

## LOW LEVEL LASER THERAPY & SKIN BOOSTERS FOR LIP BOOSTING : A COMBINED TREATMENT

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#### ABSTRACT

**Aim:** The purpose of this study is to assess the effect of both low level laser therapy as a photobiomodulation and non-cross linked hyaluronic acid injection for lip hydration.

**Materials & methods:** Twenty female Middle Eastern patients who seeked a lip rejuvenation treatment at our clinic were included in the study. Using 650 nm diode laser, photobiomodulation was applied to the lips for 5 minutes to each lip quadrant followed by injecting non-cross linked hyaluronic acid skin booster using a micro cannula. Patient satisfaction score was recorded through different follow up intervals (immediately after the procedure, 3 weeks & 3 months). Statistical analysis was performed to evaluate the patient satisfaction score through the follow up sessions.

**Results:** Patients in this study reported a market improvement in the lip texture immediately after the procedure with almost minimal swelling. The latter improvement remained persistence up to 3 months.

**Conclusion:** The combined use of low level laser therapy in addition to non-cross linked hyaluronic acid skin booster injections for lip boosting may offer an acceptable results for lip hydration with a minimal swelling post injection.

Keywords: Hyaluronic acid skin boosters, photobiomodulation, lip rejuvenation, Diode laser.

#### **INTRODUCTION**

Lips are the skin's borders with a mucous membrane, containing a mucosal component but no sebaceous glands. Kobayashi and Tagami discovered discrepancies in the moisturizing and barrier functions of skin on the lips and cheeks, revealing that the lips had less moisture in the stratum corneum (SC) and a higher transepidermal water loss (TEWL) than the cheeks. As a result, the lips are particularly prone to becoming dry and scratchy. Lip care is essential because the most frequent lip problems are dryness and chapping. Furthermore, from a make-up standpoint, it is critical to care for

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the base lips because it is unattractive to apply lip make-up on rough lips <sup>1,2</sup>.

Stratum corneum lipids serve a significant role in barrier and water-holding capabilities, with ceramides (CERs) accounting for 30-40% of SC lipids. Lips exhibit lower levels of total CER, a higher percentage of CER [NS] (non-hydroxy sphinogosine ceramide) and CER [AS] (Alpha hydroxyl fatty acid sphinogosine ceramides), a lower percentage of CER[NP] (non hydroxyl fatty acid phytosphingosine ceramide) and CER[NH] (non-hydroxy fatty acid 6-hydroxy-sphinogosine ceramides), a lower percentage of CER[NS] with long chains having large total carbon numbers, and a higher percentage of CER[NS] with short chains having small total carbon numbers when compared to other skin regions. Furthermore, we demonstrated that the degree of lip roughness, capacitance, and TEWL values are associated not only with overall CER levels, but also with specific CER species and average carbon numbers 8<sup>3-6</sup>.

Moreover there are 28 types of collagen in the human grouped into fibrillar and nonfibrillar types whose function is to provide three dimensional network for the tissues. The skin contains different types of collagen ; collagen type I, III, IV, V, VI, VII, VIII. Collagen depletion may result in weakning of the tissues, skin structure with development of wrinkles, loss of skin tone and elasticity.<sup>7-10</sup>

Photobiomodulation (PBM) treatment is a type of light therapy that uses non-ionizing light sources such as lasers, LEDs "light emitting diode", and/or broadband lights in the non-visible and infrared spectrum. It is a non-thermal mechanism that generates photophysical and photochemical processes at various biological scales. The technique is non-invasive and painless, with no adverse effects if performed correctly, posing no risk to the patient <sup>11</sup>. Localized PBM treatments have proven to have significant anti-inflammatory properties, facilitate

tissue repair, and control painful symptoms as well

Furthermore non-cross linked hyaluronic acid skin booster provides rejuvenation through collagen formation and improvement of the skin surface roughness thus it acts as a skin booster<sup>14,15</sup>. Since lip hydration procedures are usually performed in order to overcome the hydration status of the lips as well as the collagen depletion thus the use of photobiomodulation and hyaluronic acid skin booster may help in providing a synergism effect in providing hydration as well as collagen formation with providing no swelling due to the anti edematous effect of photobiomodulation<sup>16</sup>.

as the ability to stimulate collagen production<sup>12,13</sup>.

None of the published articles to this date, mentioned the combined use of low level laser therapy and non-cross linked hyaluronic acid injection so the aim of this study is to propose a novel technique for lip hydration using a combined approach of lasers and injection.

#### **MATERIALS & METHODS**

Twenty female Middle Eastern patients with an age range (20 - 40 years old) were included in the study who came to our private practice seeking lip rejuvenation treatment. Written informed consent was obtained from all patients explaining the outcome of the procedure as well as the possible side effects. Patient satisfaction score was recorded to assess the satisfaction outcome of the procedure during the following intervals; immediately after the procedure, 3 weeks and 3 months. Equipment's and products used in this study:

- (1) Diode laser "Woodpecker Laser ®" (Woodpecker er LX16 Plus Dental Diode Laser, Woodpecker, China)
- (2) Non cross linked hyaluronic acid skin booster with vitamins, antioxidants and aminoacids " RRS<sup>®</sup> hyalift <sup>®</sup> 75 PROactive syringe" (Skin Tech Pharma Group, Spain).

