GROSS ANATOMY OF THE HEAD AND NECK ASSIGNMENT1

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1.Discuss the anatomy of the tongue and comment on it’s applied anatomy.

 The **tongue** is a unique organ located in the [oral cavity](https://www.kenhub.com/en/library/anatomy/the-oral-cavity) that not only facilitates perception of gustatory stimuli but also plays important roles in mastication and deglutition. Additionally, the tongue is an integral component of the speech pathway, as it helps with articulation. The prefix **gloss-** and the suffix **-glossus** are commonly used with reference to the tongue. Additionally, the tongue is an important component of the speech pathway, as it helps with articulation.

Another important point to note is that the tongue is embryologically divided into an anterior and a posterior part. The anterior part of the tongue is also called the **oral or presulcal part** of the tongue. Under normal circumstances, the tongue is a pink, muscular organ located within the oral cavity proper. It is kept moist by the products of the major and minor [salivary glands](https://www.kenhub.com/en/library/anatomy/the-salivary-glands), which aids the organ as it facilitates deglutition, speech, and gustatory perception. While there is significant variability in the length of the tongue among individuals, on average, the organ is roughly 10 cm long. It has three main parts:

* The **tip or apex** of the tongue is the most anterior, and most mobile aspect of the organ.
* The tip is followed by the **body** of the tongue. It has a **rough dorsal (superior) surface** that abuts the palate and is populated with taste buds and lingual papillae, and a **smooth ventral (inferior) surface** that is attached to the floor of the oral cavity by the lingual frenulum.
* The **base** of the tongue is the most posterior part of the organ. It is populated by numerous lymphoid aggregates known as the lingual tonsils along with foliate papillae along the posterolateral surface.

There are numerous important structures surrounding the tongue. It is limited anteriorly and laterally by the upper and lower rows of [teeth](https://www.kenhub.com/en/library/anatomy/the-teeth). Superiorly, it is bordered by the **hard** (anterior part) and **soft** (posterior part) **palates**. Inferiorly, the root of the tongue is continuous with the **mucosa** of the floor of the oral cavity; with the **sublingual salivary glands** and vascular bundles being located below the mucosa of the floor of the oral cavity.

The **palatoglossal** and **palatopharyngeal arches** (along with the [palatine tonsils](https://www.kenhub.com/en/library/anatomy/tonsils)) have lateral relations to the posterior third of the tongue. Posterior to the base of the tongue is the dorsal surface of the **epiglottis** and **laryngeal inlet**, and the posterior wall of the oropharynx. As mentioned earlier, the presulcal and postsulcal parts of the tongue differ not only by anatomical location, but also based on embryological origin, innervation, and the type of mucosa found on its surface.

The tongue is chiefly a muscular organ with some amount of fatty and fibrous tissue distributed throughout its substance. All the muscles of the tongue are paired structures, with each copy being found on either side of the median fibrous septum. There are muscles that extend outside of the organ to anchor it to surrounding bony structures, known as **extrinsic** **muscles**. The other set of muscles are confined to each half of the organ and contribute to altering the shape of the organ; these are the **intrinsic** **muscles**

The tongue's intrinsic muscles include the following:

1. The superior longitudinal lingual muscle, which shortens the tongue and curls it upward.
2. The inferior longitudinal lingual muscle, which shortens the tongue and curls it downward.
3. The transverse lingual muscle, which elongates and narrows the tongue.
4. The vertical lingual muscle, which flattens the tongue.

The tongue's extrinsic muscles include the following:

1. The genioglossusmuscle, which protrudes the tongue, and is innervated by the hypoglossal nerve (CN XII).
2. The styloglossusmuscle, which draws up the sides of the tongue to create a trough for swallowing following adequate mastication. The pair of styloglossus muscles works together on each side to retract the tongue. The styloglossus muscle is innervated by the hypoglossal nerve (CN XII).
3. The hyoglossusmuscle, which depresses and retracts the tongue and is innervated by the hypoglossal nerve (CN XII).
4. The palatoglossusmuscle, which elevates the posterior tongue, closes the oropharyngeal isthmus, aids in the initiation of swallowing, and prevents the spill of saliva from the vestibule into the oropharynx by maintaining the palatoglossal arch. It is the only extrinsic muscle of the tongue that is not innervated by the hypoglossal nerve; instead, it is innervated by the vagus nerve (CN X).

