

Changes in Nasolabial angle and Mentolabialangle after lips augmentation with hyaluronic acid: Clinical Study

Research Article

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Abstract

Background: The nose-lip-chin relationships are very important in determination of facial aesthetics. This study aim was to evaluate the effect of injection of fillers in lips using hyaluronic acid on nasolabial angle and mentolabial angle.

Methods: A total of 25 females aged between 19 and 40 years were enrolled in this study. Hyaluronic acid was injected to improve their lips. The nasolabial angle and mentolabial angle were evaluated by comparing the photographs taken before the injection, two weeks after and two months after. AutoCAD 2017 engineering drawing program was used for image processing and dimensional calculation. The T-Student test for a paired sample was used to compare the measurements of the studied variables between the three time periods of the study.

Results: There was a statistically significant difference (p value <0.05) when using hyaluronic acid in lips augmentation on the nasolabial angle and mentolabial angle.

Conclusions: The injection of hyaluronic acid for lips augmentation decreases both nasolabial angle and mentolabial angle. The amount of the decrease did not affect the aesthetic of the face in profile view. However, the amount of decrease in both the nasolabial angle and the mentolabial angle must be taken into consideration before injecting fillers into the lips.

Keywords: Nasolabial Angle; Mentolabial Angle; Dermal Fillers; Fillers Injection; Hyaluronic Acid.

Introduction

The nose-lip-chin relationships are very important in determination of facial aesthetics [1]. The nasolabial angle defines the angular inclination of the columella as it meets the upper lip. The angle is formed between the intersection of a line tangent to the upper lip and sub nasal and a line tangent to the sub nasal the most anterior point of the columella. This angle should measure 95 to 110 degrees in women and 90 to 95 degrees in men [2].

The mentolabial angle is the anterior angle formed by the intersection of a tangent to the lower lip (sublabiale to labraleinferius) and a tangent to the upperpart of the soft tissue chin pad (sublabiale to soft tissue pogonion) [3].

Hyaluronic acid injection is popular in cosmetic procedures due

to its minimal invasion and immediate recovery [4]. Lips augmentation with hyaluronic acid is one of the most requested cosmetic treatments [5]. Lip augmentation includes reshaping and/or increasing the size of the visible part of the lips, the vermilion, changing the shape of the Cupid's bow and the relationship between the vermilion and the skin below the columella of the nose, all of that is considered within lip filling [6]. The lips augmentation can be done using either surgical or injection procedures to increase the size and obtain well-defined borders of the lips [7].

When looking at the aged lips, there are two essential points to observe, the first is the shape of the lips and the second is their relationship with the other parts in the lower third of the face, especially the support provided by the bone structures and teeth [8]. The purpose of this study is to investigate the changes in nasolabial angle and mentolabial angle after lips augmentation with hya-

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luronic acid.

Materials and Methods

Ethical approval was obtained from the Scientific Research Committee of Damascus University and confirmed consent was signed by participants before trial initiation.

The study was carried out at the department of Oral & Maxillofacial Surgery, Faculty of Dentistry, Damascus University.

The study sample consisted of 25 female patients who were injected with hyaluronic acid in the lips. The nasolabial angle & mentolabial angle were measured before the injection, two weeks after the injection, and two months after the injection.

All patients were females and the age of patients were between 18 and 40 years old. The Patients have lips that are full from degrees (0) to degrees (2) on a Merz scale as shown in Figure 1 and 2.9 Two photos one frontal and the other profile were taken of the patients before the injection. When the photos were taken, the patients were in a standing position and looking forward, the lips were in a comfortable position, and the Frankfurt plane (a plane which reaches the distal canthus of the eye and the tragus) was parallel to the ground. The camera was on the level of the Frankfurt plane. The two pictures were reviewed by three residents in the Oral and Maxillofacial Department doctors -who were trained on Merz scale to choose patients according to this scale where the patient approved by at least two doctors were chosen.

Exclusion criteria were as following: Patients who injected fillers before or during the period of study, the patients who had a previous surgical procedure on the lips or during the period of study, the patients who were pregnant or breastfeeding, the patients with

a history of autoimmune disease and the patients who suffered from severe allergy or had a severe anaphylactic accident.

Methodology

The patients' medical history was taken according to the patient's questionnaire for the study. Then, they were provided with printed pictures of the injection technique used in the study and written information about the study and the possible complications. The researcher took written consent to do the injection for the patient according to the written consent form for the study.

Pre-injection instructions were given before injection session as following:

- a) Patients were told not to use makeup before the injection session.
- b) Stop taking anticoagulants (aspirin, NSAIDs, vitamin E) for 10 days before the injection.
- c) Inform the doctor about any medications taken before the injection.

In injection session, a profile photograph for the patient was taken as shown in Figure (5a). The patient was standing, and the level of Frankfurt was parallel to the horizontal level and the patient was looking forward and the camera on the level of Frankfurt, and the distance between the camera's lens and the patient's head was 150 cm. The photograph was taken without flash in the room's light.

