

# SINUS ANATOMY

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## INTRODUCTION

The paranasal sinuses (“the sinuses”) are air-filled cavities located within the bones of the face and around the nasal cavity and eyes. Each sinus is named for the bone in which it is located:

- Maxillary sinus- one sinus located within the bone of each cheek (figures 1 and 2)
- Ethmoid sinus- located under the bone of the inside corner of each eye, although this is often shown as a single sinus in diagrams (figure 1), this is really a honeycomb-like structure of 6-12 small sinuses that is better appreciated on CT scan images through the face (figure 2).
- Frontal- one sinus per side, located within the bone of the forehead above the level of the eyes and nasal bridge (figures 1 and 3).
- Sphenoid- one sinus per side, located behind the ethmoid sinuses; the sphenoid is not seen in a head-on view but is better appreciated looking at a side view (figure 3).

## PHYSIOLOGY

The pink membranes lining the sinuses make mucus that is cleared out of the sinus cavities and drains into the nasal passage. The right and left nasal passages are separated in the middle by a vertical plate of cartilage and bone called the nasal septum (figures 1 and 2). The sidewall of each nasal passage is lined by three ridges of tissue, and each of these is called a turbinate or concha (figures 1, 2, and 3). Specifically they are designated as inferior, middle, or superior depending on whether one is referring to the lower, middle, or upper structure. (You can see Patient Education topic Nasal Anatomy to read more about this).

Most of the sinuses drain from underneath the middle turbinate, into a region called the osteomeatal complex (figure 2). When air flows through the nasal passage on each side, it streams through the crevices between the nasal septum and these turbinates. Both airflow and mucus ends up in a part of the throat called the nasopharynx (the very back of the nose, where it meets the rest of the mouth and throat). Air is then breathed into the windpipe and lungs, while the mucus is swallowed (figure 3).

## OTHER

Other interesting structures associated with the nasal and sinus tract:

- Tear duct (called the nasolacrimal duct): drains tears from the inside corner of the eye into the nasal cavity (figure 1).
- Eustachian tube: this is the tube responsible for clearing air pressure in the ears; it opens into the back of the sidewall of the nasopharynx (figure 3).
- Adenoids: this is a collection of tonsil-like tissue that is found at the top of the nasopharynx beyond the very back of the nasal cavity. Although it can be large in children, this tissue usually goes away during puberty, although sometimes it does not and is then, at times, surgically removed for various reasons. (figure 4.)

**FIGURES**

Figure 1: Head-on view of face.

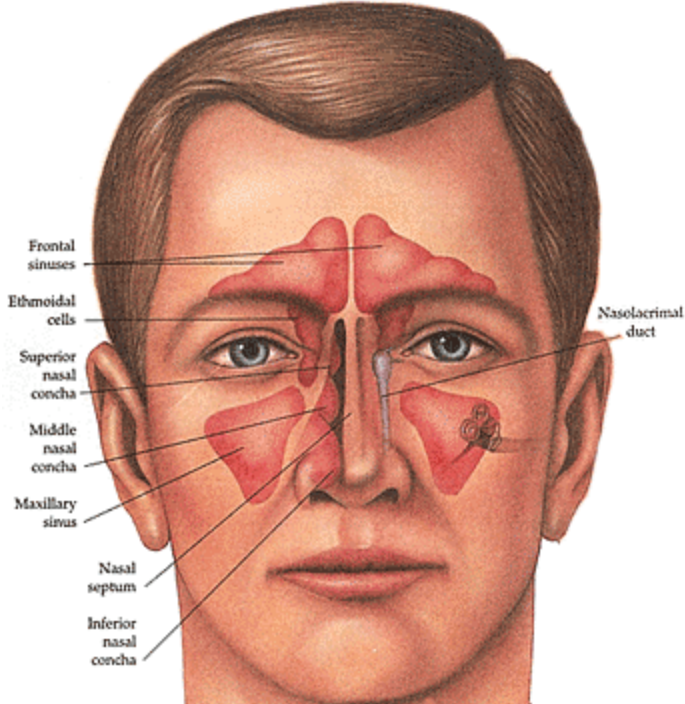


Figure 2: CT scan through the face at the level of the maxillary and ethmoid sinuses. Note how the ethmoids are really a honeycomb like structure of small sinuses. The nasal septum (S) and middle turbinates (T) are labeled. The shaded ovals represent the osteomeatal complexes.

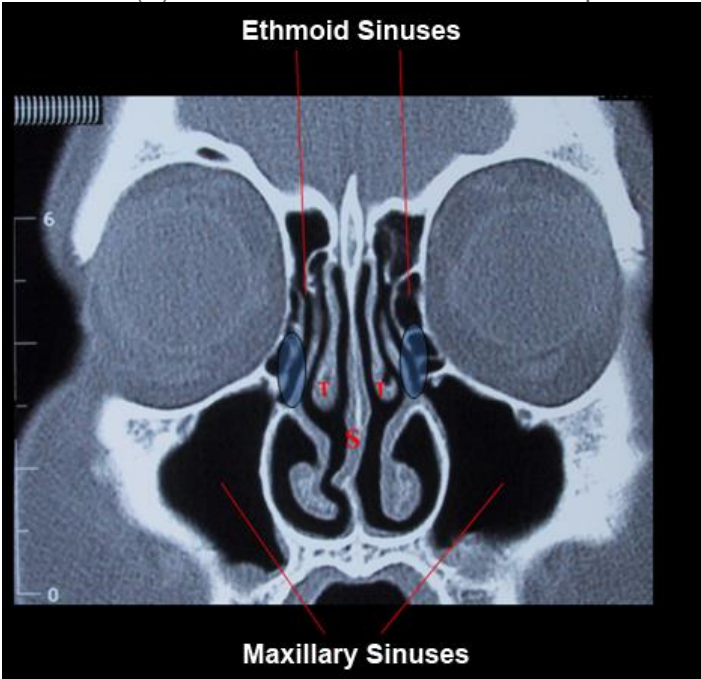
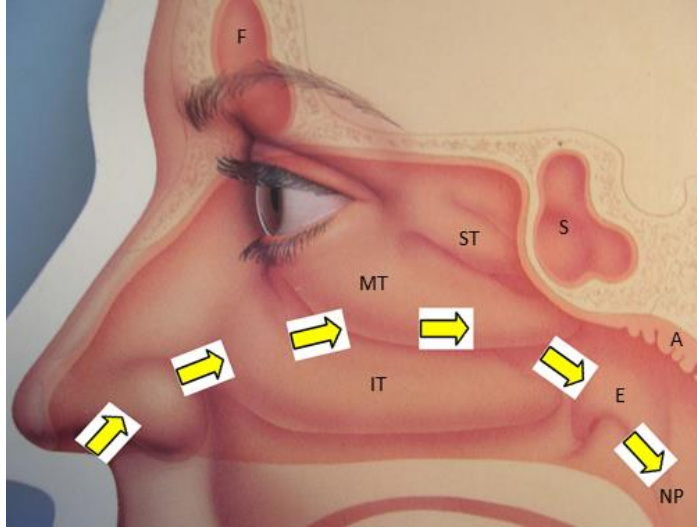


Figure 3: side view of face showing path of nasal airflow (arrows). Other important areas are labeled as indicated:



#### LEGEND

F – frontal sinus

S - sphenoid sinus

ST – superior turbinate

MT - middle turbinate

IT – inferior turbinate

E – eustachian tube opening

A – **Adenoid**

NP –nasopharynx



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