#### **Intrinsic tongue muscles**

The intrinsic tongue muscles are responsible for adjusting the **shape** and **orientation** of the organ. It is made up of four paired muscles.

|  |  |
| --- | --- |
| Superior longitudinal | **Origin** - submucosa of posterior tongue, lingual septum**Insertion** - apex/anterolateral margins of tongue**Innervation** - hypoglossal nerve (CN XII)**Blood supply** - lingual branch of external carotid artery**Action** - retracts and broadens tongue, elevates apex of tongue |
| Inferior longitudinal | **Origin**- root of tongue, body of hyoid bone**Insertion**- apex of tongue**Innervation**- hypoglossal nerve (CN XII)**Blood supply** - lingual branch of external carotid artery**Action**- retracts and broadens tongue, lowers apex of tongue |
| Transverse muscle | **Origin**- lingual septum**Insertion**- lateral margin of tongue**Innervation**- hypoglossal nerve (CN XII)**Blood supply** - lingual branch of external carotid artery**Action**- narrows and elongates tongue |
| Vertical muscle | **Origin**- root of tongue, genioglossus muscle**Insertion**- lingual aponeurosis**Innervation**- hypoglossal nerve (CN XII)**Blood supply** - lingual branch of external carotid artery**Action**- broadens and elongates tongue |

#### **Extrinsic tongue muscles**

While the shape of the tongue is determined by the intrinsic muscles of the tongue, movement of the organ within (and out of) the oral cavity is dependent on the extrinsic tongue muscles. There are four pairs of **extrinsic** **muscles**.

|  |  |
| --- | --- |
| Genioglossus | **Origin** - Superior mental spine of mandible**Insertion** - entire length of dorsum of tongue, lingual aponeurosis, body of hyoid bone**Innervation**- hypoglossal nerve (CN XII)**Blood supply** -  sublingual branch of lingual artery, submental branch of facial artery**Action** - depresses and protrudes tongue (bilateral contraction); deviates tongue contralaterally (unilateral contraction) |
| Hyoglossus | **Origin**- body and greater horn of hyoid bone**Insertion**- inferior/ventral parts of lateral tongue**Innervation**- hypoglossal nerve (CN XII)**Blood supply** -  sublingual branch of lingual artery, submental branch of facial artery**Action**- depresses and retracts tongue |
| Styloglossus | **Origin**- anterolateral aspect of styloid process (of temporal bone), stylomandibular ligament**Insertion**- blends with inferior longitudinal muscle (longitudinal part); blends with hyoglossus muscle (oblique part)**Innervation**- hypoglossal nerve (CN XII)**Blood supply** -  sublingual branch of lingual artery**Action**- retracts and elevates lateral aspects of tongue |
| Palatoglossus | **Origin**- palatine aponeurosis of soft palate**Insertion**- lateral margins of tongue, blends with intrinsic muscles of tongue**Innervation**- vagus nerve (CN X) (via branches of pharyngeal plexus)**Blood supply** -  ascending palatine branch of facial artery, ascending pharyngeal artery**Action**- elevates root of tongue, constricts isthmus of fauces |

The extrinsic muscles play an important role in pressing and molding the food bolus in preparation for the initial phase of [**swallowing**](https://www.kenhub.com/en/library/anatomy/stages-of-swallowing). There are four types of lingual papillae found on the surface of the human tongue. These include:

* **Filiform papillae** are the most abundant of the four types of papillae. They are stretched, conical, grey-white papillae that are covered in a heavy coat of keratinized squamous epithelium. By making the dorsal surface of the tongue rough, these papillae provide **friction** to allow movement of the food bolus during chewing. It should be noted that these papillae **do not possess taste buds**.
* **Fungiform papillae** are weakly keratinized and less abundant than the filiform papillae. However, they are scattered across the entire dorsal surface of the tongue. These highly vascular, mushroom-shaped papillae contain a few taste buds on the apical aspect.
* **Foliate papillae** appear as bilaterally paired, parallel, longitudinal slits on the posterolateral margin of the tongue, near the sulcus terminalis. The mucosa is non-keratinized and the papillae are populated with numerous **taste** **buds**.
* **Circumvallate (Vallate) papillae** are organized linearly, as a set of four to six large papillae anterior to each limb of the sulcus terminalis (i.e. eight to twelve papillae in total). In longitudinal section, the characteristic furrow found within the papillae can be appreciated. These moats facilitate the drainage of serous salivary **von Ebner glands** that empty into the structure. The persistent lubrication creates a favorable environment for gustatory particles to dissolve so that they can be detected by the taste buds.

