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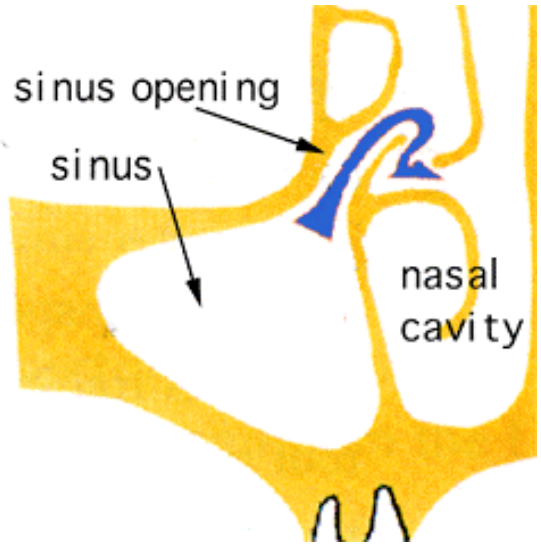
The Sinuses:

The sinuses are air filled spaces within the skull. There are four groups of sinuses:
1. Maxillary sinuses (**Cheek Sinuses**), a paired group located below the eyes and lateral to the nasal cavity.
2. Ethmoid sinuses (**In Between the Eyes, Honeycomb Sinuses**) numbering about 10-15 and arranged in a honeycomb pattern between the eyes.
3. Frontal sinus (**Forehead Sinus**), a large single or divided cavity above the eyebrows.
4. Sphenoid sinus (**Middle of Head Sinus**), a single or divided space located behind the nose, nearly in the center of the skull.

The sinuses are normally lined by a thin layer of tissue called mucosa. Glands within the mucosa produce a secretion called mucous. Mucous helps to moisten and clean the nose, and also helps in the sense of smell. The mucosa cells lining the sinuses have tiny hair-like structures called cilia that sweep the mucous to small openings in the sinus wall. Mucous lubricates our nose, upper and lower throat to help us swallow, speak, and breath. **"Post-Nasal Drip"** is normal when the consistency is naturally lubricating which causes it to be unnoticeable. When it changes concentration and consistency, then we feel it. Many disease processes or medications can cause this change.

Under normal circumstances the mucous produced in the sinuses is cleared in a self-cleaning process. However, if the natural openings between the sinuses and the nasal cavity are blocked, the mucous can accumulate in the sinuses. Anything that blocks the outflow of this mucous can



lead to sinus pressure, pain, and infections. The illustration above shows a schematic of this cleaning process. The sinus shown here is the maxillary sinus, and its opening is actually up high along the wall. The Large Arrow represents the path the mucous from the sinus takes as it passes into the nasal cavity.

