Rhinoplasty

Chapter 1 . Nasal Anatomy: Bony Support

- The osseous framework of the nose is composed of two semi-rectangular and obliquely oriented nasal bones that extend approximately one-third of the length of the nasal dorsum (Figures 1-1 and 1-2). As the strongest substance in the nose, the bony vault provides support and stability.
- In adults, the mean length of the nasal bones is approximately 20 mm. They are widest in the region of the nasofrontal suture—approximately 14 mm and narrowest at the nasofrontal angle—approximately 10 mm. The thickest portion is superiorly near the nasofrontal suture, where it averages 6 mm and is thinnest inferiorly.
- Osteotomies should be designed to cut through intermediate or transition zones of bone thickness. The region from the piriform to the radix along the nasal process of the maxilla has been shown to be no more than 2.5 mm thick and can be predictably osteotomized with small osteotomes.[1]
- Each nasal bone articulates with four other bones in the face: the frontal bone superiorly, the ethmoid bone superolaterally, the maxilla laterally along the piriform aperture, and the contralateral nasal bone medially. The lateral articulation between the nasal bone and the maxilla is not truly within the valley between the nose and malar complex, but rather extends onto the nasal sidewall. What is referred to as an osteotomy of the nasal bones actually traverses the nasal process of the maxilla. The superior extent of each bone is dense and serrated and forms a narrow articulation with a notch in the frontal bone. By contrast, the inferior border is thin but supported from beneath by overlapping attachments with the paired upper lateral cartilages. The lateral border is perhaps the most important since it is in this region that the bones commonly fracture and controlled osteotomies are performed. Here, the bone is similarly serrated. Along the superior portion, it is beveled such that the edge faces inwards, while inferiorly the converse is true. The medial border articulates with the contralateral nasal bone and, as it approaches the frontal bone, becomes thicker than it is below.
- Caudally, the edges of the nasal bones overlie the cranial extent of the paired upper lateral cartilages. Similarly, the midline septum begins outside the bony pyramid but continues beneath it proximally.
- The external surface of each bone begins as a concave structure and becomes convex inferiorly. It is also convex from medial to lateral. The topography of the inner surface is the opposite of the external surface and thus, convex superiorly, concave inferiorly, and concave from side to side.
- Each of the nasal bones is covered by the *procerus* and *compressor naris* muscles.
- Each nasal bone is perforated in the center by a foramen, which carries a small venous tributary.
- The lacrimal bone lies, posterior to the articulation of the nasal bone and the maxilla. It is the smallest and most fragile bone of the face and is situated in the anterior portion of the orbit.
  - It articulates with four bones, including the frontal and ethmoid bones, the maxilla, and the inferior nasal concha. The lateral surface of the bone, which faces the orbit, is divided by the posterior lacrimal crest into an anterior portion and a posterior portion.
  - Anterior to the crest lies the lacrimal sulcus, which unites with the frontal process of the maxilla. The upper part of this fossa contains the lacrimal sac, while the lower part contains the nasolacrimal duct.
    - This is relevant since osteotomies of the nose traverse the nasal process of the maxilla and can be injured if the osteotomy is placed too far posterior. The medial surface, which faces the nose, possesses a longitudinal furrow, which corresponds to the lateral crest. The area anterior to the furrow forms part of the middle meatus of the nose, and the area posterior articulates with the ethmoid.

