

THE NOSE

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Because breathing is so important to speech and singing, it is helpful for voice care professionals and voice teachers to understand as much as possible about the respiratory system. Although voice literature has addressed commonly issues related to the lungs, chest, abdomen and back, relatively little attention has been paid to the nose. Good nasal function is important to all voice professionals and wind players (especially double reed players who use circular breathing); and this important structure should be understood not only by laryngologists, but also by speech-language pathologists, singing teachers, and voice trainers.

The nose is even more interesting than it appears from the outside. The skin of the nose is supported by a skeleton that is made partly of bone and partially of cartilage. The upper part of the nose is given its shape by two nasal bones which attach to extensions from the maxilla, the bone which forms the front of the face, between the eyes and the mouth. A bony divider called the septum separates the two halves of the nose in the middle and attaches to the floor of the nose, which is also the roof of the hard palate of the mouth. The lower half of the nose is made up of intricate cartilages which are responsible for its complex and individualized shape. There is also a cartilaginous septum which joins the bony septum and separates the two sides of the nose in front. Each side of the nose is divided into compartments by mucosa-covered, seashell-shaped bony structures called turbinates. These structures are responsible for warming, humidifying, and filtering the air we breathe so that 10 degrees Fahrenheit environmental air is close to 98.6 degrees by the time it enters the lungs. The nose receives blood from arteries that originate from the internal carotid artery which supplies blood to most of the face and the external carotid artery which provides blood to the brain. Toward the front of the nasal septum, several of these vessels come together. This region is called Kiesselbach's plexus, an area that is the most common source of nosebleeds.

The interesting anatomy of the nose predicts the types of problems that commonly afflict it. Bleeding is certainly one of them; and although it can be frightening, it is usually controlled easily. The medical term for nosebleed is epistaxis. Most common nosebleeds originate toward the front of the nasal septum in

the region of Kiesselbach's plexus. They are often caused by trauma, usually from a fingernail or a foreign body (especially in children); but other factors can predispose people to nosebleeds. Those include very dry air (often produced by forced-air heat, air conditioning, or air travel), health problems, and medications that affect blood clotting (including aspirin). Nosebleeds near the front of the nose and not associated with medical or drug-related problems often can be controlled easily with direct pressure. The thumb and forefinger should be placed against the entire bottom half of the nose, and firm pressure should be used to compress the fleshy sides of the nose firmly against the septum continuously for ten minutes. If done properly, this maneuver is really uncomfortable, and it takes a lot of discipline to wait-out the whole time. Once the bleeding stops, the person should refrain from nose blowing for at least twenty-four hours. If this first-aid measure doesn't make the bleeding cease, or if nosebleeds occur repeatedly, consultation with a physician, preferably an ear, nose, and throat specialist should be obtained. More serious problems can also cause nose bleeds, including various growths, some benign and some malignant.

Nosebleeds may also originate from the back of the nose. These are called posterior epistaxis and are apt to be associated with more significant blood loss. They may also be associated with other medical problems, including hypertension (high blood pressure). This type of bleeding usually requires medical treatment, sometimes even packing or surgery. Cautery or packing may also be necessary for severe, persistent nasal hemorrhages from the front portion of the nose.

Nasal obstruction is another common problem that results in difficulty breathing through one or both sides of the nose. Many things can cause this. The common term deviated septum means that the cartilaginous or bony septum, or both, isn't a straight partition in the middle of the nose as it should be. Rather, it may be displaced off to one side; or it may protrude into different levels of the nose on one or both sides. When a deviated nasal septum causes symptoms, it can be fixed surgically, usually under local anesthesia. An area called the nasal valve near the upper, inside front part of the nose is particularly important for air flow. If this region is compromised even just a bit, breathing becomes very

difficult. This can be demonstrated by gently squeezing the nose about  $\frac{1}{2}$  an inch back from the tip and about  $\frac{1}{2}$  an inch down from the dorsum or (straight portion) of the nose. The nose may also be obstructed by allergy which causes the linings of the nose to swell, obstructing the spaces designed for air flow.

Nasal fracture is another common problem. The nose is an easy target during fights and often gets in the way of baseball bats, elbows on basketball courts, soccer balls, hockey pucks, and other animate and inanimate objects. Most broken noses can be set easily with local anesthesia if they are examined promptly. To get optimal results in certain fractures, surgery may be required. This can be done immediately, but more often it's postponed for at least a few weeks until the bones are solid enough to permit readjustment in the operating room. Nasal fractures can be more serious. The top of the nose is the floor of the brain. If a blow is severe enough and angled in just the right direction, the nose can fracture through into the brain resulting in serious brain contusion or hemorrhage, but more often in leakage of a clear, watery discharge from the nose. This is CSF or cerebrospinal fluid, the fluid that surrounds the brain and spinal cord. A CSF leak is a potentially serious problem and requires prompt medical evaluation and treatment. Unfortunately, the nose is usually bleeding at the same time, and sometimes it's hard to recognize the cerebrospinal fluid leak until after the bleeding has stopped. However, persistent clear, watery discharge from the nose or into the throat which has a sweet or salty taste leads doctors to suspect this problem after trauma and to perform prompt evaluation and treatment.

