7. Additional Murmurs —
The specific characteristics of the important murmurs will be discussed in detail in the SBM course, and you can refer to Swartz for more detail. For now, you should be comfortable describing how to differentiate aortic stenosis from mitral regurgitation and you should also know how to listen for and identify aortic insufficiency and mitral stenosis.

Aortic pressure

Left Ventricular Pressure

Left Atrial Pressure

Systole

Diastole

Aortic Valve opening

Aortic Valve closure

Mitral Valve opening

Mitral Valve closing

Aortic Stenosis

S1

S2

S4

Mitral Regurgitation

Aortic Regurgitation

Mitral Stenosis

Mitral Valve opening snap
a. Aortic Stenosis and Mitral Regurgitation— learn the features which distinguish these 2 common systolic murmurs.

<table>
<thead>
<tr>
<th>Two common systolic murmurs</th>
<th>Aortic Stenosis</th>
<th>Mitral Regurgitation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location</td>
<td>Aortic area</td>
<td>Apex</td>
</tr>
<tr>
<td>Radiation</td>
<td>Neck</td>
<td>Axilla</td>
</tr>
<tr>
<td>Shape</td>
<td>Diamond</td>
<td>Holosystolic</td>
</tr>
<tr>
<td>Pitch</td>
<td>Medium</td>
<td>High</td>
</tr>
<tr>
<td>Quality</td>
<td>Harsh</td>
<td>Blowing</td>
</tr>
<tr>
<td>Associated signs</td>
<td>Decreased $A_2$</td>
<td>Decreased $S_1$</td>
</tr>
<tr>
<td></td>
<td>Slow rising and delayed pulse</td>
<td>Laterally displaced diffuse PMI</td>
</tr>
<tr>
<td></td>
<td>Ejection click</td>
<td>$S_3$</td>
</tr>
<tr>
<td></td>
<td>Narrow pulse pressure</td>
<td></td>
</tr>
</tbody>
</table>

b. Aortic Insufficiency —
   i. Acute AI — $S_1$ and $S_2$ are both soft
      • $S_3$ and $S_4$ are commonly heard as before, the patient should be supine or in the left lateral decubitus position, listening over the apex with the bell
      • Murmur is short, decrescendo, blowing
      • Listen over the left sternal border in the 3rd and 4th interspaces. Ask the patient to sit up, lean forward and exhale and not take another breath - this makes the murmur easier to hear since you won’t be confused by the patient's breath sounds
   ii. Chronic AI — $S_1$ and $S_2$ are usually normal
       • $S_3$ is common
       • An aortic ejection sound may be present
       • Murmur is high pitched, blowing and decrescendo along the left sternal borner. This is heard best with the patient sitting up and leaning forward at end expiration (same as acute AI)
       • Severity of the murmur correlates with the duration of the murmur
       • Austin Flint murmur is common - this is a low pitched diastolic rumble secondary to from the regurgitant jet of blood across the aortic valve which causes early mitral valve closure

c. Mitral Stenosis — $S_1$ is loud - this is the hallmark of MS
   • Murmur is difficult to hear - it is heard best with the bell between the LLSB and apex, with the patient in left lateral decubitus position
   • Opening snap is diagnostic of MS - this is heard after $S_2$ at the apex with the diaphragm
   • Severity of MS correlates with the timing of the opening snap (if OS is earlier, murmur is more severe) and with the duration of the diastolic rumble and NOT with the intensity of the murmur.
   • A loud $P_2$ is heard if pulmonary hypertension is present
   • Atrial fibrillation is commonly present if this is a longstanding diagnosis

8. Peripheral Edema — When peripheral venous pressure is high, such as in CHF, transudation of fluid occurs and edema results. This should be looked for in dependent areas such as the ankles or, in bedridden patients, over the pre-sacral area. To test for this, press the fingers for a few seconds over the lower tibia or sacrum and see if the impression remains when the fingers are removed. Pitting edema is quantified from 1+ to 4+. There are other causes of peripheral edema such as renal failure and cirrhosis.

9. Orthostatic Blood Pressure Measurement —
If your patient complains of lightheadedness or pre-syncope or has a h/o blood loss or dehydration or autonomic nervous disease, you will want to make sure that they are not orthostatic. After checking a patient's blood pressure and heart rate in the supine position, have the patient sit and repeat the measurements after 1-5 minutes (equilibration may take longer in elderly and diabetic patients). Then have the patient stand and again repeat the measurements after 1-5 minutes. Orthostatic blood pressure changes are defined as a blood pressure fall of 20 mmHg or more from supine to standing which should be accompanied by at least a 10 point rise in pulse. If a patient is volume depleted, their CVP will also fall below the normal range of 5-8 cm.

10. Pulsus Paradoxus — Defined as a greater than 10 mm. decrease in systolic pressure noted during inspiration. Pulsus paradoxus (also called a “paradox”) is seen in pericardial tamponade, constrictive pericarditis, decompensated COPD and asthma.

11. Pediatric Cardiac Exam —
   a. Differences from adult:
      i. Small size makes localization difficult.
      ii. Rapid heart rate makes timing of heart sounds difficult.
      iii. Different problems—often a search for congenital heart defects rather than acquired problems.
      iv. Uncooperative patients. It is impossible to hear heart sounds when the patient is wailing.
      v. Strategy — "Go with the flow" - Get what you can when you can.
   c. Precordial activity — PMI is often visible. It is located at the 4th interspace until age 7, when it drops to the level of the 5th interspace. It is located left of the midclaviular line between ages 4-6, and moves to the right of this line at age 7.
   d. Check blood pressure in arm vs. leg. A decreased lower extremity blood pressure suggests coarctation of the aorta.
   e. P2 is often heard at the apex in children and doesn't mean pulmonary hypertension.
   f. Splitting of S2 at the apex is found in 25-33% of infants and children but is of no significance.
   g. Characterization of murmurs — The murmur in children is very important in differential diagnosis. It is important to distinguish between the innocent and the organic murmur. More than 50% of children develop an innocent murmur at some time during childhood. Murmurs are graded on a scale of 1-6.
      i. Still's murmur — The murmur is systolic and has a vibratory, buzzing quality. This is the most common murmur heard in children and is not abnormal.
      ii. VSD (Ventricular Septal Defect) — A holosystolic murmur (S1 coincident), varying from blowing to harsh. Pitch of murmur correlates with VSD size. Intensity does not.
      iii. ASD (Atrial septal defect) — The hallmark of the heart sounds with an ASD is the widely split S2. The systolic murmur is due to increased flow across a normal pulmonic valve.
      iv. PDA — (Patent ductus arteriosus) — A continuous murmur often described as machinery-like.
      v. PS (Pulmonic stenosis) — A systolic ejection murmur (starts after S1), usually harsh, radiating to the back. A systolic ejection click is often heard with mild PS.
      vi. AS (Aortic stenosis) — A systolic ejection murmur (starts after S1), radiating to the neck. A systolic ejection click is often heard with mild AS, as well as with an isolated bicuspid aortic valve.
      vii. Coarctation of the aorta — this produces a systolic ejection murmur which is indistinguishable from AS/PS, other than by its prominence in the back.
      viii. Jugular venous hum — This is a continuous murmur heard over the lower neck above the middle third of clavicles especially on the right; it can be obliterated by pressure on jugular veins. It is pitched low so listen with a bell. It has a humming or roaring quality which is loudest in diastole. It is common in kids and into young adulthood.

12. Summary of the Cardiac Exam: **Listen for one thing at a time**
a. Measure the pulse and blood pressure. (Examine for orthostatic changes when appropriate)

b. Have the patient lie supine and palpate the carotid pulse. (One side at a time)

c. Inspect the neck and identify the external jugular vein and the pulsations of the internal jugular vein. Estimate the central venous pressure by observing for venous pulsations with the patient at different elevations.

d. In the supine position, palpate over the aortic, pulmonic, tricuspid, and apical areas of the precordium. Note the location of the apical impulse with the patient lying supine. Assessment for size and timing can be done with the patient in left lateral decubitus position.

e. Listen with the bell and diaphragm over the four auscultatory areas. Listen also over the neck and axilla. Listen sequentially at each area for S1, S2, extra sounds, and murmurs (listening first in systole for systolic murmurs, then in diastole for diastolic murmurs).

f. Palpate the femoral pulse, popliteal pulse, dorsalis pedis and posterior tibial pulse bilaterally.

g. Look for edema and press over the shin for pitting edema.

h. Special maneuvers:
   i. Listen in the left lateral decubitus position to hear ventricular gallops if you suspect they are present but they are not audible in the supine position.
   ii. Listen with the patient sitting up and leaning forward to hear aortic regurgitation.

Sample write-up of a adult cardiac exam:

Middle aged Hispanic male in no distress

BP 145/82  P 72 regular, RR 12

CV: PMI 5th ICS in MCL, nl S1, S2, no murmurs, gallops or rubs, no heaves, thrills.  CVP 7 cm.

Pulses:

<table>
<thead>
<tr>
<th>Carotids</th>
<th>Radial</th>
<th>Femoral</th>
<th>Popliteal</th>
<th>Dorsalis Pedis</th>
<th>Posterior Tibial</th>
</tr>
</thead>
<tbody>
<tr>
<td>R</td>
<td>nl</td>
<td>nl</td>
<td>decreased</td>
<td>absent</td>
<td>absent</td>
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<tr>
<td>L</td>
<td>nl</td>
<td>nl</td>
<td>decreased</td>
<td>absent</td>
<td>absent</td>
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</tbody>
</table>

Sample write-up of a cardiac case including history and physical:

JS is a 58-year-old male smoker with a 10 year h/o HTN and 2 year h/o angina who presents to the ER with prolonged chest pain. He reports having had a stable pattern of angina for the past two years, occurring less than once a month and occurring only with moderate to heavy exertion. Today, JS started having chest pain 4 hrs ago while mowing the lawn. He took one nitroglycerin with total relief of the pain in 5 min., but the pain returned once he started mowing again. He took another nitroglycerin with some relief after 10 minutes. He stopped mowing the lawn and lay down and the chest pain subsided over 15 minutes. Within an hour the chest pain returned and could not be relieved with a a third ntg. He described the pain as identical to his usual “pressure-like “ angina, but more severe, "like an elephant sitting on my chest" associated with SOB. It was also associated with diaphoresis but he denied associated nausea, vomiting, or radiation of the pain. He drove himself to the local ER.

The patient takes atenolol 50 mg/day for his HTN and angina. His BP’s have been well-controlled in the 135/85 range,. He has been lovastatin 40 mg/day for 3 years for his hypercholesterolemia, his most recent LDL was 128 in 4/99. The patient has smoked 1ppd for 30 years and gets no regular exercise.

Family Hx: Father died of MI at age 62, mother has hypertension.
Habits: no alcohol, diet — tries to follow low cholesterol, low salt diet.

Physical Exam:

Anxious, diaphoretic male
VS: BP 170/100, Pulse 98, Resp 26, afebrile

CV: PMI 5th ICS MCL, normal S1, S2, + S3, no murmurs, CVP 11 cms, carotids with nl upstroke, no bruits bilaterally
Pulm: bibasilar coarse rales, no wheezes or dullness, otherwise decreased breath sounds throughout
Abdomen: nl BS, no HSM, no masses or tenderness
Ext: no cyanosis, no edema.

Case #2: Louis Levitt

A 48-year-old man named Louis Levitt is brought to the emergency room complaining of chest pain. His vital signs are recorded to be the following: BP: 140/90 Pulse: 100 Respiration: 14 Temperature: 98.6°F
You have 15 minutes to evaluate Mr. Levitt. What parts of the history and physical examination are relevant to this patient?
Advanced Abdominal Exam
This session will only be briefly covered during the year 2 sessions, with a focus on the abnormalities (see goals # 6-8 below).
The basic abdominal exam was discussed during your first year and is included here for the purpose of review. You are responsible for knowing this material for your GI SBM exam and your On Doctoring final physical diagnosis exam.

Preparation for September 9th session:
1. Review the Abdominal Exam video before today’s session (on reserve in Dana Library).
2. Syllabus — Physical Diagnosis pp. 62 - 66 Abdominal Exam
   The Abdomen Chapter 16 (Adult), and pp. 695-696, 710, 715, 720, 726 (Pediatric)

Goals for learning the abdominal exam:
Be able to:
1. Identify the key abdominal landmarks
2. Evaluate abdominal sounds and distinguish normal from abnormal
3. Percuss and palpate the liver and assess its size
4. Explain the significance of different percussion notes
5. Evaluate spleen size by percussion and palpation
6. Evaluate a patient for ascites
7. Perform the special maneuvers to diagnose acute appendicitis
8. Perform the special maneuvers to diagnose acute cholecystitis

A. Differential Diagnosis of Abdominal Pain — Remember that abdominal pain can be caused by non-abdominal causes such as cardiac, pulmonary and gu sources among others, and that these portions of the physical exam need to be done in addition to the abdominal exam in patients complaining of abdominal pain. For example, strep infections may often present initially in children as abdominal pain. Likewise, a LLL pneumonia may present as LUQ pain, a myocardial infarction may present as epigastric pain and testicular complaints in men often present as abdominal pain.

