

# Does the Approach of the Lateral Platysmal Bands Widen the Gap between the Medial Bands?

Luiz Charles-de-Sá, MD, PhD\*  
Natale F. Gontijo-de-Amorim,  
MD, PhD†

Valéria Loureiro Claro, MD\*  
Diogo Maciel Lobão Vieira, MD\*  
Gustavo Maltez de Andrade, MD\*  
Lucas Dantas-Rocha, MD\*  
Cláudio Gonçalves Ramos da Silva,  
MD\*  
José Horácio Abboudib, MD, PhD\*  
Cláudio Cardoso de Castro,  
MD, PhD\*

**Background:** The first visible change in an aging face and neck is the loss of neck contour, which can be corrected by treating the platysmal bands; however, it remains unclear as to which is the best strategy to approach these bands. The aim of the present study is to verify whether the lateral platysmal bands approaches, before the medial ones, cause widening of the gap between them.

**Methods:** This is a prospective, randomized, comparative study involving 30 individuals presenting various stages of neck and facial flaccidity and sagging. The patients were split into 2 groups according to the lateral platysmal approach (group A: lateral platysmal traction/plication; group B: lateral platysmal undermined/traction). A protocol was established to measure the gap between the medial bands, 3 and 5 cm away from the chin, before and after superficial musculo-aponeurotic system/platysma lateral suspension. Measurements were taken using a compass and a ruler. The endpoint was to determine whether the gap between the medial platysmal bands widens after the lateral procedure.

**Results:** Group A, first measure (1-M): the gap ranged between 1.0 and 1.6 cm in point M3 (3 cm away from chin) and between 1.8 and 3.0 cm in point M5 (5 cm away from chin) (mean in M3 = 1.2; SD, 0.22 and mean in M5 = 2.3; SD, 0.52). Group A, second measure (2-M): the measure ranged between 1.0 and 1.7 cm in point M3 and between 1.8 and 3.2 cm in point M5 (mean = 1.28; SD, 0.25 and mean = 2.42; SD, 0.63, respectively). Group B, first measure (1-M): the gap ranged between 1.1 and 1.7 cm in M3 (mean = 1.32; SD, 0.21) and between 1.8 and 3.2 cm in M5 (mean = 2.38; SD, 0.57). Group B, second measure (2-M): the measure ranged between 1.2 and 1.7 cm in M3 (mean = 1.4; SD, 0.18) and between 2.0 and 3.2 cm in M5 (mean = 2.5; SD, 0.55). Group A:  $P = 0.07$  (M3) and 0.10 (M5); Group B:  $P = 0.09$  (M3) and 0.07 (M5).

**Conclusion:** The lateral platysmal approach, plication or undermined, does not lead to a widening of the gap between the medial platysmal bands. (*Plast Reconstr Surg Glob Open* 2020;8:e2853; doi: 10.1097/GOX.0000000000002853; Published online 24 June 2020.)

## INTRODUCTION

Esthetic surgery for the face and neck rejuvenation remains one of the most frequently performed surgical procedures in the world.<sup>1</sup> With a growing aging population

across the globe, more people will likely seek rejuvenation procedures of the face and neck.<sup>2</sup>

Since the first clinical studies, the importance of the optimal management of the cervical region for a better face-lift result has been investigated. In the beginning, this was accomplished by undermining and pulling the skin.<sup>3</sup> Since the studies by Aufricht in 1906 to de Castro in 1980, data have been reported on the superficial anatomy of the neck, along with its changes due to the aging process, which elucidated many of the surgical and nonsurgical approaches to treat these undesired changes.<sup>4-8</sup>

From the \*Department of Plastic Reconstructive and Aesthetic Surgery, University of the Estate of Rio de Janeiro (UERJ), Rio de Janeiro, Brazil; and †Pitanguy School and Perform Clinic, Rio de Janeiro, Brazil.

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When evaluating an aged face and neck, the examiner must remember that one of the first visible changes is the loss of neck contour, which is caused by well-known anatomical changes, such as wrinkles and flaccidity; muscle hypertonicity with formation of visible platysmal bands; loss of adequate jawline contour; herniation or bulging of subplatysmal structures, such as the submandibular gland; and anterior accumulation of fat above and under the platysma muscle.