### **The taste buds**

While taste buds are distributed throughout the entire oral cavity, they are at higher concentrations on the tongue. Each taste bud is clear, oval and covered by **stratified squamous epithelium**. A combination of elongated taste (**gustatory**), **supportive**, and **basal** **stem** **cells** can be found within each taste bud. The gustatory cells have an apical **taste** **pore** surrounded by numerous microvilli that binds dissolved molecules and brings them closer to the receptors responsible for taste. However, these cells have a relatively high turnover rate, as their shelf life is roughly seven to ten days.

There are five gustatory sensations that are perceived by individuals. These are **sweet**, **salty**, **sour**, **bitter**, and **umami**. The microvilli found on the apical surface of the taste cells are equipped with various receptors that bind to varying molecules. The reaction generated from this compound-receptor interaction gives rise to varying [action potentials](https://www.kenhub.com/en/library/anatomy/action-potential) that are subsequently perceived as taste. Saltiness is often associated with the cationic component of a compound (i.e. **sodium** **ions**), while sourness is related to the acidity (concentration of **hydrogen** **ions**) in the compound. **Organic compounds** such as carbohydrates or amino acids give rise to sweet taste, while bitterness is associated with **long-chain organic compounds**. The final taste - umami - also known as savory, is related to compounds with the left-handed **chiral isomer of glutamic acid**.

## **Blood supply and lymphatic drainage**

### **Arteries**

The vascular supply to the tongue muscles is provided by derivatives of the [lingual artery](https://www.kenhub.com/en/library/anatomy/lingual-artery). This is a branch of the [external carotid artery](https://www.kenhub.com/en/library/anatomy/the-external-carotid-artery-and-its-branches) that traverses the region between the [middle pharyngeal constrictor](https://www.kenhub.com/en/library/anatomy/middle-pharyngeal-constrictor) and hyoglossus in order to access the floor of the mouth. It takes a sharp superior turn at the anterior border of hyoglossus as it travels alongside CN IX. Of note, the tongue has good collateral supply as the lingual artery also anastomosis with the contralateral vessel. The named branches of the lingual artery are as follows:

* The **dorsal** **lingual** **arteries** are relatively small derivatives of the lingual artery that arise medial to hyoglossus. In addition to supplying the dorsal mucosa of the tongue, it also gives branches to the palatoglossus, soft palate, palatine tonsils, and epiglottis.
* Emerging at the anterior limit of the hyoglossus, the **sublingual** **arteries** course between the [mylohyoid](https://www.kenhub.com/en/library/anatomy/mylohyoid-muscle) and genioglossus as it travels towards the sublingual glands in the floor of the oral cavity. As it arborizes, one of its branches anastomoses with the submental branches of the [facial artery](https://www.kenhub.com/en/library/anatomy/facial-artery), while another traverses the gingiva of the [mandible](https://www.kenhub.com/en/library/anatomy/the-mandible) to anastomose with the analogous contralateral vessel.
* As the lingual artery terminates near the lingual frenulum on the ventral surface of the tongue, it is referred to as the **deep** **lingual** **artery**.

The lingual artery is supported by other branches of the external carotid artery. The facial artery gives off the **ascending palatine** and **tonsillar** **arteries** that also supply the tongue. The [ascending pharyngeal branch](https://www.kenhub.com/en/library/anatomy/ascending-pharyngeal-artery) of the external carotid artery also supplies the organ.

Overview of the neurovasculature of the tongue (lateral-left view)

### **Veins**

The veins of the tongue are named similarly to the arteries that they accompany. They are formed from numerous venous tributaries that eventually coalesce. As the **deep lingual vein** forms adjacent to the apex of the tongue, it courses along the ventral surface of the tongue (deep to the mucosa).  As the deep lingual vein anastomosis with the **sublingual** **vein**, they become the **vena comitans of CN XII**. This venous network eventually drains to the **lingual** **vein** that later join the facial or the anterior division of the **retromandibular veins**. Here, they form the **common facial vein**, which is a tributary to the internal jugular vein. Alternatively, the venae comitantes may drain directly to the internal jugular vein.

The **dorsal lingual veins** are responsible for draining the lateral margins and dorsal surface of the tongue. They travel alongside the similarly named artery as they drain into the **internal jugular vein**.

### **Lymphatic drainage**

When discussing the lymphatic drainage of the tongue, it helps to group them according to the region of the tongue that they drain. The **marginal** and **central groups** drain the anterior parts of the tongue, while the **dorsal group** drains lymph from the posterior third of the organ. It is not uncommon to see the central area of the tongue draining to both marginal and dorsal groups of lymph vessels.

