

Simultaneous Rhinoplasty and Orthognathic Double Jaw Procedures: How to Get the Nasolabial Unit Harmony

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57.1 Introduction

The complex nasolabial region, which corresponds to the area covering the maxilla below, is composed primarily of two dominant aesthetic structures: the nose and the upper lip. The Le Fort I osteotomy is usually performed in order to reposition the maxilla and to correct any maxillary dentoskeletal deformity. This osteotomy is usually carried out through the transection of the perioral and perinasal musculature and through a wide periosteal degloving.

What is really essential is a wide understanding of the anatomy of the interconnections between the hard framework and the soft tissues, and in particular of the muscular web, to manage, properly, the changes that a maxillary exposure and repositioning produce on the nose and on the upper lip. Secondary changes on the nasolabial unit that have occurred following this orthognathic procedure include the following: the widening of the alar bases; the upturning of the nasal tip with a subsequent increasing of the supratip depression; the alterations of the nasolabial angle;

the increasing of the prominence of the alar groove; the flattening, the drooping, and the thinning of the upper lip; the reduction of the vermilion's exposure; and, finally, the downturning of the commissures of the mouth.

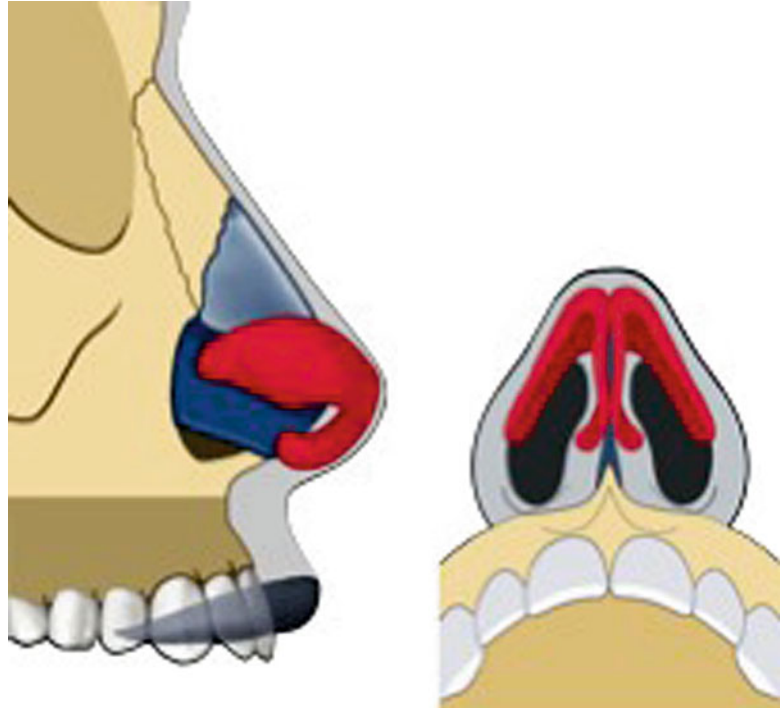
Many authors proposed their techniques to handle these effects with variable and unpredictable or unstable results [1–13]. Applying appropriate surgical techniques, many undesirable secondary changes can be prevented, maintaining the nose unchanged and achieving the aesthetic enhancement of the lip. This procedure permits the simultaneous performance of rhinoplasty and maxillomandibular osteotomies.

57.2 The Nasolabial Unit Concept

The nasolabial unit is an aesthetic component of the facial volumes and contours in which the soft tissues reflect intrinsic conditions related to their distribution and to their thickness. But above all, they reveal the disposition and the morphology of the skeletal structures below. Since the contour is a much easier aspect to analyze, due to its being made up of a line and not of volumes which, on the contrary, are characterized by light areas fading into shadow ones, the author has always preferred evaluations that analyzed the morphology of the upper lip in its subunits in profile: subnasal or angle, line of the lip, and vermilion. It is therefore necessary to understand that the form of the upper lip cannot be distinguished from the lower part of the nose and from the point of inflection of

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Fig. 57.1 The tripod: the central limb is composed by the conjoined medial crura, whereas the lateral crura form the two lateral limbs



the line called subnasal. The nasolabial profile is directly related to the position and to the shape of the hardware below.

