Otolaryngology

Medical specialty that studies anatomy and physiology of ears, nose, mouth, and throat (ENT) and uses diagnostic tests, medical and surgical procedures, and drugs to treat ENT diseases.

Anatomy and Physiology

- Ears, nose, and throat (ENT) system is contained entirely in head and neck
- Head contains:
  - internal and external structures of ears, nose, and mouth
  - internal structures of sinuses
- Neck contains internal structures of pharynx and larynx

Anatomy of the ENT System

- External Ear
  - known as auricle or pinna
  - helix - outer rim of tissue and cartilage
    - forms a C and ends at ear-lobe
  - external auditory meatus
    - opening that leads into external auditory canal (EAC)
  - external auditory meatus
  - opening that leads into external auditory canal (EAC)
Anatomy of the ENT System (cont’d)

- **External Ear (cont’d)**
  - External auditory canal has glands that secrete cerumen (waxy, sticky substance)
    - traps dirt
    - has antibiotic action against microorganisms that enter the canal
  - At end of canal is tympanic membrane (TM, eardrum)
    - thin dividing wall between external and middle ear

- **Middle Ear**
  - hollow area
    - inside temporal bone of skull
  - Contains three tiny bones collectively known as ossicles
    - malleus, incus, and stapes
  - Connected to:
    - nasopharynx
    - by eustachian tube

- **Eustachian tube**
  - allows air pressure in middle ear to equalize
  - with air pressure in throat and outside of the body

- **Mastoid process**
  - bony projection of temporal bone
  - just behind external ear
  - has tiny cavities filled with air
Anatomy of the ENT System (cont’d)

- **Inner Ear**
  - Contains 3 fluid-filled structures:
    - vestibule
    - semicircular canals
    - cochlea
  - All of these structures are known as the labyrinth

Anatomy of the ENT System (cont’d)

- **Vestibule**
  - Entrance area to inner ear
  - One end becomes three semicircular canals
  - Other end becomes coiled cochlea

Anatomy of the ENT System

- **External Nose and Mouth**
  - External nose –
    - Supported by nasal bone, forming bridge of nose and dorsum
  - At nasal tip
    - Nasal bone becomes cartilage
  - Nares (nostrils, singular-naris)
    - External openings

Anatomy of the ENT System (cont’d)

- External Nose and Mouth (cont’d)
  - Lips, cheeks, and chin
    - Supported by:
      - Maxilla (upper jawbone) and mandible (lower jawbone)
  - Nasolabial fold - Crease in cheek
    - From nose to corner of mouth
  - Philtrum –
    - Vertical groove above upper lip
  - Mentum - Chin

Anatomy of the ENT System (cont’d)

- **Sinuses**
  - Aka "paranasal sinuses"
    - Hollow cavities within bone
    - Lined with mucous membrane
  - Four sets of sinuses
    - Frontal
    - Ethmoid
    - Sphenoid
    - Maxillary

Anatomy of the ENT System (cont’d)

- **Nasal Cavity**
  - Nasal cavity walls have 3 long, bony projections –
    - Superior, middle, and inferior turbinates (nasal conchae)
      - Divide and slow inhaled air
      - Warm air
      - Provide moisture
  - Nasal cavity
    - Lined with nasal mucosa
    - Continuously produces mucus
Anatomy of the ENT System (cont’d)

Nasal Cavity
• Formed by:
  • ethmoid bone (of cranium) and
  • maxilla of upper jaw
• Nasal septum – vertical wall of cartilage
  • divides nasal cavity into right and left sides
• Cartilage becomes ethmoid bone (of cranium) in posterior nasal cavity

Oral Cavity
• Contains:
  • tongue
  • hard palate
  • soft palate
  • uvula
  • teeth
  • salivary glands
  • buccal mucosa – oral mucosa in the cheek area

Anatomy of the ENT System (cont’d)

Oral Cavity
• Hard palate (roof of mouth)
  • divides oral cavity from nasal cavity
• Made of 3 cranial bones:
  • maxilla (front of mouth), palatine bone, and vomer (back of mouth)
• Submental lymph nodes
  • under chin
  • contain lymphocytes and macrophages
    • attack bacteria and viruses

Anatomy of the ENT System (cont’d)

Pharynx (throat)
• Divided into 3 areas:
  • nasopharynx, oropharynx, and laryngopharynx
• Nasopharynx
  • becomes oropharynx (middle portion of throat)
  • eustachian tubes open into nasopharynx
  • roof and walls contain lymphoid tissue (adenoids)

