GOALS: 1) Review landmarks of head and neck exam  
   2) Learn to examine thyroid gland

EVIDENCE-BASED LESSON: You can often rule out goiter with thyroid gland inspection.

Anatomy

Skull- 7 bones separated by suture lines

Fontanelles- important during labor and when assessing infants

<table>
<thead>
<tr>
<th>Anterior</th>
<th>Triangle shape</th>
<th>Closes at age 2 months</th>
</tr>
</thead>
<tbody>
<tr>
<td>Posterior</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Changes from birth process

Molding- cranial bones shift and overlap during trip through birth canal

Resolves within about 1 week

Caput succedaneum- subcutaneous edema, will cross suture lines

Cephalhematoma- subperiosteal blood, so does not cross suture

Neck

Triangles of the neck

<table>
<thead>
<tr>
<th>Anterior:</th>
<th>Bordered by mandibles and sternocleidomastoids (SCM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Posterior:</td>
<td>Bordered by trapezius, SCM, and clavicle</td>
</tr>
</tbody>
</table>

Location of

<table>
<thead>
<tr>
<th>Thyroid cartilage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cricoid cartilage</td>
</tr>
<tr>
<td>Isthmus of thyroid gland</td>
</tr>
</tbody>
</table>

Important landmarks, especially for emergency cricothyroidotomy
Anatomy, Neck, cont’d

Lymph nodes-
  Occur in groups; size is tiny to 1cm- see page 233 for diagram
  **Enlargement can provide early clue to infection or malignancy**
  Function:
    - Defend against invading organisms
    - A partial barrier (but also a pathway) to spread of malignancy
  Lymphoid tissue mass increases rapidly, especially between ages 6-9,
  peaks at 9-12 and then regresses to adult levels
  (This includes tonsils, which can appear very large!)

Examination of the head

Inspection
  - Landmarks of face: Palpebral fissures, nasolabial folds
  - Look for symmetry, size, shape, and involuntary movements
  - Hair: Growth patterns, lice

Palpation
  - Skull: deformity from trauma, muscular tenderness from tension headaches
  - Temporal arteries: thickening, tenderness, or absent pulse in temporal arteritis
  - Hair: texture may change in thyroid disease

Examination of the neck

Inspection
  - Symmetry, goiter, scars
  **EVIDENCE-BASED LESSON:**
  Goiter is essentially ruled out if thyroid gland is not visible with neck extension. (JAMA 273; 10: 813-817)

Palpation
  - **Trachea:** should be midline, palpate superior to suprasternal notch
    - Deviation may be sign of a mass or a tension pneumothorax
    - Downward “tugging” may suggest aortic aneurysm
  - **Lymph nodes:**
    - Technique:
      - In general, may examine with each organ system, or focus on lymph system alone
      - Gentle pressure with pads of fingers 2,3, and/or 4
      - Compare bilaterally
      - Patients will often hyperextend neck for exam- encourage them to flex gently
      - Have your own order: text suggests posterior to anterior, superior to inferior
        - e.g.- occipital, postauricular, posterior cervical, anterior cervical, tonsillar, submandibular, submental, parotid, preauricular, supraclavicular
Palpation, lymph nodes, cont’d

Findings:
- Size: small, movable, discrete, nontender nodes often called “shotty”
- Consistency: hard or rubbery
- Mobility: mobile or fixed
  - “Matted” nodes are enlarged, fixed, contiguous
- Tenderness: suggests inflammation
- Warmth: suggests inflammation

If you find enlarged nodes, check drainage areas for infection, inflammation, or cancer

Important example:
- “Virchow’s node” - left supraclavicular
  - Often a clue to abdominal or thoracic malignancy

Common example:
- Tonsillar or retropharyngeal nodes often enlarged in strep throat

Thyroid gland: palpate for size, nodules, and tenderness

Technique
- Anterior or posterior approach
- Relax neck by using neutral position, also may further relax muscles on one side by tilting toward that side
- Use a gentle touch
- Have the patient swallow a sip of water while you palpate

CLINICAL SITUATION
You are seeing a patient with a “thyroid problem,” but the chart is lost. What would you look for on history and physical exam?

