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Mini-invasive boomerang-plasty for esthetic restoration of lower third face aging

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ARTICLE INFO

Article history:
Received 22 February 2014

ABSTRACT

Introduction: There is an increased demand to improve facial appearance and preserve a youthful appearance for as long as possible. Minimally invasive facial procedures have boomed among young patients with less evidence of scars, low risk, and rapid recovery being some of the attractions. Some patients are even only interested in the treatment of specific units of the face. We present an alternative technique to treat jowls through truly limited incisions.

Material and methods: The surgical protocol included a complete medical history, analysis of the degree of prominence of jowls, and development of a surgical plan. We obtained pre- and postoperative medium and long-term photographs and evaluated the results. The procedure is complemented with neck liposuction and platysmoplasty.

Results: In general, edema and ecchymosis disappeared within 2 weeks. The recovery period was 2 to 3 weeks. The pre- and retroauricular scars over time were nearly imperceptible. Permanence of the results has been demonstrated in a follow-up period of 4 years.

Conclusions: Our philosophical concept lies in the preventive benefit because it is mostly performed in relatively young patients. Boomerang-plasty anatomically restores the mandibular contour from the angle to the chin by eliminating jowls and establishes an esthetically harmonious visual difference between the face and neck. It is a simple procedure with highly satisfactory and stable effects.

1. Introduction

There is an increasing demand for improving physical appearance. We live in a global world where the media, society, the workplace environment, and maybe fashion have some influence in this regard. The process of facial aging is multifactorial and progressive [1,2]. Age undoubtedly has the most important role in soft and skeletal tissue atrophy; however, food, exercise, and certain genetic characteristics also participate.

The various reasons and demands for maintaining a youthful appearance are the variables for which younger patients request surgeries, especially so-called minimally invasive procedures. Minimal evidence of scars, low risk, and rapid recovery make these procedures attractive.

Another aspect that undoubtedly drives this group of patients is the restoration of soft tissue preserving the naturalness of facial features, thus avoiding the uncomfortable antiesthetic variable of altering the original facial features, precisely in relatively young patients. In fact, some

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http://dx.doi.org/10.1016/j.amjoto.2014.03.008
0196-0709/

patients desire modifications of specific facial esthetic units. In this aspect, we are seeing more young patients who dislike the premature appearance of jowls because they represent a sign of aging, which may not correspond to the chronological age of the individual. This appearance causes a lack of esthetic definition between the face and the neck [3], a look that can displease the individual and which may be a reason for seeking specific treatment. In particular, we think that the presence of jowls gives the feeling of a loss of the frame of the face due to an alteration of the perspective of the mandibular contour from the angle to the chin.

For this purpose we propose an alternative technique to specifically correct the jowls through a truly minimally invasive procedure called "mini-invasive boomerang-plasty for esthetic restoration of the lower third of the face due to aging" (*mini-boomerang-plasty to lower face lift*), which involves two limited pre- and retroauricular incisions.

2. Materials and methods

In this clinical study we included 42 patients, 37 women and 5 men with an age range of 37 to 55 years and a mean of 45 years. In all cases, the degree of facial rhytidosis, particularly sagging and prominence of jowls was analyzed to establish that the defect may be potentially correctable with this technique of minimal invasion. The majority of the mini-boomerang-plasty to lower facelift procedures were performed under local anesthesia with intravenous sedation and on an outpatient basis. We included pre- and postoperative photographs to aid in the evaluation of medium- and long-term follow-up results. Smoking was not allowed 2 weeks before and after the procedure.

Informed consent was obtained from all patients after providing complete information on the aim of the study. The study was approved by the ethics committee of "Dr. José E. González" University Hospital.

2.1. *Surgical technique*

Local anesthesia consisted of 1% lidocaine with epinephrine (1:100,000).

