

Treatment of Deep Wrinkles with Superficial Application Technique of Hyaluronic Acid

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Abstract

Introduction: Throughout the aging process, 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 is manifested by 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.

Introduction

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

Structurally speaking, epidermis becomes thinner and the dermo-epidermal junction flattens. Papillary dermis is particularly affected by impaired fibroblast activity. In other words, there is a reduction in 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. These fibers 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 itself down regulates neocollagenesis. Chronological aging and photo damage also affect ground substance by reducing the amount of mucopolysaccharides, glycosaminoglycans and proteoglycans, especially in hyaluronic acid, a fact that alters dermal hydration and negatively influences the turgor, thus modifying biomechanical

properties of the skin [3]. Clinically, it is manifested by 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 often do not disappear with the application of botulinum toxin, facial volumization and/or technologies (Figures 1 A-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 improvement of expression wrinkles, facial volumization with fillers or treatments with technologies were performed.

Technique

Injections of Cohesive Polydensified Matrix (CPM) hyaluronic acid (Belotero Soft®) were performed at the site to be treated under topical anesthesia. Manufacturer's directions were followed accordingly, and, after administration, cold packs were used for a few minutes to minimize pain and bruising.

Applications were administered at areas affected by wrinkles and creases, perpendicularly to the lines that would be treated. 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 skin surface, which allows visualization of the needle



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



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

(Figure 2). The needle may be inserted with bevel up or down; however, in thin-skinned patients, injection in the superficial dermis may be limited when bevel is down. Multiple lines were created for implant placement, leaving a space of 5 mm from one line to the next, with a small deposition of the product (around 0.03 ml) so that a small elevation was created. Procedure was repeated until all the affected area was covered. A light massage after applications not only helps spread the product evenly, but also make elevations disappear and provides better final correction. At the first sign of hematoma formation, digital compression was applied in order to prevent its progression.

Results

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

Discussion

Contribution of dermis to the structure and function of the skin is crucial since it not only supports and nourishes epidermis but

also gives its elasticity, resistance and tensile strength. Moreover, it cushions the body from stress and strain, contains sensory receptors, regulates healing process and it is involved in thermoregulation process [5]. Ground, or amorphous substance, is greatly involved in dermal structure as it absorbs water and keeps dermal hydration, promotes elasticity and helps the skin return to its original form, making movement of skin fibers easier, surrounding and protecting cells and tissues, and participates in distribution of nutrients [5]. With aging, 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]. Hyaluronic acid gels injected directly into the dermis may be a strategy to replace ground substance and improvement of dermal thickness, thus restoring elasticity and turgor of 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 subdermal injections, due to the risk of Tyndall effect or 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 provides the following characteristics: low viscosity, low elasticity (G'), high tan delta and high cohesivity, showing affinity between molecules of the gel [2,7,8]. These rheological properties allow for a homogeneous distribution of the gel in the dermis without risk of Tyndall effect [9]. Actually, it is the high cohesivity that provides integration to 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 isoechogenicity in relation to adjacent dermis, which allows for the application in superficial dermis (Figure 10) [2,7].

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 wrinkles



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 periorbicular 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.