The nasolabial unit's hard support consists of two different parts: the lower or dentoalveolar maxillary part and the upper or nasal one. The lower part of that supporting skeleton is made up of the frontal teeth with their tipping and their position in the maxillary alveolar structures and of the position of the basal maxillary skeleton.

The upper part is substantially the lower nasal framework, composed of two skeletal elements, a tripod (Fig. 57.1) resting on a median strong pedestal (Fig. 57.2) formed by the anterior nasal spine, and the caudal third of the septum. The paired lower lateral cartilages form the flexible tripod. The anterior septal angle is beneath the apex of the tripod – the paired tip domes. The posterior septal angle and the nasal spine support the feet of the medial crura. Overlying this tripod-pedestal skeleton, and supported by it, is a skin-soft tissue envelope or covering, with its thickness, intrinsic dimensions, and textures (Fig. 57.3).

Together, the tripod-pedestal skeleton and the skin-soft tissue envelope provide the shape of the

nasal lower third defining the subnasale position and conditioning all the lip (tethering and curling). So to read clearly the contour of the profile of the nasolabial unit and to understand the supporting framework, we have to consider, besides the dentomaxillary structure, the tripod shape and strength as well as the size and shape of the pedestal. Then, we determine the interplay between the upper and lower skeletal parts to address the treatment alternatively on the dentomaxillary structure, on the nasal structure, or on both of them.

In particular, the pedestal features are very important to influence directly the morphology of the upper lip and indirectly the tripod which is affected accordingly. The tripod rests on a pedestal which is essentially the caudal septum and the nasal spine. The feet of the medial crura articulate with the posterior septal angle and the nasal spine, and the domes are supported by the underlying anterior septal angle. The pedestal may be excessive in any of the following dimensions: its dorsal length caudally, its anterior projection at the anterior septal angle, and its caudal extension of the posterior septal angle involving or not the dimension of the nasal spine.

Fig. 57.2 The pedestal: the upper caudal septum supports the nasal tip; the lower caudal septum and the anterior nasal spine define the support of the subnasale and the upper lip

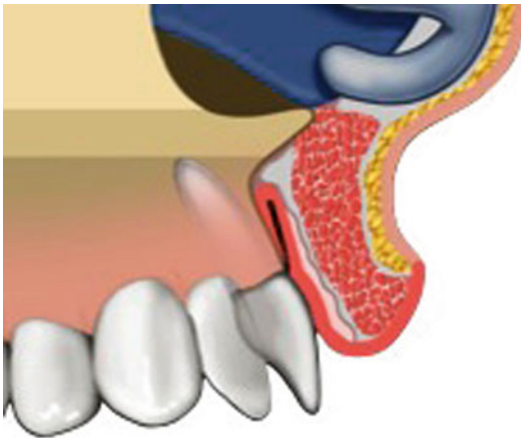
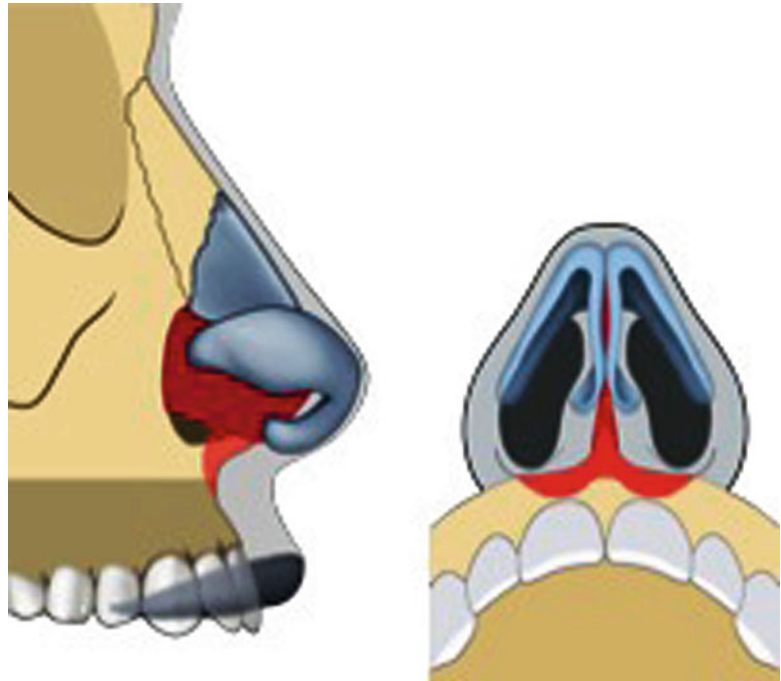


