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Many of you watching this may have had an appointment with us already, and you would like to learn a little bit more about some of the vocabulary that we use, some of the anatomy.First of all, I think it's important to talk about normal function of the nasal airway.Your nose has three basic functions:1. Smell and taste2. Filter and clean3. Condition the nasal airflowWhen you move air across the upper part of the nose where my finger is pointing, you will expose the airflow to the nerve that can sense smell; the nerve is called the olfactory nerve. You can see the small, little tunnels or perforations through which that nerve will move. There are so many people who cannot smell very well, and therefore, their sense of taste is also dramatically diminished. Having normal nasal function will provide you with maximum an ideal sense of smell.As air moves across the sinuses and, basically, to the outside portion of a structure called a middle turbinate so we say, lateral to the middle turbinate air will move across the openings of various sinuses where secretions are created, and as it moves through, it'll bounce off of several mucosal surfaces. This will enable the nose to through its stickiness attract any particulate matter, and that particulate matter will be filtered out of the air. Particulate matter may include smoke, viral particles, fungus bacteria, or any other pathogen that could be floating in the air.So one very important concept is that there should be some resistance when air moves through your nose because that's the filtration process occurring. The secret is to not have too much resistance where you're unable to breathe through your nose at all. If that were to occur, then you get no filtration whatsoever.By the time the air has reached the posterior or the back part of your nasal airway, it will have been conditioned. And this is different from filtering out particulate matter. Conditioning involves moistening the air as additional humidity is created and to warm the air, typically. In rare occasions, it may actually cool the air. But basically, you want to prepare the air to go into your lungs, and it's going to be maximally moistened and warmed.So the first clinical concept is, what we refer to at the Modern Nose Clinic, a term called physiologic nasal airflow. We believe the air should follow a pattern as it moves through the nasal airway to maximally achieve the above three functions. The corollary to this is that any anatomic problem in your nose will prevent the nose from moving air through efficiently. From 100% to something less than that. For instance, if you breathe exclusively or mostly through your mouth, then you will be using zero percent of your nasal functions. If you undergo a traditional nasal surgery in the operating room where the inferior turbinate is dramatically reduced in size, this could channel airflow along the floor of the nose and remove the upper 90% from performing its normal functions. This would lead to less than 10% efficiency of the nose. This also could predispose you to a condition called empty nose syndrome. Feel free to see my video on empty nose syndrome for additional information.So let's pause and make our first summary point. At the Modern Nose Clinic, our procedures will provide you with physiologic nasal airflow. The next few discussion points focuses on what other ear nose and throat clinics will do and should be avoided.Traditional nasal surgery will involve reducing the size of the inferior turbinate, which has been demarcated here with several small lines. The problem with doing that is that air will then be channeled along the path of least resistance, which will be the floor of the nasal airway. Unfortunately, patients will recover from this surgery initially excited that they can breathe without any nasal resistance at all. The problem is that you should have some resistance. As we mentioned earlier, there is supposed to be a filtration function occurring, and when air moves along the floor of the nose and does not utilize the upper 90%, you have basically rendered your nose crippled. And therefore, this practice should be avoided or only undertaken with extreme caution.If 90% of your airflow moves along the floor of the nose, then you never have the opportunity to move the air across the olfactory nerve, and your sense of smell will be diminished. This may not be immediately obvious to you, but your sense of smell and taste could have been better had you undergone a more elegant or delicate surgery. You basically have created a second mouth because the mouth does not have the ability to filter out air as the nose does, and the air will move from the front of the nose to the back without any humidity, without any conditioning, and with very minimal filtration.So that's physiologic nasal airflow, and the three important functions of the nose. It's important to start with this so that the rest the anatomy will make more sense. See ya.Thank you from the Modern Nose ClinicThe nose is the gateway to the respiratory system. It plays a vital role in our sense of smell, making it a key part of the olfactory system. Its structure is shaped by the nasal bones and cartilage, including the nasal septum, which separates the nostrils and divides the nasal cavity into two distinct chambers. This intricate nose anatomy supports two essential functions: breathing and detecting odors.The nose has both external and internal components. The external nose, aside from its aesthetic importance, protects the internal structures and allows air to enter. The internal part, known as the nasal cavity, plays a multifaceted role in respiration, olfaction, speech, and even taste perception. This dual-purpose organ is an incredible example of how our body combines form and function.This page explores the anatomy of the nose, with the structure of the nasal cavity, highlighting its unique features and their importance in functions like breathing, filtration, and smell.The nose plays a vital role in breathing.The nasal cavity and nearby sinuses are lined with nasal mucosa, which warms