Various growths can also arise in the nose. Benign polyps which are often associated with allergies and sometimes with asthma can form. In some cases, they shrink in response to medication; but sometimes, they require surgical removal. Other types of benign growths, as well as cancerous tumors, can make it difficult to breathe; and treatment is very successful in opening a nasal airway. Not all growths that obstruct nasal breathing occur in the nose itself. Tissue in the nasopharynx can also cause breathing problems. The nasopharynx is the area of the throat behind the nose and the very back portion of the roof of the mouth above the soft palate. That is where the adenoids are lymphoid tissue and are located.

They commonly cause nasal obstruction in children, but this usually regresses and are not troublesome in adults.

Nasal obstruction leads to mouth breathing, dental problems, snoring, runny noses, and often ear problems. There are also more serious growths that can occur in the back of the throat in which obstructed nasal breathing is the initial symptom.

Infections may also impair breathing. These are usually obvious because of a foul smell or taste, or nasal discharge which is green, yellow, or brown in color. These require treatment by a doctor, and often a culture and antibiotics. Other infections of the nose may not cause nasal obstruction: for example, sores in the hair follicles near the end of the nose. They tend to occur in people who pick their noses. These infections are really based in the follicles of the hair, and they are much more serious than they may appear. The triangular region surrounding the nose is called the danger zone, even in medical textbooks. Blood from this area drains into the angular vein which goes straight from the nose into the brain without passing through the heart and lungs and being purified first. People pick at infected areas in the nose because they are very uncomfortable, but they can induce serious, even life-threatening, infection in the cavernous sinus which is a major blood-containing structure inside the head. Infected hair follicles in this area should not be taken lightly, and treatment with antibiotics, warm soaks, and strict avoidance of manipulation is critical. It's best to choose an antibiotic that is effective against Staphylococcal infections.

Lots of people are unhappy with the appearance of their noses and inquire about having them altered. Surgery to change the cosmetic appearance of the nose is called a rhinoplasty (popularly known as a "nose job"). Rhinoplasties can often be performed under local anesthesia with sedation, and they can be combined with procedures to improve breathing. Rhinoplasties are commonly done by ear, nose, and throat doctors who specialize in cosmetic facial surgery or by general plastic surgeons. It is advisable to select a surgeon who has extensive rhinoplasty experience and training, because complications can occur. These complications may result in undesirable appearance and also impaired breathing ability.

However, such complications are uncommon in expert hands.

Among other things, the nose is used to help us smell and taste. We will not discuss taste and smell disorders at length, but it's worth mentioning that loss of the ability to smell should not be ignored. Sometimes it's easily correctable. However, it may be the first warning sign of a potentially serious medical problem that requires complete evaluation and treatment.

The nose is intimately related to the paranasal sinuses. The sinuses are air spaces in the bones of and around the face. Most so-called sinus problems as popularized in television commercials are actually allergies (or inhalant sensitivities). However, sinus infection does occur and usually is associated with persistent, infected discharge from the nose, facial pain, and occasionally headache over the eyebrows. However, headache is caused by sinus problems much less often than most people think. Acute sinusitis is treated with antibiotics and oral and topical decongestants. Over-the-counter decongestant nasal sprays should never be used for more than three days because of "rebound" swelling and long-term consequences of constriction of nasal blood vessels. When only one of the maxillary sinuses in the front of the face is affected, a dental cause such as a tooth abscess should be sought. Chronic sinusitis is treated with longer courses of antibiotics, decongestants, and sometimes steroids. It may ultimately require surgical treatment. Sinus surgery used to require incisions through the face or under the upper lip and extensive, open operations. However, the recent development of functional endoscopic sinus surgery (FESS) has changed all that. In most cases, sinus surgery can be performed through tiny scopes inserted through the nose, often under local anesthesia and sedating medication, so the surgery is much less traumatic. Because of the success rate and minimal trauma associated with endoscopic sinus surgery, safe and effective surgical treatment for chronic sinus problems is now available to people who would not have been surgical candidates before.

Like noses, sinuses can also be fractured. Usually this requires a great deal of force and happens at the same time as other facial fractures. In addition to the maxillary sinuses in the face, there are ethmoid

sinuses that run back along the upper inside of the nose, frontal sinuses above the eye, and a sphenoid sinus almost in the center of the head. Any of these can be damaged by trauma or involved in infection. True sinus problems can lead to more serious medical conditions by spreading to adjacent areas. The regions right next to the sinuses include, among other things, the eyes, the brain, and major blood vessels. So, sinus problems should neither be underestimated nor ignored, and they should be treated by a physician with experience and specialized training when they do not respond promptly to the initial medical regimen.

Who should a patient see for treatment of problems involving the nose and sinuses? Ear, nose, and throat specialists, or otolaryngologists, are doctors who receive five or more years of training after medical school in treatment of nose and paranasal sinus disorders, as well as other problems of the ear and throat. When an ear, nose, and throat doctor is consulted for such problems, he or she will look in a patient's nose using a nasal speculum and a small mirror with a bright, reflected light or with a magnified endoscope with a built-in light. This is not painful and is made even more comfortable if the inside of the nose is anesthetized with a medication sprayed or painted over the nasal membranes. The medication also opens up the nasal passages, making it easier to see the structures well. Some of the sinuses can also be examined directly using a small lighted instrument. However, thorough evaluation of sinus problems usually involves some form of imaging study such as a CAT scan. Fortunately, most sinus conditions are benign, but like nasal disease, sinus symptoms should not be ignored. Serious problems such as fungal infections and even cancers can occur in the sinuses; and the sooner they are diagnosed, the more easily and safely they can be treated and generally cured.