

THE COMBINED USE OF MINIMALLY-CROSS LINKED HYALURONIC ACID SKIN BOOSTER AND PDO SMOOTH THREADS FOR LIP REJUVENATION (LIP BOOSTING : A THERAPEUTIC APPROACH)

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ABSTRACT

Aim: The present study was performed to evaluate the effect of injecting minimally cross linked hyaluronic acid using a softfil cannula® & polydioxanone (PDO) smooth threads on restoring the lip texture, elasticity and firmness through collagen induction.

Methods: Fifty female patients were included in the study who suffered from dry lips with fissures and cracks. All patients were injected with Restylane Vital ® (a minimally cross linked hyaluronic acid) using a softfil cannula® followed by placement of PDO smooth threads (I – Thread®) at the vermillion border. Digital pictures were taken before the injection and immediately after the injection for assessment of the clinical results as well as during the follow up periods. All patients were re-injected with Restylane Vital at 3 month & 6 months.

Results: Marked improvement in the lip texture and elasticity were observed at 2 weeks after the injection which remained stable up to nine months after treatment. Moreover there was a marked decrease in the depth of the fissures and cracks in the lips.

Conclusion: Non or minimally cross linked hyaluronic acid injection into the lips along with smooth threads may offer a great improvement for dry lips with loose tissue and decreased elasticity. This can be further improved by repeated skin booster injections along two different intervals from the baseline treatment.

KEYWORDS: lips, skin boosters, smooth threads, lip rejuvenation, softfil cannula

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INTRODUCTION

The lip is affected by aging (external internal) like other parts of the face, this can be observed at the skin of the lips where it becomes thin, dry and pale. These clinical manifestations are due to the underlying histological changes that occurs as a results of the collagen depletion along with accumulation of elastic material in the papillary and mid dermis¹.

Hyaluronic acid (HA) is a natural component of the human body which plays an important role in skin viscoelasticity and it is widely used in medicine, cosmetic industry and other biomedical applications. HA based fillers & skin boosters are widely used for purpose of volumization & maintaining skin elasticity through stimulation of collagen synthesis². It was proven that intradermal injections of hyaluronic acid skin booster can have a rejuvenating effect on dry and tired facial skin especially in improvement of skin surface roughness³. Moreover Polydioxanone (PDO) smooth threads have shown to be able to trigger an inflammatory response upon insertion into the body, the results of this process is fibroblast activation and collagen production⁴. PDO threads have been used for purpose of facial rejuvenation⁵, skin laxity⁶ and scars treatment⁷.

Boosting the skin which includes the lips is through fibroblast activation which a new indication is for HA based products and PDO smooth threads. Most researches discussed the use of each separately in different areas of the face. As far as we know there is no single research that discusses the use of both products; skin boosters & PDO smooth threads into the lips and there role in collagen induction. The aim of our study is to evaluate the efficacy of using both hyaluronic acid skin booster & PDO smooth threads for treating dry lips as a novel therapeutic approach for treating this condition.

MATERIALS AND METHODS

Fifty Middle Eastern female patients (20 – 45 years old range) with good lip proportions according to the ideal lip proportions⁸ who complained from dry lips with fissures and cracks were included in the study. These patients desired to achieve a healthy looking hydrated lips without any volumization or change in the actual lip proportions. Written informed consent were obtained from all patients explaining the full details of the procedure and the expected outcomes along with the possible complications. All patients were treated using the same products, where each patient was treated using a one ml volume of minimally cross linked hyaluronic acid skin booster (Restylane Vital[®], Galderma, Switzerland) & four polydioxanone PDO smooth threads (I – Thread[®], Healux Corporation, Korea). All Skin boosters were injected with a Softfil micro cannula[®] (Soft Medical Aesthetics, France). All patients were re-injected with a one syringe of Restylane Vital at 3 months & another syringe at 6 months.

Restylane Vital[®] is a one ml syringe that is composed of hyaluronic acid, where the hyaluronic acid concentration in the syringe is 20 mg/ml. On the other hand the smooth threads is made of polydioxanone (PDO) material, which is an absorbable thin thread that is made of protein.

After the application of an antiseptic solution to the lips and perioral structures. A pilot needle were used to make an opening right at the corner of the mouth followed by advancement of the softfil cannula[®] (22 G 50 mm) in the red part of the upper lip, Restylane[®] injections were performed in a retrograde linear threading fashion. The same steps were applied for the lower lip from the same opening followed by creating another opening just to inject the other side of the upper lip, all injections were performed in a superficial plane at the submucosal tissue as guided by visualization of the shadow of the cannula underneath the tissues before injection. Figure(1)

The next step was the insertion of the PDO smooth threads (70 mm thread loaded on a 30 G 50 mm needle), four smooth threads were used for each patient, one in each lip quadrant. All threads were inserted right at the vermillion border in the deep dermal layer, the preloaded needle with the thread was advanced at a point two centimeter from the skin near to the mouth corner and advanced along the vermillion border till the rubber stop touches the skin which indicates that the whole thread is fully embedded inside the tissues, followed by screwing the needle in a clockwise direction, then withdrawal of the needle but leaving the thread inside Figure(2) As for the postoperative care, all patients were carefully instructed to avoid all of the following; smoking, eating spicy food, excessive opening of the mouth or going to the dentist.