B. General Approach — With patient lying down, place gown over chest; turn drape down and raise bottom of gown to expose abdomen, leaving chest, legs, and pubic areas covered. The simultaneous use of the gown and drape in the fashion described is very important in protecting the patient’s modesty.
   1. Make sure you have good light, a relaxed patient (without a full bladder!), and full exposure of the abdomen from above the xiphoid to the symphysis pubis.
   2. Have the patient keep their arms at their side so that their abdominal muscles are relaxed.
   3. You may need to distract the patient with conversation.
   4. Once you become proficient at the exam, you can do your ROS while conducting the exam.
   5. Proceed in an orderly sequence and always do the exam in the same sequence: inspection, auscultation, percussion and palpation of the abdomen and assessment of the liver, spleen, kidneys and aorta.

C. Inspection — Carefully look at all 4 quadrants. Note:
   1. Skin – describe or diagram any scars, striae, dilated veins, rashes or lesions.
   2. Umbilicus – contour, location and signs of inflammation or hernia..
   3. Contour of abdomen – flat, rounded or protuberant? Any bulging in the flanks?
   4. Symmetry – lack of symmetry may be a clue to an underlying mass or to an enlarged liver or spleen.
5. Peristalsis – if you suspect intestinal obstruction, look for this; ask students to describe the symptoms that a patient would present with if they had intestinal obstruction.

6. Pulsations – normal aortic pulsation is frequently visible in thin people in the epigastrium.

D. Auscultation — Use the diaphragm of your stethoscope to auscultate the abdomen. Listen for bowel sounds, bruits and friction rubs as follows:

1. Bowel sounds. If these are heard in one quadrant, there is no need to listen in the other quadrants. You must listen for 2 minutes before deciding that BS are absent. Note their pitch, frequency and character. BS will disappear late in the presentation of peritonitis and their absence is an ominous sign. With obstruction, you will hear high pitched rushes when listening to a patient’s bowel sounds.

2. Bruits, if patient has HTN, listen in the epigastrium and each upper quadrant for bruits; when patient is sitting up, you should also listen for these in the costovertebral angles. An epigastric bruit confined to systole can be heard in normal individuals.

3. If a patient complains of claudication and you suspect arterial insufficiency in the legs, listen for bruits over the aorta, the iliac arteries and femoral arteries. However, bruits confined to systole are fairly common and may be heard in normal people.

4. Friction rubs may be heard in patients with primary and metastatic malignancies, transiently after liver biopsies, with infective and inflammatory conditions and with or without hepatomegaly. However, they are rare – less than 10% of patients with liver tumors have a friction rub. They sound like velcro being ripped open or hair being rubbed together right next to your ear.

5. Venous hum – this is a continuous sound in the abdomen which is benign. It will decrease when pressure from the stethoscope is applies. It is caused by a communication between the umbilical vein and abdominal wall veins.

E. Percussion — Percuss the abdomen lightly in all four quadrants and note the quality of the percussion note (tympanic, resonant, dull, or flat). Percuss to identify the upper and lower borders of liver dullness and measure the liver span. Percuss over the stomach and identify the gastric air bubble.

1. Useful to help you assess amount and distribution of gas and to identify possible masses that are solid or fluid filled.

2. Note dullness that might indicate an underlying organ such as the liver. The normal liver span in men is 8-12 cm. the MCL; in women it is 6-9.5 cm in the MCL . Half of all palpable livers are not enlarged. Remember that is a patient has hyperinflation of his/her lungs, e.g. from COPD, then the upper margin will be shifted downward in which may make a normal sized liver palpable. If it is difficult to percuss the liver edge, then you can perform the scratch test – this has not been well studied so it is not known how well this correlates with liver size.

3. The spleen is percussed in Traube’s space. This space is defined by the 6th rib superiorly, the mid-axillary line and the L costal margin. Percuss laterally starting at the midline one or more intrathoracic levels. Normally, the percussion note in this space is resonant. If you elicit dullness in Traube’s space, this indicates splenomegaly. Splenic percussion has a sensitivity of 62% and a specificity of 72%; these figures are improved if the patient is thin or hasn’t eaten for at least 2 hours. Dullness may also indicate an underlying mass such as an enlarged bladder or a malignancy.

4. Percussion of the kidneys is done posteriorly by gently percussing over the flanks.

F. Palpation — Palpate the abdomen lightly in all four quadrants for any superficial masses. Then palpate deeply and note the presence of any areas of tenderness or any masses. Attempt to palpate the edge of the spleen, the edge of the liver. You probably will not feel them. Palpate in the upper abdomen to identify the aortic pulsation.

1. Before palpation, ask the patient to point to any areas of pain and examine painful areas last.

2. Ask them to flex their knees to insure that their abdominal muscles are relaxed.
3. Have warm hands, short fingernails and a warm stethoscope
4. Monitor patient’s reactions by looking at their face for any sign of discomfort
5. Review light vs. deep palpation
6. Discuss consistency of the liver edge and note how to chart this.
7. Assess the patient for peritoneal irritation; review rebound tenderness as a sign of peritoneal inflammation.
8. Review how to palpate for the spleen but note that this is less accurate than percussion (as noted above)
9. Review palpation of the kidneys in Swartz - note that a normal right kidney may be palpable, especially in infants and in thin, well-relaxed women and children.
10. Palpation of the aorta is only recommended in people over age 50. The normal infra-renal aorta is < 3 cm. wide but obesity prevents doctors from gaining useful information in twenty-five percent of adults. Abdominal aortic aneurysms (AAA) usually enlarge at the rate of 0.2-0.5 cm/year.

G. Assessing patients for ascites —
1. Review what symptoms you should ask about in assessing whether or not a patient may have ascites.
2. Review the 4 ways to assess for ascites — These are covered in Swartz p. 445-446
   a. inspection for bulging flanks.
   b. percussion for flank dullness — This test has a sensitivity of 84% with 59% specificity.
   c. test for shifting dullness — This test has the highest sensitivity of 86% with 72% specificity.
   d. test for a fluid wave — This is the most specific test for shifting dullness; with a specificity of 82-92%.

H. Physical exam findings in acute appendicitis — It is not necessary to do all of these special maneuvers when you suspect appendicitis but you may see them recorded on a patient’s chart so becoming familiar with them is important.
1. Rovsing’s sign – pain in the R lower quadrant during left-sided pressure suggests appendicitis (labeled a positive Rovsing’s sign).
2. Referred rebound tenderness – RLQ pain with deep pressure in the LLQ may be a sign of appendicitis
3. Psoas sign – place your hand above the patient’s right knee and ask the patient to raise that thigh against your hand. If the patient is weak or frail, this can also be done by having them turn onto their left side and having you extend the patient’s right leg at the hip. Flexion of the leg at the hip makes the psoas m. contract; extension stretches the psoas. If the patient has increased abdominal pain on either maneuver, this is a positive psoas sign, suggesting irritation of the psoas muscle by an inflamed appendix.
4. Obturator sign – flex the patient’s R thigh at the hip, with the knee bent, and rotate the leg internally at the hip. This maneuver stretches the internal obturator muscle and if it causes pain in the R hypogastric region, this is a positive obturator sign, suggesting irritation of the obturator m. by an inflamed appendix.

I. Assessment for acute cholecystitis —
Look for Murphy’s sign whenever you identify a patient with RUQ pain and tenderness. This is done by hooking your L thumb or the fingers of your R hand under the costal margin at the lateral border of the rectus m. and have the patient take a deep breath. If they experience a sharp increase in tenderness and suddenly stop their inspiratory effort, this is a positive Murphy’s sign for acute cholecystitis.

J. Assess a patient for a ventral hernia.
K. Pediatric Exam

1. Inspection
   a. The protuberant abdomen is due to poorly abdominal muscles.
   b. Superficial abdominal venous pattern – this is usually present until puberty.
   c. Look for umbilical hernias, ventral hernias, and diastasis recti. Usually not noticeable until 2-3 weeks of age, easily detected with crying.

2. Auscultation
   a. The usual bowel sounds are metallic tinkling heard every 10-30 seconds.
   b. Increase in pitch or frequency of bowel sounds indicates intestinal obstruction.

3. Percussion
   a. Same as in the adult.
   b. Allow for a greater amount of air within the stomach and intestinal lumen since infants frequently swallow air when crying and feeding.
   c. Percuss the liver in the right midclavicular line.

4. Palpation
   a. Hold the legs flexed at the knees and hips with one hand; palpate with the other.
   b. The liver and spleen edges are often palpable in most infants and children. Palpate for the liver edge in children 1-2 cm below the right costal margin.
   c. Palpate the spleen between the thumb and forefinger of your right hand. It should be movable.
   d. Feel for the aorta and its pulsations in children by deeply palpating the abdomen to the left of the midclavicular line.
   e. Palpate femoral pulses and inguinal lymph nodes.

Write-up of abdominal exam

Jaundiced fatigued young male

Abdomen flat, symmetric, with no apparent masses, skin smooth, with no striae, scars or lesions. BS present, no bruits, liver span 14cm in right MCL, splenic dullness at 10th intercostal space in left midaxillary line. No organomegaly, masses, tenderness.

Sample write-up of an abdominal case

GW is a 65-year-old retired mechanic with a hx of chronic alcohol dependence for at least 10 years. Since his divorce one year ago he has doubled his usual intake and has been drinking at least one quart of vodka a day. He currently lives alone in a two room apartment. His appetite has been poor for the last 8 months, and he has been complaining of increased fatigue and general weakness. He notes abdominal bloating for the past 2 weeks associated with 10 pounds weight gain, jaundice and new lower extremity swelling. He has also had frequent loose stools occurring 3-5 times per day for the past year. No F/C/S. The patient takes no other medications and denies IV or other drug abuse.

The patient has no prior history of alcoholic hepatitis, pancreatitis, gi bleeding, diarrhea or abdominal complaints. He has no h/o gi surgery or previous abdominal problems.

Smokes 2 ppd x 35 years
Family HX: Father died of CVA at 69yrs, hx alcoholism, mother died lung cancer, age 65 yrs.
Physical Exam: Thin white male appears older than stated age.
Ht 6 feet, wt 160 lbs BP 110/72, pulse 88, resp. 16 T. 98.6
Lungs BS decreased at bases, occ end expiratory wheeze
CV: Rhythm occ skipped beat, nl S1, S2, CVP 9 cm
Abdomen - distended, dilated venous pattern, bulging flanks, BS present, no bruits. Liver span 18 cm in R midclavicular line, shifting dullness, +fluid wave, liver edge palp 10 cm below RCM, smooth, nontender.
Dullness to percussion in Traube’s space.
Ext: 3+ pitting edema bilaterally to the knees
Neurologic Exam

**This material will be covered over two small groups**

Preparation for this session:
1. View Swartz DVD on the Neurological exam before small group.
2. Syllabus — Physical Diagnosis pp. 67 - 75 Neurologic Exam
   The Neurologic Exam, Chapter 20 (Adult), pp. 698-700, 711, 714, 722 (Pediatric)

Equipment: Tuning fork (128 cps), reflex hammer, pocket flashlight, packet of disposable safety pins or straight pins, charged oto-ophthalmoscope, pocket vision screening card.

Q-tips, tongue blades and materials for testing olfaction will be provided.

Dress: Wear gym shorts in order to allow for full examination of the lower extremity.

Goals for this session:
Know how to:
1. Assess the cranial nerves.
2. Distinguish between a upper motor neuron and lower motor neuron lesion of the 7th cranial nerve.
3. Grade and test strength, tone and muscle bulk.
4. Know the common gait abnormalities.
5. Recognize diabetic retinopathy.
6. Grade and test deep tendon reflexes.
7. Evaluate sensation including: light touch, pinprick, proprioception and vibration sense.
8. Do maneuvers to test coordination.

The complete neurological examination is divided into seven parts, as follows:

A. Mental status examination — The mental status exam is included for completeness but it will not be covered today. It will be taught in Psychiatry SBM.
   1. Psychiatric mental status includes assessments of:
      a. affect and mood
      b. thought content and process
   2. Neurologic mental status includes assessments of:
      a. level of consciousness (alert, drowsy, stuporous)
      b. ability to concentrate (i.e. attention)
      c. orientation (a screening test)
      d. language (including speech, comprehension, prosody, reading and writing)
      e. memory (immediate recall, short and long term)
      f. other tests of cortical function which can be tested depending on the situation include:
          (1) praxis (ability to carry out learned tasks on command)
          (2) constructional ability
          (3) right-left discrimination
          (4) gnosia (ability to recognize)
          (5) geographical orientation
B. Assess the function of the twelve cranial nerves —

**CN I (Olfactory): Sense of Smell.** Specific testing requires presenting an olfactory stimulus such as tobacco, coffee or soap. This is generally omitted unless the patient complains of an olfactory loss.

