

Medi Quest BRS Hospital

A monthly News letter from BRS Hospital

SMELL DISORDERS

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Introduction:

Olfaction initiates and modifies behavior in many creatures. Man concentrates on audio visual aspects and yet much money is spent modifying body odour. Man discriminates a large amount of difficult smells. Smell is useful in Chemical detection without the danger of ingesting poison, Object identification and Sexual signaling.

Nasal Anatomy and Physiology:

Nasal cavity is the Hollow portion of head behind nose which warms air, filters out dust, and houses the sense of smell. Olfactory epithelium is the area of nasal cavity with olfactory receptors. Receptors are genuine neurons (unlike photoreceptors and hair cells). Unlike other neurons, receptors are continually regenerated.1,000 different receptor types - about 1% of DNA codes for olfactory receptors making it the largest single gene family.

Fig-1

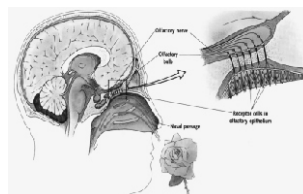


Fig-2

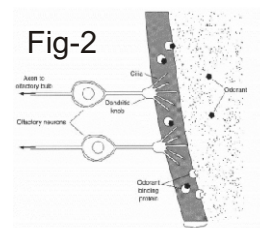
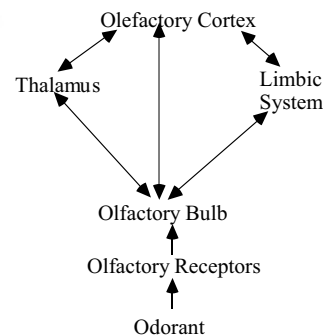
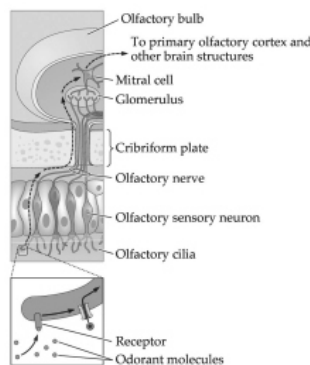


Fig-1 Nasal Anatomy Fig-2 olfactory epithelium Olfactory Receptors have four parts .They are cilia, olfactory knob, olfactory rod and the axon .Olfactory nerve through the axons of the olfactory receptors form bands which travel to the olfactory bulb. Olfactory Bulb is the organ which houses all the nerves which receive inputs from the olfactory receptors (mitral cells and periglomerular cells) which have Limbic and Thalamic connections and also with olfactory cortex (frontal lobe).

Olfactory Bulb

- Olfactory bulb - organ which houses all the nerves which receive inputs from the olfactory receptors (mitral cells and periglomerular cells)
- Limbic and Thalamic connections
- Olfactory cortex (frontal lobe)

Central Olfactory Pathways

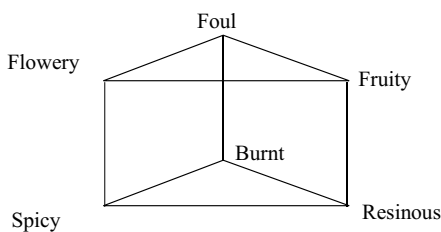


Central Olfactory Pathways

It contains three neural systems. They are CN I: main olfactory system which mediates odor. Olfactory epithelium is made up of Pseudo stratified columnar epithelium. It is located in the upper recesses of the nasal chambers (Cribriform plate, superior turbinate, superior septum, section of middle turbinate) and harbors sensory receptors of CN I. CN V: trigeminal somatosensory system which mediates somatosensory sensation.

Perception of Smell:

The dimension of smell is depicted below



Pheromones in Humans:

Infants can correctly identify their own mother's milk and are much more likely to nurse when it's their own mother. Female menstrual cycles can be altered by pheromones – the sorority effect. Male and female behavior is highly influenced by pheromones. In T-shirt experiment – musky versus sweet – the musky odor is rated by males and females as unpleasant and is thought to serve as a territorial marker among males.

Classification of Olfactory Disorders

- Anosmia: absence of smell sensation
 - Partial anosmia: ability to perceive some, but not all, odorants
 - Hyposmia: decreased sensitivity to odorants
 - Hyperosmia: abnormally acute smell function
 - Dysosmia: distorted smell perception
 - Phantosmia: olfactory hallucination
 - Olfactory agnosia: inability to recognize an odor
- Classification
- Conductive loss is due to Obstruction of nasal

passages. E.g., chronic nasal inflammation, polyposis, Tumours, Trauma

- Sensorineural loss happens when there is a damage to neuroepithelium .E.g., viral infection, airborne toxin
- Central olfactory neural loss is caused by CNS damage. E.g., tumors, neurodegenerative disorders.

Evaluation and Diagnosis:

History is the first and the foremost important step in evaluation and diagnosis. It is to be collected on the basis of the following factors. Their Olfactory ability prior to the loss, Antecedent events (head trauma, URI), Severity, Onset (gradual vs. acute), Pattern, Other medical conditions, Nasal sinus disease and allergy, Previous surgery, Medications, Smoking history, Occupational history and any complaint of taste loss. Physical examination is done using Nasal endoscopy and Neurological exam. Laboratory tests are suggested by history and physical examination only. Radiographic Imaging preferred are CT: nasal and sinus disease and MRI: intracranial causes.

