

Spare Roof Technique: A Middle Third New Technique

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Abstract

Keywords

- ▶ rhinoplasty
- ▶ humpectomy
- ▶ dehump
- ▶ upper lateral cartilages
- ▶ spare roof technique

To our knowledge, the spare roof technique (SRT) is the first technique that is based on a complete skeletonization/preservation of the upper lateral cartilages. This technique is used to keep the natural roof of the nose's middle third, while dehumping and/or correcting the crooked septum. From January 2014 till March 2015, a total of 40 rhinoplasties were performed through the SRT: 28 reduction rhinoplasties, 6 complex crooked noses (with extracorporeal septoplasty), and 6 mixed cases. The SRT is an excellent middle third technique. The natural roof was kept and fitted the accurate new position in almost all cases with no surgical complexity. It is an easy technique with many applications and it is also very useful in the classical humpectomy of the Caucasian nose and correction of the crooked nose.

The middle third is a natural area of weakness.¹ This is a transition segment between the bony pyramid and the tip, comprising only one T-shaped cartilage. Owing to academic and historical purposes, this T-shape cartilage is divided into two upper lateral cartilages (ULCs) and one quadrangular septal cartilage.²

Since the beginning of rhinoplastic procedures, the middle third has been probably the most difficult segment to deal with regarding its stability, functionality, and the brow-tip line.^{3,4} Based on the integrity of the ULCs, there are two different ways to dehump a nose: the *conservative techniques*—where the ULCs are completely preserved—and the *destructive/reconstructive techniques*—with some degree of destruction of these T-shaped segment.

The destructive/reconstructive techniques consist of splitting the ULCs (in between them) and the dorsal septum—that is, the complete separation of this T-shaped segment in three parts. In the classical en bloc humpectomy,⁵ there is always some degree of excision of the ULCs, most of the times reconstructed with spreader grafts.^{6,7} In split hump technique, there is no ablation of the ULCs⁸ but a simple separation between both ULCs and the dorsal aspect of the septum, with the confection of auto spreader flaps.^{9,10}

The conservative techniques allow the preservation of the middle/upper portion of the nasal pyramid. The philosophy of these techniques is to dehump the nasal pyramid while moving only the foundations of the bony and cartilaginous pyramid and a consequent “en bloc” repositioning of the upper and middle third, creating a new profile. The most common techniques are push down,¹¹ let down,¹² septal pyramid adjusting, and repositioning—SPAR technique,¹³ and the septorhinoplasty by disarticulation.¹⁴

Through the spare roof technique (SRT), the surgeon isolates the entire roof of the middle third (▶ **Fig. 1**), separating the quadrangular septum from the ULCs, without splitting the ULCs among them. This technique allows the surgeon to perform multiple techniques with the nasal septum, that is, dehumping and correcting the crooked nose with extracorporeal septoplasty (▶ **Figs. 1–4**).

Methods

Study Design

From January 2014 to March 2015, the same surgeon (M. G. F.) performed 40 rhinoplasties using the SRT—23 (57.5%) females and 17 (42.5%) males, aged between 18 and 47 years (average:

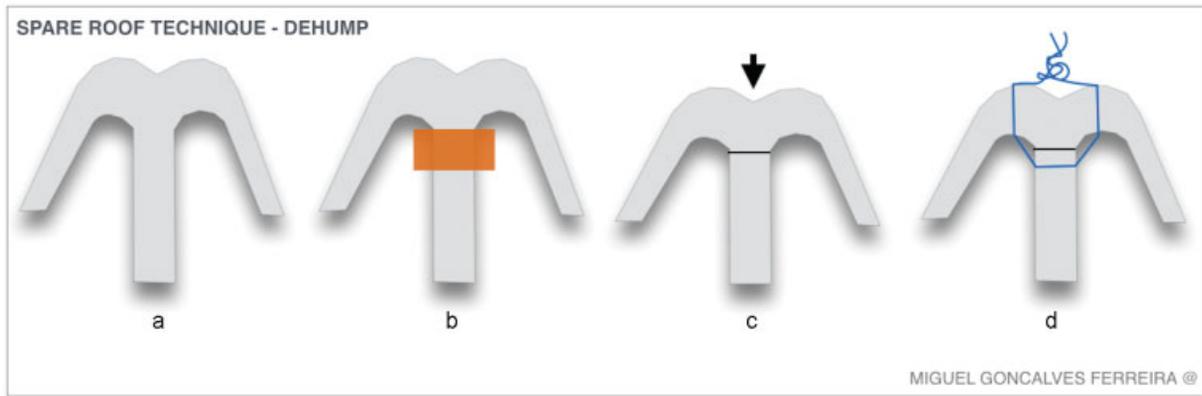


Fig. 1 (a, b) Resection of the excess of dorsal septum 1 mm below the upper lateral cartilages. (c) The “roof” goes down. (d) Suturing the roof to the dorsal part of the septum.