and moistens inhaled air.Shell-like bones called nasal conchae assist in the air-warming process.Tiny hairs in the nostrils trap large particles, preventing them from entering the lungs.The nose triggers sneezing to expel irritating particles.The sense of smell (olfaction) is controlled by smell-detecting cells in the upper nasal cavity.The nose aids speech production, particularly nasal vowels and consonants, by directing airflow.Sinuses act as echo chambers, amplifying sounds during speech.A. Skeletal FrameworkBones:Nasal BonesFrontal Process of MaxillaNasal Part of Frontal BoneCartilages:Septal CartilageLateral Nasal CartilageMajor Alar CartilageMinor Alar CartilageVomeronasal CartilageB. External OpeningsC. Skin and Soft TissueD. MusclesProcerusNasalisDepressor Septi NasiLevator Labii Superioris Alaeque NasiA. Nasal SeptumMaxillary bone(the Crest)Perpendicular plate of ethmoid boneSeptal nasal cartilage(ie, quandrangular cartilage)Vomer boneB. Roof BonesCribriform Plate of Ethmoid BoneSphenoid BoneC. FloorPalatine Process of MaxillaHorizontal Plate of the Palatine BoneD. Lateral WallConchae (Turbinates)Superior ConchaMiddle ConchaInferior ConchaMeatusesSuperior MeatusMiddle MeatusInferior MeatusE. Nasal VestibuleF. Respiratory RegionFrontal SinusesMaxillary SinusesEthmoidal SinusesSphenoidal SinusesArteries:External Carotid Artery:Facial ArteryMaxillary ArteryInternal Carotid Artery:Sensory:Ophthalmic Nerve (V1)Maxillary Nerve (V2)Olfactory Nerve (Cranial Nerve I):Autonomic Nerves:SympatheticParasympatheticAnterior Nasal CavityPosterior Nasal CavityThe external nose is a noticeable feature on the face that leads to the nasal cavity. It helps us breathe and smell and adds to our facial appearance. This article looks at the structure of the external nose anatomy, focusing on its bones and the muscles connected to it.The external nose is a structure supported by both bones and cartilage:It is located in the upper part of the nose. This framework consists of the nasal bones, parts of the maxillae, and the frontal bone.The nasal bone is a small, flat bone that forms part of the facial skeleton. Along with other bones like the zygomatic, maxilla, palatine, lacrimal, vomer, inferior nasal conchae, and mandible, it helps shape the face.The nasal bones are paired and lie on either side of the midline, between the frontal processes of the maxilla. These rectangular bones have two surfaces (external and internal) and four borders.Together, they form the bridge of the nose at the top. At the same time, their lower edges connect to the nasal cartilage, shaping the upper boundary of the nasal cavity.External Surface: It is slightly curved outward and covered by small muscles like the procerus and nasalis.Internal Surface: It is curved inward with a groove for the anterior ethmoidal nerve.The nasal bones join with nearby bones through various connections:Top Border: Joins the frontal bone at the frontonasal suture.Sides: Connect to the maxilla at the nasomaxillary suture.Bottom Border: Attaches to the lateral cartilage of the nose.Inner Edge: Links the two nasal bones at the internasal suture and extends backward to contribute to the nasal septum.The nasal bones support the structure of the nose, form the upper part of the nasal opening, and protect the nasal cavity from injury.The frontal process of the maxilla is a slender, upward extension located on the front upper part of the maxilla. It connects seamlessly with the maxillas main body below and serves several structural and functional roles:It forms the anterior lacrimal crest and the ethmoidal crest.It plays a key role in shaping the lateral wall of the nasal cavity.Anteriorly: Joins the nasal bones lateral edge, forming the nasomaxillary suture.Superiorly: Meets the frontal bones nasal margin, creating the front maxillary suture.Posteriorly: Connects with the lacrimal bone, contributing to the lacrimomaxillary suture.Medially: Interfaces with the middle nasal concha of the ethmoid bone.This structure integrates with neighboring bones to support and stabilize the nasal and orbital regions, underscoring its importance in facial anatomy.The nasal part of the frontal bone is a small section located toward the lower middle region. It connects:Laterally, with the orbital parts.Superiorly with the squamous part.This structure includes the nasal spine and nasal notch of the frontal bone. It plays a key role in shaping the root of the nose, the bony nasal septum, and the roof of the nasal cavities.The nasal part forms important joints with neighboring bones:Inferomedially: It connects with the upper edges of the right and left nasal bones to form the frontonasal suture.Inferolaterally: It joins the frontal processes of the right and left maxillae, creating the front maxillary sutures.Posteroinferiorly: It articulates with the upper portion of the ethmoid bone, forming the frontoethmoidal suture.These connections contribute to the stability and framework of the nasal region.Five distinct cartilages play a crucial role in supporting and shaping this area. It is found in the lower portion, and it includes two lateral cartilages, two alar cartilages, and one septal cartilage. Additionally, smaller alar cartilages provide further support.The septal nasal cartilage is a thin, quadrilateral structure of hyaline cartilage that divides the nasal cavity into two separate chambers.It is positioned between the perpendicular plate of the ethmoid bone and the vomer bone, encased by a protective mucous membrane. The upper edge of this cartilage connects to the nasal bones. In contrast, its lower edge joins to the alar cartilage through fibrous tissue.This division into two nasal cavities helps streamline airflow. It creates turbulence in the narrow passages, which enhances the efficiency of air movement in both directions.Additionally, the septal nasal cartilage is crucial in shaping and aligning the nose, serving as its central structural support.The lateral nasal cartilage is a wing-shaped structure that extends outward from the septal nasal cartilage. It sits just below the nasal bones and above the major alar cartilage, with a small gap