Hypothyroidism
- Symptoms: Cold intolerance, fatigue, constipation, weight gain
- Signs: Coarse/dry hair and skin, periorbital puffiness, edema

Hyperthyroidism
- Symptoms: Heat intolerance, anxiety, diarrhea, weight loss, palpitations
- Signs: Tachycardia, proptosis/eyelid retraction, warm moist skin

Auscultation

Bruit (BROO-ee): audible swishing sound over an artery or vascular organ
- Carotid arteries: future lecture
- Thyroid gland: may hear bruit over an enlarged, hyperactive gland
II. Ears, Nose, And Throat

GOALS: 
1) Develop a routine for ear, nose, and throat (ENT) exam 
2) Learn physical exam maneuvers to distinguish types of hearing loss 
2) Introduce techniques for use of otoscope, nasal speculum, and sinus transilluminator

EVIDENCE-BASED LESSON: 
History and physical findings that support diagnosis of sinusitis

Anatomy of the ear

External ear: Auricle (or pinna) and external auditory canal (EAC) are cartilage covered with thin, sensitive skin 
Cerumen secreted from distal 1/3 of canal- protects skin

Middle ear: Tympanic membrane (TM) normally looks “pearly gray”
   Pars tensa- inferior 2/3
   Pars flaccida- superior 1/3 (covers the chorda tympani)
   Umbo- where malleus attaches to TM, pulling the TM into a conical shape
   Malleus- manubrium (handle) and short process are visible
   A retracted TM makes the short process prominent
   Light reflex- cone of light that radiates anterior/inferior from the umbo
   Eustachian tube- equalizes middle ear pressure

Examination of the ear- Inspection

External ear

Position: Top of auricle should be above line drawn between outer canthus of eye and occipital protuberance
Low set auricle may signify chromosomal abnormality

Possible findings

Tophi- deposits of uric acid crystals found in patients with gout
Chondritis- infection of cartilage- often caused by piercing
“Cauliflower”-repeated trauma causes cartilage necrosis
Otitis externa- “swimmer’s ear”, pulling on lobe often painful
Examination of the ear, continued

**Middle ear- otoscopic exam**

**Technique**
- Use largest speculum that is comfortable
- Learn a comfortable hold for the otoscope
- Insert otoscope slowly, avoiding bumping the canal-
  “Look your way in”
- Manipulate auricle (usually superiorly and posteriorly) to see TM
- **Cerumen removal** may be necessary
  - Cerumen spoon- often causes EAC bleeding
  - Irrigation – contraindicated if TM perforation
  - Removal with direct visualization

**Pneumatic otoscopy-** assesses mobility and compliance of TM
- Air pressure should move TM- light reflex looks like a sail in wind
- Effusion (fluid in middle ear) will hamper TM mobility
- Retraction from eustachian tube dysfunction may allow movement
  only with negative pressure
- A specially designed speculum allows you to seal EAC more easily

**Findings**

**Mobility**
- Bulging, no mobility         Pus in middle ear- otitis media (OM)
- Retracted, no mobility      Eustacian tube dysfunction +/- effusion

**Color**
- Red                      Infection, crying
- Deep red or blue          Blood (from trauma)
- White flecks, plaques     Healed inflammation

**Bubbles**                   Serous fluid

**Hearing Evaluation**

Screening begins as soon as you meet your patient!
- Whispered voice- test each ear separately
- Weber test- base of 256/512 Hz tuning fork to vertex
  “In which ear do you hear the sound better?
  Normally, sound is heard equally
- Rinne (RINN-e or rin-NAY) test
  Bone conduction (BC)-base of vibrating fork to mastoid;
  then when sound stops, test
  Air conduction (AC)- tines 2cm from EAC
  Normally, remaining time of AC is 2x BC
Examination of the ear, continued

Hearing Evaluation, cont’d

Conductive hearing loss: external or middle ear problem
  Weber: lateralizes to (heard better in) affected ear
  Rinne: BC > AC

Sensorineural hearing loss: inner ear problem
  Weber: lateralizes to better ear
  Rinne: AC > BC

Equilibrium testing: Come back to this section during neuroanatomy!
  If you suspect a vestibular problem causing loss of balance--
  Caloric testing: warm or cold stimulus in EAC should cause horizontal
  nystagmus (rapid movements of eye right or left followed by slower correction
  back to the point of focus)