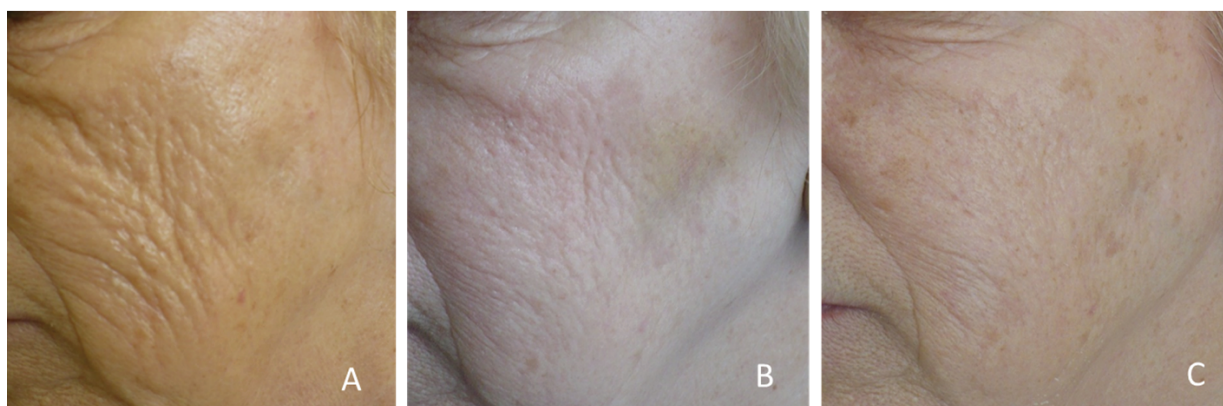


Figure 8: A-Before treatment. B-7 days after de first application. C-3 months after the second application of the treatment, did 30 days after de first one.



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

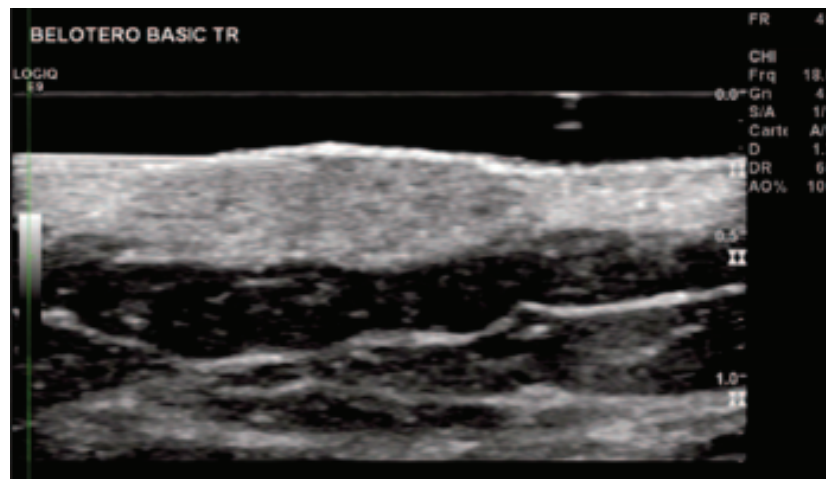


Figure 10: Ultrasound imaging of superficial dermis showing the isoechogenicity and integration to adjacent dermis after use of the filler with CPM technology, Micheels P, et al. [2].

that did not disappear after treatment with botulinum toxin, fillers or technologies.

Retro-injection technique enables homogeneous distribution to the whole affected area. Belotero Soft®, owing to its low G' and viscosity associated with its high cohesivity, provides tissue expansion in superficial dermis with prominent horizontal vectoring [2]. Thus, an improvement not only in lines but also in skin thickness can be observed, as mobility and natural appearance of the treated area are kept without 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 injections in dermis. It should here be pointed out that Tyndall effect was not observed in any of the treated patients, a fact that complies with the findings of Kühne U and Micheels P [9,2].

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 general aspect of the skin, probably caused by the use of gel (immediate response) and subsequent absorption of water (late response). The number

of applications as well as the necessary amount of filler will depend on skin thickness, the depth of lines and wrinkles and extension of affected areas. Many patients chose to undergo a second application for better results, approximately 30 days after first treatment (Figure 7). Interestingly, it was also observed that fewer number of sessions were necessary to achieve the expected result when technique is compared to the application of hyaluronic acid with low cross linking density for treatment of fine wrinkles, classically used for hydration; however, further controlled comparative studies are still required in order to confirm this finding. 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.

Long-lasting cosmetic benefits observed in patients can be attributed to the stimulation of collagen synthesis promoted by Injection of cross-linked hyaluronic acid, partially restoring dermal matrix components that are lost in photo damaged 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 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 this technique is compared to the application of hyaluronic acid with low cross linking density for treatment of fine wrinkles; however, further controlled comparative studies are still required in order to confirm this finding.

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