**CN II (Optic):**
1. **Visual acuity:** To test visual acuity, inspect the optic fundi with the ophthalmoscope.
2. **Visual fields:** Test visual fields by confrontation in four quadrants, the right superior, the right inferior, the left superior, and the left inferior.
3. **Funduscopic examination** — covered under eye exam
4. **Pupils**

**CN III, IV, VI (Oculomotor, Trochlear and Abducens):**
1. **Extraocular movements:** Test the extraocular movements in the six cardinal fields of gaze. Look for ptosis of the upper eyelids.
   (a) **Saccades** (fast eye movements)
   (b) **Pursuit or tracking** (slow eye movements)
2. **Pupils** (size, shape and reaction to direct and consensual light and the near response)
3. **Pupils** (size, shape and reaction to direct and consensual light and the near response)

**CN V (Trigeminal):**
1. **Sensation on the face**
2. **Muscles of mastication** — Test temporal and masseter muscles while the patient clenches his teeth.
3. **Sensory limb of the corneal reflex** (direct and consensual) Test sensory function in three divisions of the trigeminal nerve using a safety pin for pain and a cotton wisp for light touch. Test the corneal reflex with a cotton wisp.

**CN VII (Facial):** Inspect the face and note any asymmetry, tics, or other abnormal movements. Review the difference between an upper motor neuron and lower motor neuron lesion of the 7th cranial nerve in Swartz.
1. **Muscles of facial expression:** Ask the patient raise his eyebrows, frown, close his eyes tightly, show his teeth, smile, puff out his cheeks.
2. **Taste on anterior 2/3 of tongue.**
3. **Is there hyperacousis?**
4. **Sensation in anterior external auditory canal.
5. **Tearing and salivation.**
6. **Motor limb of the corneal reflex**

**CN VIII (Acoustic):**
1. **Hearing** - assess hearing by means of fingers, whispers, or watch tick.
2. **Vestibular function** (is there nystagmus?)
3. **Balance**

**CN IX (Glossopharyngeal):**
1. **Sensation on soft palate**
2. **Gag reflex** (sensory limb)

**CN X (Vagus):**
1. **Swallowing**—Observe the elevation of the soft palate when the patient says “ah”. Test the gag reflex by touching the soft palate or posterior pharynx with a tongue blade.
2. **Gag reflex** (motor limb)
3. **Note the quality of speech**—is there hoarseness?
4. **Cardiac function** (is there a fixed tachycardia?)
CN XI (Spinal Accessory):
1. sternocleidomastoid muscles-- Test by having the patient turn his head to each side against resistance of your hand.
2. trapezius muscles—test by having the patient shrug his shoulders upward against your hands.

CN XII (Hypoglassal): (tongue strength)--inspect the tongue at rest and when protruded.

Visual Field Defects photo
C. Motor Examination—

1. Strength
<table>
<thead>
<tr>
<th>Grade</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>no movement</td>
</tr>
<tr>
<td>1</td>
<td>a flicker</td>
</tr>
<tr>
<td>2</td>
<td>can’t move against gravity</td>
</tr>
<tr>
<td>3</td>
<td>can move against gravity</td>
</tr>
<tr>
<td>4</td>
<td>can move against gravity plus some resistance</td>
</tr>
<tr>
<td>5</td>
<td>normal</td>
</tr>
</tbody>
</table>

2. Tone —
   a. Spasticity: Initial resistance to quick movement of a joint which then diminishes by the end of the movement. This condition is seen with stroke, spinal cord injury from trauma, tumor, and multiple sclerosis.
   b. Rigidity: Steady resistance through the entire movement of a joint. This condition is observed with subcortical disease or drugs.
   c. Flaccidity: Marked diminished tone; suggests lower motor neuron disease, but may be observed acutely following upper motor neuron disease, such as stroke.

3. Bulk — Note any atrophy or asymmetry.
   a. Atrophy: Diminished muscle bulk, most marked with lower motor neuron disease, but also seen with chronic upper motor neuron disease.
   b. Fasciculations: Seen with lower neuron disease, amyotrophic lateral sclerosis and after exercise in normal people.

4. Abnormal movements —
   a. Bradykinesia — Slowness of movement is typical of Parkinson’s disease where it is manifest not only in the limbs, but also in the face with lack of facial expression and diminished blinking.
   b. Athetosis — Characterized by slow writing movements of the distal extremities. This condition is common in cerebral palsy.
   c. Chorea — Characterized by brief, rapid and irregular movements affecting the limbs, face and speech. Chorea is often quickly incorporated into more purposeful movements. Chorea, in addition to dementia and personality change, is a hallmark of Huntington’s disease.
   d. Hemiballismus — Characterized by flailing movements of the extremities. Most commonly seen with stroke involving the contralateral subthalamic nucleus.
   e. Dystonia — Characterized by alternating, sustained contractions of agonist and atnagonist muscle groups. Some presentations of dystonia include spasmodic torticollis, blepharospasm, and writer’s cramp. Certain medications, such as phenothiazines, may produce dystonia which can, in turn, be treated with anticholinergic medications.

5. Gait —
   a. Apraxia — The patient is unable to coordinate the sum of movements required to execute a normal gait. This condition may be due to multiple strokes bilaterally or normal pressure hydrocephalus.
   b. Ataxia — Unsteadiness of balance during station and gait is implied by a wide-based gait, which may be due to proximal muscle weakness from lower motor neuron disease, disease of the dorsal columns, vestibular system or brainstem.
   c. Spasticity — Poor flexion of legs, with tendency to circumduct legs, is noted. A spastic gait may be due to stroke, cerebral palsy or spinal cord injury.
   d. Festination — Velocity of gait progressively increases as the patient walks. A festinating gait type is typical of Parkinson’s disease.
e. Foot drop — Paralysis or weakness of the dorsiflexor muscles of the foot results in a slapping gait, which may be due to central or peripheral causes. As a result, the patient is more likely to stumble and fall. It is commonly caused by lumbar disc disease affecting the L5 nerve root.

D. Sensory Examination —
1. Primary sensory modalities
   a. pin and thermal sensation
   b. touch
   c. joint position sense
   d. vibration sense
2. Cortical sensory modalities
   a. two point discrimination
   b. graphesthesia
   c. stereognosis
   d. extinction
3. Distributions of sensory deficit
   a. single peripheral nerve
   b. polyneuropathy
   c. radiculopathy
   d. myelopathy
   e. brainstem
   f. thalamic
   g. cortical

E. Coordination —
1. Ataxia—Loss of smoothness of limb or truncal movements is suggestive of cerebellar disease. Limb ataxia is associated with disease of the cerebellar hemispheres, while truncal ataxia is associated with disease of the midline vermis. Saccadic or jerky eye movements are a hallmark of cerebellar disease.
2. Tremor—Resting tremor is typical of Parkinson’s disease; it improves with movement but may be exacerbated with anxiety. Benign essential tremor is present at rest, increased with movement and anxiety, and improved with alcohol. A cerebellar tremor is coarse, arrhythmic and apparent during movement and maintenance of posture.
3. Appendicular (limb) testing to evaluate coordination
   a. finger-nose-finger—Do the finger to nose test first with the patient’s eyes open, with movement of your finger, then with your finger still and the patient’s eyes closed.
   b. heel-knee-shin—Assess coordination in the legs by means of rapid rhythmic alternating movements (patient taps your hand with the ball of his foot) and by means of point to point testing (heel to knee to shin).
   c. thumb-tapping—Have the patient touch each finger with thumb in rapid sequence.
   d. rapid alternating movements—Assess coordination in arms and hands by means of rapid rhythmic alternating movements (patting leg as fast as possible, turning hand over and back in the opposite palm as rapidly as possible.
4. Romberg—This is a test of position sense. Ask the patient to stand with feet together and eyes open and then close both eyes for 20 to 30 seconds without support. Note the patient’s ability to maintain an upright posture. Normally only minimal swaying occurs. If the patient can’t do this safely with their eyes open, they should not be asked to repeat it with their eyes closed. In ataxia due to loss of position sense, vision compensates for the sensory loss. The patient stands fairly well with eyes open but loses balance when they are closed, a positive Romberg sign. In cerebellar ataxia, the patient has difficulty standing with feet together whether the eyes are open or closed.
F. Reflexes — The grading system for deep tendon reflexes is as follows:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>no reflex</td>
</tr>
<tr>
<td>+/- or trace</td>
<td>reflex present only with reinforcement</td>
</tr>
<tr>
<td>1</td>
<td>not as brisk as normal</td>
</tr>
<tr>
<td>2</td>
<td>normal</td>
</tr>
<tr>
<td>3</td>
<td>a little increased</td>
</tr>
<tr>
<td>4</td>
<td>Clonus</td>
</tr>
</tbody>
</table>

1. Deep Tendon Reflexes
   Dominant Roots
   - a. biceps C5, 6
   - b. triceps C7, 8
   - c. brachioradialis C5, 6
   - d. quadriceps (knee) L4
   - e. achilles (ankle) S1

2. Primitive or pathologic reflexes are tested in patients who are comatose or demented or who have other advanced neurologic disease.
   - a. sucking – normal in infants
   - b. snout
   - c. grasp
   - d. palmomental

3. Special Maneuvers:
   If you suspect that a patient has meningitis, flex the patient’s neck forward until the chin touches the sternum to see if there is neck pain and resistance to motion. This is called a Brudzinski’s sign. A second sign indicating meningeal irritation is done with the patient supine. Flex one of the patient’s legs at both the hip and knee. Then extend the leg at the knee and if pain or resistances are elicited, this represents a positive Kernig’s sign.

G. Screening Neurological Exam — In doing an initial physical exam on a patient in whom you have no reason to suspect a disorder of the nervous system, you can do an abbreviated neurological exam since there isn't time to do a complete exam on everyone. How do we decide which parts to include? We want to —

1. Ensure that we detect common neurological abnormalities that patient often fail to bring to our attention. For example, patient may not notice peripheral neuropathies that come on gradually. Also elderly patients may have significant cognitive or memory deficits that they don't mention.

2. Perform the aspects of the exam that are very sensitive, i.e. those tests that, if normal, predict that further testing of that function would not be revealing. For example slowed finger tapping, pronator drift and the Babinski reflex are sensitive signs of hemiparesis. If these signs aren't present, there is no need to look further for hemiparesis. Likewise, impaired sensation in the great toe is an early sign of most peripheral polyneuropathies. Therefore if this is not present, further testing looking for a peripheral neuropathy in an otherwise healthy individual would not be productive.

3. Include objective and easily reproducible parts of the exam that document important functions. A baseline description of pupillary responses and tendon reflexes is very helpful to have recorded so that later in life, if the patient develops a neurological illness in which a pupillary asymmetry or loss of reflexes is significant, we know that this is a change for them.
H. Pediatric Neurologic Exam —

Infancy —

1. Neurological screening on all newborns includes —
   a. assessment of positioning.
   b. spontaneous and induced movements and cry
   c. knee and ankle jerk reflexes
   d. elicitation of the rooting, grasp, tonic neck, and moro automatisms.
   e. eliciting the moro reflex is usually performed while the child is in the supine position; lift the head off the table and then allow to fall approximately 30 degrees in relation to the trunk onto the examiner’s hand. The expected response is extension and abduction of the arms and extension of the fingers. This is then followed by abduction of the arms at the shoulder. A cry usually accompanies this response. An abnormality of the moro reflex may signify a depression of the CNS. The moro reflex is usually present up to 5 or 6 months of age.
   f. The tonic neck reflex peaks at 2 months and is absent by 6 months. To elicit the reflex, turn the infant’s head to one side while the child is lying down and the shoulders fixed. The arm and leg on the side toward which the face is turned extend, and the arm and leg on the opposite side flex.
   g. The palmar grasp is elicited by placing an object or a finger in the palm of the infant. The infant should grasp the object. This reflex disappears by 3 to 6 months.
   h. Rooting reflex disappears at 3 or 4 months. Absence of this rooting reflex indicates severe generalized or CNS disease. It is elicited by using your finger to stroke the periorbital skin at the corners of the baby’s mouth and at the midline of the upper and lower lips. The mouth should open and turn to the stimulated side.
   i. Babinski’s reflex — Elicited by stroking your finger up the lateral edge and across the ball of the infant’s foot. A positive Babinski’s reflex is fanning of toes. This is present at birth and normally disappears by 24 months.
   j. Testing cranial nerve function of infants.
      II, III optical blink reflex — Shine light in open eyes, note rapid closure.
      IV, VI—Regards face or close object. Eyes follow movement.
      V—Rooting reflex, sucking reflex.
      VII—Facial movements (wrinkling forehead, symmetric when crying, smiling_
      VIII—Loud noise yields more reflex (until 4 months) Acoustic blink reflex (blinks in response to loud hand clap).
      IX, X—Swallowing, gag reflex
      XII—coordinated sucking and swallowing. Pinch nose, infant’s moth will open and tongue will rise in midline.

2. Early and late childhood — Similar to the adult exam.
   a. observe the child crawling, standing and walking.
   b. evaluate the child’s gait to determine the presence of hemiparesis or ataxia.
   c. the testing of individual muscle groups is impractical in this age group. Observing the manner in which a child stands can give information about the muscles of the neck, trunk, arms and legs since they are used when standing.
   d. use the Denver developmental test to screen gross and fine motor skills appropriate for child’s specific age.
   e. CN: smell and taste are almost never tested, if you need to use a familiar scent i.e. peanut butter or orange peel.
      CNII, VII, IV, VI—gently immobilize the head or the child will track with the whole head.
      Other CN tested as in adults.
f. DTR’s (deep tendon reflexes) usually difficult to test in children under 5 years due to lack of cooperation in relaxation. If you need to test DTR’s, use your finger to percuss the tendon. Use the reflex hammer with an older child. KJ (knee jerk) is present at birth, then the ankle jerk and reflex appear. The triceps reflex is present at 6 months.