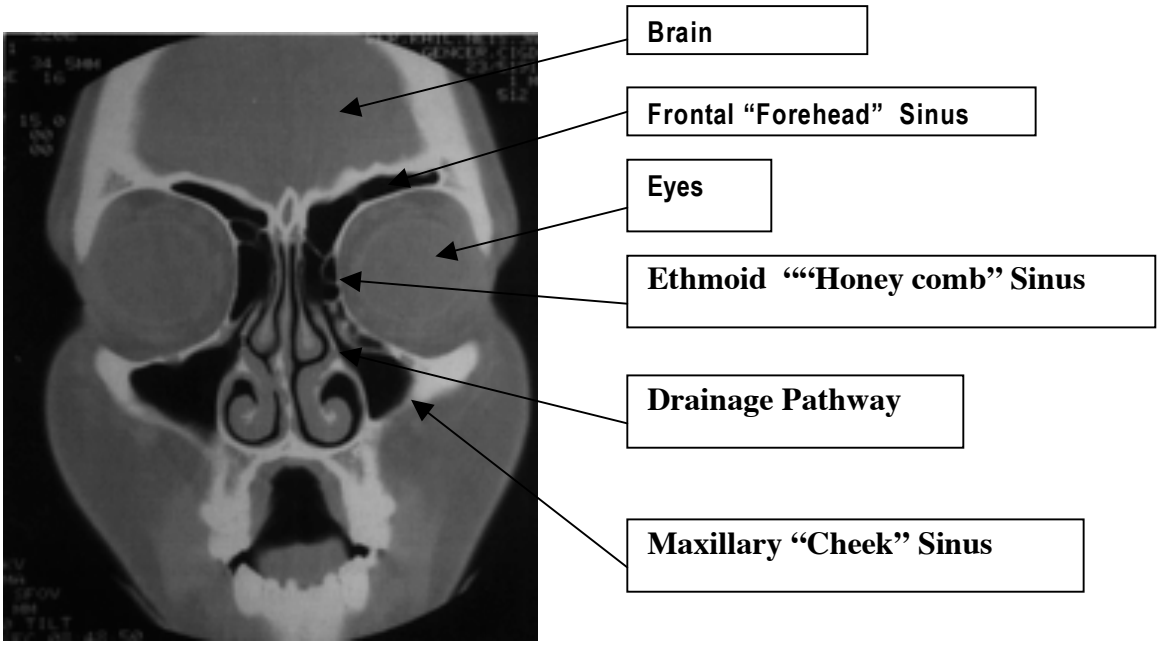
Once the mucous reaches the nasal cavity it is then swept back towards the back of the throat and swallowed. The average person actually produces two to four cups of mucous per day.

Diagnosis of Sinus Infections

Diagnosis of sinus infections (called sinusitis) is made based on the symptoms and the physical examination. Symptoms of a sinus infection include pain and pressure in the facial region or behind the eyes, fever, purulent nasal discharge with increased post-nasal drainage and nasal congestion. If the infection is quite severe it can lead to redness and swelling of the skin near the eyes. Headaches can of course be caused by many conditions other than sinusitis, so the challenge is to determine it they are due to some problem with the sinuses. Unfortunately, Nasal symptoms are generic in presentation with many different "Inflammatory Conditions" causing the same symptoms. Viral Infections, Allergic Disease and Environmental reactions can cause similar symptoms as an acute Bacterial Sinus Infection.

Physical examination is useful, but it is difficult to actually see into the sinuses in someone who has not had previous sinus surgery. In some cases one can actually see pus coming out of the sinuses, which confirms the diagnosis. Other findings which are typical for an acute sinus infection are swollen and red nasal cavity.

Since the sinuses are difficult to see, the physician may rely on x-rays to help make the diagnosis. The simplest x-ray is called a plain film and it shows some of the basic structures in the skull. However, to really get a good look at the sinuses it is often necessary to get an imaging study called a CT scan.



This picture shows a CT scan of normal sinuses. On this scan, the bone is white, and air shows up as black. In the healthy state the sinuses are filled with air, and therefore will be totally black. The sinuses are normally lined by a thin layer of tissue called mucosa. This mucosa should not be seen on the CT scan. With chronic sinusitis, there will be thickening on the mucosa and it will show up as an abnormal gray area on the walls of the sinuses.

Treatment of Sinus Infections

The first line of treatment for sinus infections is a combination of antibiotics and other medical measures. There are many antibiotics available which are active against different types of bacteria. In addition to antibiotics, oral decongestants (like pseudoephridine) are useful. Nasal decongestants like oxymetazoline (Afrin) may be effective for a short time, but should not be used for more than several days. (Long term use of oxymetazoline can produce what is called a "rebound" effect; after stopping the medication the nasal mucosa becomes even more swollen.) If there is a history of allergies, anti-histamines may be useful.
In addition to these medicines, it is often helpful to irrigate the nasal cavity with a saline solution. This helps to keep the nasal mucosa moist and cleans the nasal cavity. If sinus infections persist despite maximum medical treatment, surgery may be