

OSCE Preparation Notes



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Cheat Sheet

DIAPHRAGM: high pitched sounds
(S₁ S₂ aortic murmur, mitral regurg, pericardial friction rub)
BELL: low-pitched sounds
(S₃ S₄ mitral stenosis, tricuspid murmur, bruits, BP)

SCALE FOR GRADING MUSCLE STRENGTH

0: No movement
1: Flicker/trace
2: Movement without gravity
3: Movement against gravity
4: Movement against gravity & some resistance
5: Active movement against full resistance (normal)

PULSE

3+ Bounding
2+ Brisk, expected (normal)
1+ Diminished, weaker than expected
0 Absent, unable to palpate

HEART SOUNDS

Aortic Area: 2nd interspace RT of sternum
Pulmonic Area: 2nd interspace RT of sternum
Tricuspid (LT Sternal Border): RT ventricle, 3rd, 4th, 5th, interspaces
Mitral (Apex): LT ventricle, PMI

Murmur Intensity (express as fraction)

1: Very faint
2: Quiet, but heard
3: Moderately loud
4: Loud with thrill
5: Loud, thrill, stethoscope partly off
6: Loud, thrill, stethoscope off chest

	Duration of Sounds	Location
Vesicular	Inspiratory sounds last longer than expiratory ones.	Over most of both lungs
Bronchovesicular	Inspiratory and expiratory sounds are about equal.	Anteriorly: In the 1 st and 2 nd interspaces Posteriorly: between the scapulae
Bronchial	Expiratory sounds last longer than inspiratory ones.	Over the manubrium, if heard at all
Tracheal	Inspiratory and expiratory sounds are about equal.	Over the trachea in the neck
		Note gap

Oh Oh Oh They Traveled And Found Voldemort Guarding Very Secret Hallows
Some Say Marry Rich But My Brother Says Big Brains Matter More

REFLEXES	
4+	Hyperreflexia with clonus
3+	Hyperreflexia without clonus
2+	Average (normal)
1+	Hyporeflexia
0	No reflex

I	Olfactory
II	Optic
III	Oculomotor
IV	Trochlear
V	Trigeminal
VI	Abducens
VII	Facial
VIII	Acoustic
IX	Glossopharyngeal
X	Vagus
XI	Spinal accessory
XII	Hypoglossal

General Examination

GENERAL SURVEY

- State of health, Level of consciousness, signs of distress (*cardiac, respiratory, pain, anxiety, depression*), height and build, weight, obvious abnormalities or lesions, dress, grooming, personal hygiene, odors, posture, gait, movement, mood, alertness

BMI

	Obesity Class	BMI (kg/m ²)
Underweight		<18.5
Normal		18.5-24.9
Overweight		25-29.9
Obesity	I	30-34.9
	II	35-39.9
Extreme Obesity	III	>40

<u>Weight (lbs) X 700 / Height (in)</u>	<u>Weight (KG)</u>
Height (in)	Height (m ²)

WAIST CIRCUMFERENCE

Women	88 cm (35 inches)
Men	102 cm (40 inches)

VITAL SIGNS

- Blood pressure** (take on both arms – difference should not be greater than 5-10 mmHg)
 - *Avoid smoking, caffeine 40 min before, Have pt sit quietly for at least 5 minutes
 - *Brachial artery at heart level (4th intercostal) Below=higher BP, above=low BP
 - *Systolic (LT ventricle contraction, resistance against compressed artery)
 - *Diastole (Relaxation, no more resistance)
- [1] Choose cuff
 - Width - 40% of upper arm circumference, length - 80% of upper arm circumference
 - Too small=false high BP, too large=false low BP
- [2] Palpate brachial artery
- [3] Put cuff on over upper arm, 2.5 cm above antecubital crease
- [4] Estimate systolic pressure: palpate radial artery while inflating until it disappears, add 30 mmHg to systolic (avoids auscultatory gap [atherosclerosis], record if gap is present)
- [5] Place bell over brachial artery, inflate cuff, deflate 2-3 mmHg/sec
- Orthostatic Hypertension:** fall in systolic pressure greater than 20 mmHg, or diastolic greater than 10mmHG. Supine, Sitting, Standing. Pt must remain in position for 3-10 minutes (normally there is a slight decrease in systolic, rise in diastolic when standing, but usually recovers)
- Temperature** (fever (pyrexia)=>38 °C, hypothermia=<35°C)
 - Oral, rectal, axillary, tympanic, axillary
- Respiratory rate:** 12-20/min
 - Respiratory Rhythm (regular vs. irregular)
 - Depth (shallow vs. deep)
 - Effort (accessory muscle use)
- Heart Rate (Pulse):** 60-100 bpm (Radial pulse) (Bradycardia <40, tachycardia >100)
 - Rhythm (regular vs. irregular)
 - Rate (regular, slow, fast)
 - Contour: upstroke/downstroke, duration of summit (brisk, smooth, rapid, following S1)
 - Amplitude

	Systolic	Diastolic
Normal	<120	<80
Prehypertension	120-139	80-89
Hypertension		
Stage 1	140-159	90-99
Stage 2	>160	>100
Isolated systolic hypertension	>140	<90

Abdominal History (BAD TAN DJ)**BOWEL CHANGES**

- Steatorrhea (*fat, mucous, floating*): due to malabsorption (*IBD, Celiac, pancreatic pblm, cholecystitis*)
- Blood in stools: Melena (*coffee grounds*), hematochezia (*red*)
- Pus: inflammatory large intestine
- Quantity, shape, consistency (*pencil stools=colon CA*)

APPETITE/ANOREXIA/DIET

- Weight loss
- Nausea, vomiting
- Desire to eat
- Change in diet

DIARRHEA & CONSTIPATION

- Diarrhea: increased frequency or increased water content
 - Acute=2 week (*infection*) Chronic=4 weeks (*IBD, IBS, Celiac*)
 - Awaken from sleep?
 - Amount of fluid, # of times
- Constipation: decreased water content, decreased frequency, straining

TRAVEL/FAMILY-FRIEND WITH SIMILAR Sx**ABDOMINAL PAIN**

- *Onset*
- *Location*: point to pain
- *Duration*:
 - Acute abdomen: appendicitis (*Periumbilical, RLQ*), Cholecystitis (*RUQ, shoulder*), renal stones (*flank*), pancreatitis (*epigastric, back pain*), intestinal obstruction, PID, ectopic pregnancy (*suprapubic, hypogastric*), diverticulitis (*LLQ*)
 - Chronic abdomen: GERD (*epigastric*), peptic ulcer (*epigastric*), colon cancer, IBD, IBS
- *Character*:
 - Visceral pain: when organ capsules stretch (*ex. Liver*). Poorly localized, cramping, aching, gnawing
 - Parietal pain: inflamed parietal peritoneum. Precisely located, steady severe ache/shooting pain, aggravated by movement
 - Referred pain: innervation is at the same spinal level
- *Aggravating*:
 - Meals, alcohol, meds, stress, position, antacids
 - GERD is aggravated by: alcohol, chocolate, citrus, coffee, onions, peppermint, bending over, lifting, lying
 - MI: pain with exertion
- *Associated symptoms*
 - GERD: respiratory symptoms (*cough, wheeze, aspiration pneumonia*)
- *Radiating/Referred*
 - MI: epigastric pain
 - Appendicitis: periumbilical
 - Cholecystitis: RT shoulder
 - Duodenum, stomach, pancreatitis: back pain
- *Timing*
 - After meals? During the night? While lying down? Exertion vs. rest?
- *Severity (1-10)*

NAUSEA & VOMITING

- Color: Gastric: clear, mucus Bile: yellow/green
- Odor: Fecal: bowel obstruction
- Quantity
- Hematemesis: coffee ground (*blood*)
- Regurgitation (*raised gastric contents=esophagus*) versus vomiting (*forced expulsion=bowels*)

DYSPHAGIA (difficulty swallowing) & ODYNOPHAGIA (painful swallowing)

- Associative regurgitation, GERD
- Respiratory symptoms: hoarseness, cough
- Point to area
- Type of food:
 - Solid: structural pblm (*stricture, Zenker's diverticulum, neoplasm, varices*)
 - Liquid: motility

JAUNDICE

- Pruritic
- Urine: dark yellow with conjugated bilirubin (*from biliary obstruction*)
- Stool: acholic (*grey*)
- RUQ visceral pain
- Screen for: liver disease, alcohol consumption (*CAGE*), gallbladder disease

GU

- Menstrual
- Urinary

Abdominal Physical Exam

*Drape: Nipple line to symphysis pubis *Watch pt for discomfort *Lying supine to relax abdo muscles

INSPECTION (Pt RT)

- **Skin:** striae (*Cushing's=pink/purple*), scars (*surgery*), rashes, symmetry, lesions
- **Umbilicus:** contour, location, hernia (*caput medusa=portal HTN*), inflammation
- **Abdomen:** contour (*flat, pannus*), symmetry, peristalsis (*increased with pulsations*), flank (*ascites*), pulsations (*AAA in epigastric*), distension
- **Extrahepatic signs of liver failure:** skin (*jaundice, palmar erythema, Dupuytren's contracture, clubbing, peripheral edema, spider nevi*)

AUSCULTATION

- **Bowel Sounds:** listen in all 4 quadrants for at least 2-3 minutes
 - Clicks/gurgles: 5-43/minute
 - Borborygmi: sounds heard without stethoscope
 - Increased pitch=obstruction
- **Bruit:** aorta, renal, iliac, femoral
 - Often have systolic and diastolic components
- **Friction rubs:** liver, spleen
 - Indicates enlarged organ due to infarct, infection, tumor

PERCUSSION

- **Abdomen:** 4 quadrants
 - LUQ: tympany (*gastric bubble, splenic flexure*), RUQ: dullness (*liver*)
 - Large dullness: mass/enlarged organ
 - Protuberant abdomen + tympany throughout: obstruction
- **Liver:** Vertical Span
 - **Lower Border:** Start in the LLQ in the midclavicular line, identify lower border of dullness, mark with pen
 - **Upper Border:** starting at nipple line, percuss between ribs down to upper border of dullness, mark with pen
 - Liver Span Measurements:
 - Midclavicular: 6-12cm
 - Midsternal: 4-8cm
 - *Men/tall ppl have larger liver spans*
- **Spleen** (*Enlarged spleen: expand anteriorly, downward, medially*)
 - **Traube's Space:** at 5th/6th intercostal space, percuss lateral from anterior axillary line to midaxillary line (*Tympany=no splenomegaly, Dullness=splenomegaly*)
 - **Splenic Percussion Sign:** at lower interspace, percuss in anterior axillary line (*tympanic*). Ask pt to take a deep breath and percuss again (*Tympanic=no enlargement, Positive (dullness)=enlargement*)
- **Kidney** (*see renal exam*)

PALPATION

*May need to use pt's hand, keep hand horizontal to abdo

*Always ask about tender areas (do last), Look for pt reaction, look for guarding

- **Light palpation:** 4 quadrants
 - Identify: [1] superficial masses, [2] tenderness, [3] increased resistance (*guarding* [*persists despite relaxation maneuvers – breathing through open mouth*] vs. *muscular spasm*)
- **Deep palpation:** 4 quadrants
 - Identify masses (*location, size, shape, consistency, tenderness, pulsations, mobility*)

- **Liver:** LT hand behind pt parallel to 11th/12th ribs and pressing fwd, RT hand below dullness, press in and up, Pt takes deep breath, feel for liver edge, allow live to slip under hand
 - Inspiration: liver is palpable 3 cm below costal margin
 - Note: tenderness (*normally slightly tender*), margin (*smooth, soft, sharp, regular*)
 - Hook method: standing at pt's chest, hook hand below costal margin, pt breath in, live edge meets hooked hands
- **Spleen:** LT hand behind pt pressing fwd, RT hand in LLQ, press in toward spleen, Pt takes deep breath, feel for spleen
 - Note tenderness, contour
 - 5% of Pts, spleen is palpable
 - Lying on RT: take technique but with pt on side, brings spleen forward
- **Aorta:** Press down slightly LT to epigastric region, >3cm=abnormal
 - 50+, Smoking, male, family history

SPECIAL TESTS

- **Peritoneal inflammation** - Localizing pain:
 - [1] **Coughing:** ask pt to cough, and point to pain
 - [2] **Rebound tenderness:** press down slowly, withdraw quickly (*positive rebound tenderness=pain with quick withdrawal*)
- **Ascites** (*CHF, nephritic, malnutrition, cirrhosis, portal hypertension*)
 - **Shifting dullness:**
 - [1] With pt supine, percuss out from umbilicus, map area of tympany and dullness
 - [2] Ask pt to turn onto side, percuss borders again
 - *Positive shifting dullness:* Dullness shifts to dependant side, tympany shifts to top
 - **Fluid Wave:**
 - [1] Pt pressed hands down in midline of abdomen (stops transmission) of wave
 - [2] Tap flank and feel on opposite flank for transmitted fluid wave
 - Positive fluid wave confirms ascites
 - **Ballotting the organ:** with straight, stiff fingers on abdomen, make jabbing movement toward mass (displaces fluid)
- **Appendicitis** (*any positive=appendicitis*)
 - [1] Point
 - [2] Cough
 - [3] Palpate for tenderness
 - [4] Feel for muscle rigidity
 - [5] **Rebound tenderness**
 - [7] **Rovsing's Sign:** referred rebound tenderness (*palpation in LLQ, pain in LRQ*)
 - [8] **Psoas sign** (*irritation of iliopectus hip flexors, indicates appendix is retrocecal*): with hand on RT knee, as pt to raise thigh against hand
 - [9] **obturator sign:** flex RT hip, with knee bent, rotate leg internally at hip
 - [10] **Cutaneous hyperesthesia:** pinch skin
 - [11] Rectal exam
 - [12] pelvic exam
- **Acute Cholecystitis**
 - **Murphy's Sign:** hook find under costal margin at mid-clavicular line, Pt takes deep breath, pain (*stop breathing, winces*)=positive Murphy
- **Ventral Hernia:** ask pt to raise head & shoulder off table, hernia will bulge
- **Mass in Abdominal Wall:** ask pt to raise head & shoulder off table (or strain) and palpate again
 - (*Mass in abdominal wall= still palpable, Mass in abdominal cavity=no longer palpable*)

Cardiac History – CARS**CHEST PAIN – OLDCARTS**

- **Location:** point to pain
- **Radiation:** neck, jaw, tooth, arm, epigastric region
- **Association:** palpitation, sweating, nausea, edema, fatigue, SOB
- **Aggravating/Alleviating:** worse with exertion, relieved with rest
- **Character:** Angina (*exertional pain, retrosternal, tightness, clenched fist*), Aortic dissection (*tearing, ripping, radiating between scapula*), Bronchitis (*coughing, burning*) Pericardium (*relieved with leaning forward, sharp, knifelike with breathing*), Pericarditis/pneumonia (*sharp pain with breathing*), Costochondritis/herpes zoster (*pain with movement or palpation*) GERD (*burning with position, meals*), Anxiety