Fig. 57.3 The soft tissue envelope is a complex structure composed of skin, subcutaneous layer, muscular and peripheral connective tissue layer, submucosa with minor salivary glands, and mucosa

A gross enlargement of the pedestal in the anterior septal angle anteriorly, frequently coupled with an overprojected nasal spine, may lift a normal-sized tripod to an overprojected position and tether the lip upward producing an appearance of lip with deficient support. This nasal morphology is named “tension nose” because the

pedestal in excess stretches all the nasolabial unit and the dentoalveolar structure appears deficient as a consequence of this tethering. The key to deprojecting such a tip lies not in advancing the teeth or the maxilla neither in reducing the size of the tripod, but rather in trimming the excessive pedestal component (Fig. 57.4).

In another case, the excess of the caudal septum may force the tripod and the nasal tip downward into an underrotated or plunging tip position. Again, the pedestal excess must be addressed to affect rotation in the septal caudal portion. Both the lower nose and the nasal angle improve, without any modification of the teeth position (Fig. 57.5).

Thus, a nasal tip may be overprojected and downrotated because of the excessive length of the lateral limbs of the tripod, whereas the pedestal is almost normal or slightly deficient. The treatment in this case is a reduction of the tripod with or without a mild pedestal increase (Fig. 57.6).

The opposite condition is related to a deficiency of the pedestal due to a short nasal spine or to an underprojected septum in its anterior septal angle. The nasal tip results unsupported and the subnasale point retruded with an acute nasolabial angle and an evident accentuation of the labial curl.