Vocabulary:

NYSTAGMUS
CONFRONTATION
ACCOMMODATION
PTOSIS
ROMBERG TEST
STEREOGNOSIS
EXTINCTION
PLANTAR RESPONSE
CLONUS
INVERSION
EVERSION
DERMATOME
ATROPHY
FASCICULATION
BRUDZINSKI’S SIGN

KERNIG’S SIGN
GRASP REFLEX
SNOT REFLEX
SUCKING REFLEX
FLACCID PARALYSIS
OCULOCEPHALIC REFLEX
DOLL’S EYE MOVEMENTS
OCULOVESTIBULAR REFLEX
PROPRIOEPTION
BABINSKI REFLEX
HEMIANOPIA
DIADOCHOKINESIA
DIADOCHOKINESIA
GRAPHESTHESIA
REINFORCEMENT
Sample write-up of neurological exam

Elderly white female with flat affect

Mental status: appropriate affect, behavior and speech. Alert and oriented x 3; recent and remote memory intact.
Cranial Nerves II - XII intact
I - not tested
II- vision 20/20 bilat, peripheral fields intact by confrontation. Fundi normal.
III, IV, VI - EOMs intact, no ptosis, or nystagmus. PERRLA
VII - hearing - whispered words heard bilaterally, Weber midline, Rinne: AC greater than BC
IX, X- swallowing intact, gag reflex present, uvula rises in midline on phonation.

Motor: no atrophy, weakness or tremors. Normal gait, able to tandem walk. Strength 5/5 in all extremities. Intact RAM, finger-to-nose movements.
Sensory: pinprick, light touch, position, vibration intact bilaterally. Stereognosis - able to identify a key. Romberg negative with eyes open and eyes closed.

Reflexes: Biceps Triceps Sup KJ AJ PL
R/L 2+/2+ 2+/2+ 2+/2+ 2+/2+ 2+/2+ Ø/Ø

CASE #5: Eva Divine

You are working in the emergency room when the paramedics rush a 65-year-old woman named Eva Divine to the critical care area of the emergency room. The woman called 911 because of difficulty moving her left arm and leg. Her blood pressure is 170/110 mm Hg and her heart rate is irregularly irregular at a rate of 86 beats per minute. She is afebrile and breathing normally.

When you enter the examination room, you see an anxious, tearful patient lying on a stretcher wearing a nasal cannula. She is attached to an EKG monitor showing atrial fibrillation at a rate of 86 beats per minute and a blood pressure monitor showing a reading of 170/110 mm Hg. Her oxygen saturation is 99%. She has an inch of nitroglycerine paste applied to her chest wall.

You have a very crowded emergency room and have only 15 minutes to see Ms. Divine. What parts of the history and physical examination are relevant to this patient?
Genitourinary Exam

LARGE GROUP – DISCUSSION and practice session with manikins in Chilcott Lab.

EVERYONE MUST ATTEND THIS SESSION - IT WILL NOT BE REPEATED.

The GU individual practice exams on real patients will be held November 8, 9 & 10 at the VA Hospital from 5:00 to 7:00 pm. You will be performing the exams on a standardized patient with a partner. You will have 1/2 hour each, and you will be able to use the GU Skills Checklist (next 3 pages) as a guide.

Preparation for this session:
1. Look at Swartz DVD on GU Exam before this session.
2. Syllabus – Physical Diagnosis pp. 76-79, GU Exam
3. Swartz – Male Genitalia and Hernias, Chapter 17
4. Prepare for standardized patient interviews (half of each small group).

Goals:
At the end of this session, the student will be able to:
1. Examine a penis and intra-scrotal contents for normalcy.
2. Examine a patient’s kidney.
3. Explain the procedure to be used in doing a digital rectal exam of the prostate and list the specific things looked for in this examination.
4. Explain how to check for direct, indirect and femoral hernias.
5. Know how to recognize a hydrocele, varicocele and testicular torsion.

Note the following modification to the exam technique discussed on the Swartz DVD: I recommend using your fifth finger rather than your second, as noted on the Swartz DVD, when examining a patient for inguinal hernias. Because the fifth finger has a smaller diameter, it is more comfortable for the patient.

Write-up of male genitalia/rectal exam

Male Genitalia: Circumcised male genitalia, normal in appearance, without lesions. Penile shaft normal to palpation, no urethral discharge. Testes and epididymis non-tender to palpation, normal in size and consistency without masses bilaterally. Without hernias bilaterally.


CASE #10: Linus Lawton

A 70-year-old man presents to your office with the chief complaint of difficulty urinating. His vital signs reveal a normal blood pressure, heart rate, and respiratory rate. He is afebrile.

What parts of the history and physical examination are relevant to this patient?
GU Skills Checklist

DIRECTIONS: Check off the activities below as they are satisfactorily completed.

Directions: Check off the activities below as they are satisfactorily completed.

☐ Establish a relationship with the patient
  • Ensure that initial discussion occurs with patient dressed
  • Inquire about previous exam experiences
  • Assess patient’s knowledge of exam procedures
  • Correct misinformation about the exam
  • Confirm confidentiality of physician-patient relationship
  • Ask questions about health-related concerns

☐ Pre-examination procedures
  ___ Wash and warm hands.
  ___ Ask the patient to lie down in a supine position.
  ___ Flex his knees up to soften the abdomen.
  ___ Cross his hands on his chest to soften the rectus abdominis muscles. (Hands under the head
tighten the abdomen and make the examination difficult.)

☐ Communicate with the patient during each portion of the examination
  • Explain what you are doing at each step of the exam
  • Preface all touch (“Now you’ll feel my fingers….“)
  • Relate findings and offer appropriate explanations of anatomy and function
  • Check in often for patient comfort/discomfort

☐ Examination of the Abdomen and Supra-pubic area:
  ___ Expose only the area to be examined.
  ___ Inspect the abdomen visually and note any asymmetry, lumps or bulges, or anything unusual on one
side and not found on the other.
  ___ Palpate the abdomen with one hand, placing the other on top of the palpating hand.
  ___ Feel for abdominal masses, rigidity (signs of guarding), or tenderness.
  ___ Palpate the midline of the lower abdomen for signs of bladder distention.
  ___ Percuss the lower abdomen to detect signs of bladder distention.
  ___ Palpate the kidneys. (The left kidney is not palpable in most individuals.)
  ___ Ask the patient to take a deep breath and to exhale slowly while you palpate the kidneys.
  ___ Trap the kidneys with the balls of your fingers by pushing up with your posterior hand from
under the 11th rib and pressing down with your anterior hand.
  ___ Feel the kidneys between your hands.
  ___ Palpate along the inguinal canals bilaterally.
  ___ Palpate from the anterior superior iliac spine to the pubic tubercle.
  ___ Feel for any enlarged and palpable lymph nodes.
  ___ Ask if the patient has any questions or concerns

☐ Examination of the Penis and Intra-Serotal Contents
  ___ Advise the patient that you are beginning the GU exam
  ___ Examine the distal urethra by gently everting the meatus.
  ___ Note the color of urethra for possible signs of infection.
  ___ Look for any urethral discharge.
  ___ Feel the dorsum of the penis for evidence of induration or hardening. (The check for Peyronies
disease.)
Feel for the ventral surface of the penis, specifically the corpus spongiosum where the urethra lies.

Feel the entire length of the urethra all the way down into the perineum.

Palpate the scrotum using either one hand (this can be done with 3 fingers underneath and the thumb above, or using two hands). Reassure the patient that this maneuver is not painful.

Pick up the scrotal skin and let it rest in your hand with fingers closed tightly together.

Bring the fingers of your hand together along the median raphe between the two testes, and gently roll the entire surface of each testis and turn each between you fingers.

Feel for a uniform consistency throughout the testes, noting any signs of testicular induration or hardening that might indicate cancer of the testis.

Feel the epididymis just posterior to the testis—a tubular structure that collapses when squeezed. Note how its texture differs from testicular firmness.

Ask if the patient has any questions or concerns

**Percussion over the Kidney area:**

Ask or assist the patient to sit up straight

Percuss gently along the spine area and the kidney area bilaterally to detect possible swelling or distention.

Observe the vertebral column for possible signs of perinephric abscess.

**Examination of Intra-Scrotal Masses**

Ask the patient to stand (if possible) by the table.

Explain what you will be doing (checking for a hernia)

Check for patient’s understanding of the term and explain if necessary

Palpate the scrotal skin on both sides to detect the presence of a varicocele. If you suspect a varicocele, you can ask the patient to perform a Valsalva maneuver to see if the veins distend further with increased intra-abdominal pressure.

Check for indirect inguinal hernia.

Place the fingernail side of your little finger on the upper part of the testis.

Push the scrotal skin gently ahead of your finger as you slide your finger cephalad.

Move your little finger up along the cord and into the external ring.

Continue up the pelvic bone until you feel your finger is caught in the external inguinal ring.

Ask the patient to either turn his head and cough, or to strain and bear down as if moving his bowels while your finger remains in the external ring.

Feel for the bulge coming down the inguinal canal.

Ask if the patient has any questions or concerns

**Examination of the Anus, Rectum, and Prostate Gland:**

Ask the patient to stand with his feet comfortably far apart.

Give the patient some tissue paper to wipe off excess jelly after completion of the rectal exam.

Ask the patient to bend over with his elbows on the exam table. If the patient is obese, you may want him to use one hand to help spread his buttocks apart.

Note the color of the anus for possible signs of abnormality. Also look for fissures, fistulae or skin lesions.

Put on a glove and spread a sufficient amount of jelly on the distal phalanges of your index and middle fingers and spread the jelly around the patient’s anus.

Use a pistol-grip position with your thumb flexed (so that it does not put pressure on the patient’s gluteal crease) and the index finger turned sideways.

Insert your index finger into the rectum and press your finger slightly downward to the anterior side of the rectum.

Slowly sweep the examining finger 360 degrees around the rectum to examine the mucosa for possible signs of rectal carcinoma.
Palpate the Prostate Gland—feel the median sulcus and out to the lateral sulcus on both sides. A normal sized prostate in a young man is roughly the size of a walnut, whereas the older man’s enlarged prostate is larger and may be the size of a lemon.

If you have difficulty palpating the upper portion of the prostate, you can apply pressure to the patient’s lower abdomen, which makes the prostate move down towards your examining hand. Tell the patient that you will be applying pressure before you do so.

Feel the entire surface of the prostate for uniform consistency and symmetry to detect possible signs of prostate cancer. Normally, the consistency of the prostate is similar to the tensed thenar eminence.

In a patient in whom you suspect appendicitis, you will also want to do a careful exam of the rectum laterally, to the patient’s right side, looking for tenderness. This is important if the patient has a retrocecal appendix, which many not project the expected findings on abdominal examination.

Laterally, to the patient’s left side, one might elicit tenderness on exam due to diverticulitis or an abscess.

**Wrap up the exam**

- Allow patient to lower his gown and sit down
- Discuss exam findings
- Assess patient understanding and elicit concerns
- Address any misunderstandings

**Counsel on other health behaviors**

- Reinforce the need for males to prevent injury or disease with discussion of appropriate self-care behaviors (e.g., alcohol abuse, smoking cessation, other types of screening tests)

*Adapted with permission from Michael Curtis MD, Nan Cochran MD, and Mary LaBrecque BN of Dartmouth Medical School.*
Advanced HEENT Exam

Preparation for this session:
1. Review the Swartz DVD on HEENT Exam prior to this session.
2. Syllabus – Physical Diagnosis pp. 80 - 88 HEENT Exam
   Head, Eyes, Near, Nose and Throat: Chapters 8-11 (Adult) pp 691-695, 708-709; (Pediatric) pp. 714-720

Equipment:
1. Oto-ophthalmoscope - **please remember to recharge your batteries.**
2. Pocket vision tester.
3. Tuning fork. A 512 Hz is preferable for the Weber and Rinne tests.
4. Pen light (some otoscopes can serve as light source).

We will furnish gauze squares, tongue blades, alcohol wipes, and examination gloves in small groups.