ASSOCIATED SYMPTOMS

- **Sweating**
- **Palpitation:** unpleasant awareness of heartbeat (fluttering, skipping, racing, pounding). Ask Pt to tap rhythm
- **Edema/swelling:** worse in morning or night?
 - **Dependent:** lower body parts (CHF)
 - **Independent:** periorbital, ascites (liver, renal)
- **Fatigue/Dizziness:** quantify baseline activity (# stairs, carrying groceries)
- **Nausea**

RISK FACTORS

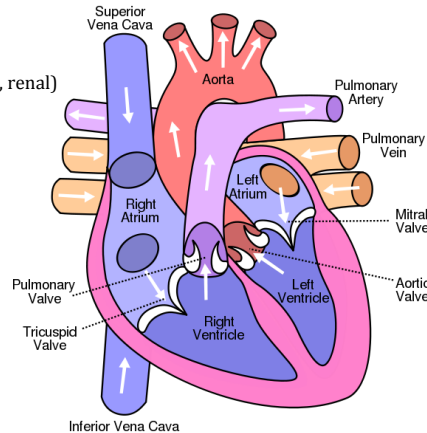
- Hypertension
- Cholesterol
- Level of Activity
- Family History
- Diet
- Sodium intake
- Alcohol consumption
- Diabetes
- Smoking
- Cardiac diseases

SOB (POSITIONAL)

- At rest? During exercise? Position? Time of day?
- **Dyspnea:** uncomfortable awareness of breathing (*sudden=pulmonary embolus, spontaneous pneumothorax, anxiety*)
- **Orthopnea:** dyspnea that occurs while lying down (*Lung obstruction, CHF, COPD*). # of pillows
- **Paroxysmal Nocturnal Orthopnea:** sudden dyspnea, awakens from sleep (*1-2 hrs after bed= CHF*)

Normal conduction pathways

SA node (pacemaker in right atrium) → Anterior, middle posterior intermodal branches -and- interarterial bundle → [Atrial contraction]
 AV node (right atrial septum) → Bundle of His → Right and left bundle branch → Perkinje fibers [Ventricular contraction]

**BLOOD FLOW IN HEART****Diastole**

- [1] **Low ventricular pressure/high atrial pressure (blood):** mitral valve opens
 - Pathologic opening snap (OS) is mitral valve is restricted
- [2] **Ventricle fills with blood from atrium:** blood moves from area of high pressure to area of low pressure
 - Children/young adults: S₃: sound of blood hitting ventricular wall
 - Pathologic S₃ gallop – change in ventricular compliance
- [3] **Atrium contracts:** slight increase in pressure in both chambers
 - S₄: not usually heard in normal adults, pathologic change in ventricular compliance

Systole:

- [4] **Ventricle contracts:** rapid increase in ventricular pressure
 - S₁: Closure of mitral valve/tricuspid valve due to pressure increase
 - Pressure causes opening of aortic semilunar valve: Pathologic systolic ejection sound (Ej)
- [5] **Blood flows from ventricle into aorta**
 - S₂: Aortic Valve (A₂) and Pulmonary Valve (P₂) close as ventricle empties and loses pressure
 - Inspiration: S₂ split=increase venous return, delay in pulmonary valve closing (delayed P₂)

Sounds**Left Side of Heart**

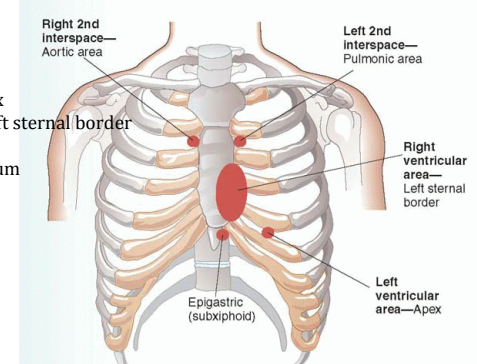
Normal	Pathological
S₁: Closure of mitral valve due to ventricular pressure increase S₂: Aortic Valve closes as ventricle empties and loses pressure <ul style="list-style-type: none"> • S₂ has two components <ul style="list-style-type: none"> ◦ A₂: closure of left-sided aortic valve ◦ P₂: closure of right-sided pulmonary valve (see below) 	Systolic Ej: systolic ejection of blood through opened aortic semilunar valve Diastolic OS: Opening snap of mitral valve S₃ Gallop: blood hitting ventricular wall (Kentucky) <ul style="list-style-type: none"> • Change in ventricular compliance S₄: Atrial contraction (Tennessee) <ul style="list-style-type: none"> • Change in ventricular compliance

Right Side of Heart

P₂: closure of pulmonary valve

Murmur: turbulent blood flow

- Due to [1] stenotic valve (narrowed) [2] Aortic regurgitation
- Mitral murmur heard at cardiac apex
- Tricuspid murmur heard at lower left sternal border
- Pulmonary valve murmur hear in 2nd/3rd left interspace close to sternum
- Aortic valve murmurs heard at 2nd right interspace



Cardiac Examination**BLOOD PRESSURE & HEART RATE**

- **BP** (see Vital Signs)
- **HR**: use radial pulse

JUGULAR VENOUS PRESSURE

*Use tangential lighting

*JVP measures Central Venous Pressure (pressure in RT atrium)

*Use RT internal Jugular Vein

*High JVP=CHF, Pulmonary HTN (JVP above jaw, pt more upright)

*LOW JVP=hypovolemic (JVP lower than clavicle, pt more supine)

*JVP: not palpable, biphasic (2 elevations) per HB, pulsation eliminated by pressure at sternoclavicle

*To increase JVP: Valsava (Pt strain down), Hepatojugular reflex (press down on RUQ)

- **JVP**: [1] elevate head to 30°, tilt head LT slightly [2] identify external jugular vein, [3] identify internal jugular venous pulse [4] measure JVP at highest point of pulsation, ruler vertical on sternal
- Normal: 3-4 cm above sternal angle (b/w manubrium and sternum - 8-9cm above right atrium)
- Amplitude
- Timing: first wave with S₁, second wave with S₂

CAROTID PULSE

*Pt in same position as for JVP (30°)

*Do not press on carotid sinus (at thyroid cartilage level)=causes reflexive drop in BP

- **Amplitude**: pulse pressure
 - Small, thready, weak=cardiogenic shock
 - Bounding=aortic insufficiency
- **Contour**: speed of upstroke, duration of summit, speed of downstroke
 - Brisk smooth upstroke following S₁, smooth round summit, downstroke before S₂
- **Timing**: Upstroke follows S₁, precedes S₂
- **Trills**: humming vibrations (*purring cat*), if felt listen with stethoscope
- **Bruit**: listen for carotid bruit with bell, ask Pt to hold breath to hear
- **Brachial artery**: if carotid artery (*superior*) cannot be assessed, use brachial (*medial to biceps tendon*)

INSPECTION

*supine with head at 30°

- Signs of Cyanosis: central (*oral mucosa*), peripheral (*lips, fingers*)
- Shape of chest (*pectus carinatum, excavatum*)
- Clubbing of fingers
- Edema (*dependant=CHF*)
- Scars
- Sternal Heaves, Pulsations
- PMI: Using tangential lighting, look for point of maximum impulse (*normally at apex*)

PALPATION

*Supine with head at 30°

- **General Palpation**:
 - Thrills: use ball/heel of hand firmly on chest over all 4 areas (*A, P, T, M*)
 - S₁, S₂: palpate carotid artery at the same time, to identify S₁, S₂
- **Aortic Area**: palpate over 2nd intercostal space, RT of sternum, ask pt to hold breath (*palpable S₂*.
→systemic hypertension, dilate aorta)

Aortic Area: 2nd interspace RT of sternum
Pulmonic Area: 2nd interspace RT of sternum
Tricuspid (LT Sternal Border): RT ventricle, 3rd, 4th, 5th, interspaces
Mitral (Apex): LT ventricle, PMI

- **Pulmonic Area**: palpate over 2nd intercostal space, LT of sternum, ask pt to hold breath (*palpable pulsation=dilated pulmonary artery*)
- **LT sternal border - RT ventricle/Tricuspid**: place fingers in 3rd, 4th, 5th interspaces, feel for RT ventricle systole (*S₃, S₄ may sometimes be felt*)
- **PMI - LT Ventricle/Mitral**: 5th intercostal space, 7-9cm from Midsternal line, measure diameter (2.5cm)
 - >10 cm from midsternal line or >3cm diameter=LVH
 - If it cannot be palpated, move pt into LT lateral decubitus
 - Location: 4th/5th intercostal, 7-9cm from midsternal line
 - Diameter: less than 2.5 cm
 - Amplitude: brisk, tapping
 - Duration: high amplitude=LVH, low amplitude=dilated cardiomyopathy
- **Epigastric (sibxiphoid)**: impulse/PMI=RVH

AUSCULTATION

*Palpate carotid artery to identify S₁ S₂

*S₁: apex of heart

*S₂: base of heart

*Start at base inch stethoscope to apex

*Radiation: Mitral stenosis to axilla, aortic murmur to neck

- **General Precordium**: Aortic area, Pulmonary area, Left sternal border, Mitral Area
- **Left Lateral Decubitus**: mitral, S₃, S₄
- **Leaning forward**: Aorta
- **Split S₂**: ask pt to take deep breath, listen in 2nd/3rd interspaces (A₂ is first & louder than P₂)
 - Louder P₂=Pulmonary HTN
- Carotid

SPECIAL TECHNIQUES

- **Left Lateral Decubitus**: Mitral Stenosis (*systolic murmur*). PMI, S₃, S₄
- **Sitting & Leaning forward**: Aortic insufficiency (*diastolic murmur*)
- **Stranding/Valsava** (*decreased venous return, decreased BP*)
 - Increased, early mitral prolapse
 - Increased hypertrophic cardiomyopathy
 - Decreased aortic stenosis
- **Squatting/Released Valsava** (*increase venous return, increased BP*)
 - Delays mitral prolapse
 - Decrease hypertrophic cardiomyopathy
 - Increased aortic stenosis
- **S₂ Splitting**: Splitting occurs on inspiration due to increase venous return to RT side
- **Identifying abnormal pulses**:
 - Pulsus Alternans: detected with radial or femoral arteries (alternating force, constant rhythm=severe left-sided heart failure, upright accentuates)
 - Paradoxical Pulse: varies with respiration (*difference > 10mmHg*)=COPD

DIAPHRAGM: high pitched sounds

(S₁ S₂ aortic murmur, mitral regurg, pericardial friction rub)

BELL: low-pitched sounds

(S₃ S₄ mitral stenosis, tricuspid murmur, bruits, BP)

Describing a Murmur

- **Timing**: Systolic or diastolic
- **Location**: where it is loudest on precordium
- **Radiation**: mitral to axilla, aorta to neck
- **Necessary maneuvers**
- **Shape**: crescendo, decrescendo
- **Intensity**: 1-6
- **Quality**: blowing, musical, rumbling
- **Extra sounds**: S₃, S₄, Ej, OS
- **Pitch**: high, medium, low

Murmur Intensity (express as fraction)

1: Very faint

2: Quiet, but heard

3: Moderately loud

4: Loud with thrill

5: Loud, thrill, stethoscope partly off

6: Loud, thrill, stethoscope off chest

Peripheral Vascular History (Arterial=6 Ps SUN RAIL....Venous=UVET)

ARTERIAL INSUFFICIENCY

- Pallor: pale colour
- Polar: cold
- Pain/Cramping (*with exertion=Claudication, relieved with rest, 10 min*)
 - *Distinguished from spinal stenosis: leg pain with exertion, relieved by leaning forward*
- Paresthesias (tingling)
- Pulselessness
- Penduluming: hanging the leg off the bed to have gravity pull blood back down leg
- Shiny skin
- Ulcers/Healing problems: cold, dry, brown-black, on toes
- Numbness
- Raynaud's: Blanching followed by cyanosis followed by reddening of fingers/toes with cold exposure
- Abdominal Pain + Weight loss=intestinal ischemia
- Ischemia: Fatigue, aching, numbness, pain with walking
- Loss of hair: over anterior tibia

VENOUS PERIPHERAL VASCULAR DISEASE

- Ulcers: ankles, blackened surrounding
- Varicose Veins
- Edema/Swelling of lower feet
- Travel=DVT

RISK FACTORS

- Smoking
- Diabetes
- Family history of AAA
- HTN
- Hypercholesterolemia
- Coronary artery disease

Peripheral Vascular Exam

INSPECTION

- **Arms:** Symmetry, Size, Swelling, Venous Pattern, Color of skin, nails, Texture of skin, clubbing
- **Legs (socks off):** Size, Symmetry, Swelling (*edema*), Shiny Venous Pattern, Varicose Veins, Color, Texture of hair, Skin, Nails, Pigmentation, Rashes, scars, Ulcers
- **JVP, Hepatojugular reflex** (*see Cardiac Exam*)
- **Ulcers:** ankles=venous, toes=arterial
- **Color:** brown=venous, pallor=arterial, red=swelling
- **Temperature:** hot=thrombophlebitis, cold=arterial

Grading of the Pulse

3+ Bounding
2+ Brisk, expected (normal)
1+ Diminished, weaker than expected
0 Absent, unable to palpate

PALPATION

- **Arms:**
 - **Pulses** (*Comment on rate, rhythm amplitude*)
 - Radial Pulse: regular, irregularly regular, irregularly irregular
 - Brachial Pulse (*if radial is insufficient*)
 - **Epitrochlear node:** elbow flex at 90°, medial side of antecubital fossa (*lymphadenopathy=infection from arterial insufficiency*)
 - **Capillary Refill**
- **Aorta**
- **Legs**
 - **Pulses** (*Comment on rate, rhythm amplitude*)
 - Femoral Pulse
 - Popliteal Pulse: knee flexed
 - Dorsal Pedis Pulse
 - Posterior Tibial Pulse: behind medial malleolus
 - **Superficial inguinal nodes**
 - **Temperature of feet/legs**
 - Unilateral coolness=arterial insufficiency
 - Swelling, redness, warmth=venous vascular disease
 - Coldness: thrombophlebitis
 - **Pitting Edema** (venous insufficiency): [1] dorsum of foot [2] behind medial malleoli [3] over shins
 - Scale: 1-4, unilateral vs. bilateral
 - If suspected, measure legs [1] forefoot, [2] small circumference of ankle [3] largest circumference of calf [4] mid thigh
 - Different great than 1cm (*ankle*) 2cm (*calf*) is unusual
 - If edema is present look for:
 - DVT: popliteal (*lower leg/ankle edema*) iliofemoral (*entire leg edema*)
 - Chronic venous insufficiency
 - Lymphedema (*non-pitting edema*)
 - Venous tenderness suggests underlying thrombosis
 - **Varicose Veins** (*of the Saphenous system*)