Anatomy of the ENT System

Pharynx
• Oropharynx
  • middle portion of the throat
  • contains the palatine tonsils
• Laryngopharynx
  • contains the lingual tonsils on either side of the base of the tongue

Pharynx (cont’d)
• Tonsils and adenoids
  • part of lymphatic system
  • function in immune response
  • contain lymphocytes and macrophages
    • attack bacteria and viruses in oral cavity
Anatomy of the ENT System (cont’d)

Larynx (cont’d)

- Pharynx divides into 2 parts:
  - Larynx leads to trachea
  - Esophagus leads to stomach

Larynx (voice box)

- Short, triangular structure
- Surrounded by cartilage
- Can be seen at front of neck as laryngeal prominence (Adam’s apple)

At superior end of larynx is epiglottis

In middle of larynx are:

- Glottis, ligaments, and vocal cords

When you swallow

- Larynx moves up, closes against epiglottis to keep food from entering lungs
- Remains open during:
  - Breathing, speaking, or singing
  - To allow air to pass over vocal cords
Physiology of the Sense of Hearing (cont’d)

- **Vibration**
  - is transmitted to **cochlea**

- **Tiny hair cells**
  - detect loudness and pitch
  - send sensory information as **nerve impulses**
  - through **vestibulocochlear nerve**
  - to **medulla oblongata** (brainstem)
  - impulses relayed to **auditory cortex** (brain) for interpretation

**Figure 16-9** The sense of hearing. Andres Rodriguez/Fotolia

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**Ear Anatomy Animation**

Click on the screenshot to view an animation on the topic of ear anatomy.

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**Auditory System Animation**

Click on the screenshot to view an animation on the topic of ear anatomy.

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**Structures of the Human Ear Animation**

Click on the screenshot to view an animation on the topic of ear anatomy.

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**Diseases and Conditions**

- **Ears**
  - Acoustic neuroma (benign tinnitus, vertigo, hearing)
  - Cerumen impaction
Diseases and Conditions (cont’d)

- Ears (cont’d)
  - Cholesteatoma (epithelial cells and cholesterol in middle ear or mastoid)
  - Hearing loss (most common disability in U.S.)

Deafness Video
Click on the screenshot to view a video on the topic of deafness.

Otitis Media Video
Click on the screenshot to view a video on the topic of otitis media.

Diseases and Conditions (cont’d)

- Ears (cont’d)
  - Hemotympanum
  - Labyrinthitis (bacterial or viral inner ear infection – vertigo, altered balance, fever, nausea, vomiting)
  - Meniere’s disease (OVERaccumulation of fluid, loss of hearing)

Diseases and Conditions (cont’d)

- Ears (cont’d)
  - Motion sickness (better in front of car or train, upper deck of boat, wing seats in planes)
  - Otitis externa (“swimmer’s ear”, bacterial or fungal infection)
  - Otitis media (most common ear infection)
Diseases and Conditions (cont’d)

- Sinuses, Nose, and Nasal Cavity
  - Allergic rhinitis
  - Anosmia (loss of smell)
  - Epistaxis (nasal hemorrhage)

Diseases and Conditions (cont’d)

- Sinuses, Nose, and Nasal Cavity
  - Polyp (tumors on a stalk)
  - Rhinophyma (rosacea)
  - Septal deviation

After 1 laser tx, 45-90 min)

Diseases and Conditions (cont’d)

- Sinuses, Nose, and Nasal Cavity
  - Sinusitis

Diseases and Conditions (cont’d)

- Mouth, Oral Cavity, Pharynx, and Neck
  - Cancer of the mouth and neck
  - Cervical lymphadenopathy
  - Cleft lip and palate

Symptoms of Acute Upper Respiratory Tract Infection

- Sore throat
- Rhinorrhea
- Watery eyes
- Nasal congestion
- Sneezing
- Coughing
- Fatigue
- Other:
  - Headache
  - Nausea
  - Arthralgia
  - Pain in ears
  - Ear pressure
  - Nonproductive cough
  - Fever
  - Vomiting

Acute bronchitis usually results from an infection such as a cold or flu.
Diseases and Conditions (cont’d)

- Mouth, Oral Cavity, Pharynx, and Neck (cont’d)
  - Cold sores (HSV, type 1)
  - Glossitis (irritation of tongue; food allergy, infection, Vit B deficiency)
  - Leukoplakia (chronic irritation from tobacco, thickened white mucous membrane)