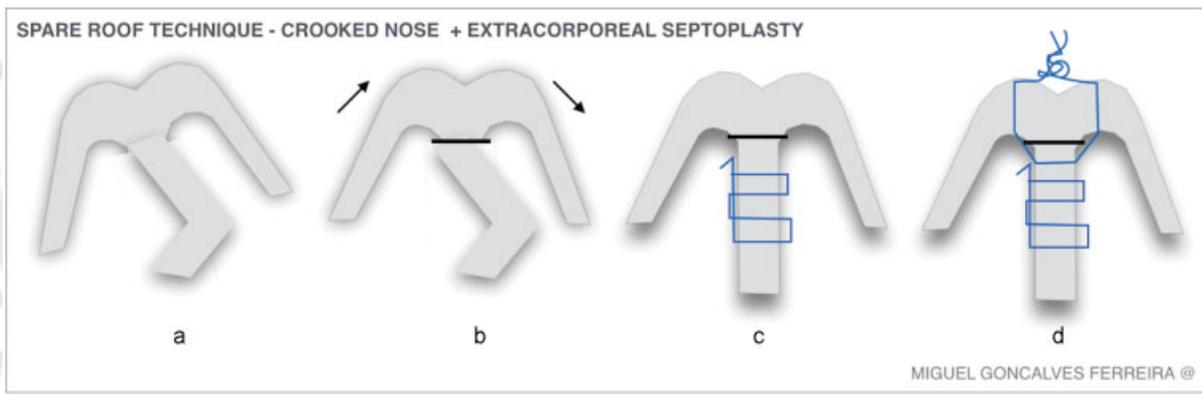


Fig. 2 (a) Crooked nose/septum. (b) Cut 1 mm below the upper lateral cartilages (ULCs), releasing the dorsal septum. (c) Repositioning the new septum after extracorporeal septoplasty. (d) Suturing the new septum to the roof (ULCs).

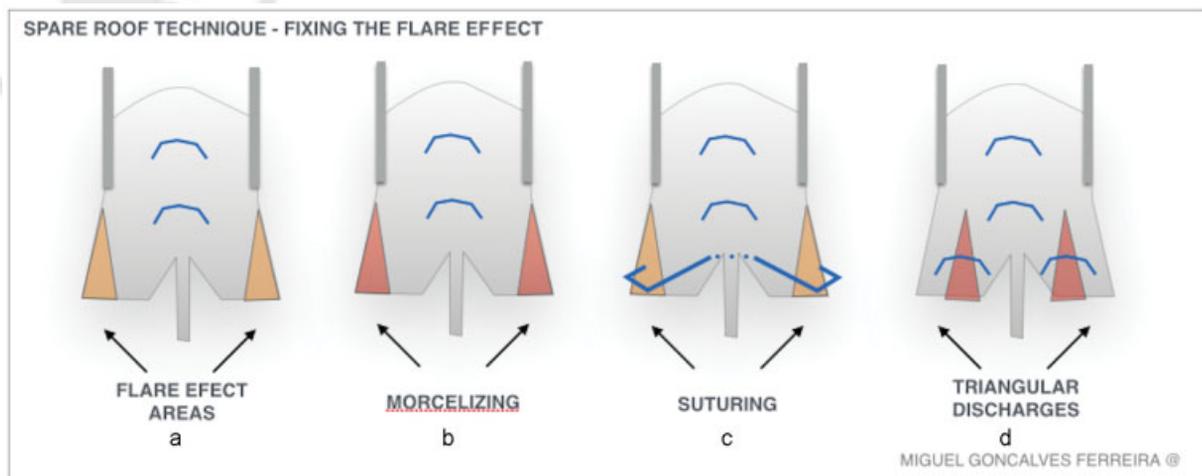


Fig. 3 (a) Areas of flare effect—caudal part. Note that the cephalic part is supported by the nasal bones (after lateral osteotomies). (b) Morselizing the flared areas. (c) Suturing and approaching the flared areas. (d) Triangular discharges and suturing to fix the flared areas.

30.6 years old). Open approach was used in 10 (25%) patients and close approach in the remaining 30 (75%).

