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## Technical and Clinical Considerations for Facial Feminization Surgery With Rhinoplasty and Related Procedures

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### Article Information

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This study describes the surgical techniques used to provide facial feminization in male-to-female transgender patients.

## Key Points

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### Question

What is the role of rhinoplasty in facial feminization surgery with transgender patients?

### Findings

In a case series study of 200 consecutive feminization rhinoplasties in combination with lip-lift techniques and forehead reconstruction, the frontonasal angle changed significantly and the degree of satisfaction after the rhinoplasty was high.

### Meaning

Rhinoplasty, in conjunction with forehead reconstruction and lip-lift, is a key procedure to obtain adequate harmony in facial feminization surgery.

## Abstract

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### Importance

Together with the forehead reconstruction, feminization of the nose is one of the most common procedures in facial feminization surgery. Rhinoplasty surgical techniques, which provide correct support and stability in the midterm to long term, are essential for obtaining a predictable result.

### Objective

To report on the technical and clinical considerations of rhinoplasty and related procedures to feminize the nose, harmonize the nose in relation to the other modified structures (mainly the forehead and maxillomandibular complex), and achieve an aesthetic result beyond gender differences.

### Design, Setting, and Participants

Case series study of feminization rhinoplasties, in combination with lip-lift techniques, forehead reconstruction, and other procedures, were performed at a private practice between January 11, 2010, and May 29, 2015, in 200 consecutive male-to-female transgender patients. The mean (SD) medical follow-up for patients was 32 (18.84) months (range, 12-77 months). Frontonasal angles were objectively measured. Postoperative and long-term patient satisfaction were assessed.

### Main Outcomes and Measures

Clinical analysis and evaluation using the 5-point Nose Feminization Scale, with 1 indicating very masculine or nose is worse and 5 indicating very feminine or exceptional result.

## Results

In these 200 patients, the mean (SD) age was 40.2 (12.2) years (range, 18-70 years). The mean (SE) frontonasal angle changed from 133.64° (0.63°) to 149.08° (0.57°) (difference in means, -15.44; 95% CI, -17.12 to -13.76;  $P < .001$ ). Most patients considered their nose to appear more feminine after the surgery, and the degree of satisfaction after the rhinoplasty was 4 (much better) of 5 points on the Nose Feminization Scale. During the evaluation of feminization rhinoplasties, special attention was given to how the nose relates to other features essential to the identification of facial gender: the forehead and maxillomandibular complex. Emphasis was placed on the midterm to long-term stability of the results by reinforcing the internal structure.

## Conclusions and Relevance

In this case series of feminization rhinoplasties in combination with lip-lift techniques and forehead reconstruction, frontonasal angles were changed, and patient satisfaction with outcomes was high. The main goal of rhinoplasty in facial feminization surgery is to obtain feminine nasal features and the harmonization of the nose with the rest of the face. Lip-lifts and frontonasal recontouring can complement rhinoplasties associated with facial feminization surgery.

## Level of Evidence

4.

## Introduction

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Facial feminization surgery (FFS) encompasses a group of surgical procedures designed to soften and modify facial features perceived as masculine, exaggerated, or nonharmonic. This surgery plays an important role in the treatment protocol for patients transitioning from male to female and makes a substantial contribution to improving their self-esteem and quality of life.

As a result, during the past few years, several feminization techniques have been developed or adapted to this discipline, including forehead recontouring and reconstruction; lower jaw and chin recontouring, which may incorporate genioplasty and mandibular angle reduction; cheek procedures; thyroid cartilage recontouring; and rhinoplasty. Feminization techniques also involve other procedures, such as hairline advancement, hair transplantation, brow-lifting, and lip-lift.

When evaluating, diagnosing, and planning a patient's feminization needs, it is essential to understand the differences between male and female facial features. Generally speaking, the male facial skeleton has some well-defined features that distinguish it from its female counterpart. The basic pillars for the visual identification of facial gender are the frontonaso-orbital complex, the nose, and the maxillo-mandibular complex. Other aspects, structural and not structural, can also influence this identification, such as thyroid cartilage (Adam's apple), hairline format, cheekbones, the upper lip, facial hair, skin type and quality, and the distribution of facial fat.