Fig. (1) The skin booster injection technique using the softfil cannula.



Fig. (2) PDO smooth threads insertion at the vermillion border.

RESULTS

None of the patients reported any signs of edema, bruising or vascular occlusion. Clinical observations were taken at four follow up sessions (immediately after the injection, 2 weeks, 3 months and 9 months), observations showed that there was a marked improvement of the fissures and cracks along with marked improvement in the lip elasticity.

All patients reported a high degree of satisfaction immediately after the injection which lasted up to nine month after the treatment, they also agreed on repeating the whole procedure all over again whenever needed. Figure (3)



Fig. (3) From Top to Bottom; the first picture : preoperative, the second picture : immediately after injection, the third picture : 2 weeks , the fourth picture : 3 months, the fifth picture : 9 months.

DISCUSSION

Hyaluronic acid is a natural component of the dermal extracellular matrix, it has the ability to regain 1000 its times water therefore it plays a great role in determination of the skin viscoelasticity, hydration and firmness. The HA improves skin turgor and increase the collagen production^{4,5}.

Kerscher et al used Restylane vital light® (Hyaluronic acid concentration 12mg/ml) skin booster for cheek injections, the results of their study showed an increased hydration in the stratum corneum in addition to improvement in skin elasticity with increased collagen production⁶. This study shows similar results to our study, however the product used in our study (Restylane Vital®)

possess a greater HA concentration which is 20 mg/ml therefore theoretically speaking it may provide better results. On the other hand several studies were conducted on animals using PDO smooth threads, all these studies have confirmed histologically the formation of collagen bundles after thread insertion⁷⁻⁹. This is similar to what we achieved in our study as the rejuvenating effect of using the PDO thread combined with the HA skin booster may be attributed to the collagen induction and the boosting effect achieved with the combined use of both products.

The idea in our research of combining both minimally cross linked hyaluronic acid and smooth monofilaments PDO threads is that they both act as a collagen inducers⁶⁻⁹, so using both products may offer a greater collagen induction than using each of them alone. The proposed approach in this study might provide an acceptable results for mild to moderate dry lips.

All injections in this study were performed in a superficial plane in order to provide the maximal effect of the skin booster which targets the dermal layer of the skin, the plane of injection "dermal layer" was chosen based on another research that was treating the face not the lips³, the use of large bore softfil cannula® (22G) provides a safe injection thus decreasing the risk of vascular occlusion which could possibly happen with the regular needle injections¹⁶. The concept behind using a long smooth thread which is 70 mm length loaded on a 50 mm needle allows to place the thread away from the corner of the mouth passing through till the vermilion border of the lip thus establishing more collagen production for both the lips and perioral area which provides a structural framework for support, this could have been also achieved using short smooth threads but we would have to increase the number of threads then. The proposed approach in this study allows to use a less number of threads yet achieving an acceptable results.

Furthermore, the reason behind using a minimally cross linked hyaluronic acid (skin booster) in this study was due to the fact that the aim was to provide rejuvenation without volumization. Where the application of a heavy cross linked hyaluronic acid product, in other terms (dermal filler) was going to provide a lip volume. Not to mention that all the patients in this study had an acceptable lip proportions and didn't desire any volumization, their main concern was the pale looking dry lips. As far as we know there was no single study testing the effect of both skin booster injections along with PDO smooth threads in the lips for purpose of lip rejuvenation and achieving a boosting effect, this point in itself caused a limitation in comparing our data with other researches. According to the results of this study, the combined use of both products may offer a therapeutic treatment option for dry lips with fissures and cracks without adding volume to the lips which matches the recent concept of using HA as a therapeutic treatment not for aesthetic purposes only¹⁷⁻¹⁹.

CONCLUSION

The injection of a non-cross linked or minimally cross linked hyaluronic acid skin booster along with PDO smooth threads may offer a therapeutic treatment for dry dull looking lips without unnecessarily volumization. It can be also performed prior to lip filler procedures as theoretically speaking it may aid in providing a longevity for the filler and helps in preconditioning the tissues before volumization. The proposed approach can be used both as a therapeutic treatment for dry lips and prior to lip filler injections for dry lip patients, putting into consideration that the patient must maintain hydration through topical applications of moisturizers and drinking plenty of water daily. This approach needs to be studied on a larger sample of patients to test the efficacy of such a procedure as well as applying the same approach with other modifications in different areas of the face.

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