University of Pennsylvania Smell Identification Test (UPSIT) is done which is based on 4 booklets of 10 microencapsulated odors, Scratch and sniff format, four responses accompanying each odor, forced choice design, scores are compared to norms (sex- and age-related). The scores are classified into Normal-36 to 40, partial Anosmia-20 to 35, Total anosmia-8-15 and probable malingering- 0 to 5. The reliability is very high.

Post Upper Respiratory Infection

It is caused due to sensorineural loss. It is the most frequent cause of smell loss in adults. It is more common in middle or older age group. Females are more vulnerable group than males. It follows a viral-like URI. It is usually more severe than the usual. The smell loss is most commonly partial. It is occasionally occurs with dysosmia or phantosmia. The physical examination is unremarkable.



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The mechanism is unclear. It is the direct insult to neuroepithelium. It is due to greatly reduced number of olfactory receptors, dendrites do not reach surface, lack sensory cilia and replacements of sensory epithelium with respiratory epithelium. It ascends to the olfactory tract or bulbs. Post viral olfactory disorder is caused due to decreased number of olfactory cells and cilia on olfactory vesicle. In the worst case there will be severe destruction, no regeneration which leads to anosmia. In mild case; there will be patchy destruction which leads to hyposmia, complete regeneration lead to normosmia and patchy regeneration or faulty regeneration proceeds to dysosmia. There is no effective mode of treatment. There may be complete recovery in 3 weeks or it may lead to permanent dysfunction. The meaningful recovery is rare.

Head Injury

Incidence of smell disorder due to Head Injury may be 4-7% in early studies and is reaching 50% in recent studies. It is generally associated with the severity of the injury; Heywood (1990) matched GCS with olfactory test scores. Lower the GCS score, higher percentage of patients with olfactory impairment. The mechanism may be due to (i) sinonasal tract alteration which happens when there is direct injury to olfactory epithelium (mucosal edema, hematoma). Nasal skeleton fracture, post traumatic rhinosinusitis are potentially treatable;(ii) Shearing injury which is caused by tearing or shearing the axons,with naso-orbito –ethmoid region fracture and also due to translational shifts in the brain secondary to coup or contracoup forces;(iii)brain contusion or haemorrhage. The damage is irreversible most of time and prognosis worsens with time.

In Post Traumatic Injury olfactory cells will be decreased in number and olfactory receptor is aciliate.

Nasal and Sinus Disorders

It is traditionally viewed as conductive loss. Airflow blockage caused by rhinosinusitis prevents odorant molecules from reaching epithelium. Surgery or medical

treatment alone is not effective. The defining factor may be the severity of the histopathological change. The degree of olfactory loss is associated with the severity of nasal sinus disease. It may be improved with systemic steroid and topical steroid. There is no documented relationship between olfactory test scores and intranasal airway access factors. Nasal and sinus disorders may lead to chronic inflammation which may be toxic to olfactory mucosa. Respiratory epithelium replaces sensory epithelium. Septoplasty and rhinoplasty do not have long-term deleterious effect .The improvement of olfactory function postoperatively after sinus surgery may be incomplete.

Other Causes of Olfactory Disorders

- ❖ Toxin
- ❖ Tumor
- ❖ Congenital
- ❖ Endocrine
- ❖ Psychiatric
- ❖ Neurodegenerative disorder (Parkinson, Alzheimer disease)

Treatment of Olfactory Disorder

If the disorder is due to Conductive loss, treatment is to relieve obstruction which can be carried out by

- ❖ Allergy management
- ❖ Topical cromolyn
- ❖ Topical and systemic corticosteroids
- ❖ Surgical procedure

In case of Sensorineural loss there is no effective mode of treatment.

Conclusion:

Possibility of regaining smell is there, though the percentage is small, by a short course of steroid or



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endonasal surgeries .But antibiotics should be avoided unless there is indication of bacterial involvement is present,because it may adversely affect smell.

BRS Hospital

Department of plastic & Cosmetic Surgery

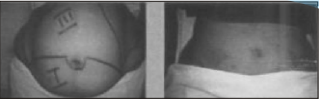
Cosmetic Surgical Procedures :

Liposuction	Gynaecomastia
Abdominoplasty	Rhinoplasty
Breast Augmentation	Hair Transplant
Breast Reduction	

MultiSpeciality Hospital

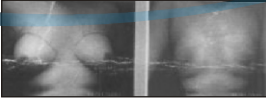
Intensive care unit (Pediatric & Adult)
Paediatrics & Neonatology
general surgery & key hole surgery
arthroscopic surgery - sports injuries
laparoscopic surgery

Liposuction



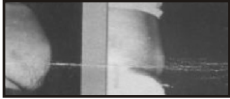
Pre OP Post OP

Male Breast Reduction Gynaecomastia



Pre OP Post OP

Abdominoplasty



Pre OP Post OP

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