between them.These cartilages work together, with the lateral nasal cartilage and major alar cartilage curving to form a sturdy connection supported by fibrous tissue.It is made of strong yet flexible hyaline cartilage (the same type as the septal nasal cartilage). The lateral nasal cartilage connects to the septum at its upper part.This connection helps maintain the structure of the nasal cavities. If the cartilage weakens or collapses, it can obstruct the inner nasal valve, reducing airflow and making it harder to breathe.The major alar cartilage is located on either side of the nasal tip. It plays a vital role in shaping the nose and supporting airflow. These thin, hyaline cartilage structures are connected to the lateral nasal cartilage by fibrous tissue. They are folded into two distinct parts: the medial crus and the lateral crus.The medial crus forms the inner section and aligns perpendicularly with the septal nasal cartilage.The lateral crus constitutes the outer portion, shaping the ala (the flared portion) of the nose.Together, the medial and lateral crus create an oval-shaped tip at each nostril.At the center of the nasal tip, the two sides of the major alar cartilages meet, forming a small notch called the apex of the nose. These cartilages also help form the walls of the nostrils/nares, ensuring they remain open.This structural support facilitates efficient airflow through the nasal passages, optimizing respiration by guiding air to the nasal valve.The minor alar cartilages are small, flexible pieces of hyaline cartilage. They are usually three to four on each side of the nose. They sit between the lateral nasal cartilage and the major alar cartilage, forming part of the nostrils outer edges (the ala).Also known as accessory cartilage, these tiny structures support and shape the nostril base. Together with the major alar cartilage, they help keep the nostrils stable and functional, maintaining their proper shape and appearance.The vomeronasal cartilage is a thin piece of hyaline cartilage that joins the vomer bone with the septal nasal cartilage. It is associated with the vomeronasal organ, a component of the accessory olfactory system that detects certain chemical signals.This organ helps detect scents and has a lining similar to the main smelling area in the nose. The vomeronasal cartilage provides structural support, contributing to the stability and function of the nose.The external openings or nostrils, also called anterior nasal apertures, are the two pear-shaped openings at the base of the nose.They serve as the entry points for air into the nasal cavity, playing a vital role in breathing and filtering particles from the air before it reaches the lungs.A nostril is one of the two openings in the nose that allow air and other gases to flow in and out of the nasal passages. In humans, the nostrils take turns becoming slightly swollen and then shrinking in a natural process called the nasal cycle.A wall of tissue separates the nostrils called the septum. If the septum is not straight, it can make one nostril appear larger than the other. In severe cases, damage to the septum can cause the nostrils to merge into a single opening.Humans, like many other land-dwelling animals, have two external nostrils (at the front of the nose) and two internal nostrils (located at the back of the nasal cavity). These internal nostrils, also called choanae, connect the nose to the throat, making breathing possible.Each nostril contains about 1,000 tiny hairs that trap dust, pollen, and other particles to keep the airways clean.Interestingly, the brain can process different smells from each nostril, similar to how the eyes process different images, which can lead to a unique smell rivalry experience.The skin on the nose changes in thickness along its length. At the top, near the glabella (between the eyebrows) and down to the nasofrontal angle (where the nose starts to slope), the skin is thick, flexible, and mobile.As it reaches the bridge of the nose, the skin becomes thinner and less flexible because it is close to the underlying bone. From the bridge to the tip of the nose, the skin remains thin. At the tip, however, the skin thickens again and contains many large oil-producing glands.Beneath the skin, four layers are separating it from the bones and cartilage. These layers include:A superficial fatty layer.A fibromuscular layer connects to the facial muscles.A deeper fatty layer.The periosteum is a layer covering the bones.Some soft tissue areas of the nose lack cartilage support. These include regions near the sides of the septum (paraseptal area), around the lateral cartilages, the top of the nostrils, and the alae (the sides of the nostrils).The muscles of the nose are part of the facial muscle group and play a role in breathing and facial expressions.These muscles include the procerus, nasalis, depressor septi nasi, levator labii superioris alaeque nasi, and a portion of the orbicularis oris (which is mainly a muscle of the mouth). Like all facial muscles, the nose muscles are controlled by the facial nerve and its branches.Each muscle works independently and is interconnected through a layer of tissue called the superficial muscular aponeurotic system (SMAS). This system extends from the upper part of the nose (nasofrontal area) to the tip of the nose.At the nasal valve, the SMAS divides into two layers: a superficial layer and a deeper layer, with each layer further dividing into medial (center) and lateral (side) components. This connection allows the muscles to work together efficiently.The procerus muscle, located over the bridge of the nose, plays a key role in creating wrinkles in this area. It becomes active during expressions of concentration or frowning.The nasalis muscle is composed of two distinct sections: the transverse compressor naris and the alar dilator naris.The compressor naris is responsible for narrowing and, in some cases, completely closing the nostrils.The dilator naris includes the larger posterior and smaller anterior portions and functions to flare the nostrils.This action enhances airflow and contributes to shaping the upper ridge of