

Jawline Contouring Through an Intraoral Approach in the Context of Bilateral Sagittal Split Osteotomy: A Proof-of-Concept Report

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Purpose: This report describes a technique to suspend the submandibular space (SS) through an intraoral approach in the context of a bilateral sagittal split osteotomy (BSSO), thus improving the jawline contour and achieving a neck-rejuvenating effect.

Patients and Methods: A sample of 6 consecutive patients referred for orthognathic surgery who also sought neck rejuvenation and contouring surgery was selected to implement the technique. The following measurements were used to evaluate the procedure: patient satisfaction with a visual analog scale, photographic assessment, additional operative time, and complications related to the procedure.

Results: The average patient age was 47 years (range, 38 to 57 yr). Three patients were women and 3 were men. All patients were highly satisfied with the results achieved at the jawline. No surgical complications occurred in any case. There was an average increase of only 5 minutes in total operative time for each side.

Conclusion: Suspension of the SS through an intraoral approach is an effective, well-tolerated, and technically straightforward method for neck contouring in patients in whom a BSSO procedure is foreseen.

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The orthognathic surgery (OS) patient “prototype” has evolved substantially during recent decades. Although correcting a dysfunctional occlusion used to be the key concern and almost exclusive therapeutic goal, the wish to optimize facial esthetics—in the context of a dysfunctional occlusion or not—has become the main motivation for treatment in many cases. Moreover, supported by improvements in the surgical, medical, and orthodontic fields and a popular perception of surgery as safe and predictable, the

number of adult patients who undergo orthodontic or combined orthodontic and surgical therapy is increasing steadily.

State-of-the-art treatment of dentofacial deformity through OS involves the comprehensive management of the hard and soft tissues to correct any functional and esthetic disharmonies of the maxillofacial complex.¹ In addition to elective changes, the skilled surgeon should be able to profit from the predicted favorable soft tissue response to skeletal repositioning

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and control unfavorable modifications. Most cervicofacial soft tissue deformities can be treated concomitantly with OS if there is no clear contraindication.^{2,3} The fact that more adult patients decide to undergo OS treatment implies that the coexistence of incipient and established cervicofacial aging changes is very common.

Although the maxillofacial region is the key area of attention when planning an OS procedure, the submental and cervical region also is a critical determinant of overall facial esthetics.^{4,5} The esthetic parameters of this region can be altered as a result of a dentofacial deformity or aging.⁶ Indeed, the normal aging process entails the formation of a visible bulge in the area of the submandibular salivary glands that disrupts the planar and smooth surface of a youthful-appearing neck. Therefore, several surgical procedures have been designed to correct these irregularities as a complement to other rejuvenation procedures of the aging neck. These include salivary gland excision,⁷ partial resection of the submandibular glands,⁸ or suspension of the submandibular space (SS) to the mandibular periosteum.⁹

At a specialized center for the correction of dentofacial deformity, OS and adjunctive cosmetic soft tissue procedures are performed simultaneously on a regular basis. The aim of this report is to describe an innovative supplemental technique to elevate the SS through an intraoral approach in the context of a bilateral sagittal split osteotomy (BSSO), hence improving the jawline contour and yielding a neck-rejuvenating effect.

Patients and Methods

At a specialized center for the correction of dentofacial deformity, a sample of 6 consecutive patients was selected to implement a new technique for jawline contouring. Together with correction of their underlying skeletal disharmony, recruited patients shared a wish for neck rejuvenation and recontouring surgery. The aim was to enhance the neck-lifting effect of mandibular advancement or counterclockwise rotation of the occlusal plane. Inclusion criteria were type V neck profile (retrognathia and microgenia) according to Dedo's⁵ classification of facial profiles and any degree of submandibular gland ptosis. Patients in whom any further neck-lift procedures were indicated (skin re-draping, platysmal plication, or liposuction) were excluded. The Declaration of Helsinki guidelines on medical protocol and ethics of 1964 and its later amendments were followed at all treatment phases. Specific written informed consent was obtained.

Diagnostic workup and preoperative planning proceeded according to the center's standardized protocol for orthognathic cases.¹⁰ Patients were

operated on under general anesthesia by the same surgeon and senior author of this article (E.H.A.) who had more than 20 years of experience in OS and facial cosmetic surgery. In all cases, a BSSO was performed according to the Obwegeser-Dalpont-Hunsuck technique¹¹⁻¹³ and in the context of a mandible-first protocol.¹⁴ Rigid fixation was achieved using a single 4-hole straight titanium miniplate along the oblique ridge of the mandible and 4 monocortical screws plus 1 additional bicortical screw at the retro-molar area.¹⁵ Once the BSSO procedure concluded, the fixation wires were released and the patient's occlusion was corroborated. At this point, the same BSSO buccal incision was used to approach the mandibular body by careful subperiosteal dissection toward the inferior mandibular border. Having reached the jawline, the periosteum was incised horizontally at the level of the molar teeth. This incision was performed superficially, with a number 15 scalpel, just 2 mm above the most lateral aspect of the inferior mandibular border to avoid damage to the marginal mandibular branch of the facial nerve and facial vessels (Fig 1). Subsequently, a blunt dissection through the periosteum was performed to reach the platysma at the level of the most lateral aspect of the mandibular body. The muscle tissue was engaged with a nonabsorbable 3-0 suture with an atraumatic needle. Then, the suture was suspended to the mandibular titanium hardware, thereby elevating the platysma to its uppermost position (Fig 2, Video 1). Two additional sutures were placed to secure the



FIGURE 1. Suspension of the platysma of the upper aspect of the submandibular space.