2.2. *Pre- and retroauricular limited incision*

We usually mark the approach with the patient in a vertical position before he/she enters the operating room. The line drawings for the incision begin at the tragus and follow exactly the convex anatomy of the preauricular fold. Then it shifts to the retroauricular fold until half the distance of the length of the ear. It is also important to delineate the pre- and retroauricular area of the subcutaneous dissection that includes a radius of approximately 4 to 6 cm (Fig. 1). A simple way to perform subcutaneous dissection and decrease bleeding is using a flat-tipped 2-mm cannula attached to a 10-mL syringe. Even if it is not necessary it can be used to perform a mini-liposuction in selected patients who have an excess of subcutaneous fat in the preauricular area to reshape (recontouring) and slightly reduce the width of the lower face (Fig. 2).

2.3. *Boomerang design*

After exposure of the superficial musculoaponeurotic system (SMAS), we design a geometric figure that is shaped like a boomerang. This figure is composed of two obtuse triangles whose bases converge following the oblique anatomy of the mandibular border. We try to get an angularity of 45 degrees approximately. We define five key points on the boomerang design (Fig. 3): A, is the proximal point of the oblique line where both triangles converge; B, is the distal point of A; C, is the obtuse angle of the upper triangle; D, is the obtuse angle of the lower triangle; and E, is the intermediate distance between points A and B and it is used to determine the height and direction of both triangles. We previously evaluate the degree of prominence and flaccidity of the jowls, and this is corroborated during the procedure. In this sense, the distance between points A and B could be 2 to 4 cm, and the distance from points E to C and D could be 3 to 5 cm, approximately. Obviously the size of the boomerang design must be adapted to each patient according to their particular anatomical characteristics.

2.4. *Boomerang-plasty and SMAS plication*

Boomerang-plasty begins with SMAS plication. The first step consists of placing an invaginating PDS 3-0 suture to attach

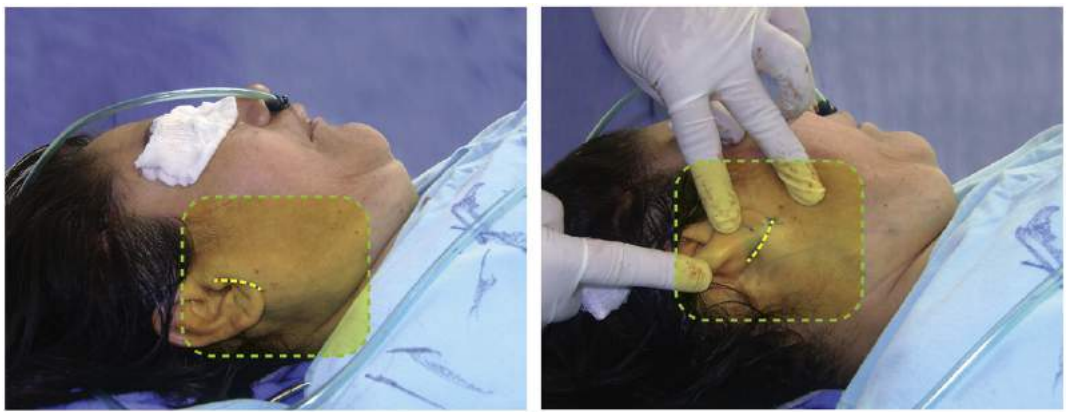

Fig. 1 – Pre- and retroauricular incisions. Limits of the pre- and retroauricular approach. Extension of the dissection area, dotted circle.

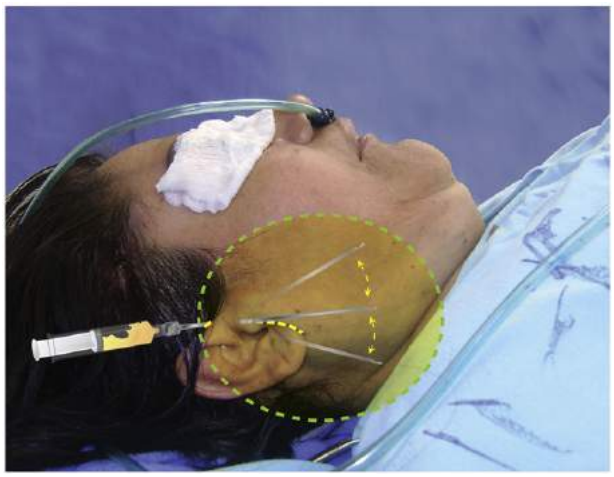

Fig. 2 – Pre- and retroauricular subcutaneous dissection with a plat-tipped 2-mm cannula. Decreases bleeding and facilitates dissection.