The marginal lymph vessels will carry lymph to the **submandibular nodes** or to the **jugulo-omohyoid nodes**. It is not uncommon to see lymph vessels decussating to drain to contralateral lymph nodes. The vessels from the central region may go to the **deep cervical nodes**, with a particular preference for the jugulo-omohyoid or jugulodigastric nodes. The dorsal group of vessels also pass laterally on either side to eventually join the marginal vessels in their course to the jugulo-omohyoid and jugulodigastric vessels.

## **Innervation**

The tongue has multiple sources of innervation based on its embryological origins. The nerve supply to the tongue can be grouped based as efferent fibers that carry motor impulses, general sensory that conveys touch and proprioception, and special afferent that conveys gustatory impulses.

### **Motor innervation**

The muscles of the tongue arise from **occipital** **myotomes** that migrated to the floor of the pharyngeal apparatus during development. These primitive myocytes took the fibers of CN XII along with them during their journey. As a result, **CN XII** provides motor **innervation to all the muscles** of the tongue, except palatoglossus. As CN XII pierces the ventrolateral part of the pharyngeal tongue, it gives a branch to the [geniohyoid muscle](https://www.kenhub.com/en/library/anatomy/geniohyoid-muscle). Subsequently, it bifurcates into medial and lateral branches. The medial branch innervates the posterior part of the transverse and vertical muscles, as well as the medial part of the inferior longitudinal muscle, and the entire genioglossus. The lateral branch of CN XII innervates the lateral part of the inferior longitudinal, superior longitudinal, hyoglossus and styloglossus muscles.

While there is an agreement regarding the fact that the **pharyngeal plexus** brings motor fibers to the muscle, there is still some discrepancy regarding which component of the pharyngeal plexus (i.e. cranial part of [accessory nerve [CN XI](https://www.kenhub.com/en/library/anatomy/the-accessory-nerve)] or the [vagus nerve [CN X]](https://www.kenhub.com/en/library/anatomy/the-vagus-nerve)) that the fibers arise from. Some sources state that CN XI piggybacks on CN X to supply palatoglossus. However, other sources are adamant that there is no hitch-hiking, and that CN X is the nerve that supplies the palatoglossus. One thing is certain, and it’s that nucleus ambiguus provides efferent fibers that innervate the skeletal muscles of the soft palate. Whether or not these fibers travel via CN X or CN XI is still uncertain.

### **Tactile sensory innervation**

The **lingual nerve** is a branch of CN V3. It is responsible for conveying **general somatic afferent** impulses from the **anterior two-thirds** of the tongue. Additionally, it also carries **sensory information** from the oral mucosa beneath the ventral surface of the tongue as well as the gingival mucosa of the lingual side of the mandible. **General afferent** impulses from the circumvallate papillae, along with the **posterior** **third** of the tongue are carried by fibers of **CN IX**.

### **Taste innervation**

There are three [cranial nerves](https://www.kenhub.com/en/library/anatomy/the-12-cranial-nerves) responsible for conveying [taste sensation](https://www.kenhub.com/en/library/anatomy/muscles-and-taste-sensation-of-the-tongue) from the tongue to the [brain](https://www.kenhub.com/en/library/anatomy/cerebral-cortex). These are CN VII, CN IX, and (to a lesser extent) CN X. The region of the tongue covered by each nerve is dependent on the proximity of the developing taste bud (and lingual papilla) to the free nerve ending. **CN VII** mitigates special sensory signals from the **anterior two-thirds** of the tongue, as well as from the inferior part of the **soft** **palate**.

Fibers of the **chorda tympani** travel by means of the lingual nerve to detect impulses from the **sulcal** **tongue**. The postsulcal tongue, circumvallate papillae, palatoglossal arches, and oropharynx are governed by **CN IX**. **CN X** only provides supply to taste buds in the extreme areas of the **pharyngeal** **tongue**. These impulses are conveyed by the **internal laryngeal branch** of the vagus nerve.

The functions of the tongue include taste, speech, and food manipulation in the oral cavity.

**Taste Functions**

Chemicals that interact with the taste buds in the tongue are referred to as "tastants." Taste buds themselves are found within the various papillae of the tongue. Tastants interact with gustatory cell receptors in the taste buds, resulting in transduction of a taste sensation. The five broad categories of taste receptors are (1) sweet, (2) salty, (3) sour, (4) bitter, and (5) umami. The lingual papillae are divided into the vallate (or circumvallate), fungiform, filiform, and foliate papillae. More than half of the taste buds are located on the vallate papillae at the junction of the oral and oropharyngeal tongue or tongue base.