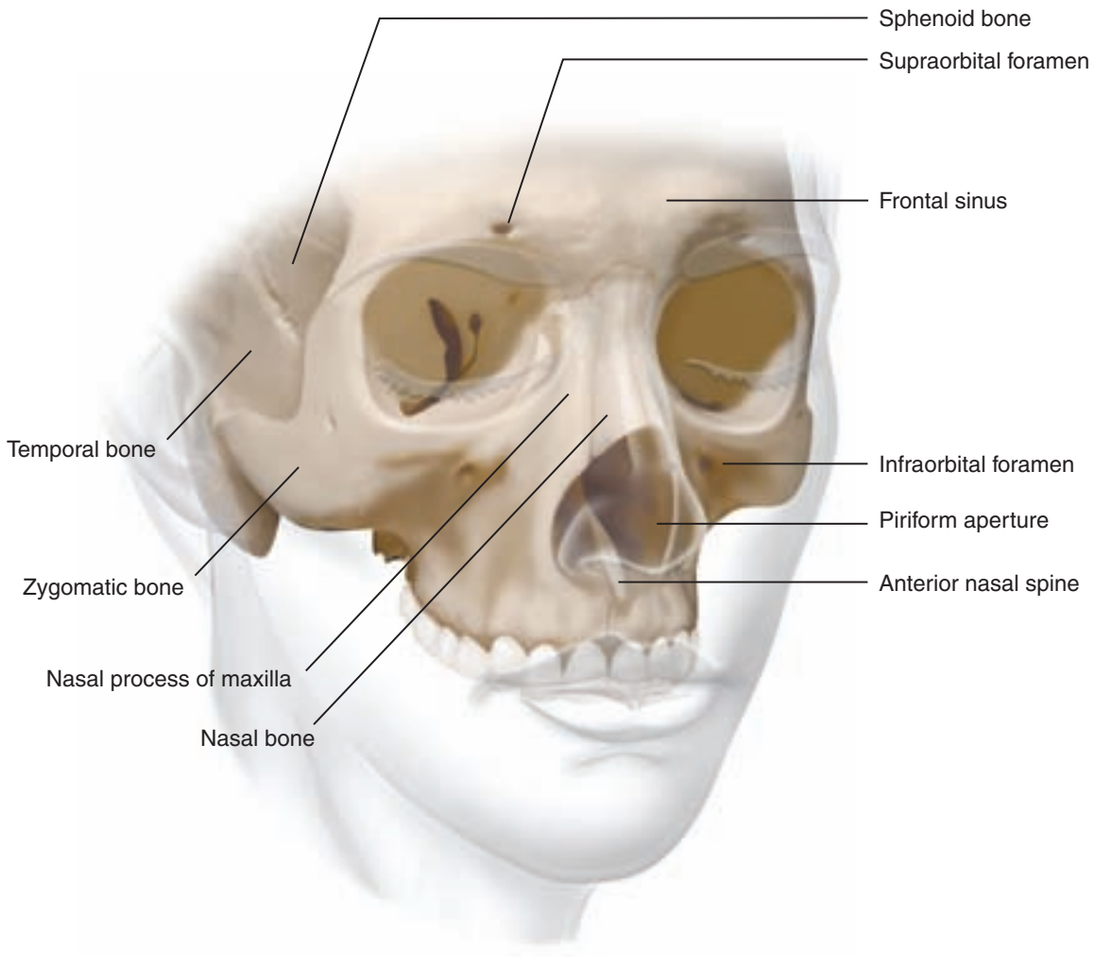

Figure 1-1. Facial bones as they articulate with the nasal bones.

