Osteotomies in Secondary Rhinoplasty

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10.1 Surgical Principles of Osteotomies in Secondary Rhinoplasty

The principles of nasal pyramid correction in secondary rhinoplasties are identical to the ones in primary rhinoplasties.

The most common reasons for revisions are remaining deviations or asymmetries of the bony pyramid caused by the primary rhinoplasty. These often result from incomplete osteotomies or inadequate postoperative fixations. We think that the postoperative fixation by any kind of cast for only 1 week is often not sufficient.

Therefore, we always change the patient's cast after 1 week, and often there is the opportunity to correct minor deviations during this time. A cast is applied for a second week, and in patients with a very wide nasal pyramid, we continue to do this for a third week to keep the bony pyramid narrow.

In terms of incomplete osteotomies, the revision has to perform what did not work during the primary procedure. With the technique of external osteotomies, this works nicely.

Another common failure patients complain about is visible stair-step deformities at the lateral nasal wall. These mostly result from a displacement of the osteotomies. If these are performed just at the junction from the nasal bone to the maxilla, the bone transection will always be too high. This happens more often when using the low-to-high lateral osteotomy than in a low-to-low technique; we prefer the latter.

The neglect of the use of spreader flaps or spreader grafts can be responsible for an unpleasant outcome of the primary procedure. Therefore, it is essential to use one of these two techniques in all rhinoplasties in which the dorsum has been lowered. This also helps to prevent the occurrence of inverted-V deformities.

10.2 Case Studies: Secondary Nasal Pyramid Correction

10.2.1 Case 1: Wide Nasal Bridge

A 25-year- old patient presented after three previous rhinoplasties with a wide nasal pyramid and irregularities of the dorsum after grafting with conchal cartilage.

After opening the nose, the anterior septum was found to be overresected. Therefore, a large columellar strut, taken from the septum, was put in a pocket in front of the anterior septal border, and the medial crura were affixed to it. After smoothing the dorsum, paramedian osteotomies were performed with a Lindemann fraise, and then low-to-low lateral and transverse osteotomies were performed transcutaneously. As a result of this mobilization, a satisfactory narrowing of the pyramid was possible. The dorsum was covered with two layers of allogenic fascia (Tutogen). The tip was narrowed by transdomal sutures, and a cap graft from fascia was put on the tip. By using fascia any visibility of the graft was avoided (Fig. 10.1).

Fig. 10.1 (**a**–**c**) Correction of wide nasal bridge. Frontal view, profile view, base view pre-op/post-op

10.2.2 Case 2: Wide Nasal Bridge

A 29-year-old patient was seen after two previous rhinoplasties. In addition to a loss of support from overresection of the septum and incomplete lowering of the dorsum, the nasal pyramid was also overly wide. The reason for the deformity of the nasal pyramid was the extremely thick bone, which required four chisels to cut the strong hump. Initially a parasagittal medial osteotomy with a Lindemann fraise was performed after lowering the dorsum, followed by low-to-low lateral and transverse osteotomies transcutaneously to mobilize the pyramid and narrow it. A cast was put on for 3 weeks to guarantee the narrowing of the bones. The missing support was achieved by a strong sandwich graft from the concha. The tip was narrowed by transdomal sutures and contoured by spanning sutures (Fig. 10.2).