**Speech Functions**

Speech is produced in part by manipulation of the tongue in the mouth against the teeth and palate within the oral cavity. The intrinsic muscles of the tongue are involved primarily in shaping the tongue for speech.

**Food Manipulation Functions**

The tongue moves food around the mouth within the oral cavity by pressing it against the hard palate and out to the sides to enable mastication. It enables the formation of the food bolus in the oral preparatory phase of swallowing. It also takes part in the oral phase of swallowing by elevating and sweeping posteriorly to propel the food bolus past the anterior tonsillar pillar, triggering the swallowing reflex.

CLINICAL ANATOMY

* **Ankyloglossia ("tongue-tie")** occurs due to an abnormal length of the frenulum linguae which causes limited manipulation of the tongue during speech and results in a speech impediment. In the most common form of ankyloglossia, the frenulum extends to the tip of the tongue. Ankyloglossia can be corrected by surgically severing the lingual frenulum.
* **Fissured tongue ("scrotal tongue," "plicated tongue")**occurs when several small furrows present on the dorsal surface of the tongue. It can be an oral manifestation of psoriasis. It is generally painless and benign, and is often associated with other syndromes (e.g., Down syndrome).
* **Geographic tongue ("migratory glossitis")**is a benign, asymptomatic condition characterized by the presence of large red patches with a greyish-white border covering the dorsum of an otherwise normal tongue. It is caused by inflammation of the mucous membrane of the tongue, which results in loss of lingual papillae. The lesions are known to migrate over time. The name arises from the map-like appearance of the tongue in this condition.

## Surgical Considerations

Thyroglossal duct cysts can develop when there is a remnant at the point of embryologic origin of the thyroid gland, the foramen cecum. The thyroid gland begins to develop in the floor of the embryologic pharynx at the point called the foramen cecum, which is located at the dorsum of the posterior tongue. The developing gland then relocates to its ultimate destination in the anterior neck by migrating down the thyroglossal duct anterior to the hyoid cartilage and thyroid cartilage before stopping anterolateral to the superior aspect of the trachea. The thyroglossal duct ordinarily disappears, but remnants of its epithelium may remain, allowing for the potential development of a thyroglossal duct cyst in this area. These cysts generally occur in the neck, close to or inferior to the body of the hyoid bone. They form a swelling at the anterior midline of the neck that is painless, fluctuant, and moves upon swallowing. Thyroglossal ducts cysts typically are removed surgically.[[9]](https://www.ncbi.nlm.nih.gov/books/NBK507782/#article-30245.r9)[[10]](https://www.ncbi.nlm.nih.gov/books/NBK507782/#article-30245.r10)

## Clinical Significance

The tongue tends to fall posteriorly, thus obstructing the airway. Paralysis or total relaxation of the genioglossus muscle presents a risk of suffocation, which can occur during general anesthesia. An artificial airway is made using intubation, which prevents the tongue from falling backward and blocking the airway.

* Ludwig angina infection, once established, evolves to include the tongue. The tongue may enlarge to two or three times its usual size and tends to distend posteriorly into the hypopharynx, superiorly against the palate, and anteriorly out of the oral cavity. Any immediate posterior extension of this process will ultimately involve the epiglottis. The styloglossus muscle creates the connection between the submandibular parapharyngeal spaces, otherwise known as the buccopharyngeal gap, as it leaves the tongue and passes in between the middle and superior constrictor muscles before attaching to the styloid process. Cellulitis of the submandibular space may spread into the pharyngeal space and, from there, into the retropharyngeal space of the mediastinum.
* Dysgeusia, or a pure taste disorder, is rare and is usually associated with olfactory disorders.

2. Write an essay on the air sinuses.

They are formally called paranasal sinuses and are air-filled **extensions** of the respiratory part of the nasal cavity. There are **four** paired sinuses, named according to the bone in which they are located; maxillary, frontal, sphenoid and ethmoid. Paranasal sinuses occur in many other animals, including most [mammals](https://en.m.wikipedia.org/wiki/Mammal), birds, on-avian dinosaurs, and crocodiles. The bones occupied by sinuses are quite variable in these other species. The function of the sinuses is not clear. It is thought that they may contribute to the **humidifying**of the inspired air. They also reduce the weight of the skull. The paranasal air sinuses are lined with [respiratory epithelium](https://en.m.wikipedia.org/wiki/Respiratory_epithelium) (ciliated pseudostratified columnar epithelium. Sinuses are formed in childhood by the nasal cavity **eroding** into surrounding bone. As they are outgrowths of the nasal cavity, they all drain back into it – **openings** to the paranasal sinuses are found on the **roof** and **lateral** walls of the nasal cavity. The inner surface is lined by a respiratory mucosa.