Pulses:

Diminished=occlusion proximally
Exaggerated=aneurysm

AUSCULTATION

- Bruits: auscultate carotid, renal, femoral, aorta

SPECIAL TECHNIQUES

- **Arterial Supply to Hand:**
 - [1] Check Pulses
 - [2] Allen's Test for ulnar patency (*done before radial puncture*): Pt makes right fist, compress radial and ulnar arteries, pt opens hand into relaxed position (*extending hand gives false positive pallor*), release pressure over ulnar artery, hand should flush red
 - Persisting pallor: ulnar insufficiency (*should not puncture radial artery*)
- **Chronic Arterial Insufficiency:** with pt supine, raise both legs to 60° for 1 min (*pallor*), have pt sit with legs dangling, normal return of pink in 10 seconds
 - Persisting pallor: arterial insufficiency
- **Mapping Varicose Veins** (*Superficial thrombophlebitis*): with pt standing place fingers of one hand on vein, place fingers of other hand on vein below, compress vein sharply with lower hand and feel for pressure wave transmitted to upper hand
 - Palpable pressure wave=veins are connected
- **Competency of Venous Valves** (*Trendelenburg – retrograde filling*): with pt supine, elevate one leg to 90°, occlude great saphenous in upper thigh (*medial*), ask pt to stand, watch for venous filling, normally takes 35 seconds for blood to fill venous system, after standing for 20 seconds, release great saphenous and look for additional venous filling (*normally none*)
 - Rapid filling=incompetent valves in communicating veins or saphenous veins
 - Negative-Negative: Competent communicating valves and competent saphenous veins
 - Negative-Positive: Competent communicating valves incompetent saphenous veins
 - Positive-positive: Incompetent communicating valves and incompetent saphenous veins

Respiratory Interview – SPACED**SMOKING, SPUTUM**

- Tobacco cessation counseling

PAIN, PIDGEONS (Carnivatum)

- Chest Pain – OLD CARTS
 - (always rule out MI)
 - MI, MSK-Costochondriasis (cough), GERD, Aortic dissection, biliary colic
 - Lung tissue has no pain fibers - lung pain is from parietal pleuritis
- Carnivatum: COPD (emphesyma)

ASTHMA, ATROPHY, ALLERGIES, APNEA

- Asthma: exercise, wheezing
- Atrophy: alpha₁-antitrypsin deficiency
- Allergies: animals, carpets, hay-fever, cockroaches,
- Apnea: fatigue during day, snoring, wake up at night (Risk factor=overweight)

COUGH (Sputum, Blood)

- Cough is response to irritated receptors in larynx, trachea, bronchi
 - Stimuli: mucus, pus, blood, dust, foreign body, hot/cold air, inflammation
- Cough is usually a resp symptom, but can also be cardiovascular (CHF)
- Length: Acute <3 weeks, subacute 3-8 weeks, chronic >8 weeks
- Sputum: Dry vs. productive cough
- Hemoptysis: coughing up blood from lung
 - Quantity
 - Color: blood from stomach is darker and vomited

EXERCISE INTOLERANCE/ENVIRONMENTAL, OCCUPATIONAL EXPOSURE (TRAVEL)

- Exercise: Ability to dress, walk, climb stairs (# of stairs)
- Environmental/occupational exposure: Travel, allergies, TB, Asbestos, Vapors, ducts, Farms)

DYSYPNEA (SOB, SOBOE)

- SOB (Dyspnea): uncomfortable awareness of breath
 - Exertional? Anxiety (non exertional)?
 - Wheeze (expiratory sound) suggest partial airway obstruction (secretions, tissue inflammation, foreign body)

Landmarks:		
Anteriorly	Posteriorly	Lung Lobes
- 2nd intercostal space: lateral to sternal angle (angle of Louis)	- 7th rib/interspace: inferior tip of scapula	- Apex: 2/4 cm above inner clavicle
Needle insertion-pneumothorax	- C7: most prominent spinous process	- Oblique (major) fissure: T3 spinous process – 6 th rib midclavicular
- 4th intercostal space: chest tube insertion	- T4: Endotracheal tube on chest x-ray (Bifurcation of trachea)	- Horizontal (minor fissure) of RT lung: 4 th rib
- Sternal angle: Bifurcation of trachea	- T7-8 interspace: thoracentesis	

Breathing

Inspiration: diaphragm contracts and descends, thorax expands, intrathoracic pressure decreases, air drawn in

Expiration: diaphragm relaxes and rises passively, chest wall and lungs recoil, air flow out

Supine: abdominal movement more prominent

Sitting/standing: thorax more prominent

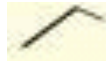



Accessory muscles: sternomastoids, scalenes

Adventitious or Added Breath Sounds

Crackles (Rales)	Wheezes and Rhonci
Discontinuous	Continuous
Intermittent, nonmusical, brief	Longer than 250msec, musical, prolonged (but not necessarily persisting throughout respiratory cycle)
Like dos in time	Like dashes in time
Fine crackles: soft, high pitched, brief (5-10msec) *****	Wheezes: relatively high-pitched (greater than 400 Hz) with hissing or shrill quality *****
Coarse Crackles: louder, lower in pitch, less brief (20-30 msec) *****	Rhonchi: relatively low-pitched (less than 200 Hz) with snoring quality *****
<i>Describing adventitious breath sounds: loudness, pitch, duration, number, inspiration/expiration (timing), location, persistence (from breath to breath), change after cough</i>	

Five Percussion Notes and Characteristics

	Intensity	Pitch	Duration	Location	Pathologic Examples
Flatness	Soft	High	short	Thigh	Large pleural effusion
Dullness	Medium	Medium	Medium	Liver	Lobar pneumonia
Resonance	Loud	Low	Long	Healthy Lung	Simple chronic bronchitis
Hyperresonance	Very Loud	Lower	Longer	Usually none	COPD, pneumothorax
Tympany	Loud	High	Musical timbre	Gastric bubble or puffed out cheek	Large pneumothorax

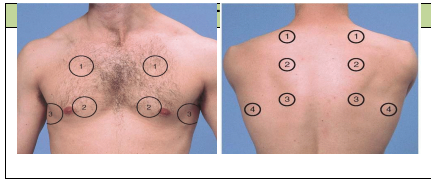
	Duration of Sounds	Intensity of Expiratory Sound	Pitch of Expiratory Sound	Locations Where Heard Normally
Vesicular 	Inspiratory sounds last longer than expiratory ones.	Soft	Relatively low	Over most of both lungs
Bronchovesicular 	Inspiratory and expiratory sounds are about equal.	Intermediate	Intermediate	<i>Anteriorly:</i> In the 1 st and 2 nd interspaces <i>Posteriorly:</i> between the scapulae
Bronchial 	Expiratory sounds last longer than inspiratory ones.	Loud	Relatively high	Over the manubrium, if heard at all
<i>Not a gap</i>				
Tracheal 	Inspiratory and expiratory sounds are about equal.	Very loud	Relatively high	Over the trachea in the neck
<i>Not a gap</i>				
Bronchovesicular/bronchial breath sounds distant from listed= air-filled lung replaced by fluid or solid lung tissue				

Respiratory Exam

*Posterior thorax: Pt sitting *Anterior thorax: Pt supine (or sitting)

INSPECTION

- **Respiration:** 4-20
 - Rate, Rhythm, Depth, Effort
 - Respiratory Distress/Accessory muscles (*sternomastoid, scalenes, abdominal, intercostals*)
 - Audible wheeze (*expiratory, lower airway*), stridor (*high pitched inspiratory, upper airway*)
 - Indicates airway obstruction
- **Cyanosis**
- **Clubbing nails** (*lung abscess, malignancy, CHF, liver failure*)
- **Displacement of trachea** (*pneumothorax, pleural effusion, atelectasis*)
- **Posterior & Anterior Chest Wall**
 - AP Diameter (*increased with COPD*)
 - Movement: symmetrical versus unilateral lag (*disease of underlying lung/pleura*)
 - Deformities (*Scoliosis, kyphosis*)
 - Masses
 - Flail Chest (*2+ ribs broken, move independently*): flail segment moves opposite direction to chest wall
 - Atrophy, hypertrophy
 - Retraction during inspiration (*obstruction=asthma, COPD*)

**PALPATION**

*Intercostal tenderness over inflamed pleura

*Have pt put arms across chest

- **Areas of tenderness** (*fractured rib*)
- **Abnormalities** (*masses, sinus tract=infection of underlying pleura-TB, actinomycosis*)
- **Chest Expansion:**
 - Posterior Chest: with thumbs at 10th rib, finger parallel to ribs, slide hands medial to raise loose skin, pt inhale deeply, watch symmetrical distance between thumbs (*can also do anteriorly*)
 - Anterior chest: thumbs lateral to xiphoid on costal margin, raise loose skin
 - Unilateral decrease/delay: fibrosis of lung/pleura, pleural effusion, pneumonia, bronchial obstruction
- **Tactile Fremitus** (*palpable vibration when pt is speaking*): ask pt to repeat "99", with ulnar surface of hand feel from fremitus, (*Posterior 4 spots, anterior 3 spots – absent over precordium*)
 - Decreased (*dec transmission*): obstruction (*COPD*), pleural effusion, fibrosis, pneumothorax, tumor
 - Increased (*inc transmission*): Pneumonia
 - Normally increased between scapula, on right side

PERCUSSION

*Have pt put arms across chest

*Heart dullness: 3rd – 5th interspace, percuss lateral to heart

*Displace breast

- **Thorax** (*front and back*): percuss thorax following ladder-pattern
- **Diaphragmatic excursion:** percuss downwards from resonance until dullness, do this on inspiration and expiration, the distance is normally 5-6 cm
 - High diaphragmatic excursion: pleural effusion, atelectasis, diaphragmatic paralysis

AUSCULTATION

*Have pt put arms across chest

- **Breath Sounds:** Use diaphragm of the stethoscope, have pt breath deeply through open mouth
 - Tracheal: neck
 - Bronchial: manubrium
 - Bronchovesicular: 1st/2nd interspaces, b/w scapula
 - Vesicular: most of lung
- **Adventitious sounds:** added sounds=crackles, wheezes, rhonchi, pleural rub
 - Describing adventitious sounds: loudness, pitch, duration, number, timing (*inspiration/expiration*), location, persistence, change with cough
- **Transmitted Voice Sounds**
 - Bronchophony: pt says "99", normally muffled & indistinct (*loud/clear=bronchophony*)
 - Egophony: have pt say "ee" (*nasal "ay"=egophony – pneumonia*)
 - Whispered pectoriloquy: Have pt whisper "99", should be heard faint and indistinct (*loud, clear=whispered pectoriloquy*)

Ladder Pattern for Percussion & Auscultation	Diaphragmatic Excursion
<p>Consolidation (<i>pneumonia, effusion</i>): Increased fremitus, Bronchophony, Egophony, Whispered pectoriloquy, Dull (when air is replaced by fluid/mass=consolidation)</p> <p>Hyperresonance: COPD</p>	

SPECIAL TECHNIQUES

- **Walk Test for Pulmonary Function:** Time an 8-foot walk at pt's normal pace, observe rate, effort, sound of breathing. *Normal <3.1 sec, more than 5.6 sec=risk for disability*
- **Forced Expiratory Time:** pt take deep breath and breath out as quickly, completely as possible, list over trachea. *Expiration time>6-8sec=risk of COPD*
- **Fractured Rib** (*locating fracture*): anteriorposterior compression (*hand on sternum, hand on thoracic spine*)

Nervous System Interview – HAD LAWTS**HEADACHE/HEAD INJURY**

- OLDCARTS
- Severity: worst headache of my life (superarachnoid hemorrhage)
- History of Head Injury
- Change in mood, attention, speech, orientation, memory, hearing, vision (*diplopia*), swallowing

ATAXIA

- Balance or gait pblms

DIZZINESS/VERTIGO

- Dizziness: light-headed/feeling faint
- Vertigo: room is spinning
- Associated symptoms: diplopia (double vision), dysarthria (difficulty forming words), ataxia (difficult gait/imbalance)

LOSS OF CONSCIOUSNESS (syncopal)

**Vasovagal syncope: warning symptoms of flushing, warmth, nausea*

**Cardiac Syncope (arrythmias): sudden onset, no warning (pt: "I woke up on the floor, not sure how")*

**Tonic-Clonic seizure: incontinence, injury to limbs/tongue*

- Black out vs. still hear voices?
- Warning symptoms?
- Prodrome: euphoria, food craving, dizzy)
- Aura (neurologic): vision, numbness, weakness
- How long?
- Syncope: sudden, temporary loss (decreased blood to brain)
- Presyncopal/near syncope: feeling faint, light headed

ABNORMAL SENSATION

- Numbness
- Paresthesia: prickling, tingling, pins & needles
- Ability to move limb?

WEAKNESS

- Areas of body involved? How has it progress?
- Onset?
- Light headedness?
- Proximal weakness: combing hair, reaching higher, getting out of chair, stairs
- Distal weakness: opening jar, using scissors
- Paralysis?