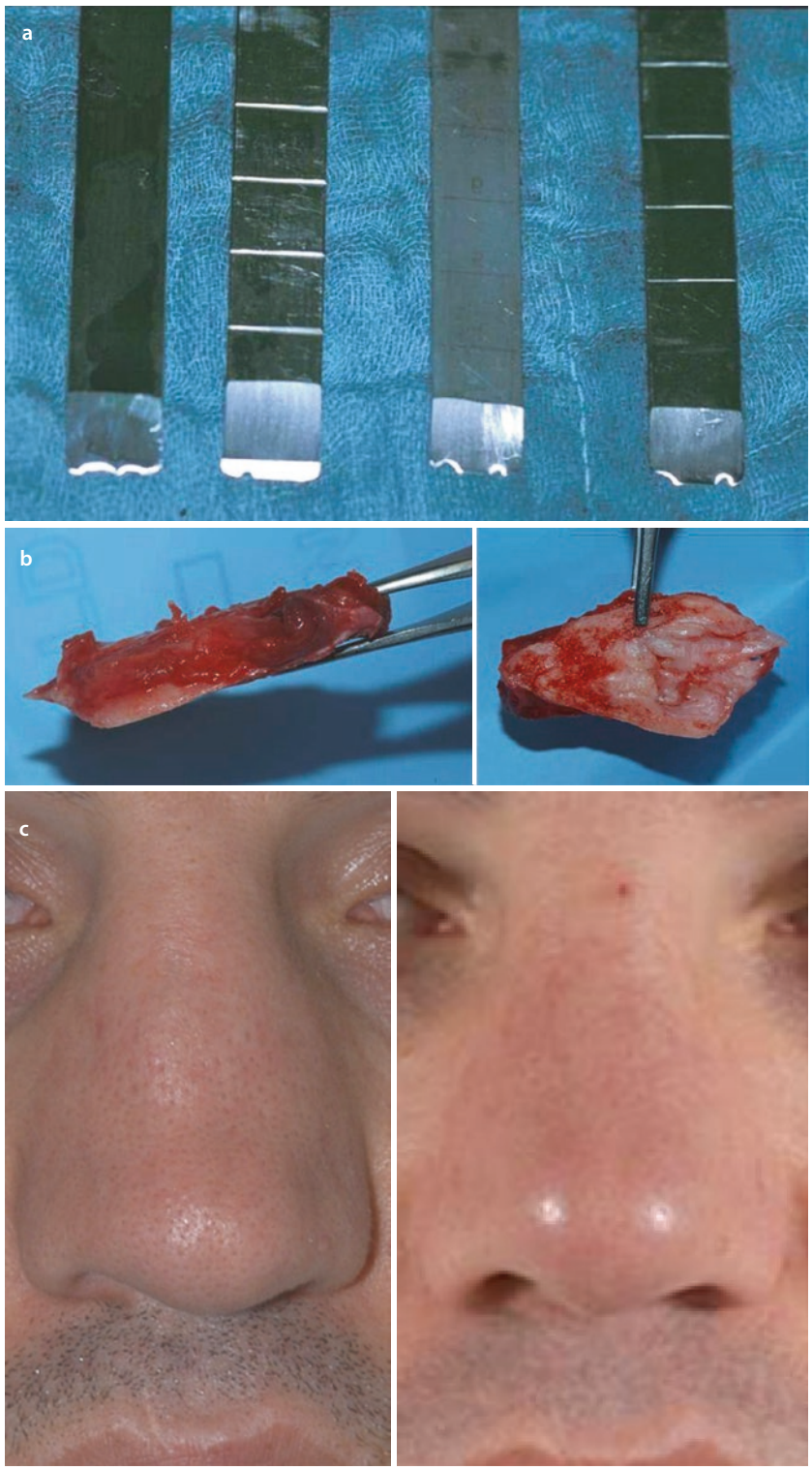
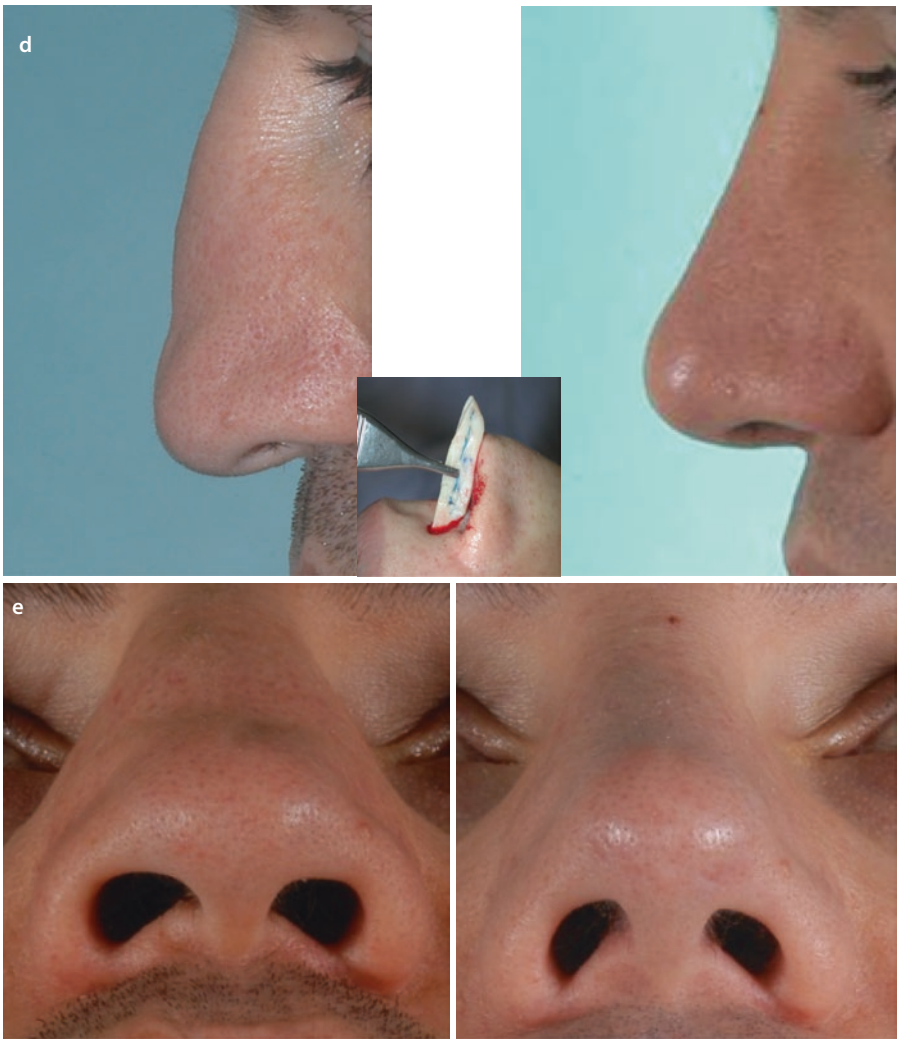


Fig. 10.2 (**a**–**e**) Wide nasal bridge. (**a**) Chisels destroyed by strong bony hump. (**b**) Strong bony hump. (**c**–**e**) Front view, profile view, base view pre-op/post-op

Fig.10.2 (continued)



10.2.3 Case 3: Asymmetrical Wide Nasal Bridge

A 51-year-old patient presented after two rhinoplasties, which were followed by nasal trauma. His complaints centered on the deviated nose, an open roof, and a wide tip with asymmetrical nostrils. The facial skeleton was asymmetrical.