With specific regard to the nose, the male nose is usually larger than the female nose because it has a greater component of bone and cartilage. Female noses tend to be narrower, the tip is often sharper, and the nostrils may be smaller. However, the nose has characteristics conditioned by ethnicity and age that are almost as important as gender-based differences. All of these aspects must be evaluated when planning a rhinoplasty in the context of FFS to achieve a 3-fold objective: (1) feminization of the nose, (2) harmonization with regard to the other modified structures (primarily the forehead and maxillo-mandibular complex), and (3) achieving an aesthetic result beyond gender differences.

Together with forehead reconstruction, nose feminization is one of the most common procedures in FFS. The nose is a prominent feature on the face, and its refinement can significantly improve gender recognition. A rhinoplasty can have an overall softening effect, making the face more harmonic and feminine.

## Methods

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This study summarizes our experience with rhinoplasty in FFS between January 11, 2010, and May 29, 2015, during which time we performed a total of 200 consecutive feminization rhinoplasties in male-to-female transgender patients. The study was approved by the Ethics Committee of the Hospital Universitario Costa del Sol, Málaga, Spain. All patients gave written consent for their image to be published in scientific publications in compliance with current personal data protection regulations.

The surgical procedures performed included rhinoplasty in combination with forehead reconstruction, rhinoplasty in combination with a lip-lift, rhinoplasty in combination with a forehead reconstruction and lip-lift, and rhinoplasty without a forehead reconstruction or lip-lift. In addition, in most cases, rhinoplasty was done in combination with other FFS procedures, such as lower jaw and chin recontouring, Adam's apple reduction, hair transplant, and soft-tissue surgery; however, these procedures are not discussed in this article.

Operations that involve rhinoplasties and intraoral techniques (jaw, chin, and/or malar procedures) require a double intubation: nasotracheal during intraoral operations and orotracheal during forehead, nose surgery, and lip-lift.

## Operative Techniques

**Feminization of the Nose** Standard rhinoplasty techniques can be used to make the nose smaller and give it a more feminine contour with proportions in harmony with the rest of the face and forehead. Generally, a reduction rhinoplasty consists of making the dorsum of the nose smaller and discreetly lifting the tip.

Rhinoplasty is a highly individualized procedure, which requires thorough evaluation of the bone and cartilaginous structures that form the nose. Feminization rhinoplasty usually is performed under general anesthesia and in combination with other procedures. The surgery most often lasts between 1 and 2 hours, and a surgical approach option available in most cases is via transcolumellar incision (open approach). Depending on the individual needs of the patient, the following procedures are possible.

**Refinement of the Tip** A strip of the cephalic margin of the lower lateral cartilages is removed, leaving at least 6 mm in the caudal border of the lateral crura to provide enough tip support and avoid collapse. Tip reshaping is one of the key points in feminization rhinoplasty, and to provide long-term stability,

grafts, such as a caudal extension graft in combination with a tongue-in-groove maneuver, shields, or on-lay grafts on top, are essential. Suturing the medial and lateral crura (intradomal sutures and interdomal sutures) is important to create an attractive nose projection, refinement, and rotation.

*Feminization of the Profile* Any excess bridge composed of bone and cartilage is removed to lower the profile for an optimal result. If the amount of the hump to be resected is less than 2 mm, a Fomon rasp is most often used to reduce the bony bridge. If the hump is larger, a monobloc osteotomy is performed with a Rubin- or Cinelli-type osteotome (14- to 16-mm wide), including the cartilaginous part previously excised with a No. 15 blade or septal scissors. With this procedure, it is crucial to insert the instruments correctly; to remove the cartilaginous hump, the blade or scissors must be parallel to the facial plane, and when the osteotome is inserted, the angulation is changed toward the glabella. Otherwise, an overresection or unaesthetic step in the middle of the bridge may be produced.