TREMORS**SEIZURES**

- Past Hx, age of onset, frequency
- Warnigng symptoms, symptom pattern
- History of head injury

Summary of Exam
Mental Status & MMSE, Alertness
Cranial Nerves 1-12
Motor system: Bulk, tone, strength, coordination, gait stance
Reflexes
Sensory: pain&temp, vibration, light touch, discriminatory touch, position
Cerebellar: RAM, point-to-point, gait, stance (Rhomborg, pronator), Nystagmus

Oh Oh Oh They Traveled And Found Voldemort Guarding Very Secret Hallows
Some Say Marry Rich But My Brother Says Big Brains Matter More

I	Olfactory	Sense of smell
II	Optic	Vision
III	Oculomotor	Pupillary constriction, opening the eye (lid elevation), and most extraocular movements
IV	Trochlear	Downward, internal rotation of the eye
V	Trigeminal	<i>Motor</i> —temporal and masseter muscles (jaw clenching), lateral pterygoids (lateral jaw movement) <i>Sensory</i> —facial. The nerve has three divisions: (1) ophthalmic, (2) maxillary, and (3) mandibular.
VI	Abducens	Lateral Deviation of the eye
VII	Facial	<i>Motor</i> —facial movements, including those of facial expression, closing the eye, and closing the mouth <i>Sensory</i> —taste for salty, sweet, sour, and bitter substances on the anterior two thirds of the tongue
VIII	Acoustic	Hearing (cochlear division) and balance (vestibular division)
IX	Glossopharyngeal	<i>Motor</i> —pharynx <i>Sensory</i> —posterior portions of the eardrum and ear canal, the pharynx, and the posterior tongue, including taste (salty, sweet, sour, bitter)
X	Vagus	<i>Motor</i> —palate, pharynx, and larynx <i>Sensory</i> —pharynx and larynx
XI	Spinal accessory	<i>Motor</i> —the sternomastoid and upper portion of the trapezius
XII	Hypoglossal	<i>Motor</i> —tongue

Upper Motor Neuron: Nerve cell bodies lie in motor strip of cerebral cortex <ul style="list-style-type: none"> • <i>Above crossover (medulla):</i> controlateral motor impairment • <i>Below crossover:</i> ipsilateral motor impairment • Hypertonia, Spasticity, • Hyperreflexia 	Lower Motor Neurons: Cell bodies are in anterior horn of spinal cord <ul style="list-style-type: none"> • Ipsilateral weakness and paralysis • Fasciculations • Atrophy • Hypotonia • Hyporeflexia
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Corticospinal tract: Voluntary Motor movement

Spinocerebellar: unconscious proprioception

Spinothalamic: conscious pain, temperature, pressure, touch

Posterior column: vibration, conscious proprioception, light discriminatory touch

Extrapyramidal tracts: involuntary reflexes, autonomic functions

Cerebellum: coordinates motor activity, equilibrium, posture

- Damaged: impaired gait, coordination, equilibrium, decreased muscle tone

Basal Ganglia: Maintains muscle tone, body movement

- Damage: increased muscle tone, impaired posture & gait, involuntary movement, bradykinesia

Neuro Examination – Cranial Nerves**OLFACTORY (I) [Smell]**

- **Smell:** check nasal passage for patency, compress one side of nose, have pt close eyes, ask pt to sniff (*Cinnamon & Coffee*)
 - *Anosmia (loss of smell): head trauma aging, Parkinson's, cocaine*

OPTIC (II) [Acuity, Fields]

- **Visual Acuity** (*Snellen Eye Chart*): pt at 20 ft, put on glasses, cover one eye with card, ask to read smallest line that more than half can be read (*if pt wears glasses, record as #/# corrected*)
 - *20/20: first number=distance of pt, second number=distance of normal eye*
 - *Legally blind: 20/200 corrected.*
 - *Myopia: near-sightedness*
 - *Hyperopia: far-sightedness*
- **Visual Field by Confrontation** (*Fish bowl*): have pt look in your eyes, wiggle fingers lateral, pt points when fingers are seen. If abnormal establish fields by testing one eye at a time (*most defects occur temporally*)
 - *Prechiasmal defect: quadratic defect*
 - *Chiasmal defect (pituitary tumor): bitemporal hemianopsia*
 - *Postchiasmal lesion (stroke): homonymous hemianopsia*
- **Funduscopy:** See head & neck exam

OPTIC (II) & OCCULOMOTOR (III) [Pupillary Reactions]

- **Size and Shape of Pupils**
 - *Anisocoria: >0.4mm difference (if papillary rxn are normal, benign)*
- **Pupillary reaction to light:** darken room, pt look into distance, shine light obliquely
 - *Direct rxn: constriction of same eye, Consensual rxn: constriction of opposite eye*
- **Near Rxn** (*if pupillary rxn is abnormal*): finger 10cm from pt, pt looks distant then look at finger.
 - *Pupillary constriction (accommodation) with near effort*
 - *Argyll Robertson: Accommodates, but doesn't reaction*
 - *Tonic (Adie's) pupil: tonically dilated. Horner: miosis (SNS pblm)*
 - *Near response: accommodation (ciliary muscles), converging (medial rectus), constriction (pupillary constrictor muscle:*

OCCULOMOTOR (III), TROCHLEAR (IV), & ABDUCENS (VI) [Extraocular Muscles]

- **Cover-Uncover Test** (*strabismus/dyconjugate gaze=diplopia*): pt look at light, cover one eye, uncover, look for deviation/movement
- **6 extra ocular movement** (*EOMS*): Make H pattern, pause in extremes to detect nystagmus (few beats of nystagmus in extremes is normal)
 - *Nystagmus: involuntary jerky movement – slow and quick components (named for direction of quick). Indicated cerebellar disease*
 - *Lid lag is seen with hyperthyroid. When looking down, the sclera is visible between iris & upper lid (normally upper lid slightly covers iris)*
- **Convergence:** pt follows finger within 5-6cm of nose (*poor convergence=hyperthyroidism*)
- **Ptosis:** CNIII palsy, Horner's Syndrome, Bell's Palsy

TRIGEMINAL (V) [Corneal reflexes, Facial sensation, Jaw movement]**MOTOR**

- **Temporal & Masseter muscle:** palpate muscles while pt is clenching jaw. Note strength
- **Jaw Movement:** Ask pt to move jaw side to side

SENSORY

- **Pain:** with pt eyes closed, poke forehead, cheeks, jaw alternatively with safety pin and blunt object, ask pt to report dull or sharp
- **Light touch:** use wisp of cotton, ask pt to report when touched
- **Temperature** (is pblm with pain): use hot & cold test tubes. Ask pt to report hot or cold
- **Corneal reflex:** pt look up and away, using wisp of cotton touch cornea. Look for blinking (*Normal - Sensory CNV, Motor CNVII*)

FACIAL (VII) [Facial Movements]

- **Talking:** note symmetry of face, tic, abnormal movements (*Bell's palsy=entire face, stroke=lower half*)
- **Facial Movements:** [1] Raise eyebrows [2] Frown [3] Close eyes tightly, resist opening [4] Show upper and lower teeth [5] Smile [6] Puff out cheeks

ACOUSTIC (VIII) [Hearing]

- **Whispered Voice Test** (*determines hearing loss*): occlude one ear (*move finger rapidly*), exhale fully, whisper "nine-four"
 - *Conductive: external/middle ear (cerumen, otitis media)*
 - *Sensorineural: cochlea, CNVIII (age, Meniere's)*
- **Webber Lateralization** (*only if hearing loss*): place vibrating 512Hz tuning fork (*human speech 300-3000Hz*) on head, ask where pt hears
 - *Normally heard midline, Conduction=heard in impaired ear, Sensorineural=heard in good ear*
- **Rinne Air/Bone Conduction:** place vibrating 512 hz tuning fork on mastoid, ask pt when no longer heard, then place beside ear canal (*U fwd*), ask pt if sound is heard
 - *Normally heard longer through air, Conduction heard longer through bone, Sensorineural heard longer through air*

GLOSSOPHARYNGEAL (IX) & VAGUS (X) [Swallowing, Palate/Pharynx, Gag]

- **Voice:** Nasal (*paralysis of palate*) or hoarse (*paralysis of vocal cord*)
- **Difficulty swallowing**
- **"Ah":** ask pt to open mouth and say "ah". Look for symmetrical movement of soft palate, uvula staying midline (*abnormality: unsymmetrical rise, deviated uvula=vagus paralysis of soft palate*)
- **Gag Reflex:** touch lateral posterior throat on each side (*unilateral absence=CNIX, CNX*)

SPINAL ACCESSORY (XI) [Voice/Speech]

- **Trapezius:**
 - Atrophy or Fasciculations of trapezius
 - Shrug: shrug both shoulder upwards against resistance
- **Sternomastoid:** as pt to turn head against resistance

HYPOGLOSSAL (XII) [Tongue]

- **Speech:** articulation of pt's words (*CNV, CNVII, CNX, CNXII*)
- **Tongue in mouth:** inspect pt tongue lying in mouth, look for atrophy, fasciculations
- **Tongue protruded:** symmetry, atrophy, deviation
- **Tongue side to side:** symmetry

Neuro Examination – Motor (Including Reflexes and Coordination)

INSPECTION

- **Body Position:** At rest & In movement
- **Involuntary movements:** tremors, tics, fasciculations (lower motor neurons)
- **Muscle Bulk:** Size and Contour of muscles
 - Atrophy (unilateral vs. bilateral): hands, shoulders, thighs, thenar (median nerve)/hypotenar (ulnar nerve) eminences
- **Muscle Tone:** when relaxed, there is slight residual tension (muscle tone)
 - Ask pt to relax, go through passive range of motion: fingers, wrist, elbow, shoulder, knee, ankle
 - Distinguish between normal, hypotonia, flaccidity
 - Increased resistance: persists through range of motion=rigidity (uniform=lead-pipe, cogwheel=ratchety [Parkinson's])

MUSCLE STRENGTH

*Ask pt to move actively against resistance, if unable test against gravity, if unable test without gravity

SCALE FOR GRADING MUSCLE STRENGTH

- 0: No movement
- 1: Flicker/trace
- 2: Movement without gravity
- 3: Movement against gravity
- 4: Movement against gravity & some resistance
- 5: Active movement against full resistance (normal)

SHOULDER

- **Elevation:** Spinal Accessory/C4 (Trapezius)
- **Abduction:** C4, C6 (Deltoid)

ELBOW

- **Flexion:** C5, C6 (Biceps)
- **Extension:** C6, C7, C8 (Triceps)

WRIST

- **Extension:** C6, C7, C8, radial nerve (Extensor carpi radialis)
- **Flexion:** C6, C7, C8

GRIP

- **GRIP:** C7, C8, T1

FINGER ABDUCTION

- **Finger Abduction:** C8, T1, Ulnar Nerve

OPPOSITION OF THUMB

- **Opposition of thumb:** C8, T1, Median Nerve

SPINE

- Flexion, Extension, Lateral Bending

THORACIC EXPANSION

DIAPHRAGMATIC EXCURSION

HIP

- **Flexion:** L2, L3, L4 (iliopsoas)
- **Extension:** S1 (Gluteus maximus)
- **Adduction:** L2, L3, L4 (adductors)
- **Abduction:** L4, L5, S1 (gluteus medius & minimus)

KNEE

- **Extension:** L2, L3, L4 (quadriceps)
- **Flexion:** L4, L5, S1, S2 (hamstrings)

ANKLE

- **Dorsiflexion:** L4, L5 (tibialis anterior)
- **Plantar Flexion:** S1 (gastrocnemius, soleus)

REFLEXES

*Reinforcement: Upper limb=clench teeth, Lower limb=squeeze hands

DEEP TENDON REFLEXES

Biceps reflex	C5, C6	Strike your own thumb over biceps tendon – <i>flexion of elbow</i>
Triceps reflex	C6, C7	Elbow flexed, shoulder abducted. Strike the tendon above elbow – <i>extension of elbow</i>
Brachioradialis (Supinator) reflex	C5, C6	Forearm slightly pronated, stroke radius 1-2 inches above risk – <i>flexion & supination of forearm</i>
Knee (patellar) reflex	L2, L3, L4	Knee flexed, strike patellar tendon below patella – <i>extension of knee</i>
Ankle reflex	S1	Dorsiflex foot, strike Achilles tendon – <i>plantar flexion of ankle</i>

CLONUS

- Move ankle, sharply dorsiflex. A few clonic beats may be normal.

CUTANEOUS STIMULATION REFLEXES

Abdominal reflexes —upper	T8, T9, T10	Lightly & briskly stroke each side of abdomen – <i>deviation of umbilicus towards stimulus</i>
—lower	T10, T11, T12	
Plantar (Babinski) responses	L5, S1	Stroke lateral aspect of sole from heel to ball curving medially across ball – <i>plantar flexion (Dorsiflexion/Babinski=corticospinal tract lesion)</i>
Anal reflex	S2, S3, S4	Using dull object, stroke outward from anus – <i>anal contraction (absence=S2,S3,S4-cauda equina lesion)</i>

4+	Hyperreflexia with clonus
3+	Hyperreflexia without clonus
2+	Average (normal)
1+	Hyporeflexia
0	No reflex

COORDINATION

*See Cerebellar

Neuro Examination – Cerebellar (Coordination)

NYSTAGMUS

*See Cranial Nerves

COORDINATION

*Motor system: Muscle strength

*Cerebellar system: rhythmic movement, posture

*Vestibular system: balance, coordination of eye, head, body

*Sensory system: positional sense

RAPID ALTERNATING MOVEMENTS

- **Arms: Slapping** (back of hand-palm-back of hand) on thigh, repeat as fast as possible
- **Finger Tapping**: tap thumb to index as fast as possible
- **Leg Tapping**: tap foot on hand as quickly as possible with ball of foot

POINT-TO-POINT MOVEMENTS

- **Arms: Finger-to-nose test** (index to nose) [1] move hand [2] arm overhead [3] with eyes closed
 - Deviation: cerebellar, labyrinth
- **Legs: Heel-to-shin test** [1] heel on opposite knee, run down shin to big toe [2] repeat with pt's eyes closed
 - Foot oscillating: cerebellar disease

GAIT

- **Walk across room**: observe posture, balance, swinging of arms, leg movement
- **Heel-to-toe** (tandem walking): walk in straight line
- **Walk on toes/heels**: pblm with toes=leg muscles, pblm with heel=corticospinal
- **Hop in place** (each foot)
- **Knee Bend** (both legs)
- **Rising from sitting position** (only if unable to do knee bend & hop): must be done without arm support

STANCE

- **Rhomberg Test** (position sense): pt stand with feet together, eye open. Pt close eyes for 30-60sec. Note pt ability to maintain upright posture
 - Pblm with eyes open and closed: cerebellar ataxia
 - Pblm with eyes closed only: dorsal column disease (vision compensated when eyes open)
- **Pronator Drift**: Pt stands with both arms straight, palms up, eyes close for 30sec. Have pt keep palms up.
 - Pronation of arm=corticospinal tract lesion
 - Tap arms briskly downwards. Normally arms returns. Overshoots/bounds=cerebellar

Neuro Examination – Sensory

*Compare symmetric areas, compare distal to proximal, vary pace

*Map boundaries of sensory loss

*Show pt first was each sensory stimuli is

*Peripheral neuropathy: alcoholism, diabetes

*Anesthesia: absence of touch sensations

*Hypoesthesia: decreased sensitivity

*Hyperesthesia: increased sensitivity

PAIN (Spinothalamic tract)

- On arms and legs, alternate safety pin and cotton swab, pt reports sharp or dull

TEMPERATURE (Spinothalamic tract)

- Only done is pain sensation is abnormal
- Use hot and cold test tube. Touch skin. Pt reports hot or cold

LIGHT TOUCH (Spinothalamic posterior)

- Using wisp of cotton touch arms and legs. Pt reports when touch is felt (calloused skin is insensitive)

VIBRATION (Posterior Column)

*Start at fingers and toes, if normal, proximal areas are normal

*Vibration is first sensation lost in peripheral neuropathy

- Low pitch tuning fork (128Hz) over distal interphalangeal joint of finger and big toe. Pt reports if vibration are felt and when they stop (if vibration isn't felt, move proximally)