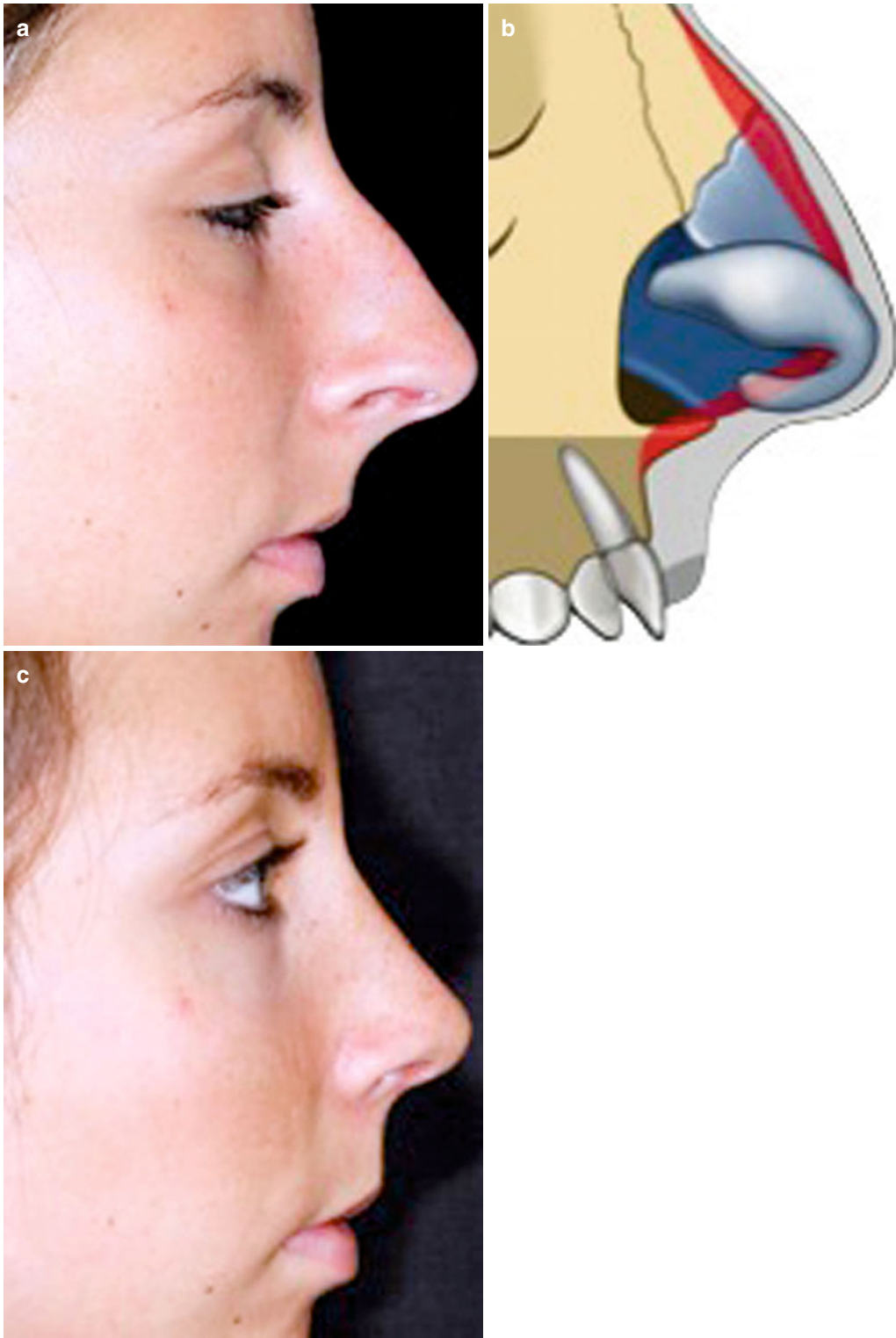


Fig. 57.4 (a) Preoperative: typical “tension nose” with overprojected pedestal. (b) Rhinoplasty. (c) Postoperative: the rhinoplasty was not able to change the inadequate profile of the upper lip

