Chapter27. Nasal Osteotomies: Width Manipulation

- *Indications*: Nasal osteotomies are indicated for narrowing wide lateral walls of the nose, closing an open roof deformity, or straightening the nasal bony framework in a deviated nose. Nasal osteotomies are frequently performed in rhinoplasty surgery. In fact, one study found that osteotomies were performed on over 95% of their patients (by comparison, a dorsal hump was removed on 84%).[1] These maneuvers are challenging because they are not directly visualized and often lack the control that is present with other interventions. Once osteotomized, the small nasal bones are not fixed as are other bones but are splinted from above and below in order to maintain the desired intraoperative position. In order for the surgeon to maintain control of the osteotomized segments, the procedure must be completed in a meticulous manner.
- *Markings*: Drawing the planned course of the osteotomy on the skin is often helpful since it may serve as a guide to follow with a finger palpating the tip of the osteotome. Remember that the low osteotomy does not begin in the nasal bone but rather on the maxilla.
- *Classifications*: The position of the osteotomy may be described by the starting and ending points along the piriform aperture and relative to the midline. A low osteotomy is positioned further off the midline while a high osteotomy is positioned more medially, or higher on the lateral nasal wall. Each type of osteotomy has an indication.[2]
  - A low-low osteotomy mobilizes a larger segment of lateral nasal wall and is used when mobilization of the bony roof is needed to correct a very wide nasal base or a large open roof deformity. The low-low osteotomy is also useful in patients with small nasal bones because it creates larger segments of bone to compensate for the scant nasal bone surface area. The low-low osteotomy also perhaps best mirrors the natural shape of the nasal bones (Figure 27-1).
  - A low-high osteotomy is used to correct a small open roof deformity or correct a medium-wide nasal base. Higher osteotomies may be preferable in the occasional patient with larger nasal bones to achieve better dorsal refinement (Figure 27-1).
  - *Double level osteotomies*: These are used when excessively convex lateral nasal walls are present or if lateral nasal deformities or asymmetries are present. Additionally, it can be useful in smoothing the transition from the cheek to the nasal sidewall when deformities exist.[3] The double osteotomies consist of two parallel osteotomies: one low-low and another more medial (higher) on the nasal wall. The order is important since performing the more lateral osteotomy first leaves an unattached and unstable piece of bone to cut secondarily.
  - *Medial osteotomies*: A medial osteotomy separates the nasal bones from one another in the midline (Figure 27-2). It is recommended when the dorsal aspect of the nose needs to be narrowed in isolation or in conjunction with the base of the nose where lateral osteotomies would also be required. Other indications are male patients with thicker bone in the region of the radix or patients with deviation of the nasal root who require mobilization and repositioning the nasal pyramid. The medial osteotomy is initiated at the lateral edge of the open roof deformity or proceeds in a lateral direction if no open roof deformity is present. It proceeds in a superolateral direction 15 degrees off the midline where a natural cleavage plane exists for the osteotomy.[4] This is easily marked on the patient as a line extending to a point halfway between the nasion and the medial canthus. The lateral nasal bone is then placed so that its superior edge gets tucked medially under the intact nasal bone. Any palpable edge can be smoothed with a rasp. If combined with a lateral osteotomy, it is important to leave about 2 mm to 5 mm of bone intact between the two superior ends of the osteotomies. The medial osteotomy with or without a lateral osteotomy is capable of narrowing the dorsum of the nose.[5]