PROPRIOCEPTION (Posterior Column)

- Grasp big toe/finger, demonstrate up and down, pt closes eyes, pt reports is toe is up or down
- Move proximally is position sense is impaired (posterior column, peripheral neuropathy)

DISCRIMINATIVE SENSATIONS (Sensory Cortex)

- **Stereognosis** (ability to identify): pt eyes closed, place familiar object in pt's hand, have pt identify object (within 5 seconds, abnormality – astereognosis)
- **Graphesthesia** (Number identification): use blunt end of pen to draw number in pt's palm
- **Two-point discrimination**: alternate between two-point and one-point. Find minimal distance discrimination (<5mm on finger pad)
- **Point Localization**: pt closes eyes, poke pt, pt points
- **Extinction**: pt closes eyes, alternate between poking symmetrically or just one side, pt identifies which side and where

Special Techniques**MENINGEAL SIGNS**

- **Neck Mobility:** pt lying supine, flex neck fwd until chin touches chest
 - Neck stiffness/resistance=meningitis, subarachnoid hemorrhage
- **Brudzinkski's Sign:** pt supine, lift pt neck, hops and knees flex=meningitis
- **Kernig's Sign:** Pt supine, flex pt hip and knee, straighten knee. Pain behind knee=meningitis

LUMBOSACRAL RADICULOPATHY

- **Straight Leg Raise** (*sciatic pain radiating down leg*): pt supine, raise straight leg (*flex hip*), dorsiflex foot. Pain radiating down leg=sciatica (*pain radiates down opp. leg=sciatica – crossed straight leg*)

ASTERIXIS

- **Pt "stops traffic"** by extending both arms, wrists extended, fingers spread. Watch for 1-2 min.
- **Asterixis:** sudden, brief, nonrhythmic flexion of hand & fingers (*liver disease, metabolic encephalopathy*)

WINGING OF THE SCAPULA

- Pt pushes against wall, scapula normal remain close to thorax.
- *Winging scapular suggest injury to thoracic nerve supplying serratus anterior muscle*

COMATOSE PATIENT

- **ABC:** Airways, Breathing, Circulation (*color, listen over trachea for stridor, vital signs*)
- **Level of Consciousness:**
 - (I) Alert (*normal*)
 - (II) Lethargic (*speak loud*)
 - (III) Obtunded (*shake pt*)
 - (IV) Stupor (*sternal rub*)
 - (V) Coma (*no response to pain*)
- **Neurological Exam**
 - (I) Respiration: rate, rhythm
 - (II) Pupils: reaction, size
 - (III) Ocular movements: gaze preference (*normally eyes look straight ahead*)
 - (IV) Oculocephalic reflex (*Doll's Eye movement*): turn head side-to-side, eye move to opposite side (*fixed eyes =pons/midbrain*)
 - (V) Oculovestibular reflex (*Cold-water caloric*): with syringe inject cold water into ear canal, watch eyes. quick rxn away, slow rxn toward stimulus (*absent=brainstem injury*)
 - (VI) Posture & Muscle tone
 - Painful stimuli: normally avoidant
 - Decorticate: extended legs, flex arms
 - Decerebrate: extended legs, extended arms
 - Flaccid paralysis: corticospinal tract lesions
 - Muscle Tone: ROM of wrist, arm, shoulder, legs
 - Drop arms off bed (*should fall slowly, quickly=flaccid*)
 - Raise legs and drop them (*slowly falls, quickly=flaccid*)
 - Flex legs and release (*return slowly to extended, quickly=flaccid*)

CARPAL TUNNEL

- **Tinels:** Tap over median nerve over carpal tunnel in wrist
 - (+): tingling in distribution of median nerve (*first 3 fingers*)=carpal tunnel syndrome
- **Phalens:** Wrists are flexed against each other for 60 second or more
 - (+): tingling in distribution of median nerve (*first 3 fingers*)=carpal tunnel syndrome

MSK Interview – MISS LEMN**MECHANISM OF INJURY**

- Timing of injury: acute versus chronic
- Trauma versus repetitive motion
- *No MOI, Acute: septic arthritis, gout, osteomyelitis*

INFLAMMATORY or INFECTIOUS JOINT PAIN

- Inflammatory: tenderness, warmth, redness, swelling, dec. ROM (*gout, rheumatoid*)
- Infection: fever, chills, warmth, redness, tenderness (*septic*)

SYSTEMIC FEATURES

- Systemic Sx: fever, chills, rash, anorexia, weight loss, weakness (*suggests infectious cause*)

SYSTEMS (OTHER)

- GU (*urinary*), GI (*sore throat, diarrhea, abdominal pain, cramps*), Eyes (*burning*), Skin (*rash, hive, psoriasis*)

LOW BACK PAIN

**Always do digital rectal exam*

- Midline (*ligaments, disc herniation, spinal cord metastasis*), Off-midline (*sacroiliitis, sciatica, hip arthritis*)
- Radiation (*intro leg with paresthesia/numbness*) Spinal stenosis –resolves with rest and fwd flexion
 - Sciatica: L5 – lateral leg, S1 – posterior calf
- Parastethia
- Bladder or Bowel Dysfunction: cause equina syndrome (*S2, S3, S4, disc/tumor*)

EXTRA-ARTICULAR

- Muscles: Myalgia (*generalizes aches & pains*)
- Tendon Sheath: Tenosynovitis
- Tendon: Tendinitis
- Bones: Osteomyelitis
- Arthralgia: pain without evidence of arthritis
- *Sprain (ligament) Strain (tendon)*

MONOARTICULAR VS POLYARTICULAR

- Point to pain
 - *Small joints have more localized pain – hands/feet*
 - *Hip pain: usually in groin or buttock (can also be in anterior thigh or knee)*
- Monoarticular: Septic, trauma, gout
- Polyarticular: rheumatoid (*symmetric & migratory*), Osteoarthritis
 - Migration pattern, Symmetry

NECK PAIN (5Ds, 2Ns)

- 5Ds: Diplopia, drop attack, Dysarthria, Dizziness, 2Ns: Nystagmus, Nausea
- Radiation, leg weakness/paresthesia
- Bladder or Bowel Dysfunction

Red Flags

- History of cancer
- Weight loss
- Pain > 1month without response to Tx
- Pain at night

Injuries
C-Spine – 5Ds, 2Ns
Diplopia (double vision)
Drop Attack (syncope)
Dysarthria (pbm speaking)
Dizziness
Nystagmus
Nausea
Lumbar Spine
Paresthesia/Weakness
Bladder/Bowel Pblm
Digital Rectal Exam

MSK Examination – Overview**INSPECTION****PALPATION**

ROM (Active first, then passive if painful)

MANEUVER, NEURO, STRENGTH TESTS

SPECIAL TESTS

**Always compare to other side (symmetry)*

General Information on Each Exam

**Strain: muscles and Tendons, Sprain: ligaments*

**Tendon: muscle to bone, Ligament: bone to bone*

**Passive movement pain=non-contractile (joint/Bone)*

**Resisted movement pain=muscle*

**Pain with joint extraction=ligamentous problem*

**Pain with joint compression=fracture*

**Ganglion cyst: encapsulated synovial fluid. Occurs in areas with movement, movement irritates and causes increased synovial production*

TMJ:

**Condylar Synovial Joint: glide & hinge motions*

**Joint formed by: condyle of mandible, articulating surface of temporal bone*

**External pterygoids: open mouth*

**Masseter, temporalis, internal pterygoids: close mouth (all innervated by CNV)*

AXIAL SKELETON

**Must always do neuro when spine/neck is involved*

**Ask if pt has orthotics, do neuro exam without shoes*

**Curves distribute weight to pelvis/legs:*

Concave curves: cervical & lumbar

Convex curves: Thoracic & sacral

**Cartilaginous Joints*

**Sharp angle at lumbosacral junction*

(immovable)=mechanical stress, L5-S1 disc herniation

**Sciatic Nerve: L4-S3 (30°)*

**C1=Atlas (flxn, extn), C7=Axis (rotation)*

**24 vertebrae (7C, 12T, 5L), Sacrum, Coccyx*

ELBOW

**Synovial-hinge joint*

**3 articulation (1) Humeroulnar joint (2)*

Radiohumeral joint (3) Radioulnar joint

ANKLE:

**Synovial hinge Joint*

**2 articulations (1) Tibiotalar Joint (2) Subtalar Joint*

**Inversion → fibular fracture*

**Eversion → Ligament sprain*

Trimalleolar Fracture → medial & lateral malleoli, distal posterior tibia (post. Malleoli)

**Common sprained ankle: inversion + plantar*

flexion=pain, eversion + dorsiflexion=relieve pain

SCALE FOR GRADING MUSCLE STRENGTH

0: No movement

1: Flicker/trace

2: Movement without gravity

3: Movement against gravity

4: Movement against gravity & some resistance

5: Active movement against full resistance (normal)

SHOULDER

**Synovial Ball & Socket Joint*

**3 Joints: (1) Glenohumeral Joint (2) Sternoclavicular*

Joint (3) Acromioclavicular Joint

**Subacromial bursa: between acromion and humerus*

**3 Muscle groups: (1) Scapulohumeral (SITS)=dynamic stabilizers (2) Axioscapular (trunk to scapula): trapezius, rhomboids, serratus anterior, levator scapula (3)*

Axiohumeral (trunk to humerus): pectoralis major, minor, latissimus dorsi

**Dynamic Stabilizers: SITS (rotator cuff) Supraspinatus (abduction), Infraspinatus & teres minor (external rotation), Subscapularis (internal rotation)*

**Static stabilizers: Labrum (ring of cartilage around acetabulum), articular capsule, ligaments*

**Popeye Biceps: tear of long head of the biceps brachii*

**Frozen Shoulder: Adhesive capsulitis (fibrous tissue)*

**Most common R.C. Tear=supraspinatus*

**Dislocation: GH joint (bone pops up)*

**Seperation: AC joint (ligament damage): Gr1: AC sprain,*

Gr2: AC torn, Gr3: Ac & CC torn

KNEE

**Condylar-synovial Joint (largest joint)*

**3 articulations (1) two condylar-artio-femoral joint (2) patellogemoral joint*

**3 bursa (1) prepatellar (2) Anserine (3)*

Semimembranosus

**Terrible Triad: MCL, ACL, Medial meniscus (snap, crackle, pop. MOI: external rotation & hyperextension*

HIP

**Synovial Ball-and-socket Joint*

**3 bursa: (1) Psoas (2) trochanteric (3) Ischial*

**Posterior hip dislocation: adduction & international rotation*

**Anterior hip dislocation: abduction & external rotation*

**Tradelenberg: hip pop out, weak gluteus medius*

Antalgic gait: limping to avoid weight bearing

WRIST

**2 joints (1) Radiocarpal (2) Distal radioulnar*

**Hand joints: (1) MCPs (2) PIPs (3) DIPs*

**Carpal tunnel: flexor pollicis longus, flexor digitorum*

superficialis, flexor digitorum profundus

MSK Examination – TMJ**INSPECTION**

- **Symmetry**
- **Swelling**: would appear 1/2cm anterior to external auditory meatus
- **Redness**
- *TMJ Syndrome: unilateral pain with chewing, Facial asymmetry, Jaw clenching & Grinding*

PALPATION

- **TMJ**: fingers in front of tragus, ask pt to open mouth, fingertips drop into joint space, note ROM, swelling, (*snapping, clicking are normal*)
- **Muscles**: palpate muscles while clenching and relaxing
 - Masseter: pain with TMJ syndrome
 - Temporal Muscles
 - Pterygoid muscles (*internal palpation, between tonsillar pillars of mandible*)

RANGE OF MOTION

*Glide & Hinge motion

- **[1] Open and Close Mouth** (*3 fingers between incisors*)
- **[2] Protrude & Retract Jaw** (*bottom teeth in front of upper*)
- **[3] Jaw side-to-side** (*laterally*)

STRENGTH TESTS

*see neuro

NEURO TESTS

*see neuro

MSK Examination – Elbow**INSPECTION**

- **Carrying angle**
- **Medial and Lateral Epicondyle**: swelling, nodules, inflammation
- **Olecranon**: swelling, nodules, inflammation (olecranon bursitis/arthritis)
- **Arm straight**: medial epicondyle, olecranon, lateral epicondyle are straight
- *Arm flexed, medial and lateral epicondyle are higher than olecranon*

PALPATION

- **Olecranon process** (displaced posteriorly=posterior dislocation or supracondylar fracture)
- **Epicondyles**: Lateral Epicondylitis=tennis elbow (wrist extensor against resistance)
Medial Epicondylitis=Golfer's/Pitcher's Elbow (wrist flexors against resistance)
- **Grooves between epicondyles & olecranon**: this is where synovium is most accessible (ulnar nerve is between the medial epicondyle and the olecranon)

RANGE OF MOTION

*Note crepitus, comfort, limitations

- **[1] Flexion**: Bend elbow (biceps, brachialis, brachioradialis)
- **[2] Extension**: Straighten elbow (triceps brachii, anconeus)
- **[3] Supination**: Turn palms up (biceps, supinator)
- **[4] Pronation**: Turn palms down (Pronator quadratus, pronator teres)

STRENGTH TESTS

*see neuro

NEURO TESTS

*see neuro

MSK Examination – Axial Skeleton (Neck and Spine)

INSPECTION

*Have pt in neutral standing position (feet together, hands at side)

- **Posture** (sit & stand): shoulders and pelvis level, head erect, listing of trunk (*herniated lumbar disc*)
- **Neck position**: midline with sacrum, east of movement (*torticollis: rotation and lateral deviation of sternomastoid*)
- **Gait east** (walking)
- **Landmarks**: spinous processes (C7/T1 most prominent), paravertebral muscles, iliac crest(L4), PSIS (S2 dimples)/ASIS
- **Curvatures**: inspect from side (*cervical, lumbar, thoracic, sacral*), not accentuation of curvatures
- **Scoliosis/Hip abduction/Hip adduction**: Shoulder height, iliac crests, gluteal folds, line from C7 to gluteal fold
- **Winging of scapula**: have pt push against wall (*loss of thoracic nerve innervation to serratus anterior muscle*)
- **Sprengel's deformity** (extra bone between scapula and C7 vertebrae)

PALPATION/PERCUSSION

*Pt standing (except with sciatic nerve, pt lies on opposite side with hip flexed)