According to Ellenbogen and Karlin,<sup>9</sup> the esthetic neck must preserve a cervicomental angle between 105 and 120 degrees, a well-defined jawline, a visible anterior border of the sternocleidomastoid muscle, a subhyoid depression, a noticeable thyroid cartilage bulge, and a submental-sternocleidomastoid angle of 90 degrees. Later on, the authors added to these parameters the importance of the anterior projection of the chin, to the appearance of the neck.<sup>10,11</sup> The submental region is defined as a triangle, with the hyoid bone as the base, the chin as the apex, and the anterior part of the digastric muscles as the lateral walls. The submental's floor is formed by the mylohyoid muscle.<sup>6</sup>

The superficial musculoaponeurotic system (SMAS) is generally considered a landmark for subdividing the superficial and deep planes of the face. The platysma muscles are defined as mimic or skin muscles with a close relation to subcutaneous tissue and skin. The lateral neck region consists of interconnected anatomical structures such as the sternocleidomastoid muscle, which is situated beneath the platysma and is enclosed by the superficial layer of the cervical fascia. The fascia of the platysma and the sternocleidomastoid muscle glide on a thin layer of loose connective tissue.<sup>6</sup>

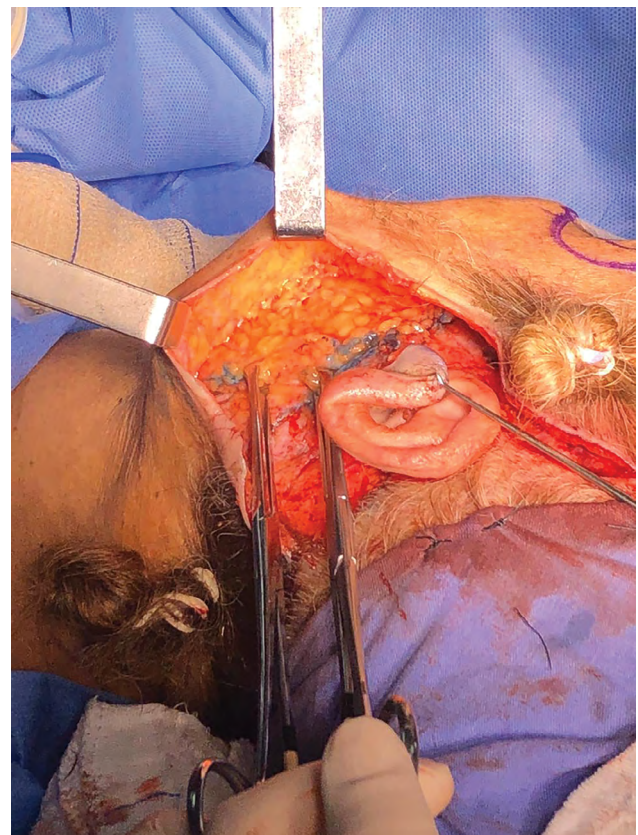
Although the anatomy of the face and neck is well defined, it remains unclear as to what is the best protocol for treating the changes associated with facial aging. Many authors have tried to clarify these treatment strategies, proposing different surgical techniques for each variant of the aging process of the face and neck. Siwani and Friedman<sup>7</sup> quantified the displacement of the midface in their cadaveric dissections, showing that the addition of medial platysma plication in face-lift reduced the amount of total lift at points along the jawline by approximately 40%. Consequently, the treatment of platysma diastasis has different protocols, considering the sequence to approach the medial or lateral platysmal bands. Some surgeons prefer to approach the medial bands first rather than the lateral ones, arguing that the reverse order increases the gap between the medial bands, leading to difficulty when it comes to closing or suturing them. On the other hand, others claim that the medial approach must be performed after SMAS and lateral platysma elevation so as to allow the maximal midface elevation without generating opposing forces during medial platysma plication.<sup>8-16</sup>

The aim of the present study was to verify whether the treatment of the lateral platysmal bands interferes with the widening of gap between the medial bands, and therefore to propose a protocol for the approach of the platysma, based on its displacement analysis.