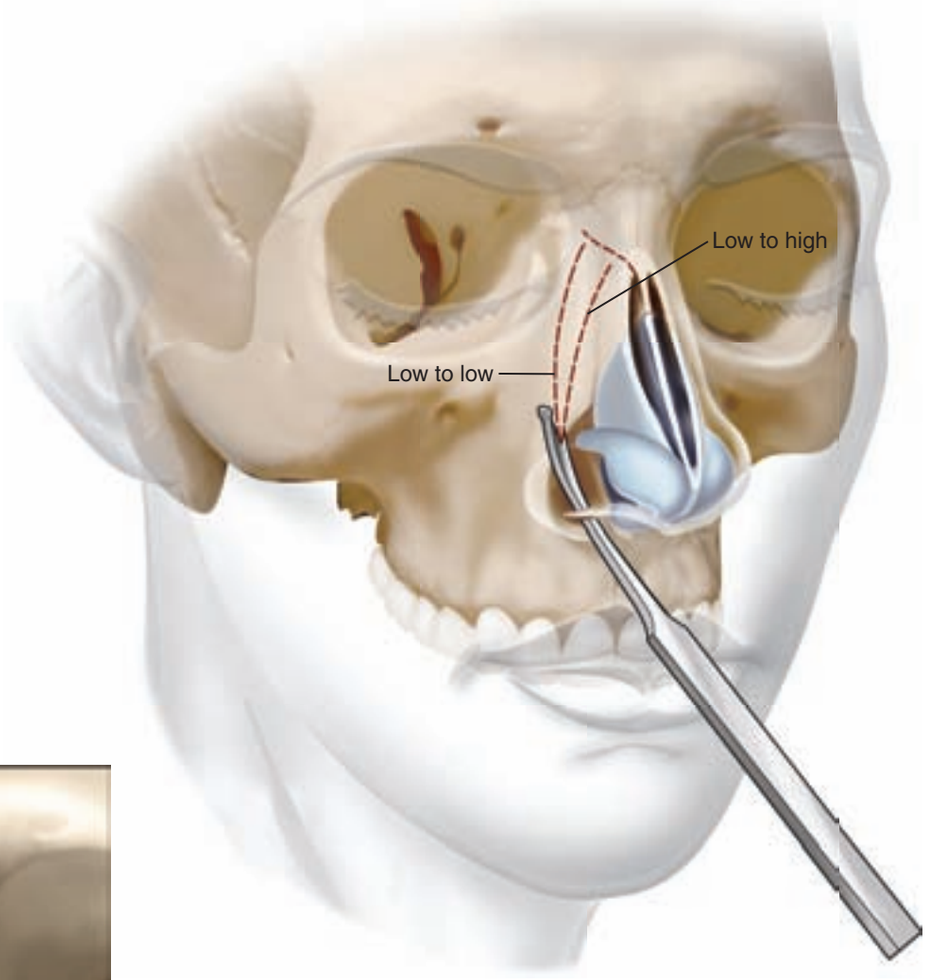

Figure 27-1. Nasal osteotome used to make one of two possible osteotomies. A high starting point on the piriform aperture may also be used.

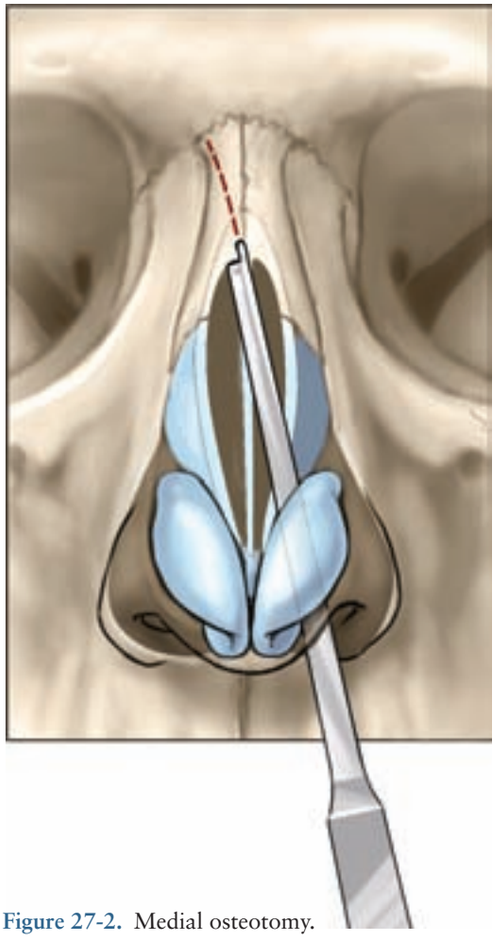

Figure 27-2. Medial osteotomy.