The pyramid was straightened and narrowed after parasagittal medial osteotomy and low-to-low lateral osteotomy combined with a transverse osteotomy performed transcutaneously. The dorsum was camouflaged by two layers of alloplastic fascia. Narrowing the tip by transdomal sutures was not effective because of the thick cartilage. Therefore, both domes were divided and then sutured together. A shield graft from the tragus was applied. The residual parts of the tragus were used to graft the supratip area (Fig. 10.3).

Fig. 10.3 (**a**–**e**) Correction of asymmetrical wide nasal bridge. (**a**) Removal of bony spiculae with a chisel. (**b**) Removal of bony spiculae wth a side-cutting burr. (**c**–**e**) Front view, profile view, base view pre-op/post-op

Fig.10.3 (continued)

10.2.4 Case 4: Deviated Nasal Pyramid Combined with Inverted-V Deformity

A 20-year-old patient presented after previous rhinoplasty with a severely deviated septum resulting in a severely deviated nose. The anterior septal border subluxated to the right and blocked the right nostril. The reason for the poor result from the previous operation was the fact that the anterior border was deformed and totally unstable.

Therefore, we performed an extracorporeal septal reconstruction, resected the deformed anterior part, and recreated a neoseptum with a straight anterior border and a straight dorsum, strengthened and supported by two spreader grafts. This spreader grafts also helped to overcome the inverted-V deformity. After paramedian, low-to-low lateral, and transverse osteotomies, the nasal pyramid could be narrowed and straightened, but the prerequisite for a straight nose was the straight neoseptum, which we had replanted after radical mobilization of the nasal pyramid and fixed to the upper lateral cartilages and the nasal bones after drilling holes there. The neoseptum was also fixed through a drill hole to the anterior nasal spine. The spine was very wide but dislocated to the right; we partially resected it so that the residual spine stood in the midline. The tip was contoured by transdomal and spanning sutures, and the position was secured by a tip suspension suture with a posterior sling.

After 1 year postsurgery, excess of the vestibular skin that was not totally smoothed out could still be seen on the right side, leaving a little irregularity. This was created by the extreme subluxation of the septum. The patient did not want further revision because the result was perfect for her (Fig. 10.4).