* **Frontal Sinuses**: These are the most **superior** in location, found under the forehead. The frontal sinuses are variable in size, but always triangular-shaped. They drain into the nasal cavity via the**frontonasal duct**, which opens out at the hiatus semilunaris on the lateral wall. They are also innervated by the [trigeminal nerve](https://en.m.wikipedia.org/wiki/Trigeminal_nerve) (CN Va).
* **Sphenoid** **Sinuses**:  The sphenoid sinuses also lie relatively superiorly, at the level of the spheno-ethmodial recess.  They are found more posteriorly, and are related superiorly and laterally to the cranial cavity. The sphenoid sinuses drain out onto the roof of the nasal cavity. They are innervated by the trigeminal nerve (CN Va & Vb).
* **Ethmoidal** **Sinuses**: There are three ethmoidal sinuses; anterior, middle and posterior. They empty into the nasal cavity at different places: They are innervated by the [ethmoidal nerves](https://en.m.wikipedia.org/wiki/Ethmoidal_nerves), which branch from the [nasociliary nerve](https://en.m.wikipedia.org/wiki/Nasociliary_nerve) of the [trigeminal nerve](https://en.m.wikipedia.org/wiki/Trigeminal_nerve) (CN Va).
* Anterior – Hiatus semilunaris
* Middle – Ethmoid bulla
* Posterior – Superior meatus
* **Maxillary Sinuses:**The largest of the sinuses. It is located laterally and slightly **inferiorly** to the nasal cavities. It drains into the nasal cavity at the **hiatus semilunaris,** underneath the **frontal sinus** opening. This is a potential pathway for spread of infection – fluid draining from the frontal sinus can enter the maxillary sinus. They are innervated by the [trigeminalnerve](https://en.m.wikipedia.org/wiki/Trigeminal_nerve) (CNVb). The**maxillary nerve** supplies both the maxillary sinus and maxillary teeth, and so inflammation of that sinus can present with **toothache**.
	+ **Clinical Anatomy:** As the paranasal sinuses are continuous with the nasal cavity, an upper respiratory tract **infection** can **spread** to the sinuses. Infection of the sinuses causes inflammation (particularly pain and swelling) of the mucosa, and is known as sinusitis. If more than one sinus is affected,alled **pansinusitis**.

### Inflammation

The paranasal sinuses are joined to the [nasal cavity](https://en.m.wikipedia.org/wiki/Nasal_cavity) via small orifices called [ostia](https://en.m.wikipedia.org/wiki/Sinus_ostium). These become blocked easily by allergic inflammation, or by swelling in the nasal lining that occurs with a [cold](https://en.m.wikipedia.org/wiki/Common_cold). If this happens, normal drainage of [mucus](https://en.m.wikipedia.org/wiki/Mucus) within the sinuses is disrupted, and [sinusitis](https://en.m.wikipedia.org/wiki/Sinusitis) may occur. Because the maxillary posterior teeth are close to the maxillary sinus, this can also cause clinical problems if any disease processes are present, such as an infection in any of these teeth. These clinical problems can include secondary sinusitis, the inflammation of the sinuses from another source such as an infection of the adjacent teeth.

These conditions may be treated with drugs such as [decongestants](https://en.m.wikipedia.org/wiki/Decongestant), which cause vasoconstriction in the sinuses; reducing inflammation; by traditional techniques of [nasal irrigation](https://en.m.wikipedia.org/wiki/Nasal_irrigation); or by [corticosteroid](https://en.m.wikipedia.org/wiki/Corticosteroid).

### **Cancer**

Malignancies of the paranasal sinuses comprise approximately 0.2% of all malignancies. About 80% of these malignancies arise in the maxillary sinus. Men are much more often affected than women. They most often occur in the age group between 40 and 70 years. [Carcinomas](https://en.m.wikipedia.org/wiki/Carcinoma) are more frequent than [sarcomas](https://en.m.wikipedia.org/wiki/Sarcoma). Metastases are rare. [Tumours](https://en.m.wikipedia.org/wiki/Neoplasm) of the sphenoid and frontal sinuses are extremely rare.