- *Approaches*: There are several acceptable approaches for accessing the bony nasal vault for the purpose of performing a lateral nasal osteotomy: endonasal, percutaneous, and gingivobuccal. The surgeon should understand and be comfortable performing each even though he may have a preferred approach.
- *Techniques*: For the endonasal and gingivobuccal approaches, the osteotomy is often performed with a specialized, curved osteotome with a notched or guarded tip. A larger, bulbous side is ahead of the cutting edge and the shorter, sharper edge is closer to the cutting surface. The notched tip of the osteotome straddles the free inferior edge of the nasal bone with the larger side external to the bone, where it is palpable but has minimal chance of piercing the skin. The smaller tip stays inside the nasal bone. While injury to the mucosa is possible, this heals well and rarely causes a problem. A sharp 2-mm osteotome is typically recommended for the percutaneous approach. Lidocaine (1%) with 1:100,000 epinephrine should be injected into the lateral and medial nasal walls at least 7 minutes prior to the osteotomies in order to minimize bleeding and postoperative bruising.
  - *Endonasal approach*: A small incision is made within the lateral nasal vestibule to provide access to the inferior junction of the nasal bones with the frontal process of the maxilla. The location for the incision is identified by retracting laterally on the nasal sidewall to drape the mucosa over the underlying piriform aperture. The incision should be just large enough to allow introduction of the nasal osteotome. Through this incision, a narrow subcutaneous dissection with a Freer periosteal elevator along the external aspect of the nasal sidewall is performed. It is important to only dissect a tunnel just big enough to accommodate the osteotome in order to preserve as much of the soft tissue attachment to the osteotomized nasal wall as possible. The osteotome is then passed along the same tunnel of dissection. Again, the longer, blunted tip of the osteotome is left external to the nasal bone so that it may be palpated beneath the skin and not puncture the skin. The sharper tip is left inside the piriform aperture medial to the nasal bones. One can palpate the tip as the osteotomy proceeds, verifying the proper orientation as the osteotomy progresses. The incision can remain open or be loosely closed so that fluid may drain.
  - *Percutaneous approach*: A small, 2-mm osteotome is introduced through a small incision at the level of the inferior orbital rim. The technique is advantageous because it allows excellent control of the proposed line of fracture by its direct approach, minimizes subperiosteal dissection resulting in more stability and less dead space, and thus reduces postoperative edema and recovery time. A small stab incision just medial to the inferior orbital rim is made with a #11 blade or the osteotome itself can be used to penetrate the skin if it is sharp. Through this incision, a 2-mm osteotome is used, in a subperiosteal plane, to create a line of perforations along the nasal sidewall by angling the instrument superiorly and inferiorly (Figure 27-3). Again, skin markings of the proposed osteotomy may help guide the surgeon while the osteotomy progresses (Figure 27-4). The skin is shifted with the osteotome to maximize the reach of the single skin incision. The incision is closed with a Steri-strip postoperatively.[6] The percutaneous scars heal well and have not been found to present a problem.

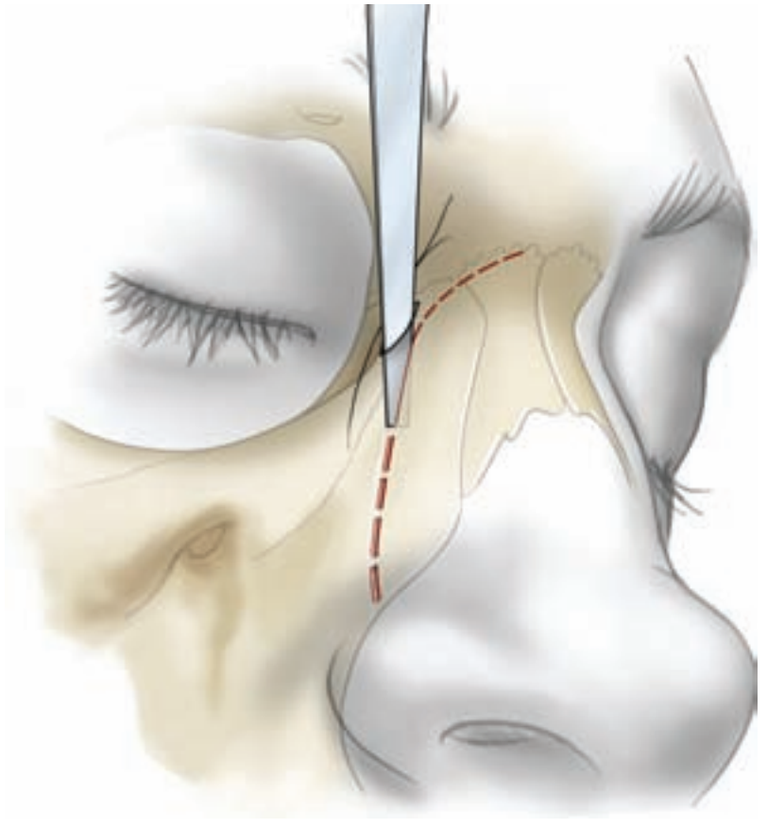

Figure 27-3. Schematic during of the percutaneous osteotomy technique.