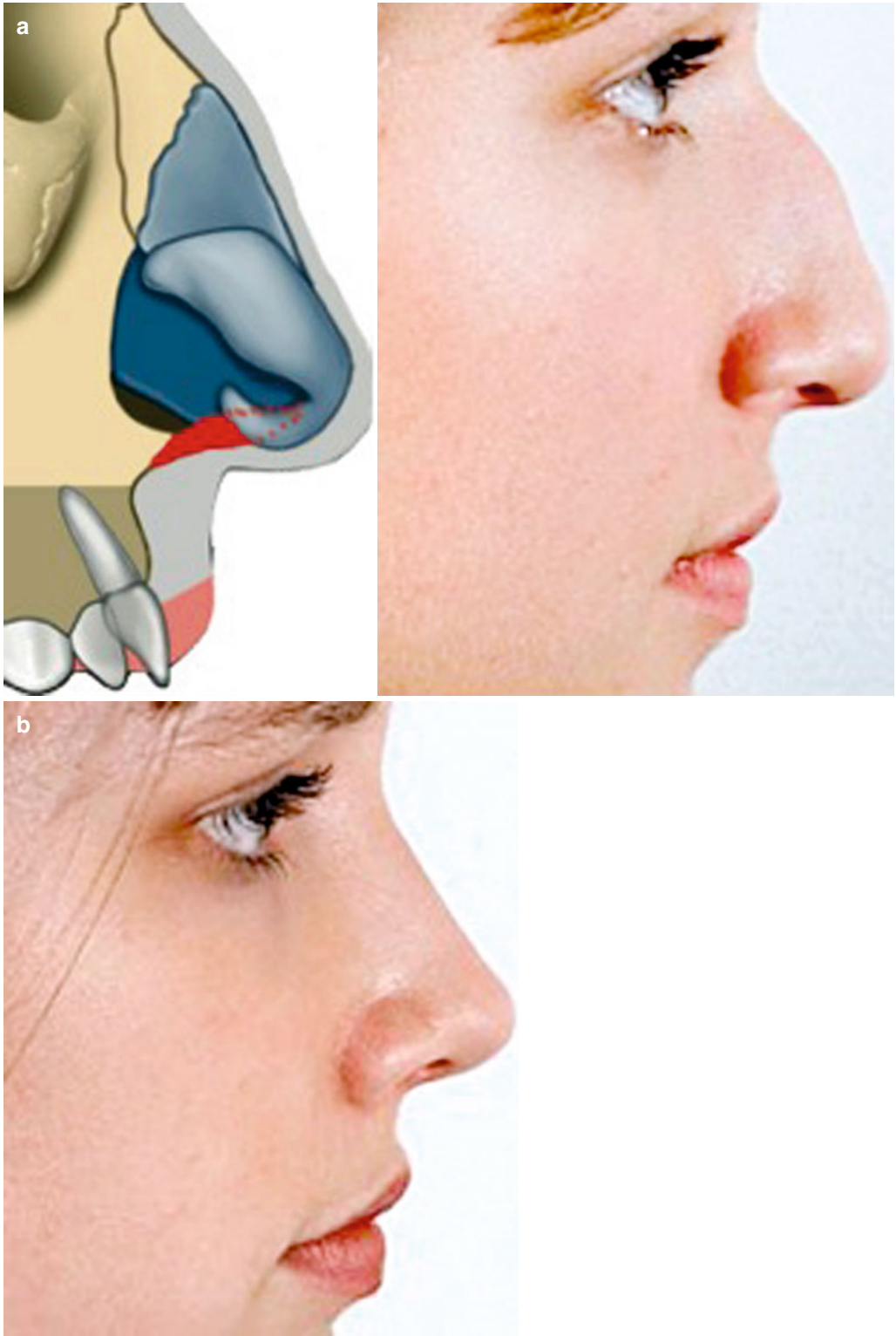


Fig. 57.5 Nasal pedestal reduction case. (a) Preoperative. (b) Postoperative



Fig. 57.6 Nasal pedestal deficiency with tripod excess. (a) Preoperative. (b) Postoperative

The harmonization between the lower nose and the lip is obtained by increasing the pedestal with grafts (Fig. 57.7).

Each alteration of the nasolabial unit has to be studied considering the lower part or dentomaxillary framework and the upper part or nasal cartilaginous skeleton: when the nasal part is altered, the nose is approached according to the tripod-pedestal concept. Through this concept, the nose can be manipulated to control its tip rotation (underrotated, normally rotated, overrotated), its projection (underprojected or overprojected), and its shape (tripod excess, defect, or distortion). The nasal structure alteration directly influences the upper lip morphology. So the nasal surgical procedures up to a complete rhinoplasty are an integrated part of the orthodontic-surgical treatment to obtain more harmonious outcomes.

57.3 The Nose and Maxilla

Moreover, the nose, due to its location in the central face, plays a fundamental role in the harmonious perception of the face. Therefore, the correction of many dentomaxillary deformities demands not only a combination of orthodontics and orthognathic surgery but also a nasal morphological correction. Usually, the rhinoplasty was performed at a later time (6 months or more) after maxillary and mandibular osteotomies to reduce the risk of unfavorable postoperative recovery. These were related to intermaxillary fixation, to the difficulty in performing the nasal-changing procedures due to the midface deformation after a maxillary surgery, to the increased postoperative edema, and to the discomfort and the longer operating time. Performing maxillary osteotomies and rhinoplasty in a single surgical procedure has become possible for the last 10 years, with the routine application of internal rigid fixation with plates and screws to the jaws, eliminating the need for intermaxillary fixation.

Advantages include the need for only one surgical procedure, an improved access and visibility to some structures like the septum or nasal spine of the nose during maxillary surgery, and the possibility to obtain a more harmonious correction of the nasolabial unit, focusing on the solution of the problems in a well-addressed manner.

The main disadvantages are related to the fact that it may be difficult to assess the extent of the nasal modifications needed after the maxillary osteotomies have been performed. The changes of the nasal morphology following the maxillary osteotomy are well known: this is due to the disruption of the nasal support system produced by the maxillary sectioning and repositioning followed by soft tissues swelling in the lip, cheeks, and paranasal area. Any surgically induced alteration may adversely affect the surgeon's capability to evaluate the needs for modifications of the nose intraoperatively.