(3) 22 G Microcannula "Softfil Cannula® " (Soft Medical Aesthetics, Paris, France)

#### **Treatment protocol**

### (A) First step : Low level laser therapy (Biostimulation \ Photobiomodulation )

The upper and lower lips were divided into four quadrants, the upper was divided into two quadrants and the lower lip was divided into two quadrants as well in order to ensure that the low level laser therapy will be applied correctly to all the lip surface area and ensuring that all parts of the lips receives equal doses. 650 nm diode laser was applied to each lip quadrant for 5 minutes using a flat top hand piece in a contact mode without any sort of circular motion. None of the patients were anaesthetized at this step in order to sense any changes in temperature. (**Figure 1**)

# (B) Second step: Non cross linked hyaluronic acid skin booster injection

After patient anesthesia with an injectable lidocaine. Only one corner of the mouth was utilized to make a single point of entry to inject both the upper and lower lip with the RRS® hyalift® syringe. An entry point was made 1 cm from the corner of the mouth with a pilot needle followed by advancing the 22 gauge cannula in an oblique direction in a superficial plane heading toward the red part of the lip, microboluses was given in each lip compartment followed by a series of retrograde and anterograde linear injections. Following the injection procedure, the lips were gently massaged. (Figure 2)

#### (C) Third step: Low level laser therapy application

Biostimulation \ Photobiomodulation was repeated at the same session after the end of the injection using 650 nm diode laser for a total of 2 minutes in a non-contact mode with circular motion all over the whole lips without dividing any quadrants so the whole exposure is spread all over the whole surface area of the lips. All patients were told to avoid active activities during the first 24 hours, as well as opening their mouth wide, having a dental operation, kissing, and smoking for the next 72 hours. No medication was prescribed to any of the individuals.

#### **Statistical analysis**

SPSS version 23.0 was used to analyze the recorded satisfaction score data (SPSS Inc., Chicago, Illinois, USA). The mean, standard deviation, and ranges were used to display the data. Qualitative variables were also displayed as percentages and numbers. The Cochran's Q test and Pearson's correlation were conducted.



Fig. (1) Low level laser therapy application on the lips.



Fig (2) Injection of RRS hyalift into the lips using a 22 G cannula.

Satisfaction score	Immediately after the procedure		At 3 weeks		At 3 months		
	No.	%	No.	%	No.	%	p-value
Not satisfied	zero	0.0%	Zero	0.0%	0	0.0%	0.014*
Less satisfied	zero	0.0%	Zero	0.0%	0	0.0%	
Quite satisfied	zero	0.0%	Zero	0.0%	0	0.0%	
Satisfied	5	12.5%	Zero	0.0%	0	0.0%	
Extremely satisfied	15	87.5%	20	100.0%	20	100.0%	
Total	20	100.0%	20	100.0%	20	100.0%	

TABLE (1) Comparison of several time periods using a study of satisfaction scores.

\**p-value p*<0.05

#### RESULTS

None of the patients have experienced any negative effects from this operation, and there was no visible swelling, especially just after the procedure. In addition to reporting improvements in lip elasticity and smoothness, the trial's patients claimed a high degree of pleasure. (Table 1) (Figure 3)



Fig. (3) Comparison of different time periods according to the satisfaction rating.

#### DISCUSSION

Collagen depletion and hydration are of a big concern when it comes to patient needs in terms of aesthetic treatments, where preserving the latter issues is of vital importance in order to maintain the skin elasticity and tone. Many treatment modalities have been advocated to provide collagen stimulation, those of which includes; supplements, IV drip, energy based devices, injectables and lasers<sup>17-21</sup>.

This study promoted a novel method for combining hyaluronic acid skin booster injections and low level laser therapy (photobiomodulation) for lip rejuvenation. The objective was to evaluate the impact of the two products on the hydration and elasticity of the lips through superficial injections using a microcannula technique. In terms of enhancing lip texture and giving dehydrate lips a moisturizing impact, the method presented here demonstrated encouraging outcomes.

One of the intriguing things we noted right after the session was the reduction in swelling that was attained as a result of the treatment. This could be because the repeated use of low level laser therapy right after the session had an antiedematous impact. It is well known fact that the use of cannulas may provide a less traumatic injection procedure however minimal swelling is usually noticed after the injection even with swelling which wasn't the case with the use of low level laser therapy.

The findings of the antiedematous effect noticed in this study was similar to other findings stated by other reseaches<sup>22,23</sup>. Moreover the use of 650nm diode laser in this study was due to the fact that this wavelength provides an acceptable tissue penetration for skin treatments, which was similar to other studies that found this particular wavelength to be suitable for skin conditions<sup>24,25</sup>.

This study have lots of limitations which includes the absence of software analysis and imaging devices but the findings of this study could be a potential point for further investigations of the latter technique for patients requesting lip rejuvenation procedures. Further studies and investigations are needed to reach the level of evidence based scientific facts.

#### CONCLUSION

For patients seeking lip hydration treatment, the method outlined in this study may yield promising results with virtually no downtime in terms of swelling. Additionally, the combination of low level laser therapy and hyaluronic acid skin booster injection will have a synergistic effect on collagen formation and hydration. One of the major limitations in this study is the small sample size so we highly advise further clinical trials using the same technique through repeated sessions on a longer follow up period as well as testing different wavelengths for low level laser therapy.

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