points A to B, which has an oblique traction vector (Fig. 4). Then we place one suture above and another below. At the end of this maneuver, we corroborate the redistribution of the flaccid soft tissue; otherwise it is necessary to remove these sutures to include a greater amount of SMAS for the plicature. We can also slightly mitigate melomental folds (marionette lines) that with some frequency are also complaints from patients. Finally we place two additional sutures above and below the respective points C and D. All sutures follow an oblique pattern vector. It is important to know the anatomy of this area, particularly to avoid trapping the marginal mandibular branch of the facial nerve [4].

The design of the boomerang and the quantity of SMAS to perform placation are a dynamic process, where we check that the invaginating sutures have sufficient tension to achieve the goal. With SMAS boomerang-plasty performed with an oblique vector of traction, we can redistribute the hanging soft tissue to a better position; in this way we are restoring the lower frame of the face, providing good definition of the entire mandibular contour that visually divides the face from the neck. It is clear to say that the desired goals must be observed in an intraoperative view (Fig. 5).

Traction of the SMAS originates a mild excess of the skin in the pre- and retroauricular areas, according to the degree of flaccidity of the soft tissue (Fig. 6). The redundant skin over the anterior region is resected maintaining the convex anatomy of the preauricular crease line. The same maneuver is performed in the retroauricular region, but at closure, we have two borders; a longer lower border which is sutured to the shorter upper border. Particularly this skin closure leaves a bottle cap-shaped wound. Nevertheless, the crumpled appearance of the wound eventually flattens and is hardly perceptible. Finally, closure is performed in two planes: subdermally usually with monocryl 5-0, and the skin, usually with 5-0 nylon or vicryl (Fig. 6).

2.5. *Neck liposuction–dissection and platysmoplasty*

In most of our patients, we complement this technique with platysmoplasty to improve the anatomic condition of the neck. We often conduct liposuction–dissection of the neck using the formerly referred to cannula and syringe. Through a submental approach in patients with mild or moderate rhytidosis of the neck [5–7] and with a loss of definition of the cervicomandibular line [8], we identify the medial borders of the plastysma muscle to perform midline plasty from the cervicofacial angle to the submental area [9]. In particular, we do not perform overlapping of the muscle, but we use lateral traction sutures (in a "double-breasted" fashion) at the level of the cervicofacial angle anchored to the periosteum and deep fascia of the contralateral mastoid region.

With this focus we obtain a greater esthetical profit, due to rearrangement of the platysma muscle through medial tension, which up to a certain degree also contributes to improve the mandibular contour. Another important objective is to achieve restoration of the cervicomandibular line. With less frequency we have detected patients with platysmal bands. In these cases, we section and partially and horizontally shape the platysma muscle at the level of the cervicofacial angle to overlap the muscle flap, as has been

