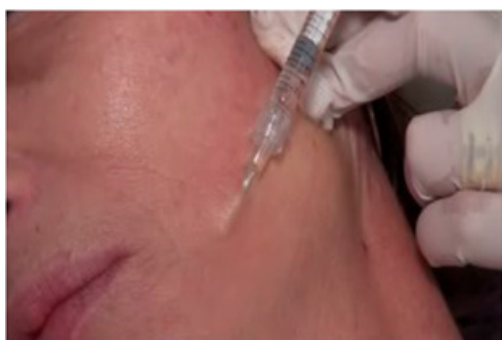


Figure 2 Retro-injection administration with needle fully inserted at an angle of 10°.

Results

Improvement in lines was immediate (Figures 3-6). In some patients, two applications were necessary (Figure 7) according to the degree of skin atrophy and dermal thickness, depth of the lines and creases, or, for a more natural aspect, if the increase in volume in the treated area was not uniformly and gradually accomplished with only one administration. The results obtained were sustained for at least one year (Figure 8) and all patients were pleased with the treatment (Figure 9).



Figure 3 Before and immediately after an application for the treatment of lateral lines.



Figure 4 Before and immediately after the application for the treatment of periorbital lines subsequent to botulinum toxin treatment.



Figure 5 Before and immediately after the application with immediate improvement in lateral lines.



Figure 6 Before and one month after the application for the treatment of perioral and lateral lines at the corners of the mouth (Cortesy- Dra Ana Lucia Lemos).



Figure 7 Before and one month after the application for the treatment of perioral and lateral lines at the corners of the mouth.

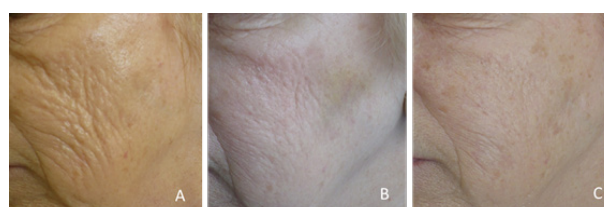


Figure 8 A- Before treatment. B- 7 days after de first application. C- 3 months after the second application of the treatment, done 30 days after de first one.

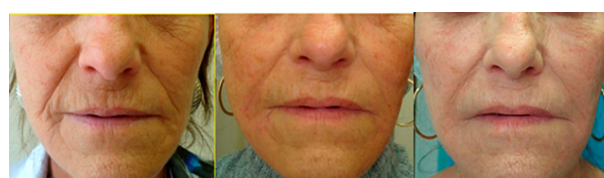


Figure 9 A- Pre-treatment. B- Immediately after the second application. C- one year after the treatment.

Discussion

The contribution of the dermis to the structure and function of the skin is crucial since it not only supports and nourishes the epidermis but also gives it elasticity, resistance and tensile strength. Moreover, it cushions the body from stress and strain, contains sensory receptors, regulates the cicatrization process and it is involved in the thermoregulation process.⁵ The fundamental or amorphous substance, is greatly involved in the dermal structure as it absorbs water and keeps the dermal hydration, promotes elasticity and helps the skin return to its original form, makes the movement of the fibers easier, surrounds and protects cells and tissues, and participates in the distribution of nutrients.⁵ With the aging, the dermis undergoes modifications in its matrix composition with a reduction in thickness. Therefore, its biomechanical properties are altered, which leads to the appearance of lines and wrinkles.⁶ The use of hyaluronic acid gels directly into the dermis may be a strategy for the reposition of the fundamental substance and the improvement of dermal thickness, thus restoring elasticity and turgor to the skin.

Filling techniques using intradermal injections are particularly pertinent for less reticulated gels and/or those with low concentrations of hyaluronic acid, which manufacturers often indicate to directly treat fine wrinkles in areas like the perioral or periorbital regions using sub-dermal injections, due to the risk of the Tyndall effect or the visualization of the injected material.

However, recent technological advances have introduced new dermal fillers with unique characteristics, like the cohesive polydensified matrix hyaluronic acid (Belotero Soft®), with particles of different sizes, and produced through the crosslink with butanediol diglycidyl ether (BDDE) in two cycles. The result is a dermal filler gel with higher- and lower-density zones, which confers the product the following characteristics: low viscosity, low elasticity (G'), high tan delta and high cohesivity, showing the affinity between the molecules of the gel.^{2,7,8} These rheological properties allow for a homogeneous distribution of the gel in the dermis without the risk of Tyndall effect.⁹ Actually, it is the high cohesivity that provides integration with the skin and a horizontal distribution, thus volumizing the dermis without altering its architecture.^{2,8} Color histological images and ultrasound tests of the treated skin show a cohesive and homogeneous appearance with high degree of dermal integration and isoechoogenicity in relation to the adjacent dermis, which allows for the application in the superficial dermis (Figure 10)^{2,7}.



Figure 10 Ultrasound imaging of the superficial dermis showing the isoechoogenicity and integration to the adjacent dermis after the use of the filler with CPM technology.²

Therefore, due to its rheological characteristics, the cohesive polydensified matrix hyaluronic acid (Belotero Soft®), was chosen to be applied in the perioral, periorbicular and lateral areas of the face using the superficial technique of retro-injections transversally to the wrinkles that did not disappear after the treatment with botulinum toxin, fillers or technologies.

The retro-injection technique enables the homogeneous distribution in the whole affected area. Belotero Soft®, owing to its low G' and viscosity associated with its high cohesivity, provides tissue expansion in the superficial dermis with prominent horizontal vectoring.² Thus, an improvement not only in lines but also in skin thickness can be observed, and the mobility and natural appearance of the treated area are kept without the visualization of the material given the high product-tissue integration.

Applications were practically painless and few bruises were formed, maybe due to the depth of the injections in the dermis. It should here be pointed out that the Tyndall effect was not observed in any of the treated patients, a fact that complies with the findings of Kuhne, et al., and Micheels, et al.,^{9,2}

The results obtained from a single application showed a high degree of satisfaction among patients. Significant improvement was observed not only in lines and wrinkles but also in the general

aspect of the skin, probably caused by the use of the gel (immediate response) and the subsequent absorption of water (late response). The number of applications as well as the necessary amount of filler will depend on the skin thickness, the depth of the lines and wrinkles and the extension of the affected areas. Many patients chose to undergo a second application for better results, approximately 30 days after the first application (Figure 7). Those who were under the effect of muscle relaxation provided by botulinum toxin were informed about the possible return of some expression lines once the movements were recovered.

The long-lasting cosmetic benefits observed in patients can be attributed to the stimulation of collagen synthesis promoted by the Injection of cross-linked hyaluronic acid, partially restoring dermal matrix components that are lost in photodamaged skin (Figure 8). This stimulatory effect may be induced by mechanical stretching of the dermis, which in turn leads to stretching and activation of dermal fibroblasts.^{10,11}

Conclusion

The superficial and transversal application technique of cohesive polydensified matrix hyaluronic acid (Belotero Soft®) showed to be ideal for the treatment of wrinkles and superficial creases located in the perioral, periorbicular and lateral areas of the face when traces of these lines were left after the treatment with botulinum toxin and/or facial Volumization and/or treatment with technologies. Furthermore, there were no important adverse or Tyndall effects reported. Interestingly, it was also observed that fewer number of sessions were necessary to achieve the expected result when the technique is compared with the application of hyaluronic acid with low crosslinking density for the treatment of fine wrinkles; however, further controlled comparative studies are still required in order to confirm this conclusion.

Acknowledgments

None.

Conflicts of interest

Authors declare there is no conflict of interest.

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