57.4 Unfavorable Modifications of the Nasolabial Unit Consequent to Le Fort I Osteotomy

Several studies have been published on the relationship between maxillary osteotomies and the modifications of nasal aesthetics and upper lip morphology. The classic osteotomy following the lines of the Le Fort I fracture (Dr. Le Fort has never performed any osteotomy, according to Paul Tessier's funny clarification) is probably the most commonly performed orthognathic surgical procedure for correction of facial skeleton dysplasia. It is traditionally carried out through an incision in the vestibular groove, on the alveolar side, largely skeletalizing the maxilla, detaching the nose's lateral cartilages fibrous ligaments (the pyriform ligament) [14] from the pyriform opening, and splitting the cartilaginous septum from the nasal spine (Fig. 57.8).

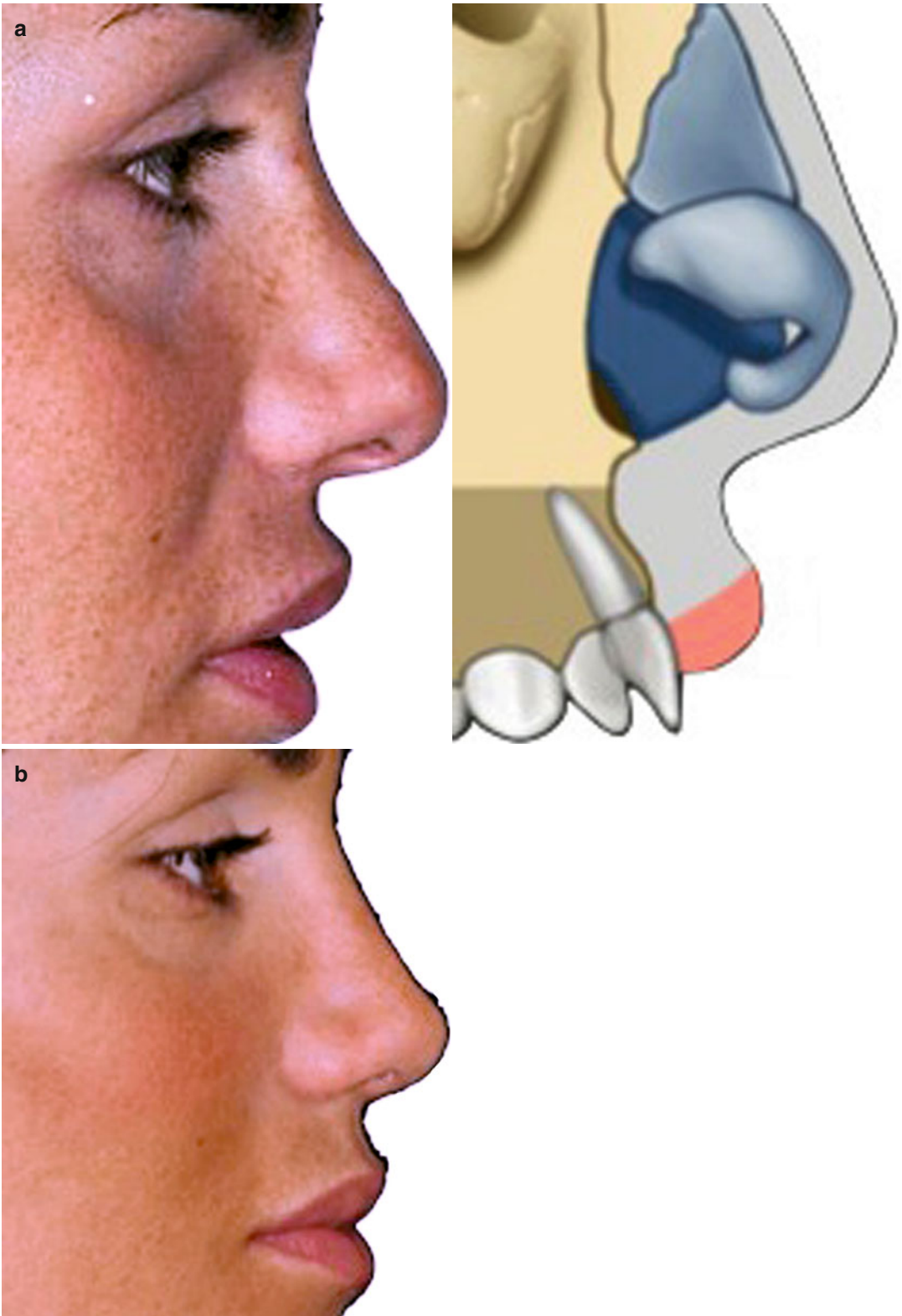


Fig. 57.7 Nasal pedestal deficiency. (a) Preoperative. (b) Postoperative

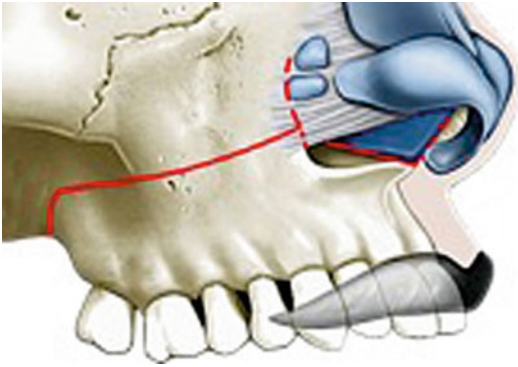


Fig. 57.8 Upper jaw: in red is the classic outline of Le Fort I osteotomy.

Summarizing the procedure mainly consists of creating a wide disruption of the muscular ligament insertions of the whole nasolabial unity.

Adverse changes can occur to a variable degree following the classic outline of Le Fort I osteotomy in the lip and nasal region, including widening of the alar nasal bases, upturning of the nasal tip creating a saddle effect, upper or lower dislocation of the columella and flattening, and thinning and lengthening of the upper