ANATOMY OF AIRWAY AND INTUBATION.
NOUR GHNAIMAT
Objectives:

1. The anatomical structures seen in region of intubation
2. Different classifications of airway structures
3. The technique of tracheal intubation
4. Assessment of patients airway including 1-2-3-Test
5. Laryngoscopes and type of blades
6. Tracheal tubes: size and types of tubes Shape of tube and specialized tubes
7. the laryngeal mask
8. Other apparatus including oro- and nasopharyngeal airways.
ANATOMY OF RESPIRATORY TRACT

- Anatomically into upper and lower tract in relation to vocal cord
- Or according to its function into conducting zone and respiratory zone.
  - Conducting zone:
    - Nose, pharynx, trachea, bronchi, bronchioles, terminal bronchioles
    - Function: filter, warm and moisten air and conduct air to and from the respiratory zone
  - Respiratory zone:
    - Respiratory bronchioles, alveolar ducts, alveolar sacs, alveoli
    - Function: gas exchange
ORAL CAVITY ANATOMY:

- Anterior Pillar
- Posterior Pharyngeal Wall
- Tongue
- Hard Palate
- Soft Palate
- Uvula
- Posterior Pillar
- Tonsil
pharynx

- fibromuscular structure that extends from the base of the skull to the cricoid cartilage at the entrance to the esophagus.
- Parts ??
- At the base of the tongue, the epiglottis functionally separates the oropharynx from the laryngopharynx (or hypopharynx). The epiglottis prevents aspiration by covering the glottis—the opening of the larynx during swallowing.
LARYNX

- cartilaginous skeleton held together by ligaments and muscle
- Located below the tongue and hyoid bone, between the great vessels of neck.
- Level of C4-C6
- 44mm in males and 36mm in females
- 9 cartilages of larynx
  - Thyroid
  - Cricoid
  - 2 arytenoid
  - 2 corniculate
  - 2 cuneiform
  - Epiglottis
### INTRINSIC MUSCLES OF LARYNX

<table>
<thead>
<tr>
<th>Muscle</th>
<th>Attachments</th>
<th>Innervation</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cricothyroid</td>
<td>anterior lateral surface of the cricoid cartilage to the inferior margin of the thyroid cartilage</td>
<td>superior laryngeal nerve, external branch</td>
<td>tenses vocal cord</td>
</tr>
<tr>
<td>Posterior Cricoarytenoid</td>
<td>posterior lamina of cricoid cartilage to the muscular process of arytenoid</td>
<td>inferior (recurrent) nerve</td>
<td>abducts vocal cord</td>
</tr>
<tr>
<td>Lateral Cricoarytenoid</td>
<td>lateral surface of cricoid cartilage to the muscular process of the arytenoid cartilage</td>
<td>inferior (recurrent) nerve</td>
<td>adducts vocal cord</td>
</tr>
<tr>
<td>Thyroarytenoid (Vocalis)</td>
<td>posterior surface of the thyroid cartilage to the muscular process of the arytenoid cartilage</td>
<td>inferior (recurrent) nerve</td>
<td>adducts vocal cord and relaxes the vocal cord</td>
</tr>
<tr>
<td>Arytenoid transverse</td>
<td>arytenoid cartilage to arytenoid cartilage</td>
<td>inferior (recurrent) nerve</td>
<td>adducts vocal cord</td>
</tr>
<tr>
<td>Oblique</td>
<td>arytenoid cartilage to arytenoid cartilage</td>
<td>inferior (recurrent) nerve</td>
<td>adducts vocal cord</td>
</tr>
</tbody>
</table>
EXTRINSIC MUSCLES OF LARYNX

- Sternothyroid muscles depress the larynx.
- Omohyoid muscles depress the larynx.
- Sternohyoid muscles depress the larynx.
- Inferior constrictor muscles
- Thyrohyoid muscles elevates the larynx.
- Digastric elevates the larynx.
- Stylohyoid elevates the larynx.
- Mylohyoid elevates the larynx.
- Geniohyoid elevates the larynx.
- Hyoglossus elevates the larynx.
- Genioglossus elevates the larynx.
LARYNGEAL FOLDS

- Vestibular fold: fixed, covers vestibular ligament, vascular pink in color. (false vocal cord)
- Vocal fold: mobile fold, voice production, covers focal ligaments, avascular. (true vocal cord)
- Glottis: gap between the vocal folds, the narrowest part of the larynx
Sensory innervation of airway:

- The sensory supply to the upper airway is derived from the cranial nerves.
INNERVATION OF LARYNX

- SENSORY (mucosa)
  - Above the vocal cords by the internal laryngeal branch of the superior laryngeal branch of vagus
  - Below the vocal cords by the recurrent laryngeal N.

- MOTOR
  - All intrinsic ms of larynx are supplied by the recurrent laryngeal N except the cricothyroid ms (by external laryngeal branch)
## The effects of laryngeal nerve injury on the voice

<table>
<thead>
<tr>
<th>Nerve</th>
<th>Effect of Nerve Injury</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Vagus nerve:</strong></td>
<td></td>
</tr>
<tr>
<td>Unilateral</td>
<td>Hoarseness</td>
</tr>
<tr>
<td>Bilateral</td>
<td>Aphonia</td>
</tr>
<tr>
<td><strong>Recurrent laryngeal nerve:</strong></td>
<td></td>
</tr>
<tr>
<td>Unilateral</td>
<td>Hoarseness</td>
</tr>
<tr>
<td>Bilateral:</td>
<td></td>
</tr>
<tr>
<td>Acute</td>
<td>Stridor, respiratory distress</td>
</tr>
<tr>
<td>Chronic</td>
<td>Aphonia</td>
</tr>
<tr>
<td><strong>Superior laryngeal nerve:</strong></td>
<td></td>
</tr>
<tr>
<td>Unilateral</td>
<td>Minimal effects</td>
</tr>
<tr>
<td>Bilateral</td>
<td>Hoarseness, tiring of voice</td>
</tr>
</tbody>
</table>
TRACHEA

- A cartilaginous and membranous tube
- Begins as a continuation of the larynx at the lower border of cricoid cartilage at the level of C6, and terminates at the carina, at the level of T5.
- Adults – 10-16 cm long and 2.5 cm in diameter
- Infants – 4-5 cm long and may be as small as 3mm in diameter
- Kept patent by the presence of C-shaped cartilaginous rings
Thank You