## METHODS

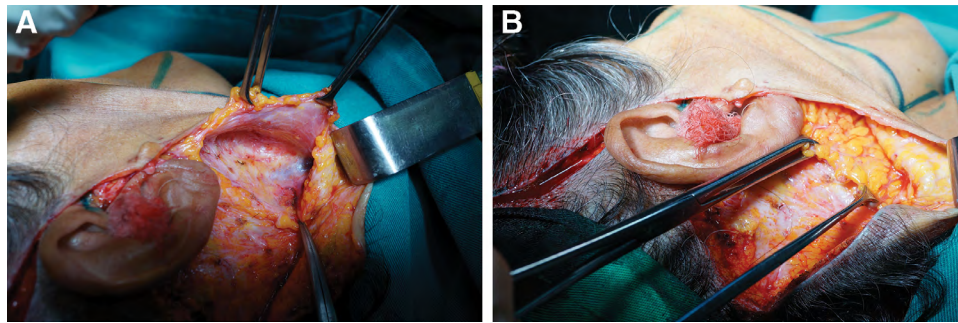
This is a prospective, comparative, randomized clinical trial involving 30 healthy individuals (both men and women) scheduled for facial rejuvenation surgery (face-lifting). The age of patients ranged from 45 to 65 years. The study (duration: 2017–2019) was conducted in accordance with the ethical principles of the Declaration of Helsinki 2000 and was approved by the Brazilian Medical Investigation Ethical Board (Protocol no. 3.408.450) and registered in the Brazilian Clinical Trials Registry (RBR-2nn9y2). All patients received extensive information on the study protocols and outcomes. All patients signed the informed consent to participate in the study and to make available the required data for the analyses of results.

After patients were selected (according to their specific anatomical alterations of the neck and by considering groups 3 and 4 of the author's classification<sup>17</sup> and groups 1 and 3 of de Castro's classification),<sup>6,11</sup> they were introduced to our database, and randomization was created (using web-based software: [www.randomization.com](http://www.randomization.com)) and performed on a 1:1 ratio. Patients were split into 2 groups (group A and group B), following this randomization. Fifteen patients from group A were allowed to undergo traction and mastoid fixation with absorbable 3-0 polydioxanone sutures (PDS; Fig. 1). Group B underwent 3–5 cm subplatysmal undermining of the lateral portion of platysma, followed by pulling and suturing to the mastoid prominence with absorbable 3-0 PDS sutures



**Fig. 1.** Lateral platysma pulled posteriorly and fixed with 3 PDS sutures in the mastoid.





**Fig. 2.** A, Lateral subplatysmal undermining. B, Lateral platysma pulled posteriorly and fixed with 3 PDS sutures in the mastoid.

(Fig. 2). In this last group, we have adopted a safe platysma window protocol preconized by Rohrich et al.<sup>18</sup> All patients had common and recognizable platysmal alterations and had their medial platysma gap measurements taken 3 cm (measure-M3) and 5 cm (measure-M5) away from the chin. An established protocol to measure the gap between the medial platysmal bands before and after SMAS/lateral platysma treatment was addressed (Fig. 3). Those measures were taken using a compass and a ruler.

(See [Video 1 \[online\]](#), which shows how the skin incision

was made 5 mm from the submental crease. The cervical area was undermined by a scissor. Medial platysmal band gap measurements were taken 3 cm (M3) and 5 cm (M5) away from the chin by a ruler and a compass (pre and post platysmal lateral approaches.)

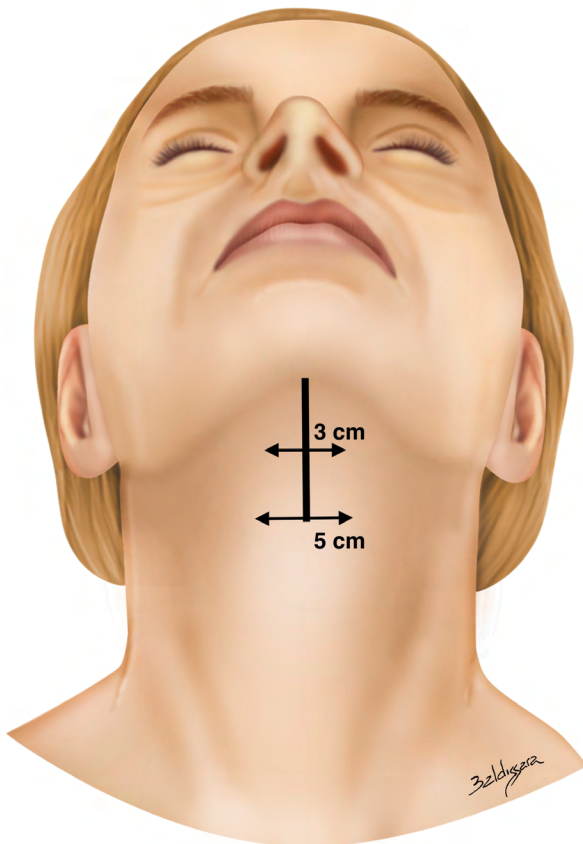
All face-lifting surgeries were performed by 1 surgeon at the Pedro Ernesto University Hospital of the State University of Rio de Janeiro (UERJ) and at the author's private clinic. Patients had various phototypes of skin color (Fitzpatrick),<sup>16</sup> photoaging, and cervicofacial sagging. Patients with hematologic and hemodynamic disturbances, auto-immune diseases, connective-tissue diseases, type I and II diabetes and other metabolic diseases, positive smoking status, and chronic use of corticosteroids were not included.