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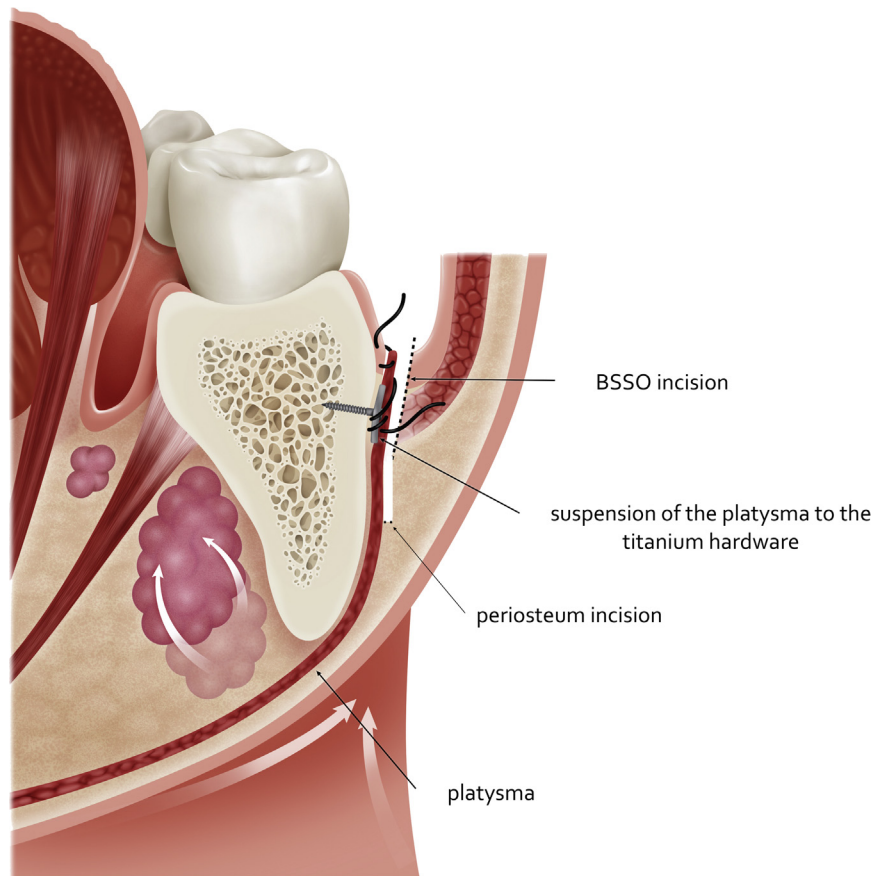


FIGURE 2. Suspension of the platysma of the upper aspect of the submandibular space to the titanium hardware. BSSO, bilateral sagittal split osteotomy.

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flap in place. Then, standard closure of the BSSO approach with absorbable 4-0 suture was completed. Thus, suspension of the para-mandibular platysma elevated the homolateral submandibular gland and platysma muscle to a more youthful position, enhancing the jaw prominence and improving the jawline contour without submandibular gland tissue excision or additional neck-lift procedures.

All patients were extubated in the operating room. A dynamic intermaxillary fixation was maintained with 2 to 4 guiding elastics. All patients wore a closed-circuit cold mask (17°C) during hospital admission and were discharged 24 hours after surgery. Standard antibiotic and anti-inflammatory medication for OS was prescribed. Functional training with light guiding elastics and a soft diet was followed for 1 month.

Objective evaluation consisted of 4 aspects:

1. Improvement of the jawline contour was readily illustrated in an objective manner. A reference point was marked at the lower border of the mandible at the level of the molar teeth. After the suspension maneuver, the painted point

was objectively uplifted to the most lateral aspect of the jawline.

2. Pre-, intra-, and postoperative photographic assessment: Preoperative images served for diagnosis and treatment planning. Intraoperatively, 2 photographs were taken at 2 time points: 1) immediately after mandibular repositioning and before suspension of the jawline periosteum to the titanium hardware and 2) immediately after suspension to objectively establish the SS lift effect. Images at 1- and 6-month follow-ups were taken to illustrate the immediate and long-term effects of the OS and lifting procedure. Short- and long-term postoperative images were superimposed using Adobe Photoshop CC2018 software (Adobe, Systems, Inc, San Jose, CA) to assess the stability of the overall surgical procedure.
3. Additional operative time needed for the jawline contouring procedure.
4. Potential complications, including damage to the lingual or hypoglossal nerves or damage to the marginal mandibular branch of the facial nerve,

injury to the facial vessels, contour irregularities, asymmetries, or SS flap mobility.