the philtrum. Additionally, the dilator naris supports the nasal valves, playing a structural role in maintaining their form and function.The depressor septi nasi muscle plays a key role in nasal function. Its primary job is to pull the nasal septum, columella, and nose tip downward.At the start of inhalation, this muscle contracts to stabilize the nasal septum. It works alongside the dilator naris muscle to expand the nostrils, making breathing easier.The levator labii superioris alaeque nasi muscle splits into two parts: a medial part and a lateral part.The medial part connects to the cartilage of the nose (major alar cartilage) and the skin above it.The lateral part merges with the muscles of the upper lip, specifically the levator labii superioris and the orbicularis oris.The lateral part helps lift the upper lip and makes the curve above the nasolabial fold more pronounced. The medial part pulls the side of the nostrils upward, changes the curve near the nostrils, and helps widen them.The internal nose anatomy consists of the nasal septum, turbinates, paranasal sinuses, and other supportive parts. These work together to clean and humidify the air, adjust its temperature, and produce mucus to catch dust, allergens, and germs.This system ensures that the air reaching the lungs is clean, moist, and warm, helping you breathe easily and keeping your respiratory system safe.The nasal septum is a thin wall inside the nose that separates the nasal cavity into left and right sides, creating two nostrils.At the front, the visible part called the columella nasi, is made of soft tissue and cartilage. The septum itself is about 2 mm thick and is built from a mix of bone and cartilage.The nasal septum has four main parts: the Maxillary crest, the Perpendicular plate of the ethmoid bone, the Septal cartilage, and the Vomer bone.At the bottom, the maxillary crest connects the septum to the maxilla (upper jawbone) and the palatine bones. This connection helps secure the septal cartilage at the front and the vomer bone at the back, giving the nasal septum its stability and structure.The maxilla, or upper jawbone, is a key structure of the facial skeleton (viscerocranium). It contributes to the formation of the eye socket (orbit), nasal cavity, and palate while also anchoring the upper teeth. This bone is essential for chewing, speaking, and facial support.The maxilla has a central body and four bony extensions called processes: frontal, zygomatic, palatine, and alveolar.It connects with multiple skull bones and fuses with its counterpart on the opposite side through the intermaxillary suture, ensuring facial symmetry and stability.The perpendicular plate of the ethmoid bone is also called the vertical plate. It is a thin, flat structure with a polygon-like shape. It extends downward from the cribriform plate and helps form the nasal septum, which divides the nose into two sides. This plate is often slightly curved to one side.At the front, the perpendicular plate connects to the spine of the frontal bone and the crest of the nasal bones.At the back, it has two parts: the upper part joins the sphenoidal crest, while the lower part connects to the vomer bone.The bottom edge is thicker than the back edge and supports the septal nasal cartilage, a key part of the noses structure.Most of the plates surface is smooth, but near the top, there are small grooves and canals. These connect to tiny openings in the cribriform plate and carry small branches of the olfactory nerves, which are crucial for the sense of smell.The septal nasal cartilage, also known as the cartilage of the septum or quadrangular cartilage, is made of hyaline cartilage. It is shaped like a broad quadrilateral, thicker at the edges than its center. It also helps separate the nasal cavities at the front.The anterior margin, which is thickest near the top, connects to the nasal bones and merges with the front edges of the lateral nasal cartilages. Its lower part attaches to the medial crura of the major alar cartilage through fibrous tissue.The posterior edge of this cartilage links to the perpendicular plate of the ethmoid bone. In contrast, the lower edge connects to the vomer bone and the palatine processes of the maxilla.The vomer is a single, unpaired facial bone situated along the midline of the skull. It plays a key role in forming the lower portion of the nasal septum, while the perpendicular plate of the ethmoid bone shapes the upper part.This bone has a thin, somewhat rectangular structure and features two surfaces and four distinct edges. Its surfaces are etched with fine grooves that accommodate blood vessels.A notable feature on each surface is the nasopalatine groove, which slants downward and forward, providing a pathway for the nasopalatine nerve and associated blood vessels.The vomer also connects to several other skull bones, including the sphenoid, ethmoid, left and right palatine bones, and the left and right maxillae.This arrangement highlights its structural importance in stabilizing the nasal septum and facilitating proper airflow within the nasal cavity.The ethmoid bone and the maxilla are the primary bones that create the roof of the nasal cavity.The cribriform plate, also known as the horizontal lamina, is a delicate, spongy structure forming part of the ethmoid bone.It plays a crucial role in supporting the olfactory bulb and is perforated with numerous small openings called olfactory foramina. These foramina allow the olfactory nerves to pass through, connecting the nasal cavity to the brain for the perception of smell.The anterior edge of the cribriform plate is short, thick, and articulates with the frontal bone. Two small wing-like projections, or alae, extend from its front, fitting into depressions in the frontal bone to complete the foramen cecum.The sides of the cribriform plate are typically smooth, though they may bulge slightly due to the presence of a small air sinus within.At its medial groove, the foramina enables nerve pathways to the upper portion of the nasal septum. In contrast, the foramina, along its lateral regions, transmits nerves to the superior nasal concha. It ensures