

Clinical note

Immotile cilia syndrome

- **Immotility of cilia and flagella**; sometimes also dynein deficiency
- Causes **male infertility** and chronic **respiratory tract infections** (both sexes)

Smoking

- Some sections of epithelial lining from nasal cavity to larynx are **stratified squamous** – in regions subject to direct airflow or physical abrasion e.g. oropharynx, epiglottis, vocal folds
 - Provides **protection** from wear and tear
- In smokers, proportion of **goblet cells** to ciliated cells **increases** to clear the particulate and gaseous pollutants (e.g. CO₂, SO₂)
 - Provides **rapid clearance**
 - BUT reduced cilia means **decreased movement of mucus layer** - congestion

Nasal cavities

- Two components to each nasal cavity
 - External vestibule
 - Internal nasal cavity (proper)
- **External vestibule**
 - Skin enters nostrils (nares), sweat glands, sebaceous glands and vibrissae (hairs) to filter out **particulate matter**
 - Epithelium loses keratinized nature as it gets further into the vestibule and transition to **respiratory epithelium**
- **Nasal cavity**
 - Cavernous chambers within the skull separated by **osseous nasal septum**
 - **Conchae**: three bony, shelf like projections extending from lateral wall of each nostril (six in total)
 - **Superior conchae** covered with **olfactory epithelium**
 - **Middle and inferior** covered with **respiratory epithelium**
 - Narrow passage between conchae known as the **meatus**
 - Increases surface area of the mucous layer for moistening the incoming air and reduces turbulence
 - Located below each conchae
 - **Swell bodies**: large **venous plexuses** in the lamina propria of conchae
 - Become **engorged with blood** every 30 mins, causing distension of the mucosa; **airflow is blocked** via this nostril so directed via other nostril; allows mucosa to recover from **dehydration**

- Partly covered by **respiratory epithelium**; numerous seromucous glands underneath
- Lower folds: **vocal folds/vocal cords**
 - Stratified squamous epithelium** (protective)
 - Bundles of parallel **elastic fibres** (vocal ligament) and bundles of striated **vocalis muscles**
 - Vocalis muscles regulate tension between the folds and ligaments – variable tension produces different sounds
- Transitions from protective stratified squamous to functional pseudostratified ciliated columnar epithelium (respiratory epithelium)

Trachea

- Lined with **respiratory mucosa**; numerous **seromucous** glands in lamina propria produce **watery mucous**
- C-shaped hyaline cartilage rings** keep lumen open
 - Rings are open on posterior surface against the **oesophagus**, and bridged by **trachealis muscle** (smooth muscle) and **fibroelastic tissue sheet** attached to the perichondrium
 - Prevent collapse- changes in pressure when thorax expands and contract
- Whole trachea surrounded by **adventitia**
- Trachealis muscle**
 - Relaxes during swallowing** to allow oesophagus to bulge into trachea lumen; elastic layer prevents excessive distension
 - Contracts in cough reflex**; narrows tracheal lumen, increased velocity of air to loosen material in the passage

Bronchial tree and lung

- At the **hilum** (opening to the lungs), **trachea** divides into two **primary bronchi**
 - Arteries, veins and lymphatic vessels also enter lungs here
- Primary bronchi split into **secondary (lobular) bronchi** – three in right lung and two in left lung
 - Each secondary bronchi **supplies a lobe** of the lungs
- Secondary bronchi divide into **tertiary (segmental) bronchi**
 - Each segmental bronchi and smaller branches comprise a **bronchopulmonary segment** – own connective tissue capsule and blood supply
- Tertiary bronchi divide into smaller bronchi then into **bronchioles**
- Bronchioles enter **pulmonary lobules**
 - Pyramid shaped, apex points to hilum
 - Delimited by thin connective tissue septum
 - Branch to form 5-7 **terminal bronchioles**