**Dress:** Wear something with an open collar to allow for examination of the neck.

**Goals for this session:**
Be able to:
1. Identify the key landmarks of the head, eyes, ears, nose and throat
2. Assess all neck lymph node chains including Virchow’s node and know the differences between normal and abnormal nodes and know the structures they drain
3. Correctly palpate the thyroid gland
4. Assess mobility of the tympanic membrane
5. Perform the Weber and Rinne tests and understand their significance.
6. Perform a fundoscopic exam and identify the media, disc, vessels, background color and macula and diabetic retinopathy
7. Know the normal cup:disc ratio and how it changes in glaucoma
8. Evaluate extra ocular movements
9. Evaluate visual fields and know their significance
10. Test pupillary response to light and accommodation

A. HEENT exam (adult)
1. Head
   a. Examine the hair, the scalp, the skull, the face and the skin.
   b. Check hair for quantity, distribution, texture and pattern of loss.
   c. Note any scaling, lesions or lumps on the scalp.
   d. Observe patient’s facial expression and note any asymmetry, involuntary movements, edema or masses.
   e. Inspect the skin for texture, thickness, hair distribution, lesions and note color and pigmentation.
2. Sinus exam — If a patient has symptoms suggestive of sinus infection such as headache or post-nasal drip, percuss and palpate the frontal and maxillary sinuses. Then darken the room and use a pen light to transilluminate the frontal and maxillary sinuses. A normal sinus is air filled and will appear as a reddish glow when looking through the patient’s mouth at the hard palate on the illuminated side.
3. Ear Exam  
   a. Inspect the external ear and identify the following landmarks: helix, antihelix, tragus and lobule. Move the auricle up and down, press on the tragus, and press firmly just behind the ear. The external ear is an area that often is sun damaged in older people and should be inspected carefully for actinic keratoses or malignancies.  
   b. Assess auditory acuity, one ear at a time, by watch tick, whisper test, or by rubbing fingers together. (precise testing requires audiometry)  
   c. Perform the Weber and Rinne test to distinguish between conductive and sensorineural hearing loss. The Weber tests for lateralization and is done by placing the tuning fork on top of the patient's head or in the mid-forehead and then asking the patient where they hear it: on one or both sides. They should normally hear it in the midline or equally in both ears. Rinne - used to compare air conduction (AC) and bone conduction (BC). This is done by placing the base of a lightly vibrating tuning fork on the mastoid bone. When the patient can no longer hear the sound move the tuning fork close to the ear canal and ask them when they can no longer hear the sound. the sound should be heard longer through air than through bone. (AC is greater than BC)  
   d. Using the otoscope and the largest ear speculum, inspect the ear canal and the tympanic membrane. Identify the cone of light, the umbo, the handle of the malleus, the short process of the malleus, the pars flaccida and the tensa. the smaller diameter ear specula are used for examination of infants and children.  

4. Nose Exam  
   a. Inspect the nose and identify the following external landmarks: bridge, tip, columnella, anterior naris, ala nasi and vestibule.  
   b. Using the otoscope and a short wide nasal speculum, inspect the medial and lateral walls of the nasal cavity and identify the septum and turbinates.  
   c. Note the color of the nasal mucosa and any swelling or bleeding of the mucosa.  
   d. Inspect the nasal septum for any deviation, inflammation or perforation.  
   e. Look for polyps, usually seen in the middle meatus.  

5. The Mouth and Pharynx Exam  
   a. Inspect the oral cavity, including the lips, buccal mucosa, teeth, hard palate, soft palate, tongue, and the floor of the mouth. Identify the openings of the parotid duct and the submaxillary duct. Identify the medial and lateral incisors, the cuspids, the bicuspids and the molars.  
   b. For a more complete examination of the tongue, grasp the tip with a square gauze and pull it to the left: inspect the side of the tongue and palpate it with a gloved finger. Repeat for the other side.  
   c. Note symmetry of the tongue when protruded. This indicates normal function of the 12th cranial nerve. (hypoglossal nerve)  
   d. Inspect the pharynx, using the tongue blade to press firmly on the midpoint of the tongue. Identify the soft palate, the uvula, the anterior and posterior pillars, the tonsils, and the posterior pharynx. Palpate any abnormal areas with a gloved finger.  
   e. While the tongue is depressed with the tongue blade, ask the patient to say "ah". Note the symmetrical elevation of the soft palate, which indicates normal function of the 10th cranial nerve (vagus nerve).  

6. Lymph Nodes of Neck  
   a. Inspect the neck and palpate for lymph nodes, including pre-auricular, posterior auricular, occipital, tonsilar, submaxillary, submental, superficial cervical, posterior cervical, deep cervical, and supravacular nodes.  
   b. When palpating the lymph nodes note their size, shape, and if there is any tenderness. A node should roll in two directions: up and down and side to side. Benign nodes tend to be small in size, soft, and well demarcated. In contrast, cancerous nodes are usually firm, occasionally fluctuant, not freely mobile and often matted. Shotty nodes in the head and neck region are
small, pea-sized, non-tender, mobile and discrete. They are commonly found, especially in small children, and usually reflect a preexisting infection.

c. Generalized lymphadenopathy usually indicates either
   1) disseminated malignancy, such as lymphoma or leukemias;
   2) collagen vascular disease, such as sarcoidosis;
   3) infectious diseases such as mononucleosis, syphilis, cytomegalovirus, AIDS, tuberculosis or
      4) reaction to drugs (e.g. dilantin) or use of IV drugs.

d. Regional or localized lymphadenopathy usually reflects a local infection or neoplasm.

Clinical Significance of Palpable Nodes in the Head and Neck

<table>
<thead>
<tr>
<th>Lymph Nodes</th>
<th>Significance</th>
</tr>
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<tbody>
<tr>
<td>Occipital</td>
<td>Common in childhood infections, Present in scalp infections in adults</td>
</tr>
<tr>
<td></td>
<td>May reflect generalized lymphadenopathy, e.g. in HIV+ patients</td>
</tr>
<tr>
<td>Anterior cervical</td>
<td>Upper respiratory infections and inflammation of the anterior portions of the mouth</td>
</tr>
<tr>
<td>Posterior cervical</td>
<td>Usually seen as result of otitis media, dandruff, other scalp infections</td>
</tr>
<tr>
<td>Pre-auricular</td>
<td>Seen in lymphoma or with ipsilateral conjunctivitis</td>
</tr>
<tr>
<td>Submandibular and submental</td>
<td>If not rock hard: reflect localized pathology, usually dental rather than malignancies</td>
</tr>
<tr>
<td></td>
<td>If rock hard:</td>
</tr>
<tr>
<td></td>
<td>• High posterior cervical nodes usually suggest nasopharyngeal tumor</td>
</tr>
<tr>
<td></td>
<td>• Submental and submandibular reflect cancer of nose, lip, anterior tongue, or anterior floor of mouth</td>
</tr>
<tr>
<td></td>
<td>• Midjugular nodes suggest cancer of the base of the tongue or larynx</td>
</tr>
<tr>
<td></td>
<td>• Lower jugular nodes reflect a primary cancer of the thyroid or cervical esophagus</td>
</tr>
<tr>
<td>Virchow's or Troisier’s Node</td>
<td>Single L supraclavicular node usually represents metastatic spread from an intraabdominal or intra pelvic malignancy. If it represents metastasis from a gastric carcinoma, it is called Virchow’s node.</td>
</tr>
<tr>
<td></td>
<td>L or R sided supraclavicular nodes may also represent metastatic involvement from either an ipsilateral breast cancer or lung cancer or an esophageal tumor.</td>
</tr>
</tbody>
</table>

The major lymph node chains and the structures they drain are depicted in Swartz on p. 182.
7. Neck Exam (other than lymph nodes)
   a. Look for symmetry and any masses or scars.
   b. Inspect and then palpate the trachea, looking for deviation from its midline position.
   c. Identify the space between the trachea and the sternocleidomastoid and compare with the other
      side for symmetry.
   d. Inspect the thyroid gland, palpate the thyroid gland from both the anterior and posterior
      position. Have the patient swallow a sip of water while you palpate. This is described in detail
      in Swartz, pp. 186-7.
   e. Identify any nodules or tenderness of the thyroid gland.
   f. If the thyroid is enlarged listen over the lateral lobes with a stethoscope for a bruit - this may be
      indicative of hyperthyroidism

Sample write-up of ears, nose, mouth, neck exam

Ears: No lesions or pain on manipulation of helix or tragus bilaterally. Right external canal partially filled
with wax (partially obscuring right tympanic membrane). Left external canal without lesions or discharge.
Left tympanic membrane gray-white in color with normal cone of light and handle of malleus well
visualized.
Nose: External nose normal without lesions or asymmetry. Nasal mucosa pink bilaterally without lesions,
septum midline. Inferior turbinates well visualized bilaterally without lesions or exudates.
Mouth: Mucosa pink with a small, about 2mm, shallow, tender ulcer on right inner buccal surface about
halfway back adjacent to lower teeth without exudate. Some teeth missing, some caries obvious with mild
swelling and erythema of adjacent gums, without discharge or bleeding. Tongue normal in color, protrudes
symmetrically, without fasciculations. Tonsils absent, posterior pharynx without erythema or exudate.
Palate and uvula symmetrical on phonation.
Neck: Full range of motion. Single, 1 cm lymph node palpable in L anterior cervicle region, mobile,
discrete, soft, tender to palpation. Thyroid smooth, non-tender, normal in size and consistency.
Thyroid: symmetric, firm, 20 gm size, no nodules

Vocabulary:

- AURICLE
- ALA NASI
- AUDIOMETRY
- COLUMELLA
- MASTOID PROCESS
- VESTIBULE
- SPECULUM
- TYMPANIC MEMBRANE
- ANTERIOR NARIS
- WEBER TEST
- OSSICLES
- HELIX
- TURBINA
- MALLEUS CANINE (CUSPID)
- MEATUS
- TRANSILLUMINATION
- INCUS
- UVULA
- PAROTID GLAND/DUCT
- STAPES
- VALLATE PAPILLA
- SUBMAXILLARY GLAND
- COCHLEA
- ANTERIOR PILLAR
- EUSTACHIAN TUBE
- POSTERIOR PILLAR
- TONSILS
- TRAGUS
- BUCCAL MUCOSA
- LOBULE
- MEDIAL INCISOR
- LATERAL INCISOR
- RINNE TEST
- ANTIHELIX
- PARS FLACCIDA
- PREMOLARS (BICUSPIDS)
- PARS TENSA
- MOLARS
- UMBO
- THYROID CARTILAGE
- CONE OF LIGHT
- CRICOID CARTILAGE
B. Screening Eye Exam — The ophthalmoscopical exam may be done with contact lenses in place. (position
the patient sitting up straight with his or her head at your eye level)
1. Observation — While interviewing look at the patient for: ptosis, strabismus, edema, head tilt
   (muscular problem), xanthelasma, erythema, exophthalmos, scleral icterus
2. Visual Acuity — Have patients attempt to read the smallest letters they can.
3. Confrontation by VF's — Count fingers in 4 quadrants; ask patient to look at your nose, then cover
   1 eye and tell you how many fingers you are moving. If patient has ptosis, hold the eyelid up while
   doing the confrontation exam. This part of the exam is especially important to do with head
   trauma, CVA, h/o intracranial mass.
4. EOM  6 = lateral rectus
   4 = superior oblique which allows the patient to look in and down
   3 = all others
   Look for —
   a. Nystagmus - a fine oscillating movement best seen around the iris. Mild nystagmus at extreme
      lateral gaze is normal; nystagmus in any other position is not.
   b. Assess eye alignment - Hirshberg test - Ask the patient to look at you, and as you shine a light
      in the midline the light should fall on symmetrical portions of both corneas. If it is not
      symmetrical, this is called strabismus and is classified as follows:
      Esotropia: eye turning inward
      Exotropia: eye turning outward
      Hypertropia: eye looking up
      Hypotropia: eye looking down
5. Pupils —
   a. Anisocoria — Unequal pupil size - present in dim and bright illumination; 10-15% of
      population has this. Estimate the change in pupillary size in mm. from dim to bright light, e.g.
      5→3. If it is hard to tell if it changes, have them bring in old photos. Notify the patient it this
      is present so if they develop a head injury in the future, they will know that their anisocoria was
      baseline.
      Evaluating the pupillary light reflex — Ask the patient to look in the distance and shine a bright
      light in one eye. Observe the direct and consensual pupillary responses.
   b. Swinging light test — This test reveal differences in the response to afferent stimuli of the two
      eyes. The patient looks at a distant object which you swing a light from one eye to the other,
      observing for degree of constriction of the pupils. In the Marcus Gunn (MG) pupil , you will
      see a paradoxical dilatation of the pupil exposed to the light. This occurs because there is an
      afferent limb defect in this eye. It is due to optic neuritis, retinal scarring, other optic nerve
      defects or glaucoma. It is rare to have a MG pupil in the absence of other nerve findings. If
      this finding is not present, you can record: no MG or no APD.
   c. Testing convergence — Have a patient look first at a distant target and then at one about 5
      inches from their nose. When the patient focuses on the near object, the eyes should converge,
      and the pupils should constrict.

**Examples of Pupillary Abnormalities**
Hippus = instability of iris, this is normal.
Homer’s - caused by impaired sympathetic n. supply; see affected pupil small, unilateral loss of
sweating and ptosis
Oculomotor nerve paralysis - see dilated pupil (6-7 mm), fixed to light and near effort; ptosis and
lateral deviation of eye may be present.
Adie’s Pupil - large, regular and usually unilateral pupil with reduced and slowed reaction to light;
caused by impaired parasympathetic nerve supply to the iris
6. Fundoscopic — Examine with the patient either on a level with or lower than the examiner; if there is no chair in room, then have the patient recline. Try to get as close as possible to the patient. Use your left eye to examine their left eye and right eye for right eye. Both the patient and examiner should remove glasses. There is no need to take out contacts except with the examiner who is very myopic.

   The order of the exam is as follows:
   media
   disc – color, distinct margins, optic cup
   vessels
   background color
   macula done last

a. Examination of the media — Start in green or black at +6 holding the opthalmoscope 18” from the patients’ eyes: you are initially examining the cornea, lens, aqueous humor and vitreous humor. Progressively reduce the amount of “plus” until lens (by clicking counterclockwise) is in focus and you see a sharp red reflex. You are looking at the media for any opacities, i.e. black spots. When a patient has cataracts you need to dim the ambient light considerably and use a small aperture so less light is emitted and the patient’s pupil will constrict less.