the functional connection of the olfactory system with different parts of the nasal cavity.The sphenoid bone is among the most intricate structures in the human body. Its unique shape has earned it the nickname wasp bone. It is positioned at the center of the skulls base. It forms a significant part of the floor of the middle cranial fossa.This bone plays a critical role in supporting and protecting vital soft tissues, including cranial nerves and portions of the brain. It is perforated by various openings, known as foramina and canals.It acts as a pathway for blood vessels and nerves to pass between the brain and other parts of the body. The sphenoid bones strategic position and structural complexity make it essential for the proper functioning of the nervous and vascular systems.The palatine process of the maxilla is a sturdy, flat bone that extends horizontally from the inner side of the maxilla. It joins with its counterpart on the opposite side at the median palatine suture, which forms a raised ridge known as the nasal crest. This crest supports the lower edge of the vomer bone.Along with the horizontal plate of the palatine bone and the palatine process of the incisive bone, it creates the hard palate. It is a vital structure separating the nasal cavity from the oral cavity.Additionally, it forms the nasal cavity floor, playing a crucial role in dividing these two spaces. As the largest component of the bony palate, it is essential for both breathing and chewing functions.The horizontal part of the palatine bone is a flat, rectangular structure with two main surfaces and four edges:Nasal Surface (Top Side): This surface is slightly curved inward and forms the back section of the nasal cavity floor.Palatine Surface (Bottom Side): It makes up the back quarter of the hard palate. It has a slightly rough and concave texture. At its back edge, there may be a small ridge where the Tensor veli palatini muscle attaches.Front Edge: It is rough and notched to connect with the palatine process of the maxilla.Back Edge: It is curved and free, supporting the soft palate. At its inner end, there is a small sharp projection called the posterior nasal spine, which anchors the Musculus uvul.Side Edge: It is joined to the lower edge of the perpendicular part of the bone and has a groove for the pterygopalatine canal.Inner Edge: It is thick and serrated for joining with the matching bone on the other side. When paired, their raised edges form a nasal crest, which supports the vomer bone.The nasal cavity contains three types of nasal conchae, which are curved bony structures essential for conditioning the air we breathe:Inferior Nasal Concha: The largest and most prominent of the conchae. This structure is a standalone bone covered by a mucous membrane rich in blood vessels. Its primary role is to humidify and cleanse incoming air, preparing it for smooth passage to the nasopharynx.Middle Nasal Concha: It is situated between the inferior and superior conchae. This part of the ethmoid bone is designed to trap airborne particles and enhance air humidification.Superior Nasal Concha: The smallest concha lies above the middle concha, just beneath the sphenoethmoidal recess. Also a component of the ethmoid bone, it plays a crucial role in filtering and humidifying the air.Together, these structures ensure that the air entering the respiratory system is clean, moist, and suitable for the delicate tissues of the lungs.The nasal meatuses are three passageways inside the nasal cavity that help direct airflow and drainage. These include the superior, middle, and inferior meatuses, each located beneath a corresponding nasal concha.The superior meatus is the smallest and sits just below the superior nasal concha. Though short and narrow, it plays an important role in nasal function.At the back, it connects to the sphenopalatine foramen, an opening that links the nasal cavity to deeper structures. It also serves as the drainage site for the posterior ethmoidal air cells, small air-filled spaces within the ethmoid bone.The middle meatus is larger and positioned beneath the middle nasal concha. The hiatus semilunaris has a distinctive curved groove running along its surface.This groove is framed by two key structures: the uncinate process below and the bulla ethmoidal above. The bulla ethmoidal is a rounded elevation containing the middle ethmoidal air cells, which drain into this region.This meatus also serves as a major drainage pathway for the frontal sinus, maxillary sinus, and anterior ethmoidal air cells, making it vital for sinus ventilation.The inferior meatus is the largest and extends along the lower part of the nasal cavity, positioned beneath the inferior nasal concha. Unlike the others, it is primarily involved in tear drainage rather than sinus ventilation.The nasolacrimal duct, which carries tears from the eyes, opens into the front part of this meatus, allowing excess fluid to drain into the nasal cavity.Each meatus has a unique role in respiration, drainage, and overall nasal function, contributing to efficient airflow and sinus health.The nasal vestibule is the frontmost part of the nasal cavity and is visible from the outside. It is mostly surrounded by the soft tissue of the nose and shaped by cartilage.The greater and lesser alar cartilages support the sides, while the flexible nasal septum forms the middle part. The upper limit is marked by a ridge called the limen nasi, and the back extends to the skin over the upper jawbone. The bottom opening is the nostril.The inner surface of the nasal vestibule is covered with a tough, protective layer of skin called keratinized stratified squamous epithelium. It is different from the deeper nasal cavity, which has a special lining called respiratory epithelium.Inside the vestibule, there are small hairs called vibrissae. These help trap dust and tiny particles from the air before it enters the lungs.The air is further checked for smells by the olfactory bulb, which contains sensory cells located in the upper part of the nasal cavity.The respiratory region is the largest part of the nasal cavity. It plays a vital role in conditioning