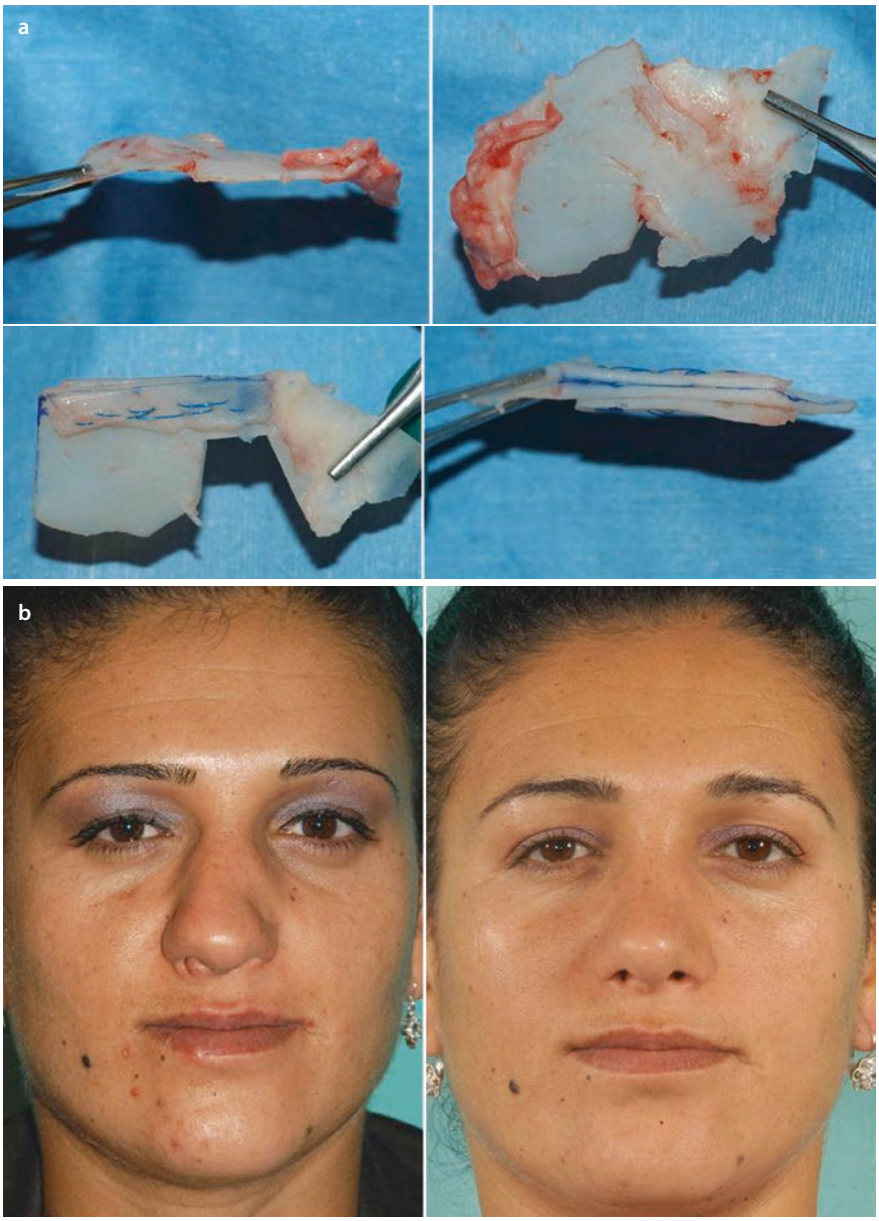


Fig. 10.4 (**a**–**d**) Correction of deviated nasal pyramid combined with inverted-V deformity. (**a**) Extracorporeal septal reconstruction. (**b**–**d**) Front view, profile view, base view pre-op/post-op

Fig.10.4 (continued)

10.2.5 Case 5: Deviated Nasal Pyramid

A 28-year-old female was seen after three previous rhinoplasties. She complained about a deviation of the bony pyramid and asymmetry of the columella base as well as a subluxation of the anterior septum to the left, with a consecutive asymmetry of the external nasal valve. She could not breathe properly, and the Cottle test result was positive. After insertion of a glass spreader and opening of the inner valve, her breathing became normal.

From the outer aspect, there was also a malformation of the right lower lateral cartilage.

Using an open approach with an inverted-V transection, the anterior nasal spine was found to be slightly dislocated, but the damage was so small that there was no reason to fracture it and to bring it in the midline. To fix the anterior border of the septum properly in the midline, we applied a four-hole microplate, which was fixed with two microscrews; after trimming, we fixed the anterior border to it. Thus, the septum was in the midline. We put in a columellar strut and fixed the medial crura to it. The narrowed inner valve was widened by putting in spreader grafts on both sides. The deviated bony pyramid was straightened by paramedian, external low-to-low lateral, and transverse osteotomies. To overcome the severe concavity of the lower lateral crus on the right side, we used a fold-under flap technique. On the left side, there was only a minor concavity that could be corrected with horizontal mattress sutures. For stabilization, we placed a batten graft under the left lateral crus. To give the ala a better contour, we put in a rim graft and covered the whole dorsum with two layers of alloplastic fascia (Fig. 10.5).