- **Spinous Processes**: palpate with thumb for tenderness associated with fracture, infection, arthritic (esp C5/C6)
- **Neck**: facet joint of neck (1" lateral to c2-C7 spinous processes)
- **Lumbar vertebral step-offs**: spondylolisthesis (fwd slippage of vertebrae), tenderness (fracture)
- **Sacroiliac Joint** (Dimple): palpate for tenderness (*alkylosing spondylitis, sacroilitis*)
- **Percuss Spine**: thumbing with ulnar surface of fist down spine for tenderness (*osteoporosis, infection, malignancy*)
- **Paravertebral Muscles**: palpate for tenderness, spasms (*firm/knotted-abnormal postures, anxiety*)
- **Sciatic Nerve**: palpate between greater trochanter and ischial tuberosity
- **Pain**: palpate areas of pain (*rheumatoid arthritis, disc herniation esp at L4-L5, L5-S1*)

ROM-NECK

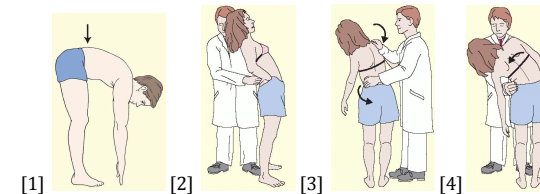
*limited ROM: arthritis, trauma muscles spasm (*torticollis*)

- **[1] Flexion** (C1-Skull): Bring chin chest (*Sternomastoid, Scalene, Paravertebral muscles*)
- **[2] Extension** (C1-Skull): Look at ceiling (*Splenius capitis, splenius cervicus*)
- **[3] Rotation** (C1-C2): Look over shoulder (*Sternomastoid*)
- **[4] Lateral Bending** (C2-C7): Ear to shoulder (*Scalene*)

ROM-SPINE

*Note smoothness, symmetry, mobility (*decreased mobility=alkylosing spondylitis, osteoarthritis*)

- **[1] Flexion**: Touch toes. Note lumbar concavity flattens out (*psoas, quadratus lumboris, abdominal muscles*)
 - Mark the lumbosacral junction, mark 5cm below, 10 cm above. Normally there is an increase of 4cm above, none below
- **[2] Extension**: Support pt at PSIS, Ask pt to bend back as far as possible (*Erector spinae*)
- **[3] Rotation** (*thoracic*): Pull shoulder and hip posteriorly, Ask pt to rotate (*Abdominal muscles*)
- **[4] Lateral Bending**: Place hands on hips, Ask pt to bend sideways from waist (*Abdominal muscles*)



SPECIAL TESTS

- **Sciatica**
 - **Straight Leg Raise**: passive leg raise, record angle of pain (>30°)
 - **Crossover test**: SLR cause pain in other leg
 - **Bowstring Test**: SLR to radiating pain, flex knee to no pain, press into popliteal fossa to reproduce static radiating pain
- **Measuring Leg Length**: measure from ASIS to medial malleolus (*discrepancy <1cm*)
- **Flexion-Alkylosing Sponsylitis**: Mark the lumbosacral junction, mark 5cm below, 10 cm above. Normally there is an increase of 4cm above, none below. Normally lumbar curve flattens (*persistin lumbar lorseosis=muscle spasm, akylosing spondylitis*)
- **Sacroiliac Stress Test**: Sidelying – squeeze iliac together, supine – squeeze iliac apart (*pain at sacroiliac or symphysis pubis is positive*)
- **Digital Rectal**: see male reproductive examination
- **Hip Special tests**: see MSK examination - Hip

STRENGTH TESTS

*see neuro

NEURO TESTS

*Upper extremity (see neuro), Lower extremity (see neuro), Digital Rectal (see repro exam)

MSK Examination – Shoulder

INSPECTION

- **Gait:** arm swing, carrying angle (*greater in females*)
- **Winging of the scapula:** pt push against wall (*loss of thoracic nerve innervation to serratus anterior muscle*)
- **Symmetry** (*scoliosis, fracture, dislocation*)
- **Swelling** (*subacromial bursitis under deltoid, dislocation*)
- **Atrophy** (*occurs with R.C. tear within 2-3 weeks*)
- **Skin:** color change, skin alternation, bony contours
- **Edema**
- **Abnormal positions**
- **Deformities**
- **Fasciculations** (*Lower motor neuron lesion*)

PALPATION

*Palpate for heat, tenderness, inflammation (*bursitis, synovitis, R.C. tear, arthritis*)

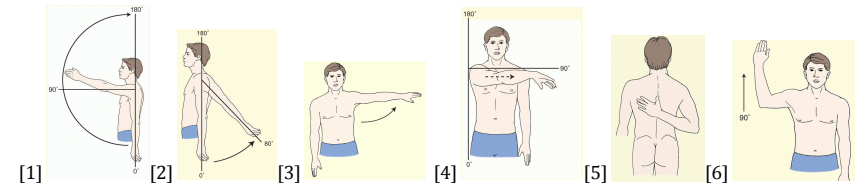
- **Scapula:** spine, borders (*superior, medial, lateral*),
- **Acromion**
- **Acromioclavicular joint**
- **Clavicle**
- **Sternoclavicular joint**
- **Sternum**
- **Coracoid process:** medial and inferior to acromion
- **Greater Tubercle**
- **Biceps tendon:** thumb on coracoid, finger on G. tubercle, external rotation of arm, finger slides into bicipital groove with biceps tendon
- **Subacromial/subdeltoid bursa:** with flexed elbow, extend shoulder posteriorly
- **SITS:** palpate tendons around humeral head, palpate muscles (*infraspinatus atrophies easily with R.C. tear*)
- **Fibrous articular capsule/tendons** (*note tenderness*)
- **Areas of Pain**

RANGE OF MOTION

*Note crepitus, comfort, limitations

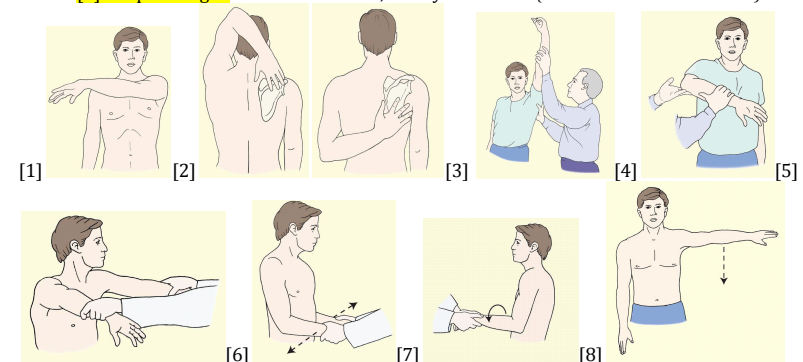
*Restricted ROM: *bursitis, capsulitis, R.C. tear, sprain, tendinitis*

- **[1] Flexion** (0-90°-180°): Raise arm in front & overhead (*deltoid, pectoralis major, coracobrachialis*)
- **[2] Extension** (0-180°): Raise arm behind (*latissimus dorsi, teres major, deltoid, triceps*)
- **[3] Abduction:** Raise arm out to side & overhead (*supraspinatus, deltoid, serratus anterior*)
 - *glenohmeral: 0=90°, scapulothoracic: 90-120°*
- **[4] Adduction:** Cross arm in front of body (*percotralis major, teres major, coracobrachialis, subscapularis*)
- **[5] Internal Rotation:** Touch shoulder blade from below (*subscapularis, deltoid, pectoralis major, teres major, latissimus dorsi*)
- **[6] External Rotation:** Hand behind neck like brushing hair (*infraspinatus, teres minor, deltoid*)



MANEUVERS/SPECIAL TESTS

- **[1] Crossover Test** (*Acromioclavicular/Sternoclavicular joint*): adduct arm- horizontal (*Pain=inflammation/arthritis*)
- **[2] Apley Scratch Test** (*Overall Shoulder Rotation*): touch opposite scapula; UP-abduction & external rotation, DOWN-adduction & Internal rotation (*difficulty=R.C. tear*)
- **[3] Neer's Impingement:** Raise pt arm, internally rotate, and press on scapula (*pain=R.C. tear, g. tuberosity against acromion pinches supraspinatus tendon*)
- **[4] Hawkins's Impingement:** flex elbow, palm down, internal rotation (*pain=R.C. tear, G. tuberosity against coracoclavicular ligament*)
- **[5] Supraspinatus Strength** (*Empty Can Test*): Laterally elevate arms to 90°, internally rotate arms with thumbs down, pt resists downward pressure (*weakness + pain=R.C. tear*)
- **[6] Infraspinatus Strength:** Elbow flexed at 90° at side, thumbs turned up, pt presses outward against resistance (*weakness= R.C. tear or bicipital tendinitis*)
- **[7] Forearm Supination:** Elbow flexed at 90°, pronated forearms, pt tries to supinate arm against resistance (*pain=R.C. tear or bicipital inflammation*)
- **[8] Droparm Sign:** Abduct arm to 90°, slowly lower arm (*unable to hold arm=R.C. tear*)



STRENGTH TESTS

*see neuro

NEURO TESTS

*see neuro

VASCULAR TESTS

*see neuro

MSK Examination – Wrist & Fingers**INSPECTION**

- **Hand at rest:** fingers are slightly flexed and parallel
- **Hand in motion:** smooth, natural movements
- **Deformities:** Rheumatoid=PIP/MCP deformities, wrist joint problems, ulnar deviation
Osteoarthritis: Heberden's nodes (*DIP*), Bouchard's nodes (*PIP*)
- **Dorsum:** swelling over joints
- **Palms:** swelling over joints, thenar atrophy (*median nerve*), hypothenar atrophy (*ulnar nerve*), thickening of flexor fascia (*Duputren's contracture*), nodes on flexor tendons (*trigger finger*)

PALPATION

- Distal **Radius & Ulna**
- **Wrist joint** Grooves (*Carpals*): palpate with thumbs on dorsum, note swelling, boggy, tenderness (*Tenderness over distal radius=Colles' fracture, bilateral tenderness=Rheumatoid*)
- **Radial Styloid:**
- **Snuff box** (*Abductor pollicis brevis, extensor pollicis brevis/longus*): tenderness with scaphoid fracture or De Quervain's Tenosynovitis (*abductor pollicis longus, extensor pollicis brevis*)
 - Poor blood supply puts fractured scaphoid bone at risk for avascular necrosis
- **Carpal bones:** 8 carpal bones
- **Metacarpals:** 5 metacarpal bones
- **Phalanges:** proximal, middle, distal phalanges
- **Compress MCP joints:** squeeze hand (*pain=arthritis, trauma*)
- **Palpate phalange joints:** MCPs, PIP (*rheumatoid + Bouchards*), DIP (*Heberden's, Psoriatic*)

RANGE OF MOTION

WRIST	FINGERS	THUMB
<ul style="list-style-type: none"> • [1] Flexion (<i>flexor carpi radialis/ulnaris</i>) • [2] Extension (<i>Extensor carpi ulnaris/radialis longus/radialis brevis</i>) • [3] Adduction: ulnar deviation dorsal (<i>flexor carpi ulnaris</i>) • [4] Abduction: radial deviation (<i>Flexor carpi radialis</i>) 	<ul style="list-style-type: none"> • [1] Flexion: make a fist (<i>lumbricals</i>) • [2] Extension: straighten fingers (<i>Extensors</i>) • [3] Adduction: put fingers close together (<i>interossei</i>) • [4] Abduction: spread fingers apart (<i>palmar interossei</i>) 	<ul style="list-style-type: none"> • [1] Flexion: thumb across palm to base of 5th finger • [2] Extension: thumb away from fingers • [3] Abduction: thumb anteriorly away from palm • [4] Adduction: thumb towards palm • [5] Opposition: touch thumb to each finger tip

MANEUVERS – WRIST

- **Carpal Tunnel:**
 - **Thumb abduction:** pt abducts thumb against resistance (*weakness=carpal tunnel – median nerve innervates abductor pollicis longus*)
 - **Tinels:** Tap over median nerve over carpal tunnel in wrist
 - (+): tingling in distribution of median nerve (*first 3 fingers*)=carpal tunnel syndrome
 - **Phalens:** Wrists are flexed against each other for 60 second or more
 - (+): tingling in distribution of median nerve (*first 3 fingers*)=carpal tunnel syndrome
- **Finkelsteins Test:** Pt grasp thumb against pump, ulnar deviates wrist (*Pain=de Quervain's Tenosynovitis – inflammation of abductor pollicis longus & extensor pollicis brevis*)
- **Sensation:** Medial n. (*index finger*), ulnar n. (*5th finger*), radial n. (*dorsal web space of thumb/index*)
- **Hand Grip Strength:** pt grasps 2nd/3rd fingers (*pain, weakness=De Quervain's Tenosynovitis, arthritis, carpal tunnel*)

STRENGTH TESTS *see neuro**NEURO TESTS *see neuro****MSK Examination – Hip****INSPECTION**

- **Gait:** Stance-weight bearing (*60%*), Swing-without weight, knee is bent (*40%*)
 - *Trandelenburg:* lurching gait – indicates weakness of *gluteus medius*
 - *Antalgic gait:* limping due to pain
- **Width between heels** 2-4".
- **Waddling** (*Abductor weakness, dislocation, arthritis*), wide base (*cerebellar*),
- **Scoliosis/Lordosis:** Loss of lordosis (*paravertebral spams*), excess lordosis (*flexion of hip*)
- **Leg length:** hip adduction, abduction, scoliosis, hip fracture
- **Atrophy**

PALPATION

- **Bony Landmarks**
 - **Anterior Hip:** Iliac crest, Iliac tubercle, ASIS, Greater trochanter, Pubic Symphysis
 - **Posterior Hip:** PSIS (*dimple*), Sacroiliac Joint (*medial to PSIS*), Greater Trochanter, Ischial tuberosity,
- **Inguinal structures** (*pt supine, heel of leg on opposite knee*): inguinal ligament, NAVEL (*hernia, aneurysm, lymph nodes*)
- **Bursa** (*pt in left lateral decubitus*): Psoas bursa (*under inguinal ligament*), trochanteric bursa (*over G. trochanter*), ischiogluteal bursa (*weaver's bottom, can mimic sciatic*)

RANGE OF MOTION

- **[1] Flexion:** Bend knee to chest (*iliopsoas*)
- **[2] Extension:** extend leg back (*Gluteus max*)
- **[3] Abduction:** move leg away from midline (*gluteus min/med*)
- **[4] Adduction:** move leg toward midline (*adductor brevis/longus/magnus, pectineus, gracilis*)
- **[5] External Rotation:** bend knee, move knee outward (*internal/external obturators, superior/inferior gemelli, quadratus femoris*)
- **[6] Internal Rotation:** bend knee, move knee inward (*gluteus min/med*)

