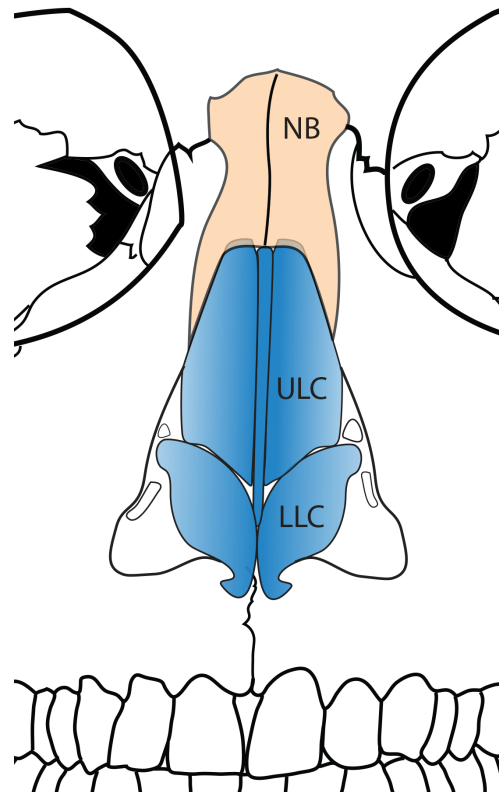
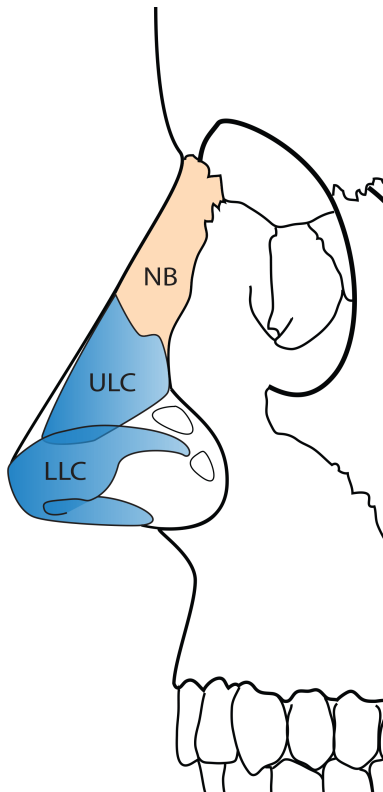




Normal nasal anatomy

Facial proportion

The Caucasian nose occupies the middle third of the face vertically and the middle fifth horizontally. It is no wider than the eye. The external nose can also be described in thirds. The upper third is bony and formed by the nasal bones (NB) and the frontal process of the maxilla. The middle third is cartilaginous and made by the upper lateral cartilages (ULC). The lower third is also cartilaginous and formed by the lower lateral cartilages (LLC). Both the middle and lower thirds are supported by the nasal septum.



Function

The function of the nose can be split into two main categories;

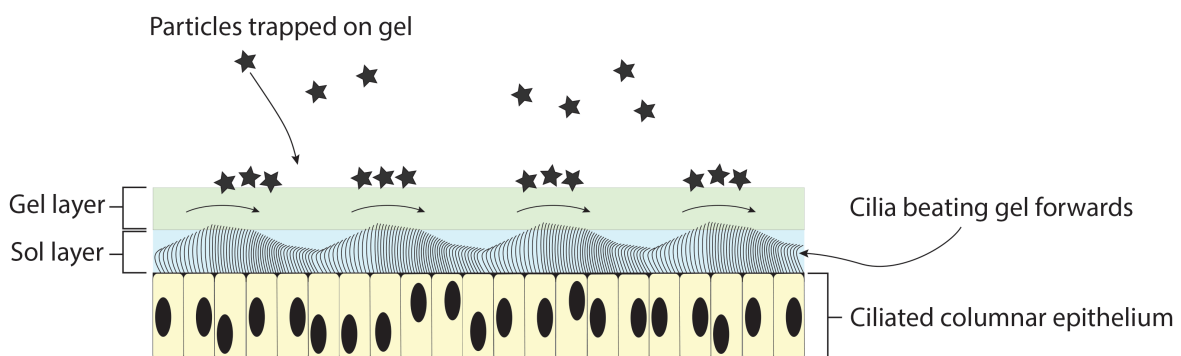
1. Air conditioning
2. Sense of smell

Air-conditioning

The first purpose of the nose is to make the air clean, moist and warm so that it can pass into the lung without causing harm. This is its air-conditioning function and it is very important. Its second function is to allow us to smell our environment, food and to sense danger.