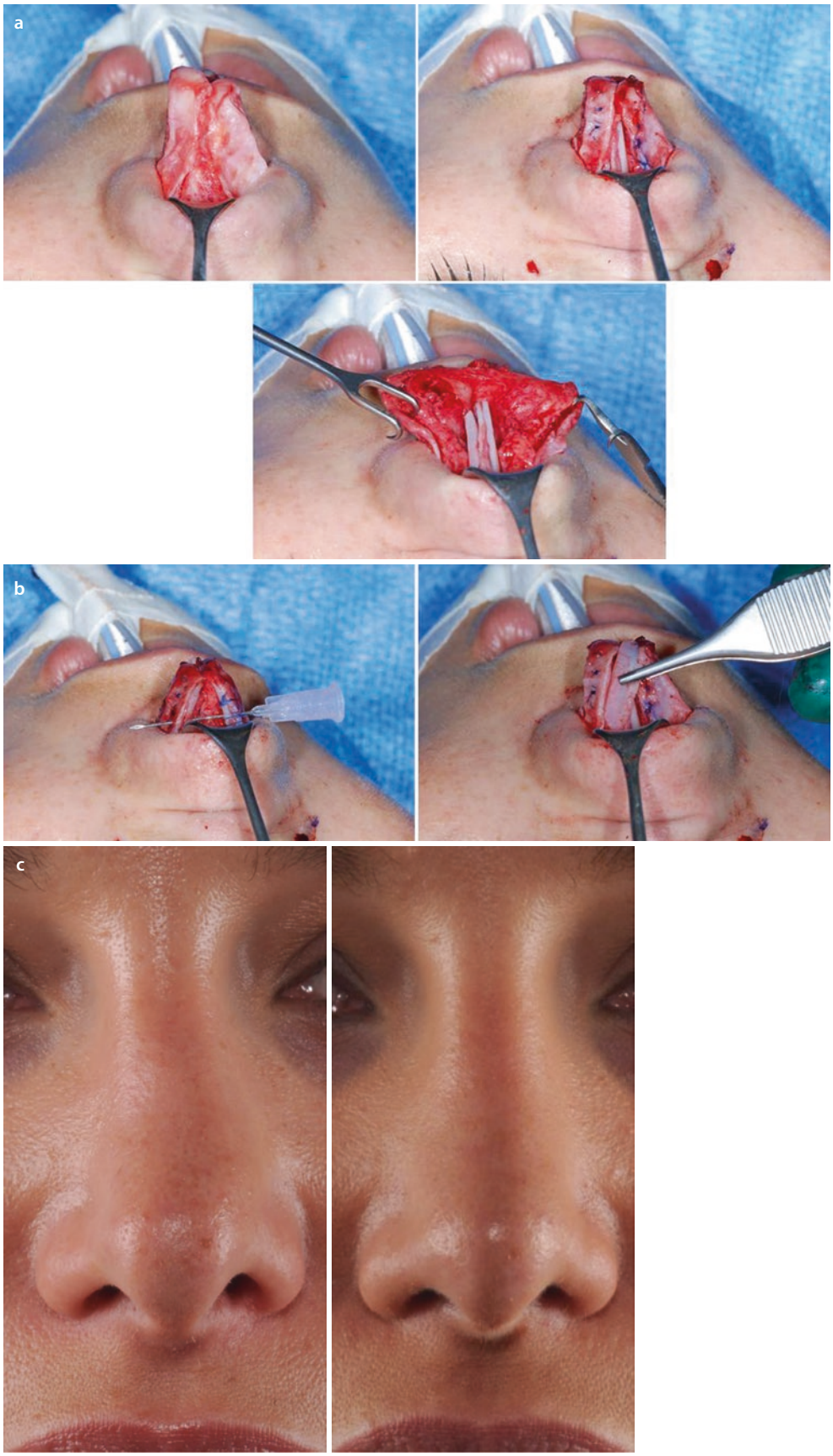
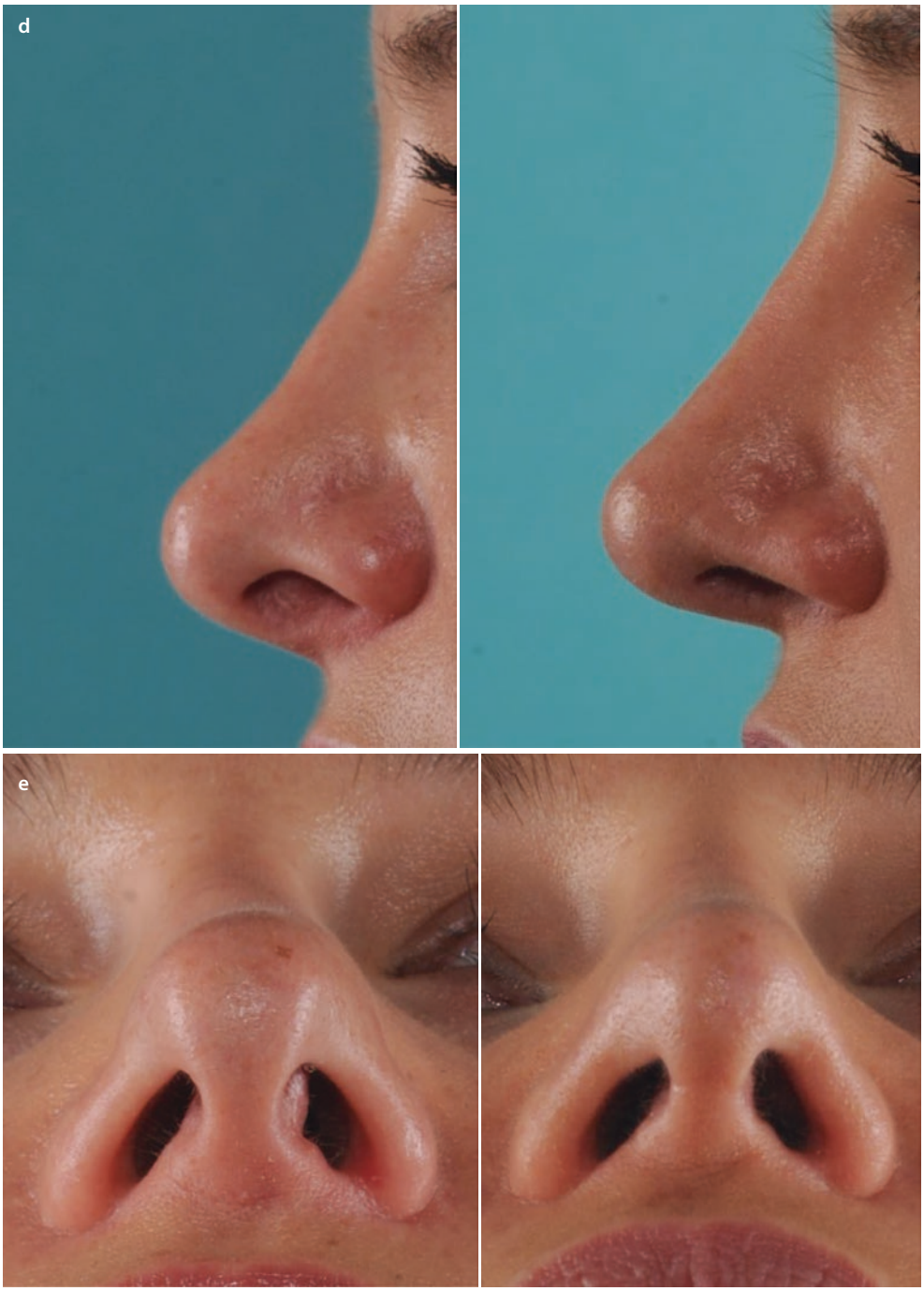