SPECIAL TESTS

- **Sacroiliac Stress Test:** Sidelying – squeeze iliac together, supine – squeeze iliac apart (*pain at sacroiliac or symphysis pubis is positive*)
- **Sciatica**
 - **Straight Leg Raise:** passive leg raise, record angle of pain (>30°)
 - **Crossover test:** SLR cause pain in other leg
 - **Bowstring Test:** SLR to radiating pain, flex knee to no pain, press into popliteal fossa to reproduce sciatic radiating pain
- **Trandelenburg:** pt standing, pt raises one foot off ground by bending knee – normally glut medius adducts standing leg to remain upright (*if pelvis drops on unsupported side= +Trandelenburg for glut medius weakness*)
- **Measuring Leg Length:** measure from ASIS to medial malleolus (*discrepancy <1cm*)
- **Saddle Anaesthesia**
- **Rectal Exam:** See Reproductive Examination

STRENGTH TESTS

*see neuro

NEURO TESTS

*see neuro

MSK Examination – Knee

Muscles cross two joints (hip/ankle), so also do hip & ankle (hip problems can present in knee)

INSPECTION

- **Postures:** Bowlegged (*genu varus*), knock-knees (*Genu valgus*)
- **Gait:** Smooth, rhythmic flow, Stance-weight bearing, knee extended (60%), Swing-without weight, knee is bent (40%),
- **Width between heels:** 2-4".
- **Limping**
- **Knee alignment**
- **Quadriceps atrophy**
- **Knee contours:** Hallows around knee (*bursitis*)
- **Inflammation, nodules**

PALPATION

*Note tenderness, nodules, bogginess

*Note crepitus, comfort, limitations

- **Tibiofemoral joint:** grooves on either side of patellar tendon, thumbs down to tibial plateau, move medial and lateral
- **Medial meniscus:** upper edge of tibial plateau when tibia is internally rotated
 - Medial meniscus tear is more common bc it's attached to MCL – tears at epicondyle. Valgus strain causes tear
- **Lateral meniscus:** lateral part of knee, knee in flexion
 - Lateral meniscus tear is less common because it is not attached. Varus strain cause tear
- **Medial Compartment:** knee is flexed to 90° – medial femoral condyle, adductor tubercle, medial tibial plateau, medial collateral ligament (*femoral medial epicondyle to tibial medial condyle*)
 - MCL tear is more common, causes locking.
- **Lateral compartment:** knee is flexed, and foot rests on opposite knee - Lateral femoral condyle, lateral tibial plateau, lateral collateral ligament (*femoral epicondyle to fibular head*)
- **Patellar femoral compartment** (*patella to femoral compartment*): patella (*move around*), patellar tendon, tibial tuberosity (*tenderness + inability extend=patellar tendon tear*)
 - **Patellofemoral Grinding test:** knee extended, compress patella against femur, pt tightens quads, patella move proximally into trochlear groove – look for smooth sliding motion (*pain + crepitus=rough patellar undersurface, patellofemoral syndrome*)
- **Suprapatellar point:** start 10cm above superior border & move distally, move distally feeling soft tissue, palpate along side of patella (*bogginess, thickening, warmth=synovitis, effusion*)
- **Bursa:** prepatellar bursa (*housemaid's knee – excessive kneeling*), Anserine bursa (*posterior-medial side of knee – running or valgus knee*), Gastrocnemius semimembranosus bursa (*medial aspect of popliteal fossa -Baker's/Popliteal cyst due to outpouching of synovial membrane*)

RANGE OF MOTIONS

- **[1] Flexion:** Bend knee (*biceps femoris, semitendinosus, semimembranosus*)
- **[2] Extension:** Straighten leg (*Quads: rectus femoris, vastus medialis, vastus intermedius, vastus lateralis*)
- **[3] Internal rotation:** turn lower leg inwards (*Sartorius, gracilis, semitendinosus, semimembranosus*)
- **[4] External rotation:** turn lower leg outwards (*Biceps femoris*)

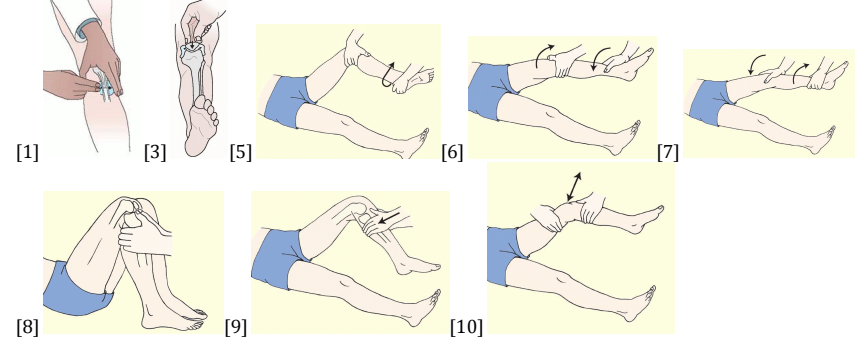
MANEUVERS**Knee Effusions**

- **[1] Bulge Sign:** pressure on suprapatellar pouch, stroke down on medial aspect, tap lateral margin (*fluid wave/bulge on medial side=effusion*)
- **[2] Balloon Sign:** right thumb/index finger beside patella, compress suprapatellar pouch with left hand, feel for fluid wave with right hand. (*fluid wave=effusion*)
- **[3] Balloting:** Compress suprapatellar pouch, ballot patella (*click or fluid returning to pouch=effusion*)
- **[4] Gastrocnemius & soleus muscles – Achilles (Thompson Test):** palpate gastrocnemius & Soleus muscle and common Achilles tendon. With pt prone, squeeze calf and watch for normal plantar flexion (*lack of flexion=torn Achilles*)

Ligaments/Meniscus (perform esp. if there is click/tenderness during flexion/extension)

- **[5] McMurray Test:** apply valgus stress to lateral side, externally rotate leg from heel, slowly extend leg (*click/locking on medial side=medial meniscus tear*)
 - Repeat on lateral side to test lateral meniscus (*however medial meniscus is much more common*)
- **[6] Adduction (Varus) Stress Test:** push laterally against knee, pull medially at ankle (*pain/gap at lateral joint=LCL tear*)
- **[7] Abduction (Valgus) Stress Test:** push medially against knee, pull laterally at ankle (*pain/gap at medial joint=MCL tear*)
- **[8] Anterior Drawer Test:** knee at 90°, draw tibia forward (*forward jerk=ACL tear*)
- **[9] Posterior Drawer Test:** knee at 90°, push tibia posteriorly (*backward jerk=PCL tear*)
- **[10] Lachman Test** (*more sensitive for ACL-removes hamstring strength*): with knee at 15°, one hand moves femur back, other hand moves tibia forward (*forward jerk=ACL tear*)
- **[11] Apley Compression Test:** with pt prone and knee flexed to 90°, apply downward pressure and rotate ankle (*click/locking=meniscus tear*)

Leg Length: from ASIS to medial meniscus (*discrepancy <1cm*)

**STRENGTH TESTS**

*see neuro

NEURO TESTS

*see neuro

VASCULAR TESTS

*see neuro

Valgus strain: MCL tear, medial meniscus

Varus strain: LCL tear, lateral meniscus

MSK Examination – Ankle & Toes

INSPECTION

- Nodules, Swelling, Calluses, Corns, Ulcers
- Inflammation, color (color over 1st MCP)
- Calcaneal valgus (heel out) or calcaneal varus (heel in)

PALPATION

- Anterior aspect of ankle joint: note boggiess, swelling, tenderness (arthritis, ligament injury, infection)
- Achilles Tendon: nodules, tenderness
- Heel: posterior, inferior calcaneus
- Plantar fasciitis: heel-strike
- Medial & Lateral malleolus (Ottawa ankle rule: ankle fracture with inability to walk after 4 steps, pain over posterior malleolus-esp. medial)
- Metatarsophalangeal Joints: compress the forefoot (pain/tenderness=metatarsalgia, gout, arthritis)
- Metatarsal heads: Squeeze over metatarsal head, and between spaces on plantar surface (tenderness over 3, 4 metatarsal heads = Moton's neuroma)

RANGE OF MOTION - ANKLE

- [1] Plantar Flexion: point foot toward floor (tibiotalar joint): (gastrocnemius, soleus, plantaris, tibialis posterior)
- [2] Extension/Dorsiflexion: point foot toward ceiling (tibiotalar joint): (tibialis anterior, extensor digitorum longus, extensor hallucis longus)
- [3] Inversion (talocalcaneal joint): bend heel inward (tibialis posterior, tibialis anterior)
- [4] Eversion (talocalcaneal joint): bend heel outward (fibularis longus, fibularis brevis)

RANGE OF MOTION – METATARSAL/PHALANGES

- [1] Invert toes (transverse tarsal joint): stabilize heel
- [2] Evert Toes (transverse tarsal joint): stabilize heel
- [3] Flex Toes (MTP joint)
- [4] Extend toes (MTP joint)

SPECIAL TESTS

- Measuring Leg Length: measure from ASIS to medial malleolus (*discrepancy <1cm*)
- Integrity of Achilles Tendon: palpate gastrocnemius muscle and Achilles tendon. With pt prone squeeze calf and watch for normal plantar flexion (lack of flexion=torn Achilles)

STRENGTH TESTS

**see neuro*

NEURO TESTS

**see neuro*

Female Reproductive History– MVP Screen

MENSTRUAL (MMAAPPD)

- **Menarch:** occurs between 9-16, can take 1 year before regular
- **Menstrual cycle:** normally 24-32 days, lasting 3-7 days, how heavy (*measure in tampons/pads*), color, clots, last menstrual period
- **Menopause:** occurs between 48-55, vasomotor symptoms (*hot flashes, mood changed, sweating, sleeping problems*), Hirtuism, Vaginal dryness/dyspareunia
- **Amenorrhea:** primary (*failure to initiate*), secondary (*menopause, pregnancy/lactation, decreased BMI, stress, HPA*)
- **Abnormal Uterine Bleeding:** postcoital (*cervical CA, polyps*), menorrhagia (*increased flow*), polymenorrhea (*less than every 21 days*), oligomenorrhea (*infrequent*), metarrhagia (*bleeding between periods*)
- **Post-menopausal:** bleeding for 6months after cessation of menstruation
- **PMS:** 1. Symptoms 5 days before menses for 3 consecutive cycles 2. Cessation with in 4 days of menses onset 3. Interferes with activities of daily living
- **Dysmenorrhea:** Primary (*relieved with advil*), Secondary (*adenomyosis/endometriosis, polyps, PID*)

VULVOVAGINAL SYMPTOMS

- Vaginal discharge (*color, odor, consistency*)
- Itchy
- Sore
- Bumps

PREGNANCY

- Gravida, Term, Premature, Abortion, Living
- Contraception

BREAST

- **Lumps,** pain: dimpling, swelling, puckering, stage during menstrual cycle
- **Discharge:** color, unilateral/bilateral, bloody, milky
- **BSE:** when, how often
- **Breastfeeding**
- **Cancer:** Family history of breast/ovarian CA, age @ diagnosis

SCREENING

- Mammogram at 50
- Pap smear
- HPV Vaccine
- Clinical Breast Exam
- Self Breast Exam
- STD Testing (*routine with pap under 24*)

Female Antenatal – DICCES

GTPAL

DOMESTIC VIOLENCE

IMMUNIZATIONS

- Pneumo/meningococcal/Hep B are safe in pregnancy

CONCERNS/ATTITUDES

- Planned? Wanted? Abortion? Fears?

CURRENT STATE OF HEALTH

- Nutrition (*300 calories, 5-10g protein, 15mg iron, 250mg Ca²⁺, 400-800mg folic acid*)
- Smoking, Alcohol, Drugs, Meds,
- Work hazards/exposures
- Prenatal vitamin (*maternal*),
- BMI (*weight, height – avg gain – 28lbs*), Exercise (*moderate 30 min 3X/wk*)

ESTIMATED DATE OF DELIVERY

- Last menstrual period
- EDD=LMP + 7 days + 7 months (*assumes 28-30 day cycle*)
- Still need ultrasound

SYMPTOMS

- Absence of menses
- Breast Fullness
- Nausea & Vomiting
- Fatigue
- Urinary Frequency

PAST OB Hx

- GPTAL
- Problems during pregnancy
- Birth history: c-section, vaginal, birth weights, term, SGA/LGA, post-partum depression

Male Reproductive History

BOWEL

- **Habits:** size, shape (*pencil*), diarrhea, constipation
- **Blood:** Melena (*coffee grounds*), hematochezia (*red*), bright red blood per rectum
- **Pain/Itching with defecation:** proctitis, anal warts, anal fissures
- **Discharge from anus:** mucopurulent

PROSTATE

- Difficulty holding back stream
- Weak flow
- Frequency (*esp @ night*)
- Pain/burning with urination
- Blood
- Pain with ejaculation
- Pain in back, thighs, hip

PENIS

- **Discharge:** stain underwear, color, consistency, systemic symptoms (*fever, chills, rash*)
- **Urinary frequency:** Pain with urination, frequency, urgency

SCROTUM

- Sores
- Pain
- Swelling/nodules
- Self-Exam

Sexual Health

RESPONSE

- Satisfaction
- Desire/interest
- Arousal: lubricate/erection
- Organism: premature ejaculation (*no orgasm with ejaculation is usually psychogenic*)
- Dyspareunia (*Pain with intercourse*): vaginismus, menopause (*decreased lubrication from lack of estrogen*)

PREFERENCE

- Are you involved/sexually active
- With a male or female
- Preference (*current & present*)

HISTORY & STDs

- Anal: give/receive, anal warts/fissures
- Oral: throat/mouth
- Number of sexual contacts in last month
- Concerns about STDs
- PMHx of Venereal disease
- HIV: 3-6 months to seroconvert

Female Breast Examination

*Ask pt: Have you noticed anything?

Do you perform month BSE

*Best done 5-7 days after menses (*decreased estrogen=decreased tenderness & nodules*)

INSPECTION

*Sitting

*Tanner Staging: [St1] prepubertal [St2] breast bud [St3] Breast elevates [St4] areola and nipple form secondary mount [St5] Mature breast - areola flattens, only nipple elevated

- Evaluate:
 - Skin changes: Color (*red=infection, inflammatory carcinoma*), symmetry, thickening
 - Contour: retraction, dimpling, masses, flattening
 - Nipple: size, shape, direction (*opposite=BCA*), ulcers, eczema, rash, discharge (*Paget's*), inverted nipple is normal
- **Arms at Side:**
- **Arms over Head:** dimpling, retraction,
- **Hands on Hip:** contracts pectoral muscles. Dimpling or retraction
- **Leaning Fwd:** good for large pendulous breasts, brings out symmetry, nipple retraction=BCA
- **Axilla:** rash (*deodorant*), pigmented (*Acanthosis nigrans=malignancy*), infection, ulceration
- Mastectomy: inspect scar for color changes, inflammation. Inspect axilla for lymphedema. Inspect breast for masses, nodularity.