SRT was performed with the following purposes: (1) dehumping in 28 (70%) patients; (2) correcting severe crooked nose (extracorporeal septoplasty) in 6 (16%) patients; (3) mixed (dehump and crooked) in 6 (15%) patients (→ **Table 1**).

The *brow-tip aesthetic line* (BTL) is an imaginary line traced from the medial brow down the lateral wall of the nose to the tip-defining points. Typically it is considered in the frontal view, but it can also be considered in the three-fourths view; in this view the BTL is almost as sensitive as the profile view. To our knowledge, the BTL considered in the frontal and

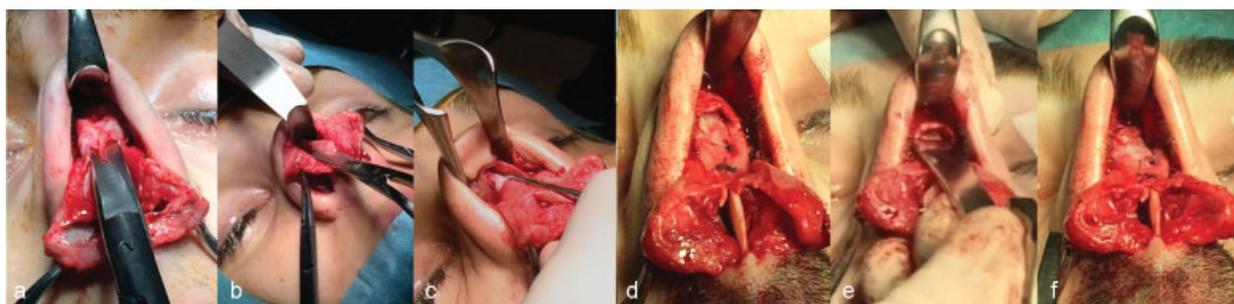


Fig. 4 (a) Release upper lateral cartilages (ULCs) from septum. (b) Cut the excess dorsal septum. (c) Release the ULCs from the bony pyramid. (d) Suture the ULCs to dorsal septum. (e) Osteotomy with Rubin osteotome (only bony hump). (f) Final aspect of the “new dorsum.”

Table 1 Main outcomes of the spare roof technique

Spare roof technique	Total	Gender		Approach		Strategy			Mean follow-up
		Male	Female	Open	Closed	Dehump	Crooked	Both	
G1, very good brow-tip line	32 (80%)	14 (82%)	18 (78%)	7 (70%)	25 (83%)	27 (96%)	4 (67%)	1 (17%)	9.1 mo
G2, good brow-tip line	6 (15%)	2 (12%)	4 (17%)	2 (20%)	4 (13%)	1 (4%)	2 (33%)	3 (50%)	7.3 mo
G3, bad brow-tip line	2 (5%)	1 (6%)	1 (5%)	1 (10%)	1 (4%)	–	–	2 (33%)	6.9 mo
Total	40	17	23	10	30	28	6	6	8.72 mo

three-fourth views is the most accurate way to validate dorsal aesthetic surgery results of the nose (► Fig. 5).

Patients were assessed through an average of 8.72-month follow-up (3–16 months follow-up) by two senior surgeons—direct and photographic validation. At the last follow-up visit, results were considered, concerning the BTL (frontal and three-fourths view), and patients were divided into three groups: G1 (very good BTL), 32 (80%); G2 (good BTL), 6 (15%); G3 (bad BTL), 2 (5%) (► Fig. 5).

We have made no functional objective analyses, but the subjective outcomes from each patient corroborate our perception that there is an improvement in the function due to the gain of width of the nasal middle vault with this technique.

Surgical Technique

The SRT is designed to preserve the natural roof of the upper and middle third based on the old Cottle concept¹⁵—“as the septum goes, so goes the nose.” It can be performed with an open or close approach.

The *first step* consists of longitudinal cut of the dorsal septum (► Figs. 1b, 4a), from the anterior nasal angle till the perpendicular plate of the ethmoid, 1 mm below the ULCs separating completely the dorsal aspect of the septum and the ULCs, preserving the union among the ULCs (► Fig. 4a). After this step, the “roof” (i.e., ULCs) is attached to the nasal pyramid only by the lateral connections of the ULCs, cephalically by the attachment between ULCs/nasal bones and caudally by the attachments of the ULCs/LLCs.