*Shortening the Nose* By removing a caudal portion of the septum, including some mucosa, significant changes can be achieved in length, along with some tip rotation, if a mild angulation is performed at the level of the septal angle. This piece of septal cartilage may be used as a columellar strut, which provides an adequate columellar break. In addition, with the tongue-in-groove maneuver, suturing the medial crura to the septum can achieve an attractive shortening and rotation of the tip.

*Narrowing of the Nasal Bone* If the bridge is wide, it can be reduced by a nasal bone fracture on each side and a posterior approximation of both sides toward the midline. We use both techniques: either an endonasal or a percutaneous osteotomy (2-mm-wide osteotome) to close the open roof. If the hump resection has been aggressive, it is important to avoid distortion of dorsal aesthetic lines and functional deformities by using different options: spreader grafts between the septum and upper lateral cartilages, upper lateral cartilage tension spanning sutures, spreader flaps, or simple reapproximation of the upper lateral cartilages.

**Forehead Reconstruction and Rhinoplasty: The Frontonasal Transition** The frontonasal transition can be another important area with regard to facial gender differences. In males, the angle formed by the transition between forehead and nose tends to be more acute. Correction of the supraorbital rim and frontal bossing softens this angle.

During forehead reconstruction, when the root of the nose is too high or projected, a rounded or conical burr is used to lower the frontonasal transition to the optimal and desired position, which will mark the level of the osteotomy or rasping of the new bony nasal dorsum during the subsequent rhinoplasty ([Figure 1](#)).

When a rhinoplasty is performed with a forehead reconstruction, our preference is to avoid anterior packing or, if a septoplasty is performed, a small piece of hemostatic sponge (Merocel; Medtronic Xomed Surgical Products Inc) is placed, not too deep, and then removed in less than 24 hours. Dressing is done with 4 to 5 layers of surgical tape (Micropore; 3M Europe), without any splint or plaster placed on top.

**Rhinoplasty and Lip-Lift** If a lip-lift is included in the surgical plan, the open rhinoplasty is carried out at the level of the superior incision of the lip-lift and the columellar skin flap is raised without any other higher incision. In this way, there is no potential risk of skin necrosis and the scar is well hidden ([Figure 2](#) and eFigures 1 and 2 in the [Supplement](#)).

Our lip-lift technique is a modification of the bullhorn technique. First, the key points are tattooed with a needle and methylene blue and then the incisions are made with a No. 11 blade. These incisions are straight and join the points, removing a strip of skin and subcutaneous tissue without violating the orbicularis oris muscle (Figure 3). When the lip-lift is performed together with a rhinoplasty, the nose surgery is done after the labial strip has been eliminated, leaving the 2-layer nasolabial closure as the last step in the sequence after meticulous hemostasis of the lip with a microdissection needle (Colorado; Stryker). The first layer, subcutaneous, is closed using a 4/0 suture (Monocryl; Ethicon Endo-Surgery GmbH), with just 3 key stitches to reduce tension: 1 in the middle and 2 at the level of the central area of the nostrils. The second layer, skin, is then closed with 6/0 nylon interrupted sutures (Ethilon; Ethicon Endo-Surgery GmbH) and a fine layer of 2-octyl-cyanoacrylate glue (Dermabond; Ethicon Endo-Surgery GmbH). Skin closures (Steri-Strip; 3M Europe) are placed on top of the wound in a horizontal pattern, with 3 more vertical Steri-Strips to reduce tension on the edges of the wound: 1 in the middle, covering the columella, and 1 Steri-Strip on each nasolabial angle.

### Assessment of FFS Results

The results assessment included both nasal anthropometric measurements and overall patient satisfaction. Fronto-nasal angles were measured preoperatively and postoperatively when the rhinoplasties were performed in combination with a forehead reconstruction (with or without lip-lift). Two independent observers made the evaluation from preoperative and postoperative clinical images. Images were obtained from each patient, always with the same camera (Eos 550D EF-S; Canon) and following the same protocol and settings. PixelStick software, version 2.9 (Plum Amazing, LLC) was used to make the measurements.