the air we breathe. It ensures that incoming air is warm, moist, and clean before it reaches the lungs. This region is lined with specialized tissue that traps harmful particles and produces mucus to keep the respiratory tract clear.Air Warming: As air passes through, blood vessels in the nasal lining transfer heat, bringing the air to body temperature.Humidity Control: Moisture from mucus and underlying tissues saturates the air, preventing dryness in the lungs.Air Filtration: Tiny hair-like structures (cilia) and sticky mucus capture dust, germs, and allergens, preventing them from entering the respiratory system.Mucus Production: Goblet cells within the respiratory lining continuously produce mucus, which traps contaminants and keeps the nasal passages moist.Mucus Clearance: Cilia in the respiratory epithelium move mucus toward the throat, where it is swallowed or expelled, keeping the airway clean.The paranasal sinuses are hollow, air-filled spaces around the nose. They help make the skull lighter and warm, moisten the air we breathe, and improve the sound of our voice.These sinuses are found in both the braincase (neurocranium) and the facial bones (viscerocranium). Three skull bones contain sinuses:Frontal bone positioned above the eyes, forming the forehead.Ethmoid bone a complex structure between the eyes, containing multiple small air cells.Sphenoid bone located deep within the skull, behind the nasal cavity.The maxilla, the largest facial bone, also has sinuses, making it the only face bone with this feature.Each pair of sinuses is named after the bone they are in, creating four groups: frontal, ethmoid, sphenoid, and maxillary sinuses. These sinuses play an important role in breathing, voice quality, and keeping the head balanced.The frontal sinuses are two air-filled spaces in the frontal bone of the skull. They are located above the eyebrows and behind the upper part of the nose. They are the highest of the paranasal sinuses and help lighten the skull while also producing mucus to keep the nose moist.These sinuses drain through a small passage called the frontonasal duct, which connects to the ethmoidal infundibulum. From there, mucus flows into the middle part of the nasal cavity through an opening called the semilunar hiatus.Interestingly, these sinuses are not fully developed in young children and usually become noticeable after the age of 7.Nerve signals from the frontal sinuses travel through the supraorbital nerve, which is a branch of the ophthalmic nerve (CN V1). Blood supply comes from the anterior ethmoidal artery, a branch of the ophthalmic artery.The maxillary sinuses are the largest air-filled spaces in the face. It is located in the upper jaw (maxilla) on both sides of the nose. They help make the skull lighter and play a role in how our voice sounds.These sinuses drain mucus through small openings called maxillary ostia, which connect to the middle part of the nasal cavity. Like the frontal sinuses, they drain through a curved groove in the nasal wall called the semilunar hiatus.The maxillary sinuses receive nerve signals through branches of the maxillary nerve (CN V2), specifically the anterior, middle, and posterior superior alveolar nerves.Blood supply comes from the superior alveolar branches of the maxillary artery, providing oxygen and nutrients to the sinus tissues.The ethmoid sinuses, also called ethmoid air cells, are one of four pairs of paranasal sinuses in the human skull. Unlike other sinuses, which have one or two large hollow spaces, the ethmoid sinuses consist of multiple small, air-filled compartments.These tiny chambers are embedded within the ethmoid bone, a delicate structure located between the eyes and behind the nasal bridge. Their number and size can vary from person to person.These sinuses are grouped into three sections: anterior (front), middle, and posterior (back). Each section drains into different parts of the nasal cavity, with all eventually connecting to either the superior or middle nasal meatus.Their primary role is to filter, warm, and humidify inhaled air while also contributing to the overall structure and function of the nasal passages.The sphenoidal sinuses are air-filled spaces within the sphenoid bone. It is positioned behind the nasal cavity. Their size and shape can vary, sometimes extending into the bones wings.Unlike other paired sinuses, they are asymmetrical due to an irregular bony septum that divides them unevenly. These sinuses drain into the sphenoethmoidal recess, a small space located above and behind the superior nasal concha.These sinuses are positioned close to several important brain structures, including:The optic nerves and the optic chiasm (which help with vision)The pituitary gland (which controls hormones)The internal carotid arteries (which supply blood to the brain)The cavernous sinuses (which help drain blood from the brain).Their sensory innervation comes from the posterior ethmoidal nerves, which are branches of the ophthalmic division of the trigeminal nerve (CN V1). Blood supply is provided by the posterior ethmoidal arteries stemming from the ophthalmic artery.The nose has a rich blood supply from three main arteries: the ophthalmic artery, maxillary artery, and facial artery. These arteries originate from the carotid arteries and form a complex network beneath the nasal lining, ensuring oxygen and nutrients reach nasal tissues.Anterior and posterior ethmoidal arteries: Supply the upper nasal septum, nasal roof, and nearby sinuses, including the ethmoid and frontal sinuses.Dorsal nasal artery: Delivers blood to the skin over the bridge and sides of the nose.Sphenopalatine artery: It is the primary artery nourishing the inner nasal lining.Greater palatine artery: Supports blood flow to the hard palate and nearby nasal structures.Posterior lateral nasal arteries & posterior septal branches: Provide circulation to the nasal walls and septum.Infraorbital artery (with superior anterior and posterior alveolar branches): Extends blood flow to adjacent facial regions.Superior labial artery: It supplies additional blood to the nose.Lateral nasal and septal branches: Maintain