Figure 27-4. Intraoperative photograph demonstrating a percutaneous osteotomy. Nasal bones are indicated in purple.

- *Gingivobuccal sulcus approach*: A small incision is made in the mucosa of the gingivobuccal sulcus in line with the proposed osteotomy (Figure 27-5). This may be done with electrocautery down to the bony surface of the maxilla to minimize bleeding. Similar to the above techniques, a tunnel is dissected along the piriform aperture and up to the level of the nasofrontal junction. Care is taken not to strip too much tissue or create too big a tunnel in order to preserve some soft tissue attachments to the nasal bones. While carrying the dissection superiorly, the takeoff of the nasal bones should be appreciated since it is below this level along the frontal process of the maxilla that the osteotomy commences (Figure 27-6). The gingivobuccal approach is perhaps the most direct approach to the nasal bones. Controlled advancement of the osteotome with the mallet is performed similar to the endonasal approach (Figure 27-7). The incision is either left open or loosely closed to facilitate fluid drainage.

- *Postoperative*: The percutaneous and gingivobuccal sulcus incisions may be left open, while the intranasal incision is closed with one or two sutures. The percutaneous site may be covered with a small adhesive strip. Internal and external support is usually indicated to hold the nasal bones in position as they heal back to the frontal bone and maxilla. Internal splinting is achieved with Vaseline gauze or resorbable foam packing. External support is achieved with a tape dressing beneath a rigid splint. The splint may be fabricated from multiple layers of plaster cut into a rough trapezoidal shape, thermoplastic polymer, or padded aluminum. If the nasal bones are not secure in their new position, it is preferable to use a splint that can be easily applied to its desired dimensions with little pressure on the nasal bones. Either plaster or a thermoplastic material works well in this situation. In such cases, the splint is generally left in place for 10 to 14 days to allow healing and remind the patient to avoid any potentially harmful contact. Careful removal is facilitated by swabs soaked in acetone or other adhesive-removing solution.
- *Pitfalls*:
  - Not every patient is a candidate for nasal bone osteotomy. Older patients with thin bones may not produce a clean osteotomy line and patients who wear heavy eyeglasses may depress the nasal bones farther than desired.
  - Laceration of the skin is certainly a possibility if the sharper side of the osteotome faces outward to minimize mucosal injury (not recommended). For the percutaneous approach, care should be taken to avoid injury to the angular artery that courses through the nasal sidewall. Local anesthesia with epinephrine should be injected in the area before making the skin incision and the scalpel should pass only superficially through the skin.
  - The starting position for the lateral osteotomy should not be below the level of the inferior turbinate. Too low a takeoff will include that part of the frontal process of the maxilla, which serves as support for the most lateral portion of the lower lateral cartilage and thus integrity of the external nasal valve.
  - At the lateral junction of the upper and lower lateral cartilages, just medial to the nasal bones, care should be taken to avoid injury to the triangle of soft tissue that supports the external nasal valve.
  - An osteotomy that is too high on the nasal bones may result in formation of either a visible or palpable ledge. It may be avoided either with a lower osteotomy on the maxilla or a double osteotomy. Correction of the postoperative ledge may be addressed with a secondary osteotomy lower on the maxilla to soften the step-off between the nasal bone and the maxilla. A bony spike in the region of the medial canthus may be the superior edge of the infractured nasal bone.
- *Tips*:
  - Preoperatively, the surgeon should have a reasonable estimation of the size of the nasal bones and decide on the most ideal path for the planned osteotomy.
  - In creating the subcutaneous tunnel along the lateral nasal sidewall, care should be taken to avoid devascularizing the free bony segment and prevent unintended malposition by preserving some of the lateral soft tissue attachment.
  - Intranasally, confirm the position of the inferior turbinate as a starting point for the lateral osteotomy and osteotomize from this point cephalad.
  - As the osteotome is advanced superiorly, the angle of the instrument should be controlled and the target point medial to the medial canthus kept on line.

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Figure 27-5. Exposure of the gingivobuccal sulcus for dissection of osteotomy plane.

Figure 27-6. Course of the osteotome along the frontal process of the maxilla.

Figure 27-7. Osteotome positioned within the gingivobuccal sulcus and advanced superiorly with gentle tapping with a mallet.