   Diopter = unit of lens strength.
   red = concave (-) lenses would be prescribed to correct myopic lenses
   green/black = convex (+) lenses would be needed to correct hyperopia or farsightedness.

b. Examination of the disc — The normal C:D diameter is 0.3-0.5; look at symmetry between the eyes. A greater than 0.2 discrepancy in C:D diameter between the eyes is clinically significant.

c. Examination of the vessels –
   i. normal ratio between arteries and veins diameter is between 1:2 and 2:3.
   ii. arteries usually cross over veins and they share the same intimal sheath. An artery can occlude a vein which is called a branch retinal vein occlusion. Usually these are associated with poorly controlled hypertension.
   iii. cholesterol plaques — Hollenhorst plaques are plaques which originate from the bifurcation of the carotid artery and can cause a retinal artery occlusion. If these are seen in the fundus, a patient needs to be referred for a carotid doppler exam.

d. Examine background
   i. note color — pallor is a sign of atrophy
   ii. look for hard exudates — These are lipid exudates from capillaries and usually indicate at least 2 months of leaky capillaries.
   iii. cotton wool spots — These represent microinfarcts of capillaries and cause an infraction of that portion of the retina and are seen in HTN and DM or in HIV + individuals.
   iv. look for proliferative retinopathy — Neovascularization; After 10 years of diabetes, 50% will have retinopathy and after 30 years, 90% of patients will have retinopathy. Vision will be affected depending on how much of the macula is involved. Laser rx is done to destroy the healthy retina in an attempt to reduce overall oxygen demand, which in turn reduces the need for the retina to resort to further neovascularization
   v. CMV retinitis — In this condition, the fundus looks like “ketchup and cottage cheese” – seen in HIV + and other immunocompromised individuals

e. Examination of the macula — This part of the exam is done last since patients can’t tolerate looking directly at a bright light for more than a few seconds. Drusen, hyaline material excreted by the retinal pigment epithelium, are seen in elderly (> 75 yo). It may be entirely normal or can disrupt vision by destruction of retinal pigmented epithelium (these are the support system for rods and cones — Macula contains mostly cones).
C. Pediatric Eye Exam

1. Inspection
   a. Examine the newborn's eyes in subdued lighting since bright lights cause infants to blink their eyes.
   b. When examining the sclera, pupils, irises, and extraocular movements hold the baby upright with arms extended fixing the head in the midline.
   c. Rotate yourself slowly in one direction. This will usually get the baby’s eyes to open.
   d. Look for subconjunctival and scleral hemorrhages. Common in newborns.
   e. Pupillary reactions are observed by covering each eye with one hand, and then uncovering it.
   f. Children ages 1-18 are examined the same way as adults are for position and alignment of the eyes as well as the eoms.

2. Visual Acuity
   a. There is no test that accurately measures visual acuity in children under 3 years of age.
   b. The Snellen E chart can be used in children over 3 years. Children usually can point to the direction the E is facing.

3. Ophthalmoscopic Exam
   a. The red retinal reflex can be seen with the ophthalmoscope set at 0 diopters and viewing the pupil at a distance of approximately 10 inches.
   b. The exam is the same as in the adult. The corneas can be seen at +20 diopters, the lens at +15, and the fundus at 0 diopters.
   c. Look for retinal hemorrhages.

4. Abnormalities
   a. If nystagmus is still present after a few days this may be an indication of visual impairment.
   b. If alternating convergent strabismus continues after 6 months or becomes unilateral sooner, the ocular muscles may be weak or it could indicate diminished visual acuity.
   c. A partial red or completely dark reflex may indicate a cataract in infants.
Vocabulary—Please familiarize yourself with these terms through your readings in referenced texts

ACCOMMODATION
LACRIMAL GLAND
CONJUNCTIVA
DIOPTER
OPTIC DISC
VENOUS PULSATIONS
MACULA (NOT MACULE)
CILIARY BODY
ANTERIOR CHAMBER
AQUEOUS HUMOR
DIRECT LIGHT REFLEX
CONJUGATE
PRESBYOPIA
CHOROID
BULBAR CONJUNCTIVA
PTOSIS
ENTROPION
TARSAL PLATE
LIMBUS
LATERAL CANTHUS
FUNDUS

SIX CARDINAL POSITIONS OF GAZE
LACRIMAL SAC
SCLERA
RED REFLEX
CENTRAL PHYSIOLOGIC CUP
RETINA
NYSTAGMUS
POSTERIOR CHAMBER
CANAL OF SCHLEMM
PUNCTUM
CONSENSUAL LIGHT REFLEX
MYOPIA
ARCUS SENILIS
FOVEA CENTRALIS
PALPEBRAL CONJUNCTIVA
ECTROPION
DRUSEN
MEIBOMIAN GLANDS
MEDIAL CANTHUS
HIPPUSS

Sample write-up of eye exam


Sample write-up of HEENT history and physical

RT is a 76-year-old male with a hx of type II diabetes and peptic ulcer disease which are stable and controlled with glyburide and lansoprazole. He works part time in an auto parts store and in the past year he has been having more difficulty hearing his customers. He has a long hx of tinnitus thought to be
 secondary to loud noise exposure in WWII. He had a hearing test 10 years ago for further evaluation of the tinnitus, but was not given a hearing aide. He wondered if one would help him now.

Habits: Smoking - stopped in 1982 after 35 pack years, no alcohol
Family Hx. father died at 98 yrs "old age", mother died 84 yrs - diabetes.

Physical Exam:
Elderly male with stooped gait having some difficulty hearing

V/S BP 130/86, RP 68, resp 16
Ears: Canals clear, TM's gray-white, slightly opaque and dull, all landmarks visible, no perforation. Hearing - unable to hear whispered voices bilaterally. Weber midline, Rinne positive, AC greater than BC, but time reduced overall.

CASE #6: Billy Walker

The paramedics rush a 4-year-old boy to the emergency room because of respiratory distress. You have 15 minutes to speak to the mother and perform a focused physical examination on Billy Walker. The vital signs are as follows:
BP: 90/60
Pulse: 136
Respiration: 30
Temperature: 103.8°F
Pulse oximeter: 97%

Upon entering the examination room, you observe a child in moderate distress. He is sitting still with his neck extended. You notice the child is drooling. The mother is attempting to comfort the child but she is obviously distraught. You hear stridor as you approach the child. What do you need to ask and what parts of the physical examination are relevant to do?

CASE #7: David Dunn

A 31-year-old executive presents to your office with the chief complaint of blurred vision. He went to the optometrist in the shopping mall who found nothing wrong with his eyesight. The optometrist suggested a check-up from a primary care physician. The patient has not seen a doctor in over 10 years.

The nurse in your practice tells you that the fasting fingerstick glucose level this morning for Mr. David Dunn was 210 mgs/dl. His vital signs are normal and he has no orthostatic changes.

Upon entering the examination room, you see an overweight man in no acute distress. His weight is approximately 190 pounds and he is 5 feet, 8 inches tall.

What are the appropriate history questions and physical examination for this patient?
Advanced Joint and Back Exam

Preparation for this session:
1. Review the Swartz DVD’s on Joint and Back exam prior to this session.
2. Syllabus – Physical Diagnosis pp. 89-100 Joint and Back Exam
3. Swartz, Chapter 19 (Adult), pp. 697-698, 711, 714, 722 (Pediatric)

Equipment: reflex hammer, tape measure

Dress: Wear gym shorts, sports bra or bathing suit. Dress to allow for examination of the shoulders, knee and back. Shoulders, knees and back will need to be fully exposed.

Goals for this session:
1. Recognize the key anatomic landmarks in the shoulder, elbow, hand, back, hip, and knee joints
2. Understand the presentation and physical exam findings characteristic of sub-acromial bursitis.
3. Know the physical diagnosis differences between rheumatoid arthritis and osteoarthritis.
4. Know how to perform straight leg raising
5. Know how to perform the shoulder impingement sign.
6. Know how to perform the bulge sign in the knee.
7. Know how to assess ligamentous laxity and anterior and posterior drawer signs in the knee.

I. Joint Examinations

A. Physical Exam of Neck and Shoulder
1. Symptoms — The most common cause of shoulder pain is overuse resulting in tendonitis of the rotator cuff and not the true shoulder joint. This is typically caused by overhead activities such as throwing, swimming, and tennis. If there is a h/o trauma, then injury to the acromioclavicular joint or dislocation are possible. Patients with pain due to a rotator cuff problem report pain during the night which occurs when they try and sleep on the affected side. If the pain is localized to the top of the shoulder, this suggests arthritis or an AC joint separation. Pain due to an inflamed bursa or a torn rotator cuff begins in the deltoid region and radiates to the lateral upper arm. Also, patients with rotator cuff problems may have a tingling sensation in the forearm and that can be confused with carpal tunnel syndrome.

2. Start with neck exam including range of motion and neck compression test. However, manipulation of the neck should be avoided in patients with suspected instability. Tilt the head and neck toward the symptomatic side and see if pressure on the top of the head intensifies the neck, shoulder, arm and hand pain - this test is very sensitive for the diagnosis of lateral rupture of a cervical intervertebral disc.

3. Inspection —
   a. Observe patient with arms at sides for asymmetry, erythema, masses or effusions.
   b. Note any muscle atrophy — Deltoid atrophy suggests disuse from impingement syndrome or adhesive capsulitis.
   c. Observe any prominence or swelling of the sternoclavicular (SC), acromioclavicular joints (AC), or subacromial bursa.
4. Palpation —
   a. SC joint — This will be tender in arthritis.
   b. Clavicle —
   c. AC joint — Will be tender if separated or arthritic.
   d. Acromion and subacromial bursa - passively extend at shoulder to move subacromial bursa and rotator cuff into palpable position
   e. Greater tuberosity of the humerus — lateral and inferior to the acromion
   f. Bicipital groove — best palpated with arm in external rotation

5. Range of Motion —
   a. Active range of motion - if the patient is able to complete full ROM actively, there is no need to test passive ROM. Always compare the 2 sides since ROM can vary between individuals and age groups.
   b. A normal shoulder should be able to do the following. This should be followed over time to determine if a patient’s joint problems are improving.
      i. abduct 170°
      ii. adduct 50°
      iii. forward flex (also called elevation) 160°
      iv. extend 60°
      v. external rotation – patients should be able to clasp their hands behind their head, with the elbows flexed
      vi. internal rotation – patients should be able to clasp their hands behind their back, with the elbows flexed
      vii. It is most useful to document maneuvers that are functionally important such as comb her hair, put on his shirt and scratch his/her back
   c. Impingement of the rotator cuff muscles begins at 60-90 degrees and is described as the painful arc.
   d. If active ROM is decreased, then test passive ROM. With passive ROM, the examiner should do all the work and the patient’s muscles should be totally relaxed. With a rotator cuff tear, active ROM may often be decreased while passive ROM is maintained. For adhesive capsulitis or glenohumeral arthritis, both active and passive ROM are often decreased.
6. Strength —
Rotator cuff muscles – these initiate abduction of the shoulder for the first 15 degrees. They are the SITS muscles or the supraspinatus, infraspinatus, teres minor and subscapularis. Deltoid muscle strength is tested by having the patient attempt abduction against resistance.

7. Sensation — It is important to test sensation if there is suspected dislocation, instability or fracture of the shoulder or arm.

8. Vascular Exam — Check the radial pulse in patients with suspected shoulder dislocation or arm fracture.

9. Specific maneuvers — Only the most commonly used maneuvers are mentioned. These are only done when there is an abnormality detected on the exam.
   a. Yergason’s sign — Done to test for bicipital tendonitis. The patient typically complains of pain over the long head of the biceps, particularly at night. Abduction and forward flexion of the arm are normal but there is tenderness over the biceps tendon on exam. In order to test for this, have the patient sit with his/her palms on thighs. Starting with the normal side, grasp the wrist firmly and ask him/her to turn up the palm against your resistance (i.e. supinate) which causes the biceps to contract which should not be painful. Then repeat on the affected side. Pain during this maneuver which is localized to the anteromedial aspect of the shoulder is a positive sign for bicipital tendonitis.

7. Impingement sign — With the patient seated, forward flex the arm to an overhead position with the elbow bent. If you produce pain from impingement of the humerus against the coracoacromial arch, by pushing the wrist towards the floor, the test is positive.

B. Physical Exam of Elbow —
1. Symptoms — The most common symptom of elbow pathology is well-localized elbow pain. Swelling, warmth and decreased range of motion may also be present.
2. Inspection — Inspect the elbows in flexed and extended position.
3. Palpation —
   a. test range of motion of elbows – flexion/extension and supination/pronation
   b. identify the medial and lateral epicondyles of the humerus and the olecranon process of the ulna.
   c. the olecranon bursa lies between the olecranon process and the skin. This is not normally palpable.
   d. the ulnar nerve, our so-called “funny bone”, is sensitive to palpation and can be felt posteriorly between the olecranon and the medial epicondyle.
4. Range of Motion —
   a. Patient should be able to flex their elbow 135° and touch their ipsilateral shoulder.
   b. Extension is normally 0° but patients may have up to 5° of hyperextension of the elbow.
   c. Supination to 90° is normal.
   d. Pronation to 90° is normal.