circulation to the nostrils and surrounding skin.This intricate blood supply ensures nasal tissues remain well-nourished, promoting quick healing. However, the high vascular density also makes the nose prone to bleeding when blood vessels are damaged.The veins of the nose play a crucial role in draining blood from different regions. The angular vein is responsible for draining the sides of the nose.It receives blood from the lateral nasal veins, which extend from the nostrils (alae). This vein connects with the superior labial vein, facilitating venous return.At the upper part of the nose, small veins from the dorsum merge into the nasal arch. It is a branch of the frontal vein, which helps drain blood from the root of the nose.Woodruffs plexus is a network of large, thin-walled veins present deeper inside the nasal cavity near the back of the inferior meatus.These veins are large, thin-walled, and have little surrounding tissue, like muscle or fibers. The mucous membrane covering them is also thin and has very few structures.The lymphatic system of the nose follows a clear drainage pattern. The surface lymphatic vessels run alongside veins, while the deeper ones follow arteries.The front part of the nasal cavity, including its walls, drains lymph and external nasal skin into the submandibular lymph nodes.The deeper parts of the nasal cavity and the paranasal sinuses drain into the upper deep cervical lymph nodes, either directly or via the retropharyngeal lymph nodes.Additionally, the back portion of the nasal floor is likely to drain into the parotid lymph nodes.Lower LimbHip Bone Anatomy Complete Guide with Parts, Names, Functions & DiagramComplete Guide on Leg Anatomy with Parts, Functions & DiagramComplete Guide to Thigh Muscle Anatomy: Learn Parts, Names & DiagramKnee Anatomy: Complete Guide to Parts, Names, Functions & DiagramFemur Anatomy: Complete Guide with Parts, Names, Functions & DiagramHip Muscle Anatomy Complete Guide with Parts, Names, Functions & DiagramUpper LimbComplete Guide to Finger Anatomy with Parts, Names, Functions & DiagramComplete Guide to Forearm Anatomy: Parts, Names, Functions & DiagramComprehensive Guide to Arm Anatomy: Parts, Names & DiagramComprehensive Guide to Hand Anatomy: Parts, Functions & DiagramUltimate Guide to Bicep Anatomy: Parts, Names, Functions & DiagramShoulder Anatomy: Ultimate Guide to Parts, Names, Functions & DiagramWrist Anatomy: Ultimate Guide to Parts, Names, Functions & DiagramComplete Guide to Nail Anatomy with all Parts, Names & DiagramsSpine Anatomy: Complete Guide with Parts, Names, Functions & DiagramHuman HeadSkull Anatomy: Complete Guide with Parts, Names, Functions & DiagramUltimate Guide to Eye Anatomy: Parts, Structure, Functions & DiagramTongue Anatomy: Complete Guide with Parts, Names, Functions & DiagramMouth Anatomy: Complete Guide with Parts, Names, Functions & DiagramComplete Guide to Tooth Anatomy: Learn Parts, Names & DiagramUltimate Guide to Ear Anatomy: Parts, Structure, Functions & DiagramOrgansExternal Sources-WikipediaKenHubOptometristsCleveland ClinicAmerican Academy of Ophthalmology The human nose warms, filters and moistens the air drawn in by the lungs and detects air impurities that trigger the sense of smell. The external part of the nasal structure protrudes out through a hole between the cheek bones and consists of two nostrils divided by a barrier called the septum. Behind the exterior part of the nose is a nasal cavity that is lined with mucous membranes and has the olfactory hairs responsible for the sense of smell at the top. Linked to the nasal cavity are four sinus cavities above and below the eyes also lined with mucous membranes. Together these structural elements deliver warm, moist and clean air to the lungs and trigger the sense of smell if any non-air molecules are present in the air flow. The human nose is made up of an external part with two nostrils and the separating septum as well as internal cavities that filter the air. At the top of the main nasal cavity, located above the mouth's palate, are olfactory hairs responsible for the sense of smell. The function of the nose is to detect odors in the air and deliver warm, clean and moist air to the lungs. When the lungs expand and the body takes a breath, air initially enters through the nostrils and passes through the main nasal cavity under the nose bone and above the mouth's palate. This cavity has three protrusions and three passages. The superior concha at the top of the nasal cavity channels air through the superior meatus while below them the middle and inferior conchas guide the air into the middle and inferior meata passages. All three passages reunite at the back of the throat to pass down the trachea to the lungs. All the passages are lined with mucous membranes and fine hairs to trap dust and other foreign particles, including potentially harmful microbes.At the top of the superior meatus, the hairs filtering the air are longer and are responsible for the nasal sense of smell. The olfactory bulb is located here, and nerve cells sense the presence of air impurities resulting in signals that the brain interprets as odors. While the sense of smell is often neglected, it is a key warning mechanism for the body to determine whether food has spoiled, whether there is danger from smoke or fire and for monitoring cleanliness. The nose anatomy supports the nose's sense of smell function. The three passages through the main nose cavity share the flow of air, but only the superior meatus has the smell sensing hairs and cells. The air passes through the nasal passages quite quickly and often too fast for detailed smell sensing. Most of the air passes through the two lower passages, but the long hairs of the upper passage slow down the air flow and give the smell sensors more time to function.When a substance that triggers a smell is present in the air, it is absorbed by the mucous lining the walls of the upper passage. Nerve cells are located under the mucous lining and are sensitive to different substances. When a nerve cell is triggered by the presence of substance molecules in the mucous lining, it sends a signal to