The platysmal band position and hypertrophy during preoperative time were analyzed in static and dynamic status. (See [Video 2 \[online\]](#), which shows how platysmal bands are identified in static and dynamic status during preoperative evaluation.)

In the central cervical area, most patients were allowed to undergo cervical liposuction, with or without open cervical lipectomy, in order to identify the medial platysma fibers and its border. For liposuction, a 3 mm cannula attached to a syringe or a liposuction apparatus was used. The undermining of the neck's skin was done in the anterior and lateral part of the neck, and occasionally, the whole cervical skin flap was undermined. The submental incision was placed 3 mm caudal to the submental crease, making it possible to adequately address the middle area of the neck.<sup>6,9,11</sup>

After all the measurements of the platysma gap have been taken (pre and post platysmal lateral approaches), the medial platysmal borders were sutured from the thyroid cartilage to the submental level through a submental incision, using absorbable 3-0 PDS sutures.<sup>6,11</sup> When the platysma muscle border was hypertrophic, it was excised by a tangential strip excision technique before suturing. However, in cases presenting a long distance between hypertrophic medial bands, performing a transversal partial myotomy below the hyoid bone has been our preference.

In our surgical sequence to treat an entire aged face, the midface was treated before the platysmaplasty, according to the facial volumizing aspect. Thin face was submitted to an SMAS vertical plication on zygomatic arc (PDS 3.0 sutures), associated with lipotransfer (Regen Fat Codes



**Fig. 3.** Measurement of the medial platysma diastasis gap distance, 3 cm (M3) and 5 cm (M5) away from the chin. The measures were taken using a ruler and a compass.



**Fig. 4.** In some cases, the facial lipotransfer is performed, after the SMAS treatment in midface, following the Regen Fat Codes protocol.

protocol; Fig. 4). The fuller faces underwent an oblique SMASectomy, according to Daniel Baker protocol.<sup>19</sup> An SMAS oblique ellipse was drawn from the lateral orbital aspect to the mandibular angle. The ellipse width resection was determined according to the degree of flaccidity. This SMASectomy did not extend to the lateral platysmal edge. Suture suspension (PDS 3.0 sutures) of the malar fat pad to achieve more angularity of midface was adopted to all patients, according to Pitanguy and Gontijo-de-Amorim.<sup>20</sup> (See Video 3 [online], which shows the surgical sequence applied to treat the aged face. Group A was submitted to lateral platysmal traction. The patients from group B underwent a lateral platysmal undermining and traction.

After the midface treatment, the neck was addressed in 2 different ways according to the protocol enrolled in this study (Figs. 1, 2). The study followed this sequence: medial platysmal band gap measurement, midface lifting, lateral platysmal treatment, medial platysmal bands' gap measurement and treatment of them.

Data were analyzed using both parametric and non-parametric statistical analysis. Tests were performed to evaluate the differences between the two groups. Parametric test (t-test) was used because the variables

showed Gaussian distribution. The Graph Pad Prism version 5.01 software (San Diego, Calif.) was used to analyze the data. The results were expressed as mean  $\pm$  standard deviation (SD). Statistical significance was set at  $P < 0.05$ .

## RESULTS

Between 2017 and 2019, 30 patients underwent neck- and face-lifting by the first author. Of these, 6 were men (20%) and 24 were women (80%). The procedures were primary face-lifts. The age of patients ranged from 45 to 65 years (mean, 56.6; SD, 4.89) in group A and from 53 to 65 years (mean, 58.40; SD, 3.71) in group B. Group A was submitted to lateral platysmal pulling and mastoid fixation, and group B was submitted to platysmal undermining, pulling, and mastoid fixation. SMAS plication was realized to the midface treatment in 10 and 8 patients of groups A and B (60% of all cases), respectively. The SMASectomy was done in 5 and 7 patients of groups A and B (40% of all cases), respectively.