The *second step* consists of removing the remaining excess of dorsal septum (from 1 to 5 mm, as needed) to enable the hump’s decrease as desired (► Figs. 1b, 4b). This step should

be carefully performed with 1-mm excisions at each time, till the desired result has been achieved. Dealing with the medium to severe crooked noses implies the quadrangular septum entire removal by performing an extracorporeal septoplasty (► Fig. 2). When performing extracorporeal septoplasty, the preservation of a 5-mm cartilaginous septum is done in the junction with the perpendicular plate of the ethmoid to allow fixation of the “new” septum. The other fixations with 4.0 PDS are done with the posterior septal angle/nasal spine (with a bony needle hole) and superiorly two stitches to the preserved roof (ULCs) (► Fig. 2d).

The *third step* consists of releasing the junction among the nasal bones and the ULCs—undermining the nasal bones till the cephalic end of the ULCs (~7 to 10 mm above the caudal end of the nasal bones)¹ (► Fig. 4c). The cephalic portion of the ULCs always ends in the junction between the perpendicular plate of the ethmoid and the nasal bones.

The *fourth step* consists of suturing the “roof” (ULCs) to the dorsal aspect of the remaining or reshaped septum (► Figs. 1d, 2d, 4d). When performing big hump reductions, there may be some flare effect that increases the width of the middle third (► Fig. 3a). This “width effect” can be beneficial in some Caucasian thinner noses. When the width is too much, it happens in the caudal part of the ULCs and it can be solved with one of three options: morselizing/crushing the excess ULCs (► Fig. 3b), with one suture from the excess cartilage/septum/cartilage (► Fig. 3c), or control with triangular discharges (► Fig. 3d).

At this stage, and since the “cartilaginous roof” is already dehumped, the *fifth and final step* is addressed only to dehump the bony part (► Fig. 4e). This can be done with a traditional bony humpectomy with a Rubin osteotome plus

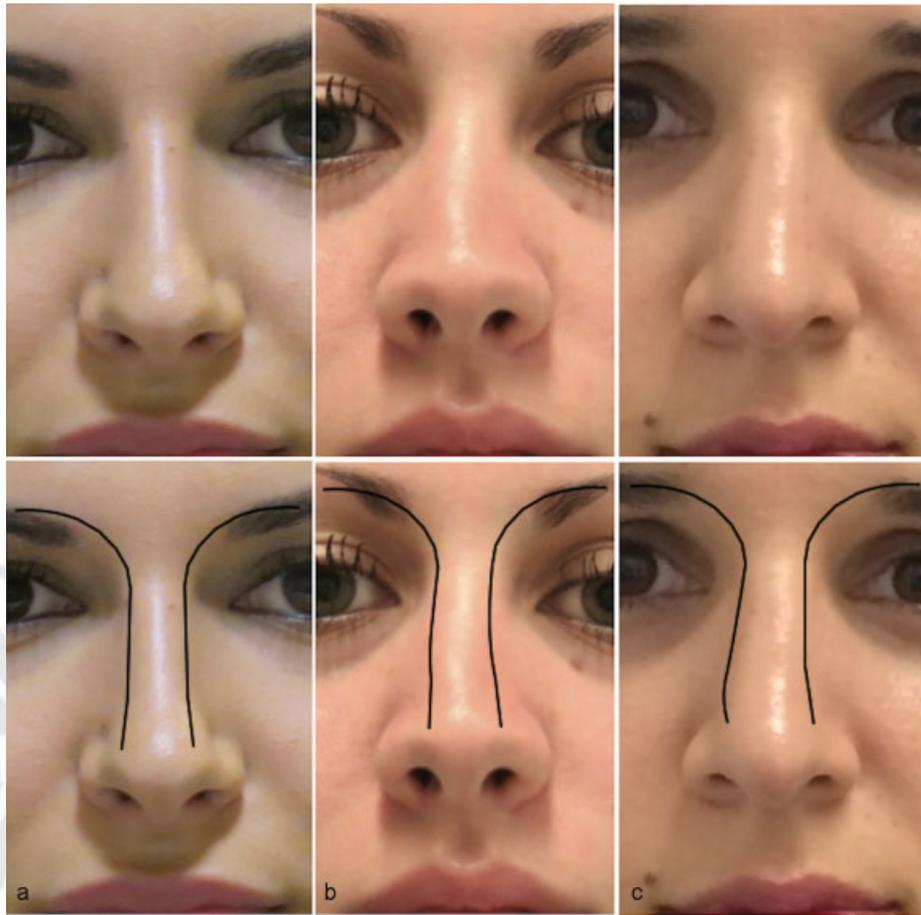


Fig. 5 (a) Very good brow-tip line—G1; (b) good brow-tip line—G2 (in this case, slightly crooked in the middle third); (c) bad brow-tip line—G3 (in this case, there was an unacceptable crooked middle third/tip—patient elected for revision surgery).