lip with loss of the ideal curl. The reduction of soft tissues' fullness in this region can result in changes similar to those seen with aging, including deepening and increasing of nasolabial groove, reduced vermilion, and lateral retraction of the upper lip with downturning of the commissures of the mouth. These modifications are mainly associated with maxillary movement's direction and entity, extension of subperiosteal dissection and muscular transection or disruption, and handling of musculature and mucosa during the closure of the surgical access.

Various methods of soft tissue repositioning and closure of the vestibular incision (alar base cinch suture, mucosal V-Y suture, W incision and suture, etc.) in order to control nasal and labial changes have been described in the literature [4, 7–10]; however, predictability is not expected and stable success has not been consistent among reports.

To prevent these unfavorable effects, many authors [6, 11] have proposed a new outline cutting

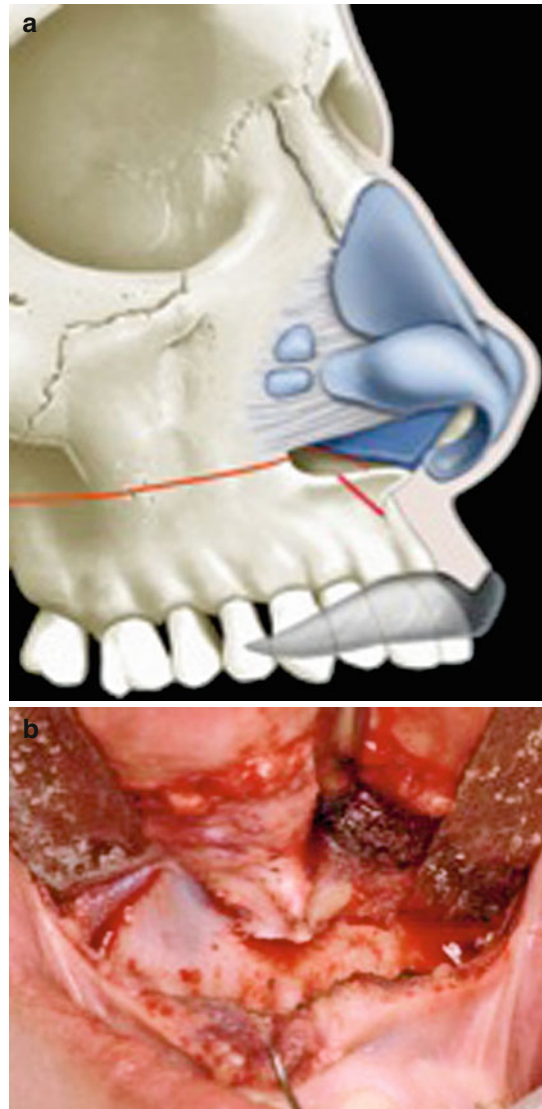


Fig. 57.9 (a) Outline in red of the modified technique. (b) The conservative technique of Le Fort I osteotomy

under the nasal spine to respect the integrity of the nasolabial muscle. The author suggests the use of this technique combined with a very small mucosal incision (3 cm large) limiting the periosteal dissection to the surface of the osteotomy, working in two lateral tunnels, and osteotomizing at a lower level in respect of the teeth apex (Fig. 57.9). The aim of this procedure is a more