Then, regional anesthesia was performed using lidocaine 2% with an adrenaline 1/100000 for the upper and lower lip. The infra-orbital injection was performed to anesthetize the upper lip, and the mental foramen injection was performed to anesthetize the lower lip. After that, Emla cream (AstraZeneca, Sweden) was applied to

Figure 1. Merz scale of lower lip fullness [9].

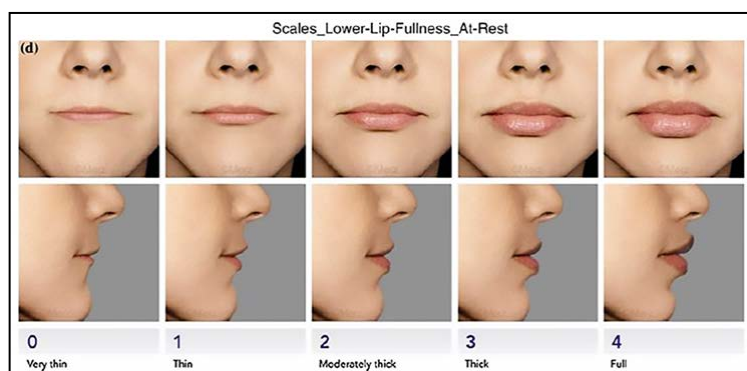


Figure 2. Merz scale of upper lip fullness [9].



the area for 20 minutes with a layer of 1 mm. the, lips and surrounding area were disinfected with the topical antiseptic solution hexamidine.

For filler injection, cross-linked hyaluronic acid with a concentration of 23.5 mg/ml (Hyaluronica 2 Vital Esthetique, France) was injected in the lips. Firstly, filler was injected in the lateral subunit of Cupid's bow in the upper lip as shown in Figure 3. Then, it was injected in the medial subunit of Cupid's bow in the upper lip as shown in Figure 4.

The needle was inserted with an angle of 45 degrees with the outer line of the lip. The depth of the insertion is 1 mm. Then the needle becomes parallel to the outer line of the lip and the full length was entered. The filler was injected along the needle's way slowly with a retrograde threading method. It is important to maintain a gradual rate of injection to an equal flow of filler material, and stretching the lip and tightening it during the injection, which helps to regulate the flow of the filling material. After injection, the area was gently massaged to control the distribution of the filler material and to avoid formation of lumps in the lips.

Finally. The patient was given post-injection instructions which included applying an ice pack intermittently and immediately after the injection for 48 hours to reduce edema and bruises and avoiding anticoagulants (aspirin, non-steroidal anti-inflammatory, vitamin E) for 24 hours after injection.

The first follow up was two weeks after the date of the injection session, where a profile photo was taken as shown in figure (5b) according to the same conditions in which the photograph was made before the injection.

The second follow up was two months after the date of the injection session, where also a profile photograph was taken as shown in Figure (5c) according to the same conditions in which the photographs were made two weeks after the injection and before the injection.

AutoCAD 2017,engineering drawing program, was used for im-

age processing and dimensional calculation. The optical images were also matched using a ruler included when capturing the optical images in all stages of the research and calculating the percentage of zoom in images using (AutoCAD 2017) program.

Statistical Analysis

A T-Student test for a paired sample was used to compare the measurements of the studied variable between the three-time stages of the study using SPSS v24.

Microsoft Excel program was used to clarify the results in tables.

The estimation of the statistical differences was based on the significance level (0.05).Therefore, any value (P-Value) above the significance level (0.05) considers that the observed difference is statistically insignificant. Whereas, any value (P-Value) below the-significance level (0.05) considers that the observed difference is statistically significant and it is a real difference.

Results

No complications occurred during filler injection.

The arithmetic mean of the nasolabial angle of the sample of this study before the injection of hyaluronic acid was 108.80 degrees. After the injection of hyaluronic acid, the arithmetic mean was 105.80 degrees. After two months of injection was 106.27 degrees. This indicates that the injection of the lips using hyaluronic acid leads to a decrease in nasolabial angle by an average of 2.53 degrees.

The results of this variable are shown in Table (1).

The arithmetic mean of the mentolabial angle of the sample of this study before the injection of hyaluronic acid was 133.9 degrees. After the injection of hyaluronic acid, the arithmetic mean was 132.2 degrees. After two months of injection was 132.4 degrees. This indicates that the injection of the lips using hyaluronic acid leads to a decrease in mentolabial angle by an average of 1.5

Figure 3. Injection of the lateral part of the upper lip.

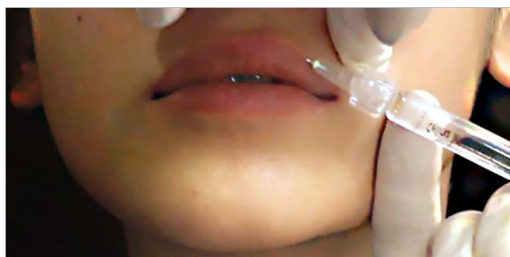


Figure 4. Injection of the medial part of the upper lip.



Figure 5. Shows the Nasolabial angle and Mentolabialangle a) before the injection. b) after 2 weeks. c) after 2 months.