  Direction of nystagmus is defined as the direction of the rapid portion

  Use COWS to remember the normal response:
  Cold water in EAC causes nystagmus to Opposite side, while
  Warm water stimulus causes nystagmus to Same side as the stimulus

Examination of the Nose-Inspection

External nose- possible findings
  Deformity- trauma
  Discharge- infection, trauma, foreign body
  Flaring- respiratory distress
  Transverse crease- from “allergic salute”

Nasal cavity
Technique
  May use nasal speculum or largest otoscope speculum
  Nasal speculum should open in anterior-posterior direction,
  NOT pressing on sensitive septum

Findings
  Bluish, swollen mucosa- allergies
  Generalized redness- infection
  Bleeding- often from Kiesselbach plexus, on anterior septum
Examination of the Sinuses
Frontal and maxillary sinuses are the most accessible to examination
Palpation and percussion may or may not be helpful
Transillumination of maxillary sinuses:
  - Darken room completely
  - Patient seated with head back, mouth open and eyes closed
  - Light source just lateral to nose and inferior and medial to eye
  - Look for light transmitted through sinuses to hard palate
  - Lack of transillumination suggests that sinus is filled with secretions

EVIDENCE BASED LESSON:
“Does This Patient Have Sinusitis?” JAMA 270(10): 1242-6
The following increase the likelihood that your patient has sinusitis:
  - History of colored nasal discharge
  - Poor response to decongestants
  - Maxillary tooth pain
  - Physical exam showing purulent nasal discharge and abnormal
    maxillary sinus transillumination

Examination of Mouth and Oropharynx

Anatomy
Oral Cavity:
  - Stensen ducts (parotid glands) open opposite to upper 2\textsuperscript{nd} molars
  - Wharton ducts (submandibular glands) open lateral to frenulum
Oropharynx: posterior to tonsillar pillars
Teeth:
  - Eruption of deciduous teeth- rule of 6 (with many exceptions!)
    - 2 at 6 months
    - 6 at 12 months
    - 12 at 18 months
    - 18 at 24 months
  - Permanent teeth start forming at age 6 months

Inspection
Lips- possible findings:
  - Angular cheilitis (key-LY-tis)
  - Actinic cheilitis- sun damage, may precede cancer
  - Angioedema- allergic swelling
  - Herpes labialis- “cold sore”
  - Carcinoma
Colors:
  - Pale- anemia
  - Blue- cyanosis
  - Red- CO poisoning
Examination of Mouth and Oropharynx, continued

Inspection, continued

**Oral cavity**

**Technique:** use tongue blade and/or gloved finger for thorough inspection of buccal mucosa, gums, teeth, and entire oral cavity

**Findings**

- Buccal Mucosa:
  - Thrush- adherent white patches

- Tongue:
  - Geographic tongue
  - Smooth – may indicate vitamin deficiency
  - Glossitis
  - Black hairy tongue
  - Varicosities
  - Nonhealing ulcer or nodule- consider cancer

**Oropharynx**

**Technique**

- “Say ‘ah’”
- “Pant like a dog”- can keep you from having to use the tongue blade
- Tongue blade, if needed, is more palatable if moist

**Findings**

- Bifid uvula- may indicate cleft palate
- Asymmetric movement of soft palate- lesion of CN IX or X
- Erythema, exudate- tonsillitis
- Asymmetric tonsillar swelling- peritonsillar abscess
- Post-nasal drip

**INFANTS - special considerations**

- **Position:** parent’s lap or shoulder
- **Timing:** save ear/pharynx exam for last
- **Ear exam:** canal often curves up, so often must pull pinna posterior and inferior, unlike with adult
- **Pharynx:** can often get a good look during crying
III. The Eyes

GOALS: 1) Develop a routine for examination of the eye
        2) Become familiar with use of ophthalmoscope

Anatomy
External eye:  Eyelids, lacrimal gland and duct
Internal eye:  Light travels through cornea, anterior chamber, pupil, lens, and vitreous body on the way to the retina.
              Ophthalmoscope can focus at any of these levels

Examination: Inspection
Vision testing
Should be done with any visit involving an eye complaint, also used to screen children for visual problems