Overall patient satisfaction with the operation was scored using the Nose Feminization Scale, which takes into consideration both the level of femininity of the nose before and after the operation and the aesthetic improvement in the nose after the rhinoplasty. The scale scores range from 1 to 5, with 1 indicating very masculine or nose is worse and 5 indicating very feminine or exceptional result.

### Statistical Analysis

The results are expressed as mean (SE). Differences between the means were tested for statistical significance by 1-way analysis of variance. The analysis was carried out using SigmaStat, version 3.5 (Jandel Corporation). Differences were considered significant at  $P < .05$ .

### Results

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Among the 200 patients, ages ranged from 18 to 70 years, with a mean (SD) age of 40.2 (12.2) years. The mean medical follow-up period for patients was 32 (18.84) months, with the interval ranging from 12 to 77 months. No serious complications were observed, and no urgent immediate secondary operations were required.

Rhinoplasty in combination with forehead reconstruction was performed in 150 patients (75.0%); rhinoplasty in combination with a lip-lift, in 24 patients (12.0%); rhinoplasty in combination with a forehead reconstruction and lip-lift, in 21 patients (10.5%); and rhinoplasty without a forehead reconstruction or lip-lift, in 5 patients (2.5%).

All nasal packings, if present, were removed in the first 24 hours after surgery, and there was no need to place them again after removal due to new bleeding. All the nonabsorbable stitches and the surgical tape were removed from 1 week to 10 days after the operation. There were no complications related to the open approach scar.

Most of the patients reported light to moderate paresthesia in the tip of the nose, with complete recovery starting 3 months after surgery. Most of the patients also had low to moderate postsurgical edema, mainly in the root of the nose and lower eyelids. Bruising around the eyes also occurred in most of the patients, which resolved 2 to 4 weeks after the surgery.

When rhinoplasty and forehead reconstruction were performed in combination, there were no complications related to the approach to the frontal sinus, such as sinus dysfunction, sinusitis, or mucocele or any fractures in the anterior wall of the frontal sinus.

Revision rhinoplasty was carried out in 8 patients (4.0%) at least 12 months after the primary surgery because of chronic infection of the tip, dorsal irregularity, or unmet expectations with regard to refining the tip. [Figure 4](#) and [Figure 5](#) show preoperative and postoperative clinical results after FFS with rhinoplasty.

The mean (SE) frontonasal angle changed from 133.64° (0.63°) to 149.08° (0.57°) (difference in means, -15.44; 95% CI, -17.12 to -13.76;  $P < .001$ ). Most patients considered their nose to appear more feminine after the surgery, and the degree of satisfaction after the rhinoplasty was 4 (much better) of 5 points on the Nose Feminization Scale. The results are shown in the eTable in the [Supplement](#).

## Discussion

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Rhinoplasty plays a key role in FFS and is one of the most important pillars in combination with forehead reconstruction and lower jaw and chin recontouring. With rhinoplasty, it is possible to ensure that the nose, an identifying element of facial gender, has a feminine appearance in harmony with any other modified structures (eTable in the [Supplement](#)).

Although treatment with female hormones has been shown to improve skin quality and redistribute facial fat, it has no effect on the nasal osteocartilaginous skeleton. According to our experience and working philosophy, the most predictable, long-lasting, and natural feminization rhinoplasty effects are achieved with absolute control of the internal structures and the placement of the appropriate cartilage grafts. For that reason, an external approach or open rhinoplasty is preferred in most cases. Classic rhinoplasty techniques, which are purely reductive, must be limited to select cases when performing a rhinoplasty in feminization because of their inability to provide the correct support and stability in the midterm to long term—an essential part of obtaining a predictable result. For this reason, we champion a long-range philosophy, which takes both aesthetics and structure into consideration. When the facial feminization surgeon addresses only the aesthetic problems of the nose without considering the nose's inner structure and support, midterm and long-term complications can occur, such as asymmetry, deviation, or tip collapse.

