1. Anatomy

The external nose contains the right and left nostrils (or nares), each communicating with the nasal cavities via a slight dilatation just inside the nostril called the nasal vestibule. Bone from the frontal, maxillary and nasal bones supports the upper one-third of the external nose while cartilage supports the lower two-thirds.

Each nasal cavity extends posteriorly from just behind the nasal vestibule, through the opening called the anterior choana, to communicate with the nasopharynx via the posterior choana. They are separated by the nasal septum, which is composed of bone posteriorly and cartilage anteriorly. Each nasal cavity has a roof, a floor, a medial (or septal) wall and a lateral wall (Figure 12.1). The roof of the nose is closely related to the frontal sinuses, the anterior cranial fossa, the ethmoidal sinuses and the sphenoidal sinus. The floor of the nose is closely related to the anterior maxillary teeth and the vault of the palate, while the medial wall represents the nasal septum. The lateral wall of the nose is complex and bears three (occasionally four) horizontal projections called turbinates or conchae, the superior turbinate being the smallest and the inferior turbinate the largest. The passageway of the nasal cavity below and lateral to each of the turbinates is called the superior, middle and inferior meatus respectively; above and behind the superior turbinate

![Figure 12.1. Right lateral wall of nasal cavity.](image-url)
lies the sphenoethmoidal recess. The paranasal sinuses open onto the lateral wall of the nasal cavity, as does the nasolacrimal duct, so that disease affecting this region of the nose can obstruct the drainage of secretions and present as sinusitis.

Each nasal cavity is divided into functional areas, reflected in the nature of the epithelial lining. The nasal vestibule is lined by skin and contains many short hairs that help to filter particles from the inspired air. The olfactory area, concerned with the sense of smell, is restricted to the upper part of the nasal cavity and is centred on the cribriform plate of the ethmoid bone, the adjacent part of the nasal septum and the superior turbinate. The rest of the nasal cavity is lined by respiratory mucosa, the function of which is to warm and humidify the air and to trap particulate material. The complex architecture of the lateral wall of the nasal cavities facilitates this process by increasing the surface area and the turbulence of the airflow.

The paranasal sinuses are extensions of the nasal cavities and represent air-filled spaces in the skull bones lined by respiratory mucosa (Figure 12.2). They are usually absent or poorly developed at birth but enlarge most during the eruption of the permanent teeth and after puberty. They are located in the frontal, ethmoidal, sphenoidal and maxillary bones as paired structures about the midline but tend to be considered from a pathophysiological perspective into anterior and posterior groups. The anterior group comprises the frontal sinus, the anterior and middle ethmoidal sinuses and the maxillary sinus, all opening into the middle meatus, while the posterior ethmoidal sinuses and the sphenoidal sinus represent the posterior group and drain into the superior meatus and the sphenoethmoidal recess respectively. The nasolacrimal duct opens into the inferior meatus anteriorly.

The frontal sinuses lie between the outer and inner tables of the frontal bone and are closely related to the anterior cranial fossa. Disease in the frontal sinus is often associated with intracranial complications. The ethmoidal sinuses number between 3 and 18 and consist of a labyrinth

---

**Figure 12.2.** Ethmoidal sinuses and maxillary sinuses. Coronal view of nasal cavities at level of first molar tooth showing maxillary and ethmoidal sinuses.