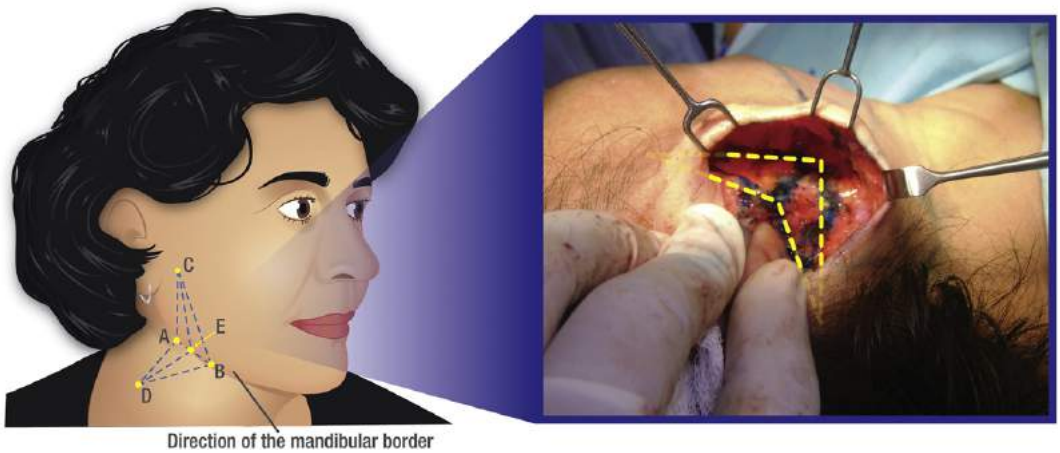

Fig. 3 – (A) Boomerang design on the SMAS. Both bases of the triangles converge and follow the anatomy oblique of the mandibular border. Five key points are described in the geometric figure of the boomerang.

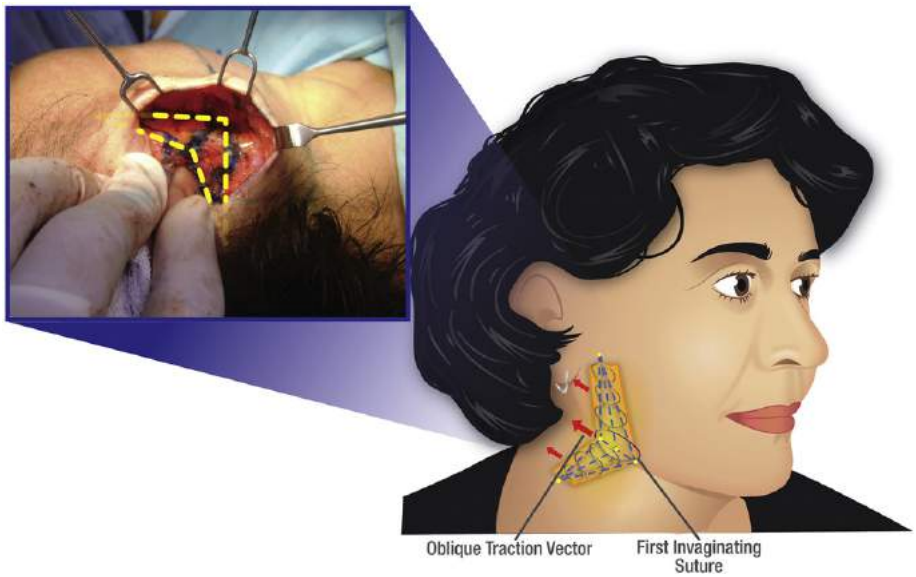

Fig. 4 – Boomerang-Plasty and SMAS plication. Placement of the first invaginating suture with an oblique vector of the traction. This suture is a guide to place the rest of the sutures.

described by some authors [10]. In addition we obtain better reaffirmation and contention of the platform on which the structures of the neck base rest [11,12].

3. Results

Patients were evaluated by three plastic surgeons that were not involved in the procedure and were blinded to the operator performing the procedure, categorizing the results with a Likert scale as excellent, very good, good, and poor. The results were considered by the evaluators as very good in 87% of the patients, good in 11%, and poor in 2%. Patient self-evaluation results were very good (90%), good (8%), and poor (2%). Their expectations were adequately met since it was a procedure with minimal incisions. The benefits reached with the mini-boomerang-plasty to lower face lift technique were documented photographically before and after surgery over a follow-up period of 6 months to 4 years (Figs. 7 and 8). A minimal crumpled appearance of the retroauricular scar persisted in two patients, and two others developed a hypertrophic scar. The scar evolved satisfactorily in the remaining patients and the bottle-cap shape in the retroauricular area practically disappeared over time [13–15]. One patient had a small hematoma on the neck, which was resolved in the medical office through needle aspiration. There were no infections or major complications.

Although two patients who developed a crumpled retroauricular scar did not show dissatisfaction, they accepted a small retouch that involved skin resection and closure. We believe that the hypertrophic scar was possibly caused by a miscalculation due to tension on wound closure.