For the structural grafts, we prefer to use the patient's own cartilage obtained largely from the septum, auricular concha cartilage, or, in certain cases, chondrocostal cartilage. At no time have we used bank cartilage or alloplastic materials, such as silicone, expanded polytetrafluoroethylene, or high-density

porous polyethylene. These materials, which are most often used in augmentation rhinoplasty, have a record of long-term complications, including infections, implant displacement, protrusions, cutaneous problems, and contractions.

This study describes the simultaneous combination of rhinoplasty with a lip-lift technique and frontonasal transition modification. When a lip-lift is performed simultaneously with the rhinoplasty, the same incision is used for both, with the skin fully lifted from the columella to expose the medial crura of the lower lateral cartilages. Although this procedure is technically more laborious and requires a more meticulous dissection, it negates the need for a new columellar incision, which could compromise the viability of the cutaneous cover between the 2 incisions.

In our experience, the frontonasal angle is particularly critical. The work done by Farkas and Kolar has provided cranio-orbital proportions and measurements that include the frontonasal angle among the general population. In this article, we explain the way in which we have modified this angle in combination with forehead reconstruction to lower the height of the anterior wall of the frontal sinus to the height of the nasal root. This surgical procedure has created more feminine nasal profiles in all patients according to the measurements made ( $133.64^\circ$  [ $0.63^\circ$ ] vs  $149.08^\circ$  [ $0.57^\circ$ ]) and consistent with the work by Noureai et al. Despite the fact that Raffaini et al prefer to perform the frontonaso-orbital reconstruction and rhinoplasty separately within a 6-month period, we choose to do both simultaneously because of the superior control of the frontonasal angle. By combining both approaches and delimiting the desired height of the nasal dorsum with a burr from above, it is possible to guide the dorsal osteotomy a posteriori. Furthermore, we believe that there is no need to separate the rhinoplasty from the forehead reconstruction, as Raffaini et al have suggested, because we have not seen any sinus complications in the short-, medium-, or long-term postoperative follow-up.

## Conclusions

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Despite the fact that the frontonaso-orbital complex is one of the main facial areas that determines the identification of facial gender, the nose plays a crucial role in FFS of the middle third. The main goal of rhinoplasty in FFS is to change masculine nasal features to feminine ones by performing dorsal reduction, tip refinement, and narrowing the nasal bones, most often using an external approach and cartilaginous grafts to provide good tip support and long-term stability. Lip-lift and frontonasal recontouring can be technically complementary to rhinoplasties associated with facial feminization.

## Notes

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### Supplement.

**eFigure 1.** Preoperative and Postoperative Clinical Result After FFS With Rhinoplasty

**eFigure 2.** Preoperative and Postoperative Result After Rhinoplasty Associated With Forehead Reconstruction and Lip-Lift