the brain that the brain interprets as a smell. Most smells are composites, taking the signals of several different cells reacting to different substances and interpreting those signals as a particular odor. For example, the smell of smoke may involve dozens of impurities in the air, but their combination is interpreted as smoke. The smell of sweat has dozens of different components, and the brain has learned to interpret that combination as the smell of sweat.When the nose is working properly, it helps protect the respiratory system and can deliver important sensory signals. These can be warnings about dangerous or unpleasant situations, or they can be positive experiences accompanied by pleasant odors. When the nose is not working the way it should, such as during a cold, the loss of the sense of smell and the reduction of the air filtering and moistening functions serve to emphasize their importance. Markgraf, Bert. "How The Human Nose Works" sciencing.com, . 24 September 2018. APA Markgraf, Bert. (2018, September 24). How The Human Nose Works. sciencing.com. Retrieved from Chicago Markgraf, Bert. How The Human Nose Works last modified March 24, 2022. A big batch of cookies coming out of the oven. Your gym bag full of dirty clothes. How do you smell these smells and thousands more? It's your nose, of course. Your nose lets you smell and it's a big part of why you are able to taste things. The nose is also the main gate to the respiratory system, your body's system for breathing. Let's be nosy and find out some more about the nose. What Are the Parts of the Nose? The nose has two holes callednostrils. The nostrils and the nasal passages are separated by a wall called theseptum(say: SEP-tum). Deep inside your nose, close to your skull, your septum is made of very thin pieces of bone. Closer to the tip of your nose, the septum is made ofcartilage(say: KAR-tel-ij), which is flexible material that's firmer than skin or muscle. It's not as hard as bone, and if you push on the tip of your nose, you can feel how wiggly it is. Behind your nose, in the middle of your face, is a space called thenasal cavity. It connects with the back of the throat. The nasal cavity is separated from the inside of your mouth by the palate (roof of your mouth). It sniffs and smells, but how does it work? Find out more in this nose video. When you inhale air through your nostrils, the air enters the nasal passages and travels into your nasal cavity. The air then passes down the back of your throat into the trachea (say: TRAY-kee-uh), or windpipe, on its way to the lungs. Your nose is also a two-way street. When you exhale the old air from your lungs, the nose is the main way for the air to leave your body. But your nose is more than a passageway for air. The nose also warms, moistens, and filters the air before it goes to the lungs. The inside of your nose is lined with a moist, thin layer of tissue called a mucous membrane (say: MYOO-kus MEM-brayne). This membrane warms up the air and moistens it. The mucous membrane makes mucus, that sticky stuff in your nose you might call snot. Mucus captures dust, germs, and other small particles that could irritate your lungs. If you look inside your nose, you will also see hairs that can trap large particles, like dirt or pollen. If something does get trapped in there, you can probably guess what happens next. You sneeze. Sneezes can send those unwelcome particles speeding out of your nose at 100 mph! Further back in your nose are even smaller hairs called cilia (say: SILL-ee-uh) that you can see only with a microscope. The cilia move back and forth to move the mucus out of the sinuses and back of the nose. Cilia can also be found lining the air passages, where they help move mucus out of the lungs. How Does Smelling Work? The nose allows you to make scents of what's going on in the world around you. Just as your eyes give you information by seeing and your ears help you out by hearing, the nose lets you figure out what's happening by smelling. It does this with help from many parts hidden deep inside your nasal cavity and head. Up on the roof of the nasal cavity (the space behind your nose) is the olfactory epithelium (say: ol-FAK-tuh-ree eh-puh-THEE-lee-um). Olfactory is a fancy word that has to do with smelling. The olfactory epithelium contains special receptors that are sensitive to odor molecules that travel through the air. These receptors are very small there are about 10 million of them in your nose! There are hundreds of different odor receptors, each with the ability to sense certain odor molecules. Research has shown that an odor can stimulate several different kinds of receptors. The brain interprets the combination of receptors to recognize any one of about 10,000 different smells. How Does the Brain Recognize Smells? When the smell receptors are stimulated, signals travel along the olfactory nerve to the olfactory bulb. The olfactory bulb is underneath the front of your brain just above the nasal cavity. Signals are sent from the olfactory bulb to other parts of the brain to be interpreted as a smell you may recognize, like apple pie fresh from the oven. Yum! Identifying smells is your brain's way of telling you about your environment. Have you ever smelled your toast burning? In an instant, your brain interpreted the smell and a problem and you knew to check on your toast. You learned to associate a certain smell with burning and now your brain remembers that smell so you recognize it. Your sense of smell also can help you keep safe. For example, it can warn you not to eat something that smells rotten or help you detect smoke before you see a fire. How Does the Nose Help With Taste? Most people just think of the tongue when they think about taste. But you couldn't taste anything without some help from the nose! The ability to smell and taste go together because odors from foods allow us to taste more fully. Take a bite of food and think about how it tastes. Then pinch your nose and take another bite. Notice the difference? It's just another reason to appreciate your knockout of a nose!

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