- Mouth, Oral Cavity, Pharynx, and Neck (cont’d)
  - Pharyngitis (sore throat)
  - Temporomandibular joint (TMJ) syndrome
  - Thrush (yeast - Candida albicans)

- Mouth, Oral Cavity, Pharynx, and Neck (cont’d)
  - Tonsillitis (bacterial or viral infection, enlargement)

Laboratory and Diagnostic Procedures (cont’d)

- Laboratory and Radiologic Tests
  - Audiometry (tests hearing ability frequency in Hz, intensity in dB)
  - Culture and sensitivity (C&S)
  - Rapid strep test (detects group A strep within 5 minutes)
Medical and Surgical Procedures

Medical Procedures
- Nose, sinus, mouth, and throat examinations
- Otoscopy

Surgical Procedures
- Cheiloplasty (lip revision)
- Cochlear implant (for sensorineural loss)
- Endoscopic sinus surgery
- Myringotomy (incision to relieve pressure, pus, fluid, tubes)

Surgical Procedures (cont’d)
- Plastic Surgery
  - Otoplasty (ears)
  - Rhinoplasty (nose)

Surgical Procedures (cont’d)
- Septoplasty
- Stapedectomy

Surgical Procedures (cont’d)
- Tonsillectomy and adenoidectomy (T&A)
- Tympanoplasty

16-8
Audiologist Video
Click on the screenshot to view a video on the topic of a career in audiology.
Back to Directory
Abbreviations

**AOR**  auditory cerumen response
**AO, AD** right ear; left ear; both ears
**AI, AII** left ear/curl; ear(s) tested; both ears, ear(s) untested
**KRAK** kinematic auditory reflex analysis
**KOB** cochlear otoscopy (otoscope)
**EEC** electrophysiological examination

*According to the Joint Commission on Accreditation of Healthcare Organizations (JCAHO) and the Institute for Safe Medication Practices (ISMP). These abbreviations should not be used, however, because they are still used by some healthcare providers, they are included here.*

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### Pronunciation

- **concha** (KOH-kah)
- **endoscopy** (en-DAWS-koh-pee)
- **epistaxis** (EP-ih-STAK-sis)
- **eustachian** (yoo-STAY-shun)
- **external auditory meatus** (eks-TER-nal AW-di TOH-ree mee AA-tus)
- **helix** (HEE-lik)
- **impedance** (IM-pee-dans)
- **incudal** (IN-koo-dal)
- **incudes** (IN-KYOO-diez)
- **labyrinthitis** (LAB-ih-rin-THY-tis)
- **laryngeal** (lah-RIN-jee-ah)
- **laryngopharynx** (lah-RING goh-FAIR-inks)
- **larynx** (LAIR-inks)

### Pronunciation

- **leukoplakia** (LOO-koh-PLAY-kee-ah)
- **mallemus** (MAL-ee-uh)
- **maxillofacial surgeon** (MAK-sil oh-FAY shal SER-jun)
- **Meniere’s disease** (MEN-ee AIRZ dah-ZEEZ)
- **mucosal hypertrophy** (myoo-KOH-sal hy-PEHR-troh-fee)
- **myringitis** (MEER-in-JEE-tis)
- **myringotomy** (MEER-ing-GAWT oh-mee)
- **nasolabial** (NAH-zoh-LAY-bee-ah)
- **otoralgia** (oh-TAL-jee-ah)
- **otitis externa** (oh-TYE-tis eks-TER-nah)
- **otitis media** (oh-TYE-tis MEE-dee-ah)
- **otolaryngologist** (OH-toh-ryh-LAIR-ing-GAWL oh-jist)
- **otosclerosis** (OH-toh-sklee-ROH-sis)

### Pronunciation

- **otoscopy** (oh-TAWS-koh-pee)
- **palatine tonsil** (PAL-ah-teen TAWN-sill)
- **pharyngeal** (fah-RIN-jee-ah)
- **pharyngitis** (FAIR-in-JEE-tis)
- **rhinophyma** (RY-noh-FY-mah)
- **rhinorrhea** (RY-noh-REE-ah)
- **stapedectomy** (STAY-peh-DEK-toh-mee)
- **stapedial** (stah-PED-ee-dal)
- **temporomandibular joint** (TEM-poh-ROH-man-DIB-yoo-lar JOINT)
- **tympanic membrane** (tym-PAN-ik MEM-brain)
- **tympanoplasty** (TAYM-pah-NOH-PLAS-tee)
- **vestibulocochlear nerve** (ves-TIB-yoo-lar KOH-klee-ar NERV)
- **vestibule** (VES-tih-BOOL)

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**Summary**