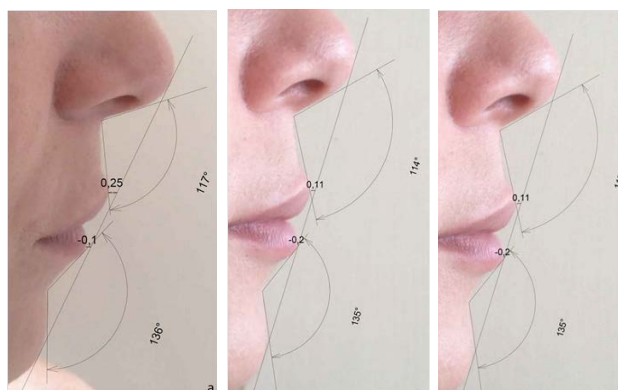


Table 1. Results of the t-test to study the differences in measuring of the nasolabial angle between the studied stages in degrees.

Differences in measuring of the nasolabial angle between study stages						
	Stage	Mean	SD	(t-test)	P-Value	The decision
First comparison	Before	108.8	6.002	7.246	0.000	There is a statistically significant difference
	After 2 weeks	105.8	5.348			
Second comparison	Before	108.8	6.002	6.141	0.000	There is a statistically significant difference
	After 2 months	106.27	5.522			
Third comparison	After 2 weeks	105.8	5.348	13.5	0.004	There is a statistically significant difference
	After 2 months	106.27	5.522			

Table 2. Results of the t-test to study the differences in measuring of the mentolabial angle between the studied stages in degrees.

Differences in measuring of the mentolabial angle between study stages						
	Stage	Mean	SD	(t-test)	P-Value	The decision
First comparison	Before	133.9	7.787	5.03	0.000	There is a statistically significant difference
	After 2 weeks	132.2	7.757			
Second comparison	Before	133.9	7.787	4.38	0.001	There is a statistically significant difference
	After 2 months	132.4	7.845			
Third comparison	After 2 weeks	132.2	7.757	1	0.334	no statistically significant difference
	After 2 months	132.4	7.845			

degrees.

The results of this variable are shown in Table (2).

Discussion

Dental aesthetics has become one of the most interesting fields for most dentists. When talking about cosmetic dentistry, that means harmony between the teeth, the gingiva, the lips and the face [10]. In the past years, there has been an increase in the desire for minimally invasive procedures, which include injections of botulinum toxin type A and dermal fillers [11]. Lips play an important role in the aesthetics of the face for their shape and fullness [12]. Lips augmentation with hyaluronic acid fillers has become so popular [13]. The dermatologic literature did not contain any information regarding the proper esthetic characteristics of lips and the answer is found in the dental literature, in which many articles have addressed the proper height, size, and location

of the lips as produced by dental restoration [14].

The nasolabial region is composed essentially of two aesthetic structures, the nose and upper lip. The nasolabial angle is one of the most important parameters to determine the aesthetic of this region [15]. Unnatural fullness above the lip is to be avoided because it blunts the edge of the lip and gives them a prognathic appearance [14].

Armijo, Bryan S et al. study's in 2012 tried to defining the ideal nasolabial angle. The result of Armijo, Bryan S et al. study's showed that the ideal nasolabial angle would be 93.4 to 98.5 degrees for men and 95.5 to 100.1 degrees for women [16].

In our study, the arithmetic mean of the nasolabial angle before lips augmentation with hyaluronic acid was 108.80 degrees and the arithmetic mean of the nasolabial angle after two months from lips augmentation with hyaluronic acid was 106.27 degrees.

This indicates that the injection of the lips using hyaluronic acid leads to a decrease in nasolabial angle by an average of 2.53 degrees. From a statistical point of view, the P-value is lower than the significance level (0.05). Therefore, the observed difference is considered statistically significant.

The mentolabial angle is one of the important components of facial attractiveness. It is formed by the intersection of a tangent to the lower lip and a tangent to the upper part of the soft tissue chin pad [3].

Naini, Farhad B et al. study's in 2017 concluded that the mentolabial angle of approximately 107 degrees to 118 degrees was deemed the most attractive, with a range of up to 140 degrees deemed acceptable. Angles above or below this range are perceived as unattractive, and anything outside the range of below 98 degrees or above 162 degrees is deemed very unattractive. A deep mentolabial angle 84 degrees or an almost flat angle 162 degrees was deemed the least attractive [3].

In our study, the arithmetic mean of the mentolabial angle before lips augmentation with hyaluronic acid was 133.9 degrees and the arithmetic mean of the mentolabial angle after two months from lips augmentation with hyaluronic acid was 132.4 degrees. This indicates that the injection of the lips using hyaluronic acid leads to a decrease in mentolabial angle by an average of 1.5 degrees. From a statistical point of view, the P-value is lower than the significance level (0.05). Therefore, the observed difference is considered statistically significant.

Conclusions

The results of this study showed that the injection of hyaluronic acid into the lip decreased both the nasolabial angle and mentolabial angle. The amount of the decrease did not affect the aesthetic of the face in profile view in the sample of this study. However, the amount of decrease in both the nasolabial angle and the mentolabial angle must be taken into consideration before injecting fillers into the lips.

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