PICTURE!
5. **Swollen or Tender Elbows** —
   a. **Olecranon bursitis** — Swelling and inflammation of the olecranon bursa may result from trauma or may be associated with rheumatoid or gouty arthritis. The swelling is superficial to the olecranon process.
   b. **Arthritis** of the elbow — Synovial inflammation or fluid is felt in the grooves between the olecranon process and the epicondyles on either side. Palpate for bogginess or fluctuance as well as for tenderness.
   c. **Rheumatoid nodules** — Subcutaneous nodules develop at pressure point along the extensor surface of the ulna in patients with rheumatoid arthritis or acute rheumatic fever. They are firm and nontender and are not attached to the overlying skin.
   d. **Epicondylitis** —
      • lateral epicondylitis or “tennis elbow” typically results from repetitive extension of the wrist or pronation-supination of the forearm. The patient c/o pain and tenderness over the lateral epicondyle and sometimes in the extensor muscles close to it. If the patient is asked to extend the wrist against resistance, the pain will increase.
      • medial epicondylitis, also called pitcher’s or golfer’s elbow, is the result of repetitive wrist flexion, as in throwing a ball. Tenderness is maximal at the medial epicondyle. Wrist flexion against resistance increases the pain.

C. **Physical Exam of Hands and Wrists** —
   1. **Symptoms** — Pain and swelling of the joints are the most important symptoms of disorders of the hand.
   2. **Inspection** — Note any erythema, warmth or swelling.
   3. **Range of motion** —
      a. Ask the patient to make a fist with each hand – this tests flexion of the MCP, PIP and DIP joints
      b. Ask the patient to make a claw by bringing their fingertips to their MCP joints – this tests extension at the MCP joint
      c. Inspect the wrists in the flexed and extended position. The grip is the strongest when the wrist is partially extended so impaired extension has functional implications.
      d. Ulnar and radial deviation - with palms facing downward, move the hands laterally (ulnar deviation) and medially (radial deviation).
      e. Have the patient supinate (palms upward as though they are holding a bowl of soup) and pronate their hands.
   4. **Palpation** —
      a. Identify the different rows of joints in the hands. Palpate the medial and lateral aspects of the joint. Note any swelling, bogginess, bony enlargement, redness or tenderness.
         i. MCP’s (metacarpal-phalangeal joints) – affected in rheumatoid arthritis
         ii. PIP’s (proximal interphalangeal joints) - tender, swollen, symmetrical involvement is often seen affecting the PIP joints in rheumatoid arthritis. One may also see hard, painless nodules called Bouchard’s nodes on the PIP joints in degenerative arthritis.
         iii. DIP’s (distal interphalangeal joints) – Heberden’s nodes are hard, painless nodules on the dorsolateral aspects of the DIP joints and are seen in degenerative arthritis.
      b. Palpate each wrist joint, with your thumbs on the dorsum of the wrist and your fingers underneath. Note any swelling, bogginess or tenderness.

5. **Range of Motion** —
   a. Wrist flexion should be 90 degrees.
   b. Wrist extension should be 70 degrees.
6. Abnormalities —
   a. De Quervain’s tenosynovitis — This is tenosynovitis of the thumb abductors and extensors. The patient complains of a weak grip and pain at the base of the thumb that is aggravated by certain movements of the wrist. Ask the patient to flex the thumb and close the fingers over it. When you attempt to move their hand into ulnar deviation, this will cause excruciating pain with De Quervain’s tenosynovitis.
   b. Rheumatoid arthritis — Multiple abnormalities may be seen in the hand including chronic swelling and thickening of the MCP and PIP joints. Range of motion of the wrists becomes limited and the fingers may deviate to the ulnar side. “Swan neck” deformities also occur later in the course of the disease in which the PIP joints are hyperextended with a fixed flexion of the DIP joints. Rheumatoid nodules may also be present in both the acute and chronic disease state.
   c. Gout — In chronic tophaceous gout, one may see asymmetric knobby swelling and deformities on the hands (and feet) which can ulcerate and release white urates.
   d. Trigger Finger — This is a painless nodule in a flexor tendon in the palm, near the head of the metacarpal bone. When the patient tries to extend their fingers from a flexed position, the nodule is too big to enter the tendon sheath. With persistence, the finger will extend and one can palpate and sometimes hear a snap as the nodule pops through the narrow tendon sheath.
   e. Thenar atrophy — If a patient has atrophy localized to their thenar eminence, this is caused by a disorder of the median nerve such as carpal tunnel syndrome.

D. Physical Exam of Knee —
1. Symptoms — The most common causes of knee pain are patellofemoral syndrome and osteoarthritis, both of which are diagnosed largely by history. Also, remember that pain in the knee may be referred from the hip, the lumbar spine and from the foot and ankle so those portions of the physical must frequently be done as well as the knee exam in a patient with knee complaints. Patients may complain of pain, swelling, locking or instability. Taking a detailed history of the mechanism of an acute injury is very helpful in making the diagnosis.
2. Inspection — This should be done in the sitting, standing and supine positions. Is there swelling, effusions, masses, deformity, atrophy or a flexion contracture in the joint.
   a. Standing —
      i. Examine the patient’s gait looking for a limp
      ii. Observe the amount of varus (= bow-legged) or valgus (= knock-kneed) deformity by noting gaps between the knees and medial malleoli respectively when the patient is trying to stand with his/her legs together. A more sophisticated test which is performed by orthopedists is to measure the Q-angle, which is the angle between an imaginary line from the anterior superior iliac spine to the middle of the patella with a line along the long axis of the tibia. The Q-angle should be about 15-20°.
   b. Sitting —
      i. Look for the landmarks in and around the knees:
         1) the tibial tuberosity (a tender swollen tibial tuberosity in an adolescent suggests Osgood-Schlatter disease),
         2) the medial condyl of the tibia,
         3) the lateral condyl, of the tibia and
         4) head of the fibula.
      ii. Look for any atrophy of the quadriceps muscles, especially the medial compartment or vastus medialis which can atrophy quickly and is responsible for the last 10-15 degrees of extension.
   c. Supine —
      i. Look for any loss of normal hollows around the patella and note any other swelling in or around the knee.
ii. Look for any effusions or diffuse swelling which may obliterate the normal hollows around the patella.
ii. Look for erythema.

3. Palpation —
   a. Feel for abnormal warmth, comparing with the contralateral side
   b. Note any focal tenderness. Fluctuance or bony exostoses
   c. Feel for crepitus on knee flexion and extension and note its location
   d. Examine for a knee effusion — The so-called “bulge sign” by milking the medial aspect of the knee firmly upward two or three times to displace any fluid. Then press or tap the knee just behind the lateral margin of the patella. Watch for a bulge of returning fluid in the hollow medial to the patella. Normally none is seen.
   e. Note whether the patella is ballottable
   f. Flex the knee to about 90° to palpate the tibiofemoral joint. The patient’s foot should rest on the examining table. With your thumbs, press into the joint and palpate along the course of each collateral ligament. Identify any points of tenderness. Note any irregular bony ridge along the joint margins.
   g. Examine all of the bursae listed below.
      i. prepatellar — Anterior to patella, this bursitis is often due to repetitive strain on the quadriceps or patellar tendon with resultant tendonitis and a reactive bursitis.
      ii. infrapatellar — Similar to prepatellar bursitis in origin and treatment, located inferiorly to the patella and posterior to the patellar tendon.
      iii. anserine — Located in anteromedial knee at the superior potion on the tibia and allows the tendons of the medial muscle of flexion to glide smoothly. This bursa is irritated by repetitive side to side motion associated with many sports. Dx made by focal pain and possible swelling in the anteromedial knee associated with flexion and internal rotation of the knee.
      iv. semimembranous — Located in the posteromedial portion of the knee, this bursitis is often seen in runners and is diagnosed by localized pain and swelling in this part of the knee.
      v. Baker’s cyst — Looking for this is done only if the patient complains of pain or fullness behind the knee. It may only be seen with the patient standing and the knee fully extended. A Baker’s cyst is an abnormal communication between the knee joint space and the semimembranosus bursa. It may occur secondary to trauma or inflammation; these are often self-limited but may be quite painful. They can rupture causing pain, erythema and swelling to the lower leg, mimicking symptoms of a DVT.

4. Range of Motion of the knee — The normal knee can flex from 0-130°.

5. Testing of the Menisci — This should be done if the patient complains of pain, popping or grinding in the knee.
   McMurray’s test —
   With the patient lying supine, legs extended, flex his leg fully with one hand. Then, place your other hand on the knee joint with your fingers touching the medial joint line and your thumb against the lateral joint line. Push on the lateral side to apply valgus stress to the medial side of the joint, while at the same time, rotating the leg externally. Maintain the valgus stress and external rotation, and extend the leg slowly as you palpate the medial joint line. If this maneuver causes a palpable or audible “click” in the joint, there is a probable tear in the medial meniscus. Tenderness elicited in palpation of the joint line on either side suggests the possibility of a torn meniscus.
6. Testing of the Anterior Cruciate Ligament — This need only be done if the patient complains of injury, instability or pain in the knee.

PICTURE

a. Anterior Drawer Test — With the patient lying supine and the knee flexed to 90° and the foot in 15° of external rotation, apply an anterior force to the tibia, i.e. draw the tibia towards you. This is difficult to do after an acute injury since it is often hard to bend the knee and pain-related spasm of the hamstrings may inhibit anterior displacement even with an ACL tear. If the tibia slides forward from under the femur, the anterior cruciate ligament may be torn and this is considered a positive anterior drawer sign.

b. Lachman Test — With the patient lying supine and the knee flexed to 30°, put an anterior force on the tibia while holding the femur stable. The advantages of this test are that since the knee is minimally bent there is minimal pain. Also, the angle of the knee prevents “guarding” of displacement by the hamstrings. However, it may be difficult to perform with small hands or on an obese patient.

7. Testing of the Posterior Cruciate Ligament —

E. Posterior Drawer Test — With the knee flexed to 60-90° and the foot in neutral position, apply a posterior force on the tibia, i.e. push the tibia away from you. If it moves backward on the femur, the posterior cruciate ligament is probably damaged and this is considered a positive posterior drawer sign. See the pictures below from Hoppenfeld, Physical Exam of the spine and extremities. New York: Appleton-Century-Crofts, 1976.
E. Physical Exam of Hip —

1. Symptoms — The major symptoms of hip disease are pain, stiffness, deformity or a limp. In degenerative arthritis, one of the first complaints of hip pain will be that a patient has difficulty putting on their shoe.

   True hip pain is felt by the patient in the groin or it may radiate down the medial thigh. Often patients confuse back, buttock or trochanteric bursitis pain with hip pain so it is important to ask them to point to where their “hip pain” is bothering them. Lateral hip pain is often due to a trochanteric bursitis.

2. Palpation —
   a. Feel for abnormal warmth, comparing with the contralateral side
   b. Note any focal tenderness or fluctuance over the hip joints and the trochanteric bursae.

3. Range of Motion of the hip — These motions should be tested with the patient in the supine position. The normal hip can flex from 0-90° with the knee extended and to 120 degrees with the knee flexed. It can extend 15 degrees. Abduction to 40 degrees, internal rotation to 40 degrees and external rotation to 45 degrees is normal. Internal and external rotation are the first motions to be lost in degenerative arthritis.

4. Trendelenberg sign — This test is done standing and indicates a disorder between the pelvis and the femur. Ask the patient to stand on their “good” leg and note that the contralateral pelvis elevates, which indicates that the gluteal medius is working normally. Then ask the patient to stand on their “bad” leg and the contralateral pelvis will fall, because of a failure of the gluteus medius muscles to contract normally. This is called a positive Trendelenberg test.

F. Foot Examination —

1. Examine the foot sitting and standing. Are there deformities? Look for hallux valgus (see below) and at the height of the arch. Are there hammer toes? Other foot deformities? Erythema or swelling?

2. Examine the soles of shoes for abnormal wear.

3. Hallux valgus and bunions — Hallux valgus is a common deformity of the great toe in which one will see deviation away from the midline toward the second toe. Osteophytes may be palpable at the joint line. The true bunion is a bursa that develops over the medial border of the first MTP and produces an effusion.

4. Corns — These are areas of skin thickening that develop over the toe as a result of chronic mechanical irritation. Hard corns develop over interphalangeal joints of the toes when a cock-up deformity causes pressure on the joint in shoes. Soft corns are areas of skin thickening between the toes from abnormal pressure as the toes rub against each other.

5. Plantar fasciitis — The patient complains of swelling or tenderness on the plantar surface of the calcaneous. When standing. On exam, there is often tenderness at the calcaneous or the midpoint of the plantar surface. Frequently a spur is seen on radiograph although it is not the cause of the pain.