Fig. 10.5 (**a**–**e**) Correction of deviated nasal pyramid and concave LLCs. (**a**–**b**) Fold-under flap on the right side, horizontal mattress suture and batten graft on the left side, spreader grafts on both sides of the septum. (**c**–**e**) Front view, profile view, base view pre-op/post-op

Fig.10.5 (continued)



10.2.6 Case 6: Wide Bony Pyramid

A 23-year-old male presented for revision surgery after a severe nasal trauma in childhood. The patient complained that he was unable to comfortably wear his eyeglasses as a result of his nasal bridge deformity. Examination revealed a very large nasal pyramid with an overprojected dorsum and a retracted columella. Endonasal inspection revealed a severe residual septal deformity.

Using the open rhinoplasty approach, the upper lateral cartilages (ULCs) were first divided from the dorsal septum. However, elevation of the septal flaps was challenging because of heavy scarring and partial reduplication of the residual septal bone and cartilage fragments. Lowering the dorsum with a chisel was avoided because the nasal bones were exceptionally brittle and easily disrupted. Therefore, we used a powered cylindrical drill to remove the bony hump and to successfully create a smooth bony contour. Parasagittal medial osteotomies were then created with a Lindemann burr, and the perpendicular plate was fractured posteriorly using a 5-mm chisel and firm (transverse) digital pressure applied along the desired fracture line. The residual parts of the septum were then removed and fixed to a PDS foil scaffold. The neoseptum was reimplanted after mobilizing and narrowing the nasal bones with transcutaneous low-to-low lateral and transverse osteotomies. The neoseptum was sutured to the ULCs and to the nasal bones and the anterior nasal spine (ANS) after the creation of osseous drill holes. The ANS was also modified with the Lindemann burr to create a sagittally oriented groove for better stabilization of the caudal neoseptum. For reconstruction of the retracted columella and correction of the overly acute nasolabial angle, a double-layered conchal sandwich graft was also fixed to the caudal neoseptum. The very wide and bulky tip was narrowed using transdomal sutures combined with spanning sutures and a tip suspension suture with a posterior sling. The reconstruction was concluded with placement of four layers of allogenic fascia lata (Tutoplast) as a full-length dorsal onlay graft (Fig. 10.6).