**eTable.** Nose Feminization Scale



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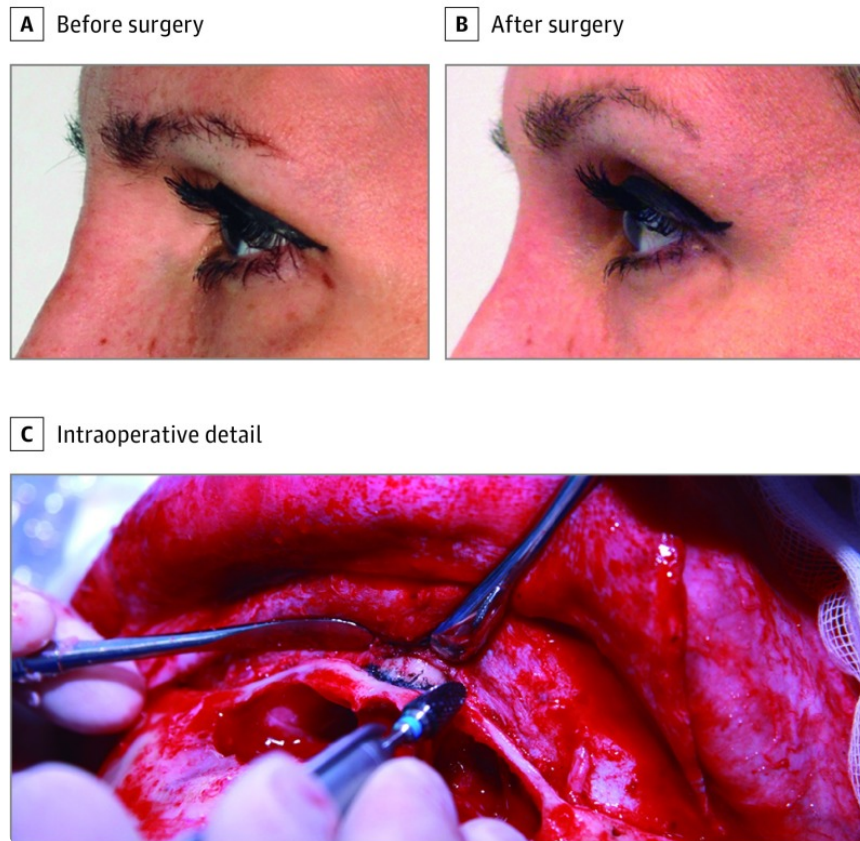
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## Figures and Tables

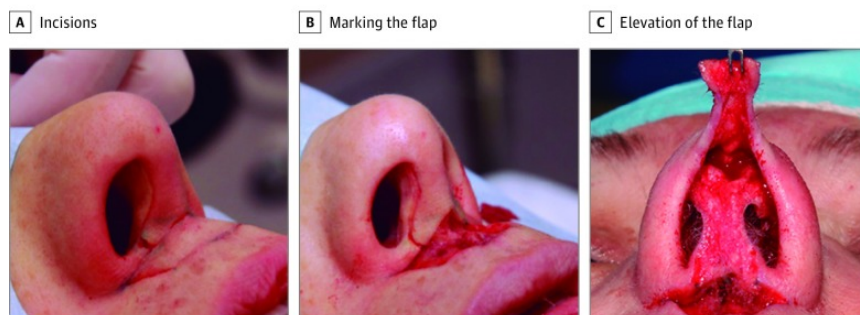
Figure 1.



### Frontonasal Transition

Before (A) and after (B) lowering the frontonasal transition during a forehead reconstruction with intraoperative detail of the technique showing the opened frontal sinus and the transition with the nasal bones (C).

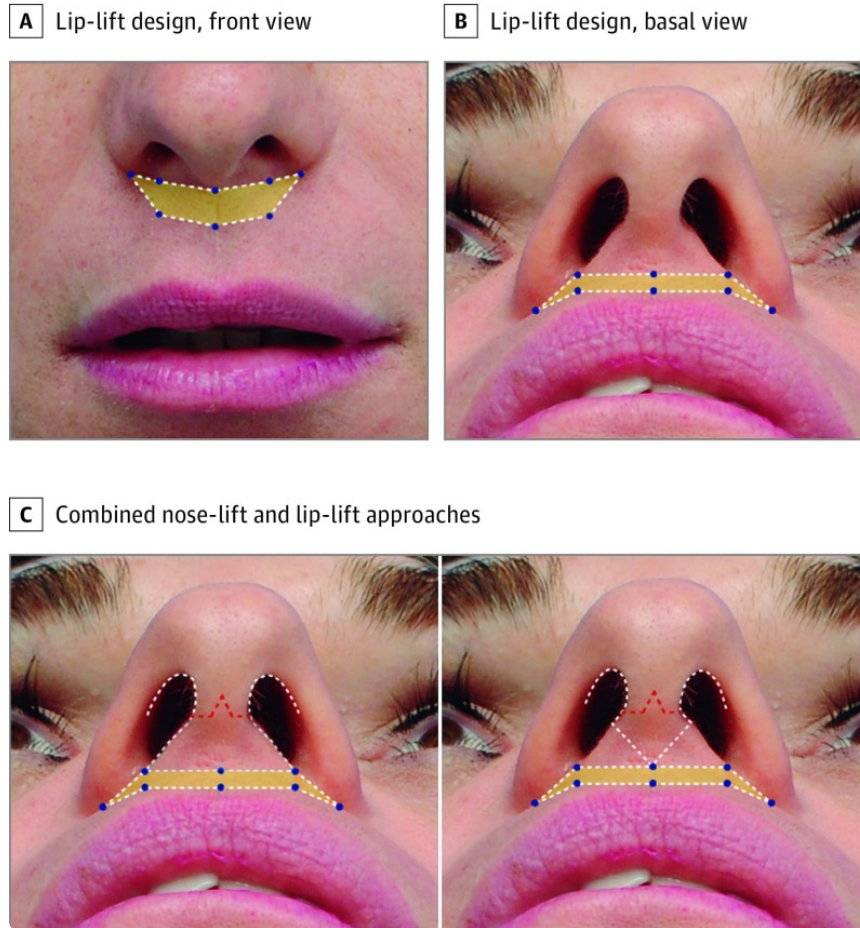
Figure 2.