Fig. 6 Pre- and postoperative (11 months). Nasal hump in a patient without tip surgery.



Fig. 7 Pre- and postoperative (13 months). Nasal hump, crooked nose, dropped tip.



Fig. 8 Pre- and postoperative (10 months). Nasal hump, smashed, and crooked nose. Extracorporeal septoplasty.

lateral osteotomies or preserving the bony roof: two triangular osteotomies are done—*wedge resections*—around the nasomalar suture and then concluded with enough greenstick transversal osteotomies so that the remaining bony hump can be pushed down.

Report of Cases

The authors have selected three exemplificative cases:

Case 1

Eleven months post-op. Typical nasal hump in a patient who did not want any tip surgery. SRT, closed approach, transfixated septoplasty, nondelivery, without sutures ULCs/septum. Remaining bony hump removed by rasp plus lateral osteotomies (►Fig. 6).

Case 2

Thirteen months post-op. Nasal hump, crooked nose, dropped tip without definition. SRT, open approach, with sutures ULCs/dorsal septum. Remaining bony hump removed by Rubin osteotome plus lateral osteotomies (►Fig. 7).

Case 3

Ten months post-op. Nasal hump, smashed and crooked nose, dropped tip without definition. SRT, open approach, with sutures ULCs/dorsal septum. Extracorporeal septoplasty. Remaining bony hump removed by Rubin osteotome plus lateral osteotomies (►Fig. 8).

Discussion

The SRT is a new technique used to approach the middle third of the nasal pyramid in rhinoplasty. It was designed to preserve the natural roof of the middle third based on the Cottle concept—as *the septum goes, so goes the nose*.

The middle third still remains as the most challenging segment to deal with in rhinoplasty. This technique provides a new tool to release the quadrangular septum and deal with it separately, following the surgeon's needs and answering most of the surgical problems in this segment.

This study of 40 patients showed that this is a useful, reliable, easy, and refined technique to deal with the middle third, mainly in two kinds of noses: (1) noses with any kind of hump and (2) medium to severe crooked noses (in these

cases, the author prefers the extracorporeal septoplasty as the election maneuver to use with the SRT).

Although this is a conservative technique, it involves the disruption of the osteocartilaginous junction (upper and middle third), and in some cases there is a need to place some diced cartilage to smooth camouflage in this transition.

Controlling the height is an easy step, by being able to cut the amount of excess dorsal septum, in a slow 1-mm fashion (step-by-step) decreasing until the perfect profile is achieved. Then two or three sutures (PDS 5.0) are placed through the ULCs and dorsal septum. The remaining bony hump should be addressed with a traditional osteotomy with Rubin osteotome (followed by lateral osteotomies), or two simple triangular osteotomies around the nasomalar suture and final transverse osteotomies to push down the bony hump. Controlling the width in big hump reductions, where some “flare effect” can happen, is achieved by triangular discharges and weakening of the ULCs or sutures (►Fig. 3).

Controlling stabilization is an easy step with the sutures (PDS 4.0 or 5.0) to the dorsal septum: the lateral attachments are still there and are very strong. Controlling the “K” area is not a problem while dehumping. However, in the extracorporeal septoplasty, the “new” septum should be well sutured to the preserved roof, perpendicular plate of the ethmoid, and anterior nasal spine.

Conclusion

The SRT is a new conservative technique to approach the middle third of the nasal pyramid in rhinoplasty. It mainly addresses dehumping and correction of the medium to severe crooked noses.

It is an easy and reliable technique, with excellent short- and medium-lasting results. Although more studies are needed, this study demonstrates that it is an excellent technique. As a conservative technique, it can always be converted in the classical en bloc humpectomy or the split hump technique if the surgeon does not feel comfortable with it.

As far as we know, this technique has not been described before in the rhinoplasty literature. Nevertheless, this is a preliminary report and further research is required, mainly comparative studies, with larger groups of patients concerning long-term results/potential issues.

Conflict of Interest

The authors have no conflict of interests, including relevant financial interests, activities, relationships, and affiliations that could be perceived as having influenced this work.

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Author's Contribution

Miguel Gonçalves Ferreira was responsible for design, analysis, and interpretation, as well as writing of the manuscript; had full access to all the data in the study; and takes responsibility for the integrity of the data and accuracy of the data analysis.

Daniel Monteiro was responsible for analysis, interpretation, and writing of the manuscript.

Cláudia Reis and Cecília Almeida e Sousa were responsible for writing of the manuscript.

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