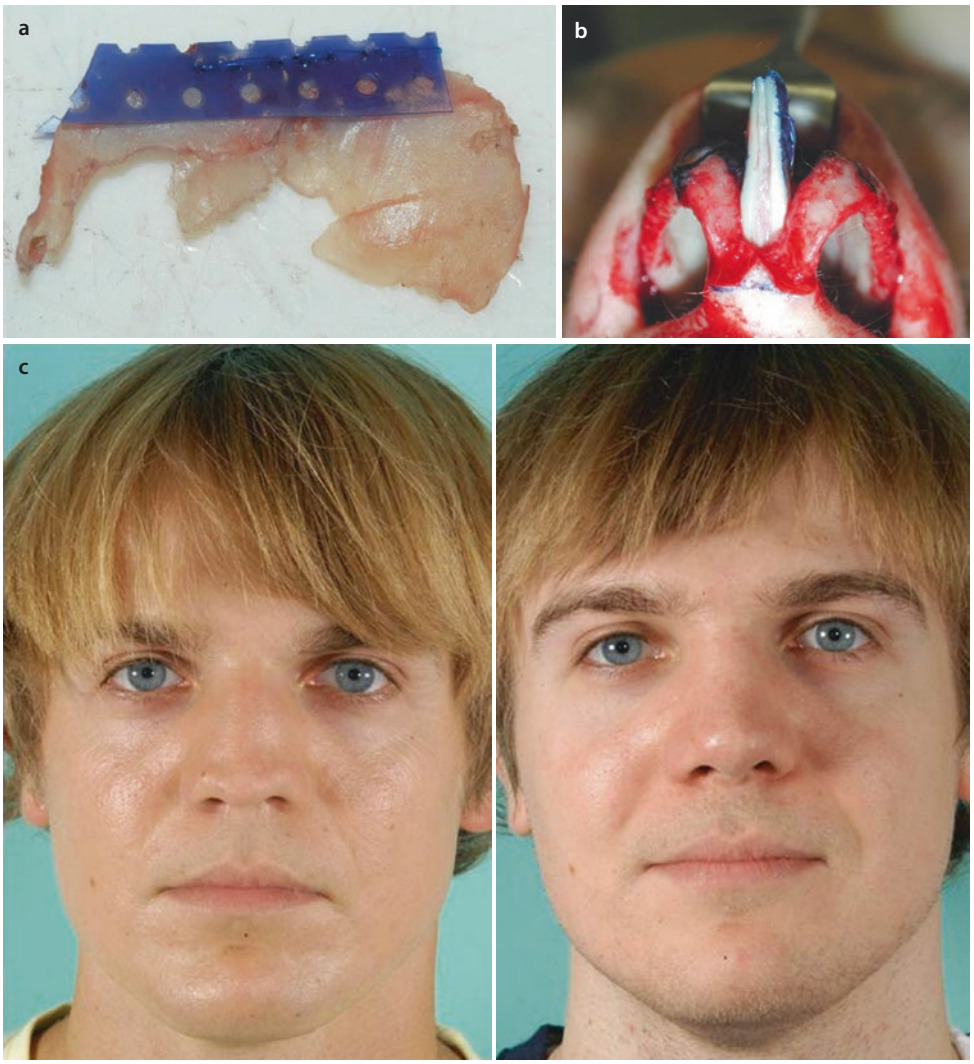
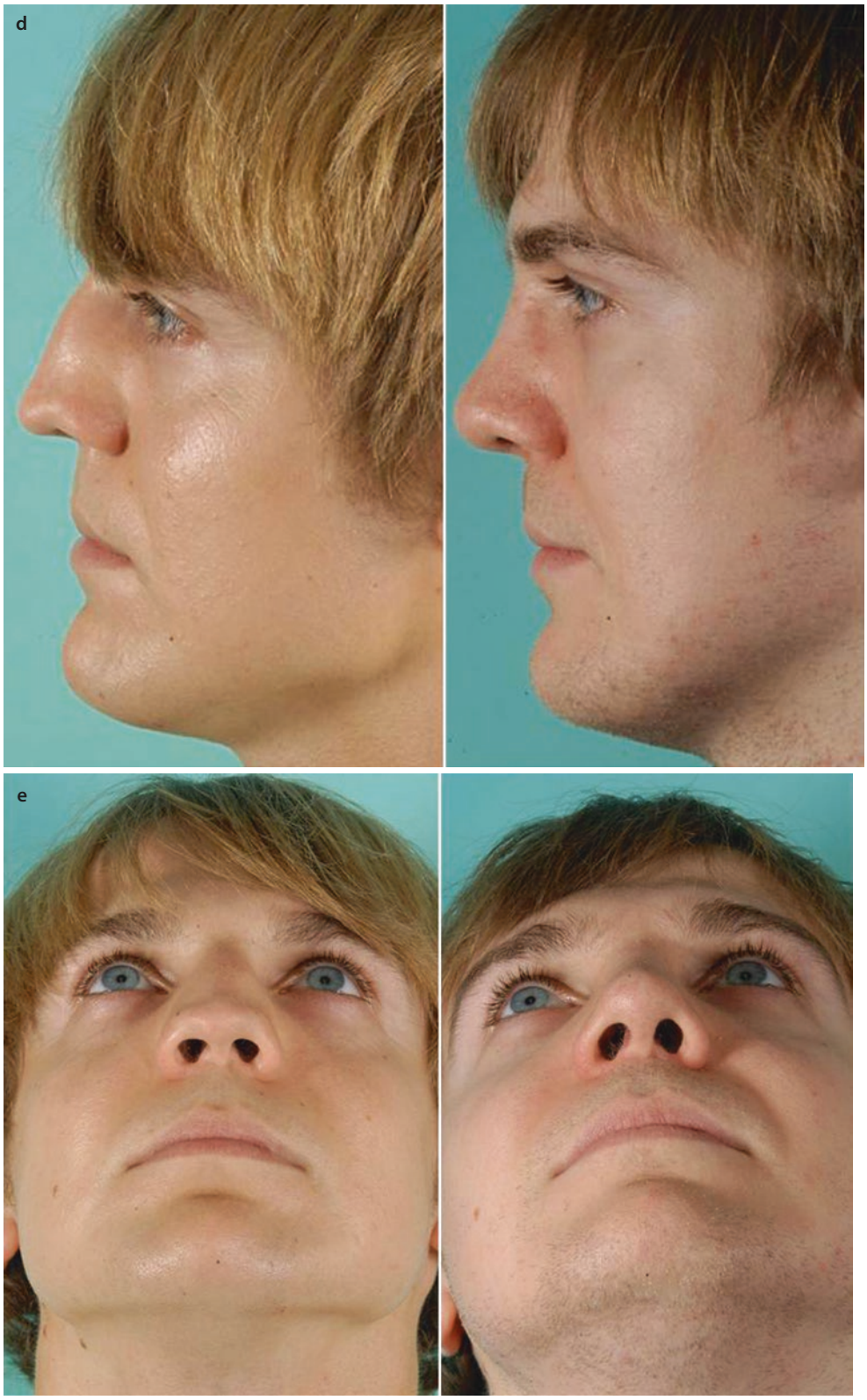