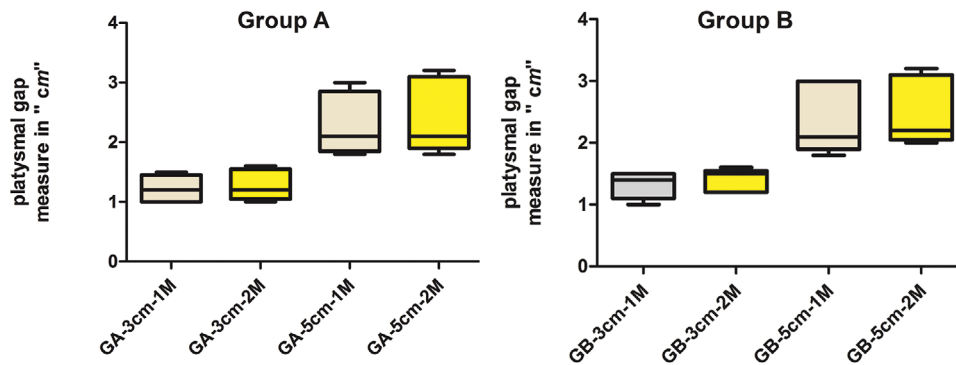
The platysmal medial gap measurements were taken 3 cm and 5 cm away from the chin before and after lateral platysmal approaches on both groups. In group A, the first measure (1-M) of the medial platysmal gap ranged between 1.0 and 1.6 cm (mean, 1.2; SD, 0.22) in point M3 (3 cm away from chin) and between 1.8 and 3.0 cm (mean, 2.3; SD, 0.52) in point M5 (5 cm away from chin). The second measure (2-M) ranged between 1.0 and 1.7 cm (mean, 1.28; SD, 0.25) in point M3 and between 1.8 and 3.2 cm (mean, 2.42; SD, 0.63) in point M5.

In group B, the first measure (1-M) ranged between 1.1 and 1.7 cm and between 1.8 and 3.2 cm in the points M3 and M5 (mean, 1.32; SD, 0.21 and mean, 2.38; SD, 0.57, respectively). The second measure (2-M) ranged between 1.2 and 1.7 and between 2.0 and 3.2 cm in the points M3 and M5 (mean, 1.4; SD, 0.18 and mean, 2.5; SD, 0.55, respectively) (Fig. 5). The medial platysmal gap analysis of pre (1-M) and post (2-M) lateral platysmal approaches showed no significant change at a distance of 3 cm (M3) and 5 cm (M5) in both groups A ( $P = 0.07$  and  $0.10$ ) and B ( $P = 0.09$  and  $0.07$ ; Table 1).

Complications associated with the procedures were bruise and scar alteration in 1 case, which was treated with topical medications.

## DISCUSSION

Several authors have proposed different approaches to treat the platysma, considering the patient's anatomical changes due to the aging process.<sup>18-26</sup> In this study, an investigation was made on whether any difference exists in the medial platysmal gap after lateral platysma treatment. The literature reports that some authors have described some techniques based on their preferences and their clinical results.<sup>26-30</sup> Ellenbogen and Karlin,<sup>9</sup> in his manuscript entitled *Visual Criteria for Success in Restoring the Youthful Neck*, published in 1980, described 7 types of neck, and for each of them, he has a different approach. When it came to treating the platysma, he either excised and sutured the posterior border of the platysma with an anterior adjustment after, or first



**Fig. 5.** A, Group A: the platysmal gap distances, 3 and 5 cm away from the chin as measured in 2 moments: pre (first measure: 1-M) and post (second measure: 2-M) lateral platysmal approaches. Group A: first measure (1-M): the gap ranged between 1.0 and 1.6 cm in the point M3 (mean, 1.2; SD, 0.22) and between 1.8 and 3.0 cm in the point M5 (mean, 2.3; SD, 0.52). Group A: second measure (2-M): The measure ranged between 1.0 and 1.7 cm in point M3 (mean, 1.28; SD, 0.25) and between 1.8 and 3.2 cm in point M5 (mean, 2.42; SD, 0.63). B, Group B: first measure (1-M): ranged between 1.1 and 1.7 cm in points M3 (mean, 1.32; SD, 0.21) and between 1.8 and 3.2 cm in point M5 (mean, 2.38; SD, 0.57). Group B: second measure (2-M): ranged between 1.2 and 1.7 in points M3 (mean, 1.4; SD, 0.18) and between 2.0 and 3.2 cm in point and M5 (mean, 2.5; SD, 0.55). Group A:  $P = 0.07$  (M3) and 0.10 (M5); Group B:  $P = 0.09$  (M3) and 0.07 (M5).