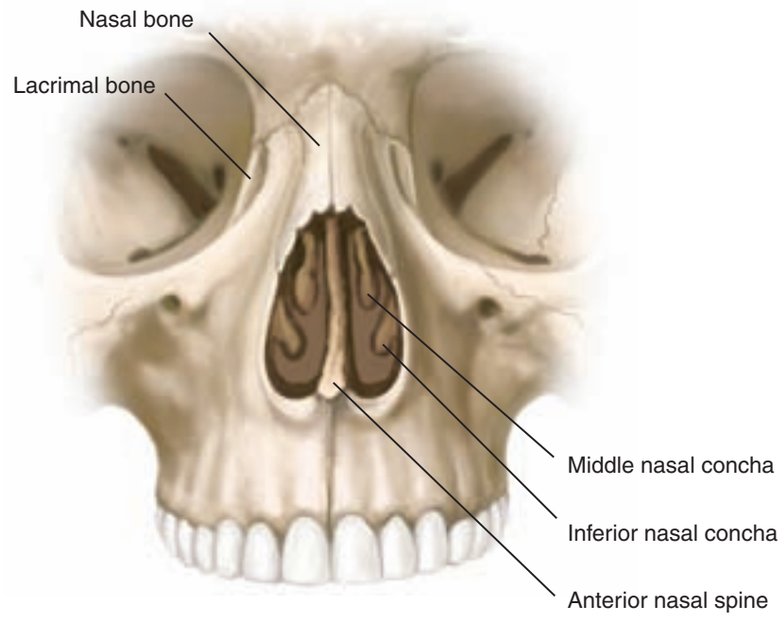

Figure 1-2. Nasal bones and internal structures of the nasal cavity.

- The nasal conchae, or turbinates, are shelves of bone, which extend from the lateral nasal sidewalls and curl within the air passages (Figures 1-2 and 1-3). They serve to direct inspired air into a steady, regular flow across the surface mucosa. The mucosa is composed of pseudostratified ciliated cells.
  - The inferior turbinates are the largest turbinates and are responsible for the majority of airflow deflection, humidification, heating, and filtering. The bulk of inhaled airflow travels between the inferior and the middle turbinates.
  - The middle turbinates are almost as long as the inferior turbinates but do not come as far anterior. The middle turbinates cover the openings of the maxillary and ethmoid sinuses. They serve to protect the sinuses from direct contact with pressurized nasal airflow.
  - The superior turbinates are smaller structures, which protect the olfactory bulb. They shield the nerve axons piercing through the cribriform plate into the nose.
  - All three turbinates are innervated by pain and temperature receptors, via the trigeminal nerve (CN V).

REFERENCE

1. Harshbarger R, Sullivan PK. Lateral nasal osteotomies: Implications of bony thickness on fracture patterns. *Ann Plast Surg*. 1999;42:365.

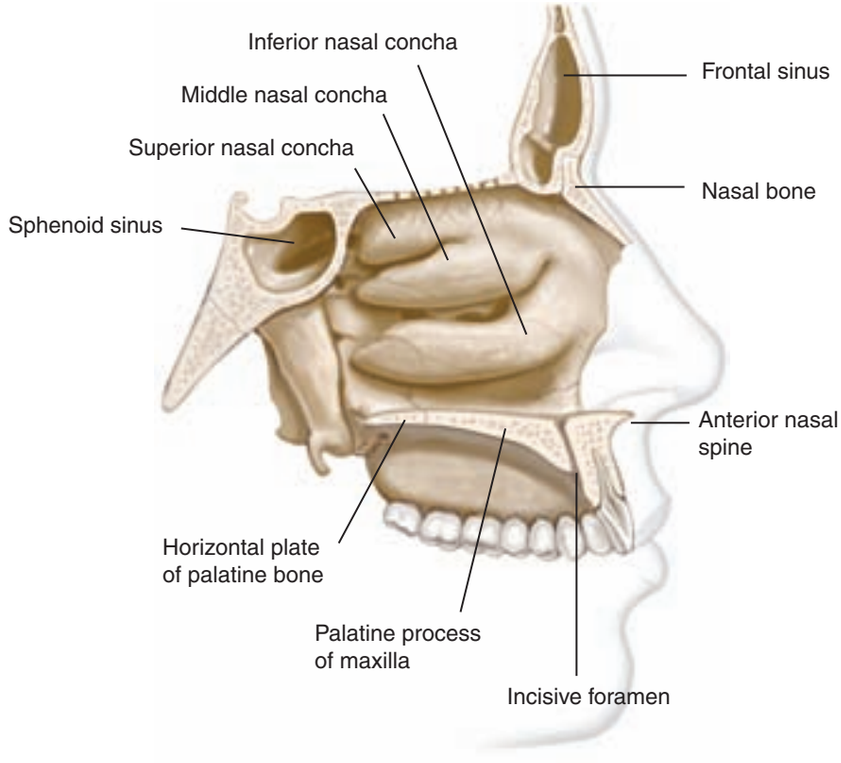

Figure 1-3. Internal topography of the lateral nasal cavity.