Fig. 10.6 (**a**–**e**) Correction of wide bony pyramid. (**a**) Extracorporeal septal reconstruction: explanted septum with PDS-foils for reconstruction of the internal nasal valve. (**b**) Sandwich graft from the concha used as septal extension graft. (**c**–**e**) Front view, profile view, base view pre-op/post-op

Fig.10.6 (continued)



10.2.7 Case 7: Crooked Nose with Asymmetrical and Deviated Nasal Pyramid

A 38-year-old male presented after three previous nasal surgeries with an overly wide and deviated nasal pyramid and an inverted-V deformity. The profile revealed an overprojected tip, saddling of the cartilaginous dorsum, and a bony dorsal hump. The base view revealed a very unnatural pointed tip with asymmetrical nostrils.

Using the open rhinoplasty approach, dissection of the tip revealed a severe asymmetry of the lower lateral cartilage (LLC). Despite the use of an open approach with previous surgery, this deformity had been unrecognized and/or untreated. Next, the septum was dissected, and the residual components were removed. After thinning the bony septal components with a powered cylindrical drill bit, a straight neoseptum was created by splinting the cartilaginous segments using the thinned ethmoid plate as a splinting graft. The bony dorsum was then smoothed using the powered cylindrical drill bit to create a smooth and even contour dorsal profile. After parasagittal medial osteotomies and percutaneous low-to-low lateral and transverse osteotomies, the wide and deviated nasal pyramid was successfully straightened and narrowed. The neoseptum was then reimplanted in a more anterior position so that the medial crura could be fixed to the anterior border of the septum using the tongue-in-groove technique. The neoseptum itself was fixed to the ULCs and to the nasal bones and ANS after creating osseous drill holes with the Lindemann burr. For sculpting the tip and correcting the tip asymmetry, a unilateral lateral crural overlay technique (lateral sliding technique) was performed on the right side. Transdomal sutures and spanning sutures were then applied to narrow the tip cartilages. After redraping the skin flap, the middle vault saddle deformity was corrected by reimplanting pieces of allogenic fascia that were removed during dissection of the dorsum (Fig. 10.7).

Fig. 10.7 (**a**–**e**) Correction of a crooked nose with asymmetrical and deviated nasal pyramid. (**a**) Severe asymetry of the LLCs. (**b**) Symetrical contour of the LLCs by suture techniques. (**c**–**e**) Front view, profile view, base view pre-op/post-op

Fig.10.7 (continued)

10.2.8 Case 8: Narrow Nasal Pyramid with Inverted-V Deformity

A 39-year-old female presented after previous rhinoplasty with an unsatisfactory functional and cosmetic outcome. An overly narrow dorsum with collapsed internal nasal valves resulted in bilateral nasal airway obstruction. A C-shaped dorsal curvature and an overresected dorsum with an inverted-V deformity also led to a cosmetic deformity of the nasal bridge. Additionally, an overrotated, deviated, and boxy nasal tip with retracted soft-tissue facets and an oblique columella was observed.

Using the open rhinoplasty approach, exploration confirmed the clinical findings: the dorsum was extremely narrow with collapse of both internal nasal valves, and both LLCs exhibited buckling at the transition of the medial and intermediate crura. After separating the ULCs from the dorsal septum, parasagittal medial osteotomies were created using a powered Lindemann fraise. The bony pyramid was then mobilized using percutaneous low-to-low lateral and transverse osteotomies. Rib cartilage was then harvested and 2.0-mm wide cartilage strips were fabricated for use as extended spreader grafts. Extended spreader grafts served to simultaneously straighten the dorsum, widen the internal valves, and eliminate the inverted-V deformity. The overprojected and overrotated tip was then deprojected and counterrotated using the medial crural overlay technique. This also permitted simultaneous correction of the buckled medial crura. The overresected lateral crura were then strengthened using lateral crural strut grafts fashioned from rib cartilage, and transdomal sutures were used to contour the nasal tip. Because of thin overlying skin, the tip framework was also covered with a shield graft fashioned from allogenic fascia lata. The columellar incision was then closed with 6-0 permanent sutures, whereas all other sutures were performed with resorbable suture material. The residual rib cartilage was diced to a very fine consistency and used as free diced cartilage (FDC) to augment and smooth the dorsum and soft-tissue triangles (Fig. 10.8).

Fig. 10.8 (**a**–**c**) Correction of a narrow nasal pyramid with inverted-V deformity. Front view, profile view, base view pre-op/post-op

Suggested Reading

Ballert JA, Park SS. Functional rhinoplasty: treatment of the dysfunctional nasal sidewall. Facial Plast Surg. 2006;22(1):49–54.

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Sheen JH. Spreader graft: a method of reconstructing the roof of the middle nasal vault following rhinoplasty. Plast Reconstr Surg. 1984;73(2):230–9.