Subjective evaluation of the procedure was performed by measuring patients' postoperative satisfaction with the resulting outcome. A graphically and numerically rated visual analog scale (VAS; 0 to 10) was used, with 0 representing complete dissatisfaction and 10 representing maximum satisfaction.

Descriptive statistics were used for quantitative analysis.

Results

Of 78 patients who underwent isolated OS during a 7-month period, 6 (0.77%) underwent concomitant OS and neck rejuvenation surgery. All 6 underwent bimaxillary OS with mandibular advancement using pure advancement or counterclockwise rotation. The average patient age was 47 years (range, 38 to 57 yr). Three patients were women and 3 were men (Table 1).

Subjectively, all patients were satisfied with the results at the jawline (VAS average satisfaction score, 10). No surgical complications occurred in any case. The average increase in operative time was 5 minutes (range, 4 to 6 minutes) for each side (Table 1).

Photographic documentation displayed the immediate, short-term (1-month), and long-term (6-month) effects of the neck lift (Fig 3). Six-month follow-up proved the stability of the procedure (Video 2).

Discussion

By definition, OS aims to correct functional skeletal and dental discrepancies. However, treatment planning should aspire to achieve the maximal esthetic outcome attainable for the patient. To this effect, it is preferable that the treatment planning process starts with the establishment of the soft tissue goals, that is, the definition of the most favorable contours of

the soft tissue profile. Subsequently, the amount and direction of skeletal repositioning to achieve the desired soft tissue contours can be determined. The skilled surgeon should be able to detect any alterations in facial harmony that might remain after skeletal repositioning and select the additional esthetic adjuncts that could improve the final outcome.

A comprehensive diagnosis for OS planning also should evaluate signs of cervicofacial aging. The normal aging process entails a combination of soft and hard tissue changes. As in esthetic antiaging surgery, OS planning should consider the specific contribution of the soft and hard tissues to facial disharmony and aging, and a gender- and age-specific plan should be established.^{1,2,6}

The contour of the neck and the submental-and-neck angle (SMNA) are essential determinants of overall facial esthetics. The submental and cervical region can be defined essentially by the jawline, the SMNA, and the submental soft tissue thickness (SSTT).¹⁶ Esthetic procedures in the neck are designed to modify the submental and submandibular region and the SMNA by volume reduction or relocation. Although OS allows for total righting of the SMNA,⁶ which ideally measures approximately 110° (range, 100° to 135°), improvement of esthetic conditions related to SSTT and jawline contouring is only partial in some cases. In these situations, complementary esthetic procedures, such as lower rhytidectomy and submandibular gland suspension, are a good option, respectively.

Nevertheless, the main limitation of this study is the small sample, which hinders the possibility of drawing statistically meaningful conclusions. Moreover, a technical note or case report with a small sample of patients can lead to publication bias, observational bias, selection bias, recall bias, information bias, misclassification bias, confirmation bias ("my-side bias"), and the danger of overinterpretation. Likewise, although a questionnaire is a valid research instrument

Table 1. DEMOGRAPHIC DATA, SURGICAL PROCEDURE, INCREASE OF OPERATIVE TIME, SURGICAL COMPLICATIONS, AND VAS SATISFACTION SCORE OF STUDIED SAMPLE

Patient	Gender/Age (yr)	OS	Increase in Operative Time (Minutes)	Surgical Complications	VAS Score
1	F/44	bimax CCW	5	None	10
2	F/57	max CCW, mb adv + CCW	7	None	10
3	M/38	bimax adv	4	None	10
4	F/52	max adv, mb CCW	5	None	10
5	M/49	max CCW, mb adv + CCW	4	None	10
6	M/42	bimax CCW	5	None	10

Abbreviations: adv, advancement; bimax, bimaxillary; CCW, counterclockwise rotation; F, female; M, male; max, maxillary; mb, mandibular; OS, orthognathic surgery; VAS, visual analog scale.



FIGURE 3. Pre- and postoperative images illustrate short-term (1-month) and long-term (6-month) effects of the neck lift.

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that can help researchers to access the thoughts and feelings of research participants, respondent bias and researcher bias can be produced, such as a confirmation bias (“my-side bias”) or bias in questionnaire construction.

The authors suggest an innovative supplemental technique to contour the jawline through an intraoral approach in the context of a BSSO. The platysma of the upper aspect of the SS is suspended to a more youthful position and when added to the neck-lifting effect of mandibular advancement or counterclockwise rotation of the occlusal plane, the neck contour is improved substantially without the drawbacks of a conventional open approach for submandibular gland reduction or suspension surgeries.^{7,8} The main limitation is the technique acts only at the level of the middle mandible and, hence, does not preclude additional neck-lift procedures if sagging in other areas exists. Nevertheless, the procedure is clinically effective, minimally invasive, technically undemanding, and time efficient. This proof-of-concept study showed high levels of patient satisfaction, minimal additional morbidity, and low risk of surgical complications.

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