The lungs require air that is at body temperature, is moist and clean and it is the job of the nose to provide this. It has a very rich blood supply, which is close to the surface of the nose, and this helps with raising the air temperature. The cool air is warmed by blood passing through these vessels. It is the rich blood supply that makes the nose bleed so easily when it is hit, picked or operated upon. The nose moistens the air in a couple of ways. Firstly the lining of the nose contains mucous glands that secrete slightly sticky mucus onto its surface. Secondly, the blood vessels in the lining of the nose squeeze out some of their own plasma contents onto the lining. This combination makes the lining of the nose wet so that when the air is drawn into the nose it quickly picks up this moisture and becomes saturated itself. You can see the moisture in your breath if you breathe out onto a cold surface because this moisture condenses as a plume of steam.

The cleaning function of the nose is achieved by the mucociliary clearance system. This system is microscopic in size and works at the surface of the cells that line the nose. Each of these cells has a small tuft of cilia projecting from its surface and these move back and forth and sweep mucus and debris stuck in that mucus backwards towards the back of the nose and then down the throat. The diagram below shows this.



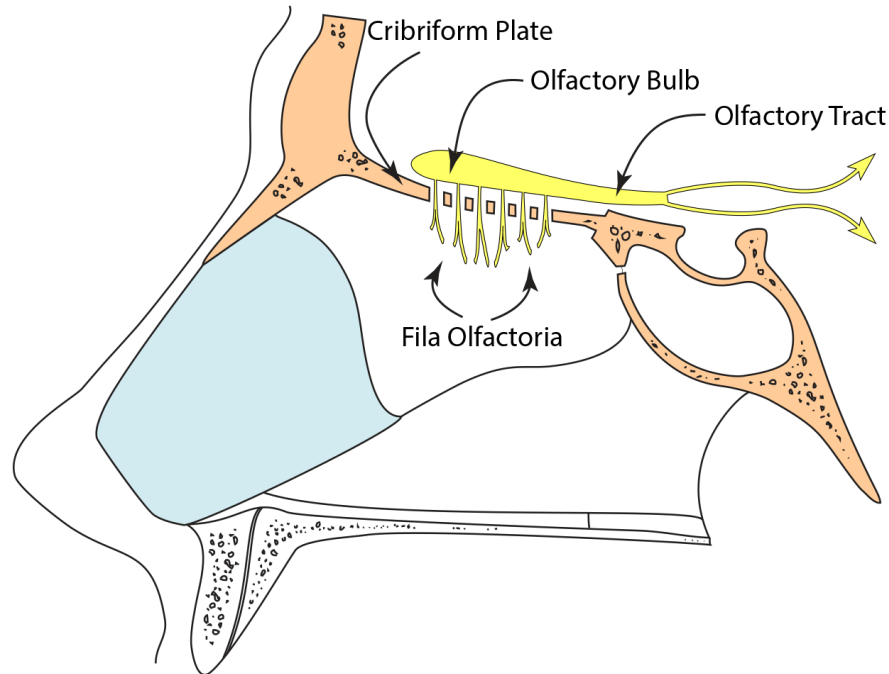
The mucociliary system exists throughout the nose, sinuses and lungs and it keeps these clean by removing debris and pushing it down the throat.

When the system breaks down the nose and sinuses quickly become infected because trapped viruses and bacteria aren't swept away. An infective rhinosinusitis may develop. Cigarette smoke is known to paralyse the cilia and it is related to an increased risk of sinonasal infection. Cocaine does the same thing. Some patients are born with cilia that do not work and they commonly have sinus infections.

Sense of smell

The second function of the nose is to allow us to smell. This sense is one of the oldest senses and developed at a very early stage of man's evolution. It alerts us to danger from bad food, fire, smoke and other environmental hazards. It is absolutely essential to the sense of taste

and when it is lost food tastes uninteresting. The organ of smell is called the olfactory organ and it sits high up on the roof of the nose. It sends small nerve bundles called fila olfactoria through the cribriform plate into the olfactory bulb and from here the information passes via the olfactory tracts to the brain (Amygdala, hippocampus and thalamus).



The diagram shows that the olfactory organ is high in the nose and that there are nerve bundles that pass through the anterior skull base into the olfactory bulb. The bulb is attached to the olfactory nerve (Cranial nerve 1) that passes backwards into the brain. The olfactory nerve is a special visceral afferent nerve. Loss of smell commonly happens when the nose itself is blocked when the patient has rhinitis. It also happens after a head injury and if this is severe it may never recover. Sinus infections and brain tumours can also cause loss of smell. A complete loss of the sense of smell is called anosmia.