### Elevation of the Columellar Skin Flap

A, Drawing of the incisions for the external nasal approach and lip-lift. B, Marking the columellar flap and removal of the lip skin strip. C, Elevation of the proposed columellar flap and complete exposure of medial crura and domes.

Figure 3.



### Lip-Lift Technique

A, Design of modified bullhorn lip-lift (front view). B, Design of modified bullhorn lip-lift (basal view). C, Nose and lip-lift combined approaches. We show 2 different approaches depending on the patient's anatomy and the surgeon's choice. Blue dots show marking the lip-lift; yellow, skin removed for the lip-lift; red dotted line, incision level in a traditional open approach rhinoplasty; and white dotted line, incisions performed for the rhinoplasty and lip-lift.

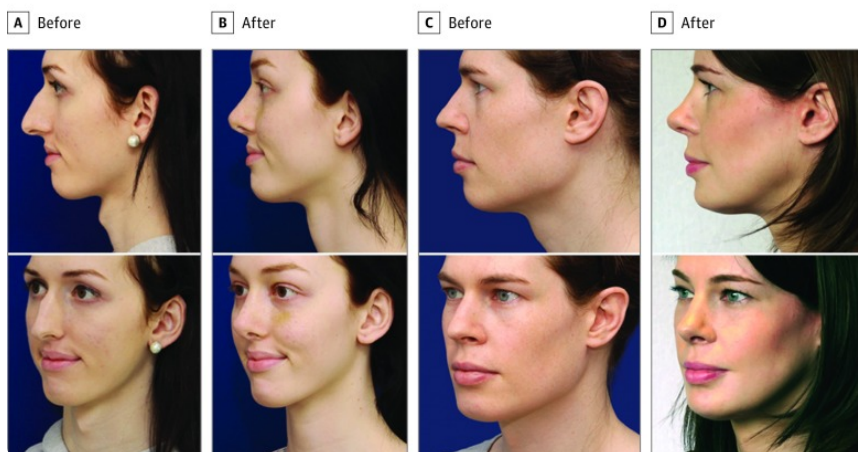
Figure 4.



**Preoperative and Postoperative Clinical Results After Facial Feminization Surgery Including Rhinoplasty, Forehead Reconstruction, and Lip-Lift**

Before (A) and after (B) rhinoplasty and forehead reconstruction by coronal approach, and before (C) and after (D) rhinoplasty, forehead reconstruction by coronal approach, and lip-lift.

Figure 5.



**Preoperative and Postoperative Clinical Results After Facial Feminization Surgery Including Rhinoplasty Associated With Other Procedures**

Before (A) and after (B) rhinoplasty, forehead reconstruction by coronal approach, and Adam's apple reduction; before (C) and after (D) rhinoplasty, forehead reconstruction by coronal approach and simultaneous hair transplant, lower jaw and chin recontouring, and Adam's apple reduction.