G. Back Examination —

1. Symptoms — Remember that back pain may be referred from the chest, abdomen or pelvis and these portions of the exam should also be done if a patient complains of acute back pain. A patient may complain of pain in the back, buttocks or legs, stiffness or decreased mobility, numbness or paresthesias in the lower extremity and may have associated bowel or bladder changes.
2. Inspection —
   a. Observe the spine from the side noting the cervical, thoracic and lumbar curves, noting that the
curves of the cervical and lumbar spines should be concave and the curve of the thoracic spine
should be convex. Lordosis is common in patients who are markedly obese. Kyphosis may be
observed in aging adults. A sharp angular deformity, called a gibbus, is associated with a
collapsed vertebra, and is usually secondary to osteoporosis.
   b. Look for the most prominent vertebrae – C7 and T1.
   c. Look for any differences in the heights of the shoulders, the iliac crests, and the skin creases
below the buttocks. Unequal heights of the iliac crests, called a pelvic tilt, suggests a leg length
inequality. Scoliosis may also cause a pelvic tilt.
   d. Have the patient bend forward to touch the toes (flexion). Note the smoothness and symmetry
of movement, the range of motion and the curve in the lumbar area.
   e. Sit down behind the patient, stabilize the patient’s pelvis with your hand and ask the patient to:
      i. bend sideways - lateral bending,
      ii. bend backward toward you - extension, and
      iii. twist the shoulders one way and then the other - rotation.
   f. With the patient in a sitting or standing position, palpate the spinous process with your thumb.
Identify any tenderness.

3. Palpation —
   a. Gently percuss the spine for tenderness by thumping it with the ulnar surface of your fist.
Percussion may cause pain if there is an osteoporotic fracture, malignancy or infection of the
spine.
   b. Inspect and palpate the paravertebral muscles for tenderness and spasm. Tenderness in the
costovertebral angles may indicate a kidney infection rather than a musculo-skeletal problem.

4. Range of Motion —
   a. Ask the patient to bend forward to try and touch his/her toes. Inspect the spine for an
unexpected curvature. The patient’s back should be symmetrically flat as the concave curve of
the lumbar spine becomes convex with forward flexion. A lateral curvature of rib hump should
make you suspect scoliosis. Scoliosis often becomes evident during adolescence, before a
patient develops any symptoms.
   b. Forward flexion – expect flexion of 75-90˚

5. Special Techniques —
   a. For LBP with radiation into the leg –
      i. If the patient has noted low back pain that radiates down the leg, check straight leg raising
on each side in turn. This is best done with the patient either lying supine. When supine,
raise the patient’s relaxed and straightened leg until the pain occurs. Then dorsiflex the
foot – if there is a herniated lumbar disc, this will increase the pain. Record the degree of
elevation at which the pain occurs. Tightness or mild discomfort in the hamstrings with
this maneuver are common and do not indicate radicular pain. A normal person can raise
their straightened leg to 80˚ without complaining of LBP.
      ii. Review the neurologic exam in the syllabus for a detailed discussion of lower extremity
reflexes and the sensory exam of the lower extremities. These should be memorized.
   b. Schober’s Test – This test should only be performed if you suspect an inflammatory process
affecting the back such as ankylosing spondylitis. With the patient standing erect, estimate the
top of the sacrum by imagining a line between the posterior iliac spines. Make the skin in the
midline 10 cm. above this line and 5 cm. below this line with a measuring tape. Then have the
patient bend forward maximally, attempting to touch the floor with their hands. Normally, this
distance should increase to greater than 15 cm. (14 cm in shorter adults). False positives (i.e. lesser increases not due to disease) can occur in joggers, people over 50 and those with prior back surgery. Only 2% of the normal population demonstrates less than 5 cm. of flexion.

### Normal Range of Motion for Various Joints

<table>
<thead>
<tr>
<th>Joint</th>
<th>Motion</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shoulder</td>
<td>Abduction (in frontal plane)</td>
<td>0° to 180°</td>
</tr>
<tr>
<td></td>
<td>Forward Flexion (Fig. 24-6)</td>
<td>0° to 180°</td>
</tr>
<tr>
<td></td>
<td>Internal, external rotation (humerus, held laterally so that it is parallel to floor and perpendicular to body; forearm moved in sagittal plane)</td>
<td>0° to 90°</td>
</tr>
<tr>
<td>Elbow</td>
<td>Flexion-extension</td>
<td>0° to 160°</td>
</tr>
<tr>
<td></td>
<td>Pronation</td>
<td>0° to 90°</td>
</tr>
<tr>
<td></td>
<td>Supination</td>
<td>0° to 90°</td>
</tr>
<tr>
<td>Wrist</td>
<td>Flexion-extension</td>
<td>90° to 70°</td>
</tr>
<tr>
<td></td>
<td>Ulnar-radial deviation</td>
<td>50° to 20°</td>
</tr>
<tr>
<td>Metacarpophalangeal</td>
<td>Flexion-extension</td>
<td>90° to 30°</td>
</tr>
<tr>
<td>Spine</td>
<td>Extension</td>
<td>0° to 30°</td>
</tr>
<tr>
<td></td>
<td>Lateral motion</td>
<td>0° to 50°</td>
</tr>
<tr>
<td></td>
<td>Rotation (trunk)</td>
<td>90°</td>
</tr>
<tr>
<td></td>
<td>Rotation (lower thoracic, lumbar)</td>
<td>30°</td>
</tr>
<tr>
<td>Cervical spine</td>
<td>Flexion</td>
<td>45°</td>
</tr>
<tr>
<td></td>
<td>Extension</td>
<td>60°</td>
</tr>
<tr>
<td></td>
<td>Rotation</td>
<td>60° to 80°</td>
</tr>
<tr>
<td></td>
<td>Lateral bending</td>
<td>40°</td>
</tr>
<tr>
<td>Hip</td>
<td>Extension</td>
<td>0° to 15°</td>
</tr>
<tr>
<td></td>
<td>Flexion (knee flexed)</td>
<td>0° to 120°</td>
</tr>
<tr>
<td></td>
<td>Flexion (knee extended)</td>
<td>0° to 90°</td>
</tr>
<tr>
<td></td>
<td>Abduction</td>
<td>0° to 40°</td>
</tr>
<tr>
<td></td>
<td>Internal rotation</td>
<td>0° to 40°</td>
</tr>
<tr>
<td></td>
<td>External rotation</td>
<td>0° to 45°</td>
</tr>
<tr>
<td>Knee</td>
<td>Hyperextension-flexion</td>
<td>-15° to 130°</td>
</tr>
<tr>
<td>Ankle</td>
<td>Plantar flexion-dorsiflexion</td>
<td>-45° to 20°</td>
</tr>
<tr>
<td></td>
<td>Inversion-eversion</td>
<td>-30° to 20°</td>
</tr>
</tbody>
</table>
II. Pediatric Orthopedic Exam
   A. Infant
      1. Note any positional deformities. Newborn's feet are not held straight but in a varus (apart) or
         valgus (together) position. Determine whether this position is flexible or fixed. A true
deforomity is fixed. Use one hand to immobilize the heel then gently push the forefoot to the
neutral position with the other hand. If you can move it to the neutral position, it is flexible.
      2. Metatarsus varus — Adduction and inversion of fore foot. Present at birth and usually resolves
         spontaneously by age 3 years.
      3. Tibial torsion — A twisting of the tibia. This may originate from intrauterine positioning.
         Check for this by placing both feet flat on the table, and push up the knees. With the patella
         and the tibial tubercle is a straight line, place your fingers on the four malleoli. The line
         connecting the four malleoli is parallel to the table.
      4. Hip exam — Check for congenital dislocation at every visit until the infant is a year old by
         performing the Ortolani maneuver. This is done by placing your thumbs on the infant's inner
         thighs, near the knees, with fingers on the greater trochanters. Abduct the legs, rotating the
         proximal femur toward the pelvis. This external rotation normally feels smooth and has no
         sound. A positive Ortolani's sign is when you feel and hear a click as the head of the femur
         pops back into place.
      5. Allsi sign — This is another test for hip dislocation. It is positive if one knee is significantly
         lower than the other when the knees are in the flexed position.
      6. Observe ROM (range of motion) through spontaneous movement of the extremities.
      7. Examine the spine and check for any tenderness. The concave cervical spine curve of the
         infant indicates normal forearm strength.
   B. Early and Late Childhood
      1. Gait — Observe the child's gait while he/she is walking away and back to you. A broad base
         gait is seen from 1 – 2 years. At age 3 the base narrows and the arms are held closer to the
         sides.
      2. Observe the child for increased angulation at the elbow or extreme shoulder height asymmetry
         and any asymmetry in the angle formed by the humerus and the forearm (elbow carrying
         angle). A unilateral deformity may be congenital or from a traumatic growth disturbance.
      3. Lower extremities — With the child standing look at the alignment of the legs. Check for
         knock-knees (genu valgum), bowleg (genu varum), internal femoral torsion (the patella face
toward each other), external femoral torsion (patella face away from each other) and for
         differences in leg lengths. (pelvic brims not level)
      4. Feet — Parents are often concerned about "flatfeet" and "pigeon toes". Flatfoot (pes planus) is
         the turning in of the medial side of the foot (pronation). The normal longitudinal arch is
         concealed by a fat pad until 3 years making the child look flatfooted. Pronation is common
         between 12 and 30 months. Pigeon toes (toeing in) is when the child walks on the lateral side
         of the foot and the longitudinal arch looks higher than normal. This usually starts as a forefoot
         adduction and is spontaneously corrected by age 3.
      5. Osgood-Schlatter disease — This is an enlargement of the tibial tubercles which may be
         caused by stress on the patellar tendon. This pain may increase with kicking, running, and
         kneeling.
      6. Back — Examine the adolescent's back starting at age 12 for the following:
      7. Kyphosis — This common during adolescence due to poor posture. Have the patient bend
         forward with arms hanging free. Observe from the side. If the patient is not able to touch
         his/her distal shin or toes their hamstrings may be too tight due to spondylolisthesis in the
         lower lumbar spine. Look for an excessive round back in the thoracic spine.
      8. Scoliosis — Stand or sit behind the patient and ask him/her to bend forward with their arms
         hanging free.
You should see a straight vertical spine and the posterior ribs should be symmetric with equal elevations of shoulders, scapulae, and iliac crests. The spine should also be straight with the patient standing.

Write-up of the Joint and Back Exam:
No joint deformities, swelling, masses; normal spinal curvature, no tenderness to palpation of joints. Good ROM in hands, wrists, elbows, shoulders, spine, hips, knees and ankles. Good muscle strength.

CASE #8: Daniel Doolittle

Daniel Doolittle is a 33-year-old salesman who makes an appointment to see you because of a backache. He is asking your office manager to schedule him for an MRI (magnetic resonance imaging) study to evaluate his back problem. Mr. Doolittle stated that his friend had a similar backache and he needed an MRI so why not just order one for him too.

Mr. Doolittle had his annual physical examination three months ago and it was normal. He has no medical problems and takes no medications. His vital signs are normal.

What do you want to ask of this patient? What parts of the physical examination do you want to perform?

CASE #9: Bruce Berger

An 18-year-old high school senior named Bruce Berger has made an urgent appointment to see you because of a headache which developed during football practice. He had to leave practice because of the severe pain.

Upon entering the room, you see a young man with eyes closed tightly holding the left side of his head. His blood pressure is 110/75 mm Hg. The rest of his vital signs are within normal limits. What parts of the history and physical examination are relevant to this patient?
Examination of the Breasts, Axillae and Pelvis

Preparation for this session:
1. View Swartz DVD on the Breasts and Axillae exam prior to this session.
2. Syllabus – Physical Diagnosis pp. 101 Examination of the Breasts, Axillae and Pelvis
4. Syllabus – Articles pp. 25-27, The Pelvic Examination: A View from the Other End of the Table
5. Syllabus – Articles pp. 28-38, Does this Patient Have Breast Cancer, Mary Barton, MD et al.

A. Breast Exam – will be covered in large group with practice using silicone breast models in small group.

B. Gynecology Exam

Each student will be assigned to one gynecological physical assessment sessions which will be held during the winter. The session consists of a didactic portion and a small-group clinical/portion with a Gynecologic Teaching Associate. Student schedules will be pre-assigned, but may be swapped with a same-gender classmate. Class preparation will include reading, written assignment, videos and, an interactive computer program based on the course. Attendance is mandatory. Students will evaluate their own preparation and skills with written input from the midwifery faculty and their GTA.

A white lab coat is required attire.

Students have found this to be an excellent experience which reduces anxiety and teaches a difficult skill.

CASE #3: Jane Jett

A 10-year-old girl named Jane Jett is brought to the emergency room by the school nurse with the chief complaint of shortness of breath. The vital signs are as follows:
BP: 100/70
Pulse: 100
Respiration: 28
Temperature: 98.6°F
Oxygen Saturation: 99%

Upon entering the examination room, you observe a patient who is in mild to moderate respiratory distress. She seems to be frightened and concerned. She is looking at the peak flow meter and appears to be confused and perplexed. What parts of the history and physical examination are relevant to this patient?

CASE #4: Julia Gordon

You are about to evaluate 25-year-old Ms. Julia Gordon in the emergency room. She called the ambulance because of leg pain. The paramedics inform you that her:
BP: 110/70
Pulse: 80
Respiration: 12
Oxygen Saturation: 100%

As you enter the examination room, you notice a thin woman lying on the stretcher looking at her right lower extremity. You have 15 minutes to see Ms. Gordon. What parts of the history and physical examination are relevant to this patient?