Acuity:
    Far vision- test at 20 feet with Snellen chart
    Near vision- test at 14 inches with pocket chart
    Test without, then with corrective lenses

Visual fields:
    Confrontation test estimates peripheral vision (may be important in glaucoma, multiple sclerosis, stroke, or pituitary or other CNS tumor)
    Use your own visual fields as a reference

External exam
    Be systematic- for example, move from peripheral to central areas

Findings:
Eye brows:  Loss of lateral growth may suggest hypothyroidism
            Xanthelasma- irregular, slightly raised yellow periorbital lesions may suggest lipid disorder

Eyelids:  Ptosis (TOH-sis)- if upper lid covers part of pupil (muscle weakness or neurologic lesion)
          Ectropion (lid turned out) or Entropion (lid turned in)
          Hordeolum (stye)- inflammation of sebaceous gland
          Foreign body- may need to evert lid for full inspection

Conjunctiva:  Hemorrhage- from trauma
              Conjunctivitis- inflammation from infection, allergy…
              Pterygium (ter-IG-ee-um)- growth of conjunctiva over cornea
External exam of eye, continued

Cornea:  Sensation tests cranial nerve V (CN V)
         Arcus senilis- lipid deposits, seen in many elderly
         Special exam techniques for corneal abrasion

Pupils:  Check direct and consensual response to light
         May also check accommodation (constrict with near focus)

         Miosis (my-OH-sis) if <2mm (narcotic use, elderly)
         Mydriasis (mi-DRY-ah-sis) if >6mm (head injury, drugs)
         Anisocoria- unequal pupil size, may be normal variation

Sclera:  Icterus- yellow discoloration that indicates jaundice

Extraocular eye movements:  test CN III, IV, VI and 6 extraocular muscles (EOM)

Technique
Patient watches your finger move through 6 “cardinal positions”

Findings
Lack of coordinated movement
   (problem with cranial nerves or muscle strength/alignment)
Nystagmus- involuntary rhythmic eye movements
   A few beats of horizontal nystagmus at extreme
   lateral gaze is normal
Lid lag- exposure of sclera over iris as patient moves eyes
   inferiorly (found in hyperthyroidism)

Other techniques to assess balance of EOM
Used most often in screening young children
   Corneal light reflex
   Cover-uncover testing

Ophthalmoscopic exam (preparation for 90-minute workshop in February 2003)

Goal:  examine optic disc, arteries, veins, and retina

Technique
Allow pupils to dilate
   -  darken room
   -  use least light possible from scope (dim, small aperture)
   -  may consider mydriatic drops (if you do, examine for shallow
      anterior chamber to avoid acute narrow-angle glaucoma)

Examine patient’s right eye with your right eye and scope in right hand,
   patient’s left eye with your left eye and scope in left hand
Keep your other eye open
One hand on patient’s head for proprioception, stabilization
**Ophthalmoscopic exam** continued

**Technique, continued**

Begin on a mid-high green number (book says 0) for complete exam, dial toward 0 to focus on retina – adjust focus (higher red numbers if nearsighted) 
Aim from 15° lateral to patient’s directed gaze to reach optic disc 
Trace vessels back to disc 
Finally, have patient look at light to examine macula

**Findings**

Papilledema- vague disc margins, suggests increased intracranial pressure (ICP) 
Hemorrhages- from diabetes, glaucoma, hypertension 
Exudates- many causes 
Vessels: 
  - Arterioles- brighter, redder, narrower (2/3 to 3/5 diameter of venules) 
  - Venules- more purple, wider

Venous pulsations- normal, but not always present 
  - If present, rule out increased ICP 
  - “Nicking” of veins where arteries cross- seen in hypertension

**CLINICAL SITUATION:**

You are performing an ophthalmoscopic exam on a patient with hypertension 
What might you find?

Keith-Wagner classification for hypertensive retinopathy

**Group I:** Increased arteriole light reflex

**Group II:** Arterial-venous (AV) crossing changes 
  - A/V diameter ratio 1 / 2

**Group III:** Cotton wool spots- yellow areas with poorly defined margins representing retinal infarcts 
  - Hemorrhages

**Group IV:** Papilledema- optic disc loses definition from increased intracranial pressure (ICP)