**Table 1. Data on Baseline Study Characteristics**

Sex (Man/Woman)	Group A, 2/11	Group B, 4/13
Age (range, 45–65 y)	Mean, 56.6 (SD, 4.89)	Mean, 58.4 (SD, 3.71)
Platysmal lateral plication	15	0
Platysmal lateral undermining	0	15
Point M3 cm: 1-M (pre) and 2-M (lat. plast. appr.)	1.22/1.28 (SD, 0.22/0.25)*	1.32 /1.4 (SD, 0.21/0.18)*
Point M5 cm: 1-M (pre) and 2-M (lat. plast. appr.)	2.3/2.42 (SD, 0.52/0.63)*	2.38/2.5 (SD, 0.57/0.55)*
Midface: SMAS-plication (18 pactes)	10	8
Midface: SMASectomy (12 pactes)	5	7

\* $P$ valor gap analysis of pre (1-M) and post (2-M) lateral platysmal approaches showed no significant changes at 3 cm (M3) and 5 cm (M5) distance in both groups A and B (Group A:  $P = 0.07$  and 0.10. Group B:  $P = 0.09$  and 0.07).

sutured the anterior and then the platysma flaps were pulled posteriorly and sutured. Mottura<sup>13</sup> published in 1999 that in the case of severe bands, the lateral traction and plication elevate the muscles against the force of gravity and that can be a cause for recurrence. He also states that pulling the skin in a lateral direction pulls the free borders further apart.

The ideal sequence of the platysma complex mobilization, as well as the appropriated approach of the lateral and medial bands, is still controversial.<sup>31,34</sup> Some authors have preconized that midline platysmal plication can limit the mobilization of the neck tissues, impairing the improvement in the neck and jawline.<sup>35,36</sup> de Castro<sup>6</sup> has approached the suprahyoid region after elevating the lateral aspects of the face, claiming that tension applied in the midline before pulling the lateral tissues could restrict the generation of opposing forces, the potential of the malar fat pad, and SMAS elevation. This protocol has been ratified by other surgeons,<sup>37–40</sup> stating that due to the platysma and SMAS being continuous entities, it could reduce its lateral elevation. In 2016, Jacono and Malone<sup>41</sup> demonstrated a cadaveric study showing significant limitations in the mobility of facial structures with midline platysmal sutures. Owsley<sup>42</sup> preconized that the medial plication results in drawing skin more medialward with overlying submental skin, which

impaired the lateral and superior tissue mobilization. Conversely, other authors have adopted the treatment of medial bands previously for diverse reasons, including the superolateral platysmal lifting to increase the midline platysmal gap.<sup>7,42,43</sup>

There is no agreement for the protocol to be adopted on the sequence of the medial and lateral band approaches of the platysma.<sup>44–47</sup> In our study, the platysma anatomical measurements demonstrated that the lateral approach of the platysma does not widen the gap between the medial bands. Our results showed that regardless of the type of lateral approach (traction or undermined), there was no increase in the platysmal gap. To explain why there was no medial displacement of the medial platysma band in this study, we have to consider some factors: the small distance of superolateral displacement from the lateral edge of the platysma to fixation in the mastoid (3–5 cm of displacement) will be insufficient to widen the gap; the elasticity of platysma muscle bears major resilience when submitted to lateral and medium traction forces and the presence of attachments and ligaments in the mandibular region. If the lateral approach did not lead, by indirect action, to a change in the position of the medial borders, we could suppose that the medial approach would not cause a change in the position of the lateral edges and, consequently, would not be a limiting factor to the ascension of



the tissues in the midface. Obviously, to confirm this supposition, we would require other measurements, which were not done in this study. Based on these results, we have proposed a protocol defining the surgical steps according to anatomical measurements. In our face-lifting protocol, we have adopted a sequence of the SMAS elevation, lateral and medial platysma approaches, in a faster surgical time.

Some limitations in this study were the lack of the lateral platysmal board position measurement after SMAS elevation, the lack of measurement of the platysma muscle thickness, and the small number of patients.

## CONCLUSION

The lateral platysmal approach (pulled or undermined) does not produce or widen the gap between the medial platysmal bands.

**Luiz Charles-de-Sá, MD**  
 Av. Joana Angélica  
 124/602, Ipanema  
 Rio de Janeiro  
 RJ-Cep 22420-030  
 Brazil

E-mail: [clinicaperforma@uol.com.br](mailto:clinicaperforma@uol.com.br)

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