Fig. 5 – Intraoperative view. A 49-year-old woman with a moderate degree of facial aging. Left side, preauricular excess skin after boomerang-plasty, and appearance after removal of residual skin tissue. Right side, retroauricular excess skin after boomerang-plasty. Closure of the retroauricular area leaves a bottle-cap shape.

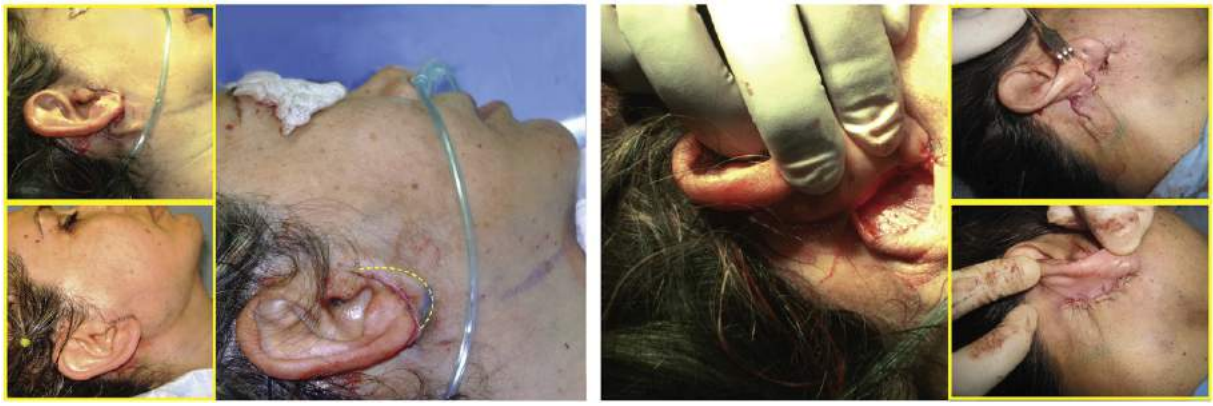

Fig. 6 – Intraoperative view. (A) Preoperative view. (B) Final outcome after boomerang-plasty and midline platysmoplasty.

The results obtained with the boomerang-plasty technique have been stable over the years, the soft tissue of the lower third of the face and the neck have remained reaffirmed and with a better appearance.

4. Discussion

A careful analysis of the specific conditions of each patient to assess the variables of age, quality of each of the cover layers, including bone structure, give us the guidelines to establish the best treatment approach that solves the problem. In the indicated patients, the benefits of a traditional face lift are highly satisfactory. Its results have been well documented through various techniques developed over the last 30 years and it is still very valid for a certain group of patients. Various methods have been reported with minimal incisions to treat aging of the lower third of the face and jowls with vectors of vertical and oblique traction with very good results, but these involve an extended preauricular approach that follows the prepilous line of the sideburn [16] or toward the temporal area [17], and others with retroauricular extension [18].

Our current philosophical approach in younger patients who want to improve their appearance of the lower third of the face, is to advocate for procedures that involve limited incisions, which are distinguished by a minimal surgical stigma, and a relatively fast recovery process.

As we know the process of facial aging is dynamic and irremediably progressive. Facial soft tissue falls in a staggered way; these stop at the anatomical lines of the face until they go beyond the natural limits, and then folds appear. A clear example of this is the jowls. Commonly, young patients who start to notice a loss of definition of the mandibular contour look at themselves in a mirror and digitally lift the soft tissue of the jowls toward a different vector until they find the best point of traction that restores the anatomy of the mandibular border (Fig. 9).

We have focused this work particularly on correcting jowls through a process involving a truly limited approach. The geometric shape of the boomerang design and its strategic position with regard to the oblique anatomy of the mandibular border allows direct stretching of the soft tissue we want to rearrange. With the plicature of the upper triangle of the boomerang, we reaffirm the tissues of the lower portion of the cheek. To some extent it is possible to reduce marionette lines. The plicature performed exactly at the level of convergence of the triangle base rearranges the tissues and returns the visual definition of the jaw line. Lower triangle plasty rearranges and tenses the lateral portion of the platysma (medial to lateral traction). As mentioned before our vector of traction is oblique. We achieve the final rearrangement platysma with midline platysmoplasty (lateral to medial traction) and simultaneously we reinforce the platysma platform to give greater containment to the structures at the base of the neck. The combination of platysmaplasty maximizes the results of the boomerang-plasty and vice versa. The end result is a global definition of the lower third of the face and neck.