Fig. 57.10 (a) Preoperative male with CII biretruded with small mandible and severe deformation of the nose. (b) Six years postoperative following bimaxillary advancement, chin vertical increase, and rhinoplasty

conservative approach on the soft tissue structures. After the mobilization and the repositioning of the maxilla, the closure of the access is carried out by suturing the transected muscles.

Using this technique, the Le Fort I osteotomy's drawbacks on the nose or on the upper lip have been almost eliminated. Besides, in case of original alteration of the nose, a rhinoplasty can be performed simultaneously. The usual sequence carried out in that case sees the orthognathic procedure as the first one, under nasotracheal intubation, with the jaws fixed with plates and screws to get solid skeletal structures. Then, as a second step, the intubation is converted in an orotracheal one in order to allow the rhinoplasty procedure.

57.5 Indications for Rhinoplasty Associated with Treatment of Dentomaxillary Deformities

Any dorsal humped nose, saddle nose, tension nose, broad-based nose, nasal tip deformation (broad, boxy, globous, downrotated, asymmetric tip) demanding correction can be treated in association with maxillary and mandibular osteotomies.

The procedure becomes very difficult only in case of severe nasoseptal deviation or extreme septal alteration with major functional problems requesting a complete cartilage rebuilding; in these cases, the delayed procedure is advised.

The rhinoplasty could be performed according to two access, open or closed, depending on the area of deformation: the closed access is usually preferred in case of limited dorsal deformity. In case of tip needing correction, the open access is mandatory. Any defect can be approached with

the preferred technique: reductions, repositions, sutures, and grafts [15, 16]. Only in case of mild to moderate septal deviation the correction demands special care to stabilize the septum in the midline with sutures. Wide use of columellar struts fixed or not to the maxilla is mandatory in case of tip support deficiency.

The simultaneous correction of the nose and of the maxillary alteration can result in a well-balanced and harmonic face in only one procedure, thus reducing the morbidity and increasing the patients' satisfaction.

57.6 Clinical Examples

The following clinical examples of double jaw orthognathic surgery combined with rhinoplasty are the more concrete representations of the exposed concepts.

This young male had CII biretruded with small mandible and severe deformation of the nose (Fig. 57.10). Bimaxillary advancement, chin vertical increase, and rhinoplasty were performed.

This female patient had asymmetric mild CIII with unsupported and downrotated nasal tip (Fig. 57.11). She had (double jaw orthognathic surgery) maxillary advancement and frontal rotation of the maxilla, rhinoplasty, and soft tissue lipofilling.

This female patient had asymmetric CIII with maxillary deficiency and unsupported nasal tip (Fig. 57.12). She had maxillary advancement, mandible and chin reduction and symmetrization, and rhinoplasty.

This female had CII biretruded with postrotated mandible and overprojected nose (Fig. 57.13). She had maxillary impaction, mandibular advancement, and rhinoplasty.



Fig. 57.11 (a) Preoperative asymmetric mild CIII with unsupported and downrotated nasal tip. (b) Four years postoperative after (double jaw orthognathic surgery) maxillary advancement and frontal rotation of the maxilla, rhinoplasty, and soft tissue lipofilling



Fig. 57.12 (a) Preoperative female with asymmetric CIII with maxillary deficiency and unsupported nasal tip. (b) Three years postoperative after maxillary advance-

ment, mandible and chin reduction and symmetrization, and rhinoplasty



Fig. 57.13 (a) Preoperative female showing CII biretruded with postrotated mandible and overprojected nose. (b) Four years after maxillary impaction, mandibular advancement, and rhinoplasty

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