Our objectives are aimed at obtaining a good definition of the anatomy of the jaw line in its entirety (from the angle to the chin), as well as redefining the cervicofacial angle (which visually translates into a greater length of the base of neck, in a side view). This standard allows us to obtain a high degree of refinement, and since it is performed in relatively young patients it will show a facial frame with clearly defined esthetic boundaries, denoting greater joviality [19].

The common denominator to treat facial aging of the upper and middle third of the face is via vertical vectors [20]. While it is true that a perpendicular (vertical) force lifts the sagging tissues, we must consider that the tissues that will be lifted may have different fixation points therefore different traction vectors may be required for better displacement [21,22].

In our opinion, when we are able to restore the mandibular contour, providing a high degree of esthetic refinement, since we clearly define the face from the neck, obtaining a highly satisfactory facial balance.[5,6,37,38] We believe that this appearance gives a clear sign of joviality. On the other hand, the preventive aspect is fully accomplished since the patients are treated at a relatively early age and continue looking younger for a longer period of time.

Obviously it is possible, and in some cases desirable, to combine this minimally invasive method with other procedures, particularly, we recommend, in our mestizo population if needed, refinement of the nasal tip. This maneuver provides greater presence and a high standard of facial esthetics [23]. Similarly, it is feasible to combine it with other facial cosmetic procedures of limited incisions, such as a midface lift using a lower blepharoplasty or a transconjunctival approach [24–26].

Fig. 7 – A 39-year-old woman with a moderate degree of facial aging. (A, C, E) Preoperative view. (B, D, F) Postoperative view after boomerang-plasty and midline platysmoplasty, with 2 years of evolution.

5. Conclusions

Boomerang-plasty is a procedure specifically developed to correct jowls and consequently restore the anatomy of the mandibular contour. As we mentioned before, it is desirable to combine it with management of the neck with a simple midline platismoplasty or any of its variants. We believe that this technique actually meets the term minimally invasive and obviously with the advantages it brings: rapid recovery and a return to daily life and/or work on with minimal stigmas of surgery.

Another advantage of this type of procedure is that it is performed at a young age making it preventive, because the quality of the tissues at 45 years is completely different 20 years later, not to mention that other roles are also different. One of the top concerns of patients who undergo a cosmetic facial procedure is hoping to appear younger, which is more feasible and praiseworthy in this group of patients, since obviously they still have better quality of skin than at older ages.

Evidence of pre- and retroauricular incisions actually, over time, become mostly imperceptible. This aspect gives it great

Fig. 8 – A 55-year-old-woman with a moderate to severe degree of facial aging. (A, C, E) Preoperative view. (B, D, F) Postoperative view after boomerang-plasty, midline platysmoplasty, Blepharoplasty and centrofacial lift, with 4 years of evolution.

naturalness. It is an easily reproducible, safe procedure that can be performed in an average time of 3 hours. It can be accompanied by other facial cosmetic and/or body procedures. It can also be performed on older patients who refuse a traditional facelift procedure, explaining the limitations that this procedure would have in contrast with the benefits of a minimally invasive technique.

Finally, we believe that this procedure is a good alternative for younger patients with mild to moderate degrees of facial rhytidosis who particularly seek to correct jowls in addition to loss of definition of the face and neck and, when combined with neck plasty, it is feasible to restore the esthetic standards of the lower third of the face and neck. In this way, we obtain a greater facial esthetic balance that has a dynamic and global impact. These results, in our experience, would be difficult to achieve with an isolated procedure.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

Acknowledgments

The authors thank Sergio Lozano-Rodriguez, MD for his help in translating the manuscript. They also thank the graphic

Fig. 9 – Maneuver that some patients use to correct jowls. Soft tissues are digitally pulled obliquely.

designer, Alejandra Orozco Castro, for her help in making the images presented in this paper.

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