PALPATION

Breast – Supine

*3 minutes per breast, best done with breast tissue flattened, vertical strip pattern, concentric circles

*3 pressures: light, medium, deep

- **Palpate breast** with finger pads of 2nd/3rd/4th fingers, with fingers slightly flexed, in concentric circles. Palpate using vertical strip pattern, from posterior axillary line to mid-sternum, from clavicle to inframammary line (*Braline*). Ensure that tail of Spence in axilla is palpated.
 - **Lateral Breast:** pt supine, on opposite hip, hand on forehead, shoulder pressed against bed. Palpate from axilla to bralene. Stop at nipple.
 - **Medial Breast:** pt supine, hips/shoulders flat against bed, hand at neck (*elbow even with shoulder*). Continue palpating to midsternum
 - Note: tenderness (*premenstrual*), nodules (*location: quadrant, clock, cm from nipple*), consistency, size (*in cm*), shape (*round, cystic*), mobility, dimpling when moved
- **Nipple:** elasticity (*loss=CA*), compress areola with index finger to check for discharge (*color, consistency, quantity, blood=Paget's-DCIS=papilloma, clear/serous/green/black=normal*)

Axilla – Sitting

*Use RT hand for LT axilla and visa versa

*Cup fingers together

- **Lymph Nodes:** central lymph nodes (*high in axilla*), pectoral lymph nodes (*anterior axillary fold*), lateral lymph nodes (*humerus*), subscapular lymph nodes (*posterior axillary fold*), supraclavicular lymph nodes, infraclavicular lymph nodes
 - > 1cm enlarge=infection from hand/arm, immunization, lymphadenopathy, malignancy
- Mastectomy Scar: palpate scar, pay special attention to upper outer quadrant and axilla

BREAST SELF EXAM

- Best performed after menses
- Supine: vertical strip
- In front of mirror: with hand on hip
- Shower: vertical strip

Female Genital Exam

*Drape: mid abdomen to knees, depress drape between knees

*Anteverted uterus is most common, retroverted, retroflexed

EXTERNAL**INSPECTION**

- **Sexual maturity:** [St1] preadolescent (*no hair=vellus*), [St2] Long, slightly pigmented, [St3] dark, coarse, curly, [St4] Covers entire medial portion [St5] Covers thighs
- **Genitals:** Mons pubis (*itchy, red maculopapules, lice at base of hair, rash*), Labia majora/minora, Perineum, Clitoris, Urethral Meatus (*caruncle=prolaspe*), Introitus,

PALPATION

- **Bartholin glands:** index in posterior vagina, thumb on labia majora
- **Milk Urethra:** culture discharge
- **Pelvic muscle strength:** 2 fingers in vagina, pt squeezes (*kegel*), 3 seconds=full strength, fingers pulled up & in

INTERNAL**VAGINAL WALLS**

- Separate labia with middle & index, ask pt to bear down, no bulges (*cystocele/rectocele*)

PAP TEST

*Have patient slide buttox to extend slightly over end of table

- **PREPARE SPECULUM:** moisten speculum & fingers with warm water, enlarge introitus with index (*applying downward posterior pressure*), check location of cervix with index and middle finger, inset speculum downward (*speculum at angle or pressed down along posterior wall*), open speculum, cup cervix
- **INSPECT CERVIX:** color, position, discharge, friable, nodules, bleeding
- **PAP TEST:** [1] STD swabs before pap test because blood interferes (*Chlamydia [aerobic]=pink*), [2a] Cervical scrape: long end in os, be sure to get transformation zone with squamocolumnar junction (*always before endocervical brush*), [2b] Endocervical brush: in os, roll between finger and thumb, [3] Cervical broom: put plastic brush tip into os
 - Pedersen: long, thin (*virgin, nulliparous*)
 - Graves: short/fat/plattapus like (*multiparous*)
 - Slide smear: do not do Pap during menses because blood interferes
 - Cytology: Pap can be done during menses because RBCs are filtered
- **INSPECT VAGINAL WALL:** inspect vaginal wall as speculum is withdrawn, rotate speculum. Note color, discharge

BIMANUAL

- Lubricate index & middle finger, press in & posterior on perineum
- **Palpate vaginal mucosa:** note nodules, tenderness, masses (*rectovaginal mass may be stool, it can be indented, or verified with rectovaginal exam*)
- **Palpate cervix:** note position, shape, mobility, tenderness (*PID*)

- **Palpate uterus:** pelvic hand in posterior fornix, ado hand presses down, elevate cervix. Once uterus is between hands, move pelvic hand to anterior fornix to palpate body. Note shape, size, tenderness, nodules
- **Palpate Ovaries:** abdo hand in lower quadrant, pelvic hand in lateral fornix. Note size, shape, tenderness (*PID*)

RECTOVAGINAL EXAM

- Index in vagina, middle finger in rectum (*asp pt to straining down to relax sphincter*).
- Cervix is felt (*Pain=PID*)

HERNIA

- Labia majora, upward & lateral. Pt coughs

Male Genital/Rectal Exam

PENIS

INSPECTION

- **Retract prepuce:** nodules, ulcers, masses, smegma (*cancers can occur under prepuce*)
 - Phimosis (*tight prepuce*), paraphimosis (*once retracted cannot return*)
- **Glands:** Balanitis (*inflammation*), Balanoposthitis (*gland + penis inflammation*)
- **Skin at penis base:** lice at base of hair, excoriations, rash
- **Urethral meatus:** hypospadias (*congenital ventral displacement*), compress urethra between thumb & finger (*culture discharge*)

PALPATION

- Shaft between thumb and 1st finger.
- Note induration (*ventral=urethral stricture due to CA*), Tenderness (*can be secondary to stricture*)

SCROTUM

INSPECTION

- **Skin:** rashes, epidermoid cysts (*occluded follicle with keratin debris*)
- **Contour:** Lumps, veins, cryptorchidism (*poorly develop scrotum*)

PALPATION

- **Testes:** Palpate testes between thumb and first 2 fingers
- **Epididymis:** Palpate epididymis on superior-posterior surface of testes (*painless nodule=CA, tender epididymis=epididymitis, orchitis, torsion, strangulated hernia*)
- **Spermatic cord:** move up from epididymis to spermatic cord. Note nodules, swelling, varicocele (*tortuous veins, usually on left*). Locate vas deferens within spermatic cord
 - Spermatic cord contains veins, artery, lymphatic, vas deferens
- **Transillumination of Mass:** red glow=hydrocele, no glow=tumor, testis, hernia

RECTUM/PROSTATE

**Sidelying or leaning forward*

**Lie with buttocks close to edge on left side with right leg flexed more than left*

INSPECTION

- **Sacroccygeal:** pilonidal cysts/sinus (*drainage?*), lumps, nodules
- **Perianal area:** ask pt to bear down, and inspect anal area for lumps, ulcers, rashes, anal fissures, hemorrhoids

PALPATION

- Place gloved index over anus, ask pt to bear down (*warn them they may feel like passing stool*), push index into anal canal. Note sphincter tone, tenderness, induration, nodules
- **Anal Wall:** Rotate clockwise & counterclockwise
- **Lesion:** To access lesion, ask pt to bear down
- **Prostate:** palpate posterior surface – lateral lobes, median sulcus (*warn pt, he may feel urge to urinate*). Note size, shape, consistency, nodules.
 - Normally prostate is rubbery & nontender
- **Seminal vesicle/Peritoneal cavity:** is possible extend finger above prostate
- Remove finger and test fecal matter for occult blood

HERNIA

**Incarcerated → Cannot be reduced*

**Strangulated → Ischemic, nausea/vomiting, surgery*

INSPECTION

- Note any bulging, asymmetry
- **Valsava:** ask patient to bear down (*increases abdominal pressure*), look for hernia bulge

PALPATION

- **Inguinal hernia:** Index into inguinal canal (*invaginate scrotum*), follow spermatic cord to inguinal canal (*triangular slit*). Ask Pt. to bear down, and feel for hernia pushing against index
 - Direct hernia: pushes finger forward, indirect hernia comes down and taps finger (*most common*)
 - If inguinal hernia is found, ask pt to lie supine & try to reduce it
- **Femoral hernia:** hand on anterior thigh, ask pt to bear down.

HEENT History**HEAD – OLDCARTS, FamHx**

*Primary headache: no cause

*Secondary headache: underlying cause

- **ONSET:** Sudden (*thunderclap*) versus gradual
- **LOCATION:** point to pain, symmetric versus bilateral (*migraine/cluster headaches are unilateral, tension headaches are temporal, cluster headache are retroorbital*)
- **DURATION:** periodic, recurring, constant
- **CHARACTER:** throbbing, stabbing, severe onset (*subarachnoid/meningitis*) versus gradual worsening
- **ALLEVIATING/AGGRAVATING/ACCOMPANYING:** nausea & vomiting (*migraines, subarachnoid, brain tumor*), coughing, sneezing, position of head (*increase pain with tumor/sinusitis*), analgesives/ergotamine/triptan overuse
- **RADIATES:**
- **TIMING:** time of day (*wake up>*), episodic (*migraine/tension-peaks over hrs*), prodrome (*euphoria, food craving, dizziness*) aura (*neurologic – vision, numbness, weakness, photophobia[migrains]*)
- **SEVERITY:** worst headache of my life
- **FAMILY Hx**

EARS – DETH V

- **DISCHARGE:** associated with earache/trauma, perforated eardrum secondary to otitis media
- **EARACHE:** associated fever, sore throat, cough. Pain=otitis externa, upper resp Sx=otitis interna
- **TINNITIS** (*ringing without stimulus*): Associated with vertigo=Meneires', increases with age, popping=TMJ, vascular from neck
- **HEARING LOSS:** Unilateral versus bilateral, sudden versus gradual, associated vertigo/earaches
 - Sensorineural: inner ear, cochlear, brain (*difficulty understanding speech – mumbling, worse in noisy places*)
 - Conductive: External ear, middle ear (*noisy places help, NSAIDs, aminoglycosides, aspirin, quinine*)
- **VERTIGO:** room spinning/rotating (*CNVIII, Labyrinth, central lesions*)

EYES – VBL-STD

- **VISION/GLASSES:** hyperopia (*farsighted*), myopia (*nearsighted*), presbyopia (*poor accommodation with near sight – age related*)
- **BLURRED/LOSS OF VISION:** sudden versus gradual, unilateral versus bilateral
 - Sudden unilateral painless → retina
 - Sudden unilateral painful → cornea
 - Gradual bilateral → cataracts, macular degeneration
 - Sudden bilateral → toxicity of drug, chemical or physical irritation
- **LOCATION OF LOSS:** central (*cataracts, macular degeneration*), peripheral (*open-angle glaucoma*), one-sided/quadrants
- **SPECKS/LIGHTS:** vitreous floaters, fixed specks (*lesion in retina or pathway*), flashing lights (*detached vitreous from retina*)
- **TEARING/DRYNESS:** pain/redness
- **DIPLOPLIA:** horizontal (*CNIII, CNVI*), vertical (*CNIII, CNIV*), persists with one eye close (*cornea/lens*)
 - Diplopia is caused by weak EOM, brainstem lesion, cerebellar lesion

MOUTH/THROAT/NECK – BLTHSS

- **BLEEDING FROM GUMS:** common with gingivitis, ask about tendency to bruise/bleed elsewhere (*thrombocytopenia*)
- **LYMPH NODES:** swollen glands? Associated with pharyngitis or acute infection
- **THYROID:** Ask about temp intolerance, sweating, appetite, energy, palpation
- **HOARSENESS:** larynx (*laryngeal nerves*), overuse of voice/allergies, smoking=chronic
- **SORE THROAT:** often associated with URI
 - Step: associated fever, exudate, lymphadenopathy, absence of cough
- **SORE TONGUE:** systemic cause (*nutritional deficiency*) versus local cause (*amphthous ulcers*)

NOSE

- **RHINORRHEA & CONGESTION:** one sided (*deviated septum/foreign body*) versus bilateral (*viral, allergic rhinitis, drugs-BCP, ETOH*). Itchiness is associated with allergies. Ask about associated sneezing, watery eyes, sore throat. Environment?
 - Bacterial sinusitis: suspected after URI (*fever, headache, sinus tenderness, maxillary toothache*)
- **EPISTAXIS** (*nose bleed*): ask about recurrent nose bleeds? Ask about tendency to bruise/bleed elsewhere (*thrombocytopenia*)

HEENT Examination**HEAD****INSPECTION**

- **Hair:** quantity, distribution
- **Scalp:** psoriasis, pilar cysts (*soft lumps*)
- **Face:** symmetry (*palsy, stroke*), involuntary movements (*tics, tremors*), edema, masses
- **Skin:** color, texture, lesion, hair (*hirsutism*)

PALPATION

- **Skull:** deformities, suture abnormalities, Paget's (*increased skull size*), nodules, masses
- **Hair:** texture (*hyperthyroid=fine hair, hypothyroid=coarse hair*)

NECK**INSPECTION**

- **Masses:** visible enlarged salivary glands/lymph nodes
- **Swelling**
- Observe from for **exophthalmose** from above pt (*protrusion of eyelids-proptosis*)
- Observe if pt's **clothing** are appropriate for weather

PALPATION

- **Lymph nodes:** with pads of index & middle fingers use gentle rotary motion (*nodes easily moved*)
 - Posterior auricular, preauricular, tonsillar, submandibular, submental, superficial cervical chain, deep cervical chain (*under SCM*), posterior cervical chain, supraclavicular, occipital
 - Note: size, shape, mobility, consistency
 - *Shotty nodes=normal, nonmobile/nontender=malignant, tender/mobile=inflamed*
- **Trachea Deviation:** fingers beside trachea, compare distance to SCM on both sides
- **Thyroid gland:**
 - **Inspection:** tip pt head back, and using tangential lighting directed downward from chin, inspect thyroid while drinking water and swallowing (*gland rises & falls*)
 - **Palpation:** while standing behind pt, find notched thyroid cartilage, find cricoid cartilage below, located thyroid isthmus. Ask pt to swallow water (*feel for thyroid moving up and down*). Displace trachea to feel lobe.
 - Note: size, shape, consistency, nodules, tenderness
 - If enlarged: listen over lateral lobes for bruit
- **Carotid arteries & Jugular Vein:** palpate carotid arteries, auscultate for bruits, take JVP

RANGE OF MOTION *See MSK Examination (Spine)

MOUTH**INSPECTION & PALPATION**

- **Lips:** color, moisture, lumps, ulcers
- **Oral Mucosa:** use tongue blade & light – color, ulcers, white patches, wavy white linge develop where teeth meet, nodules
- **Ductal Openings:** Stensons duct (*parotid gland – buccal mucosa by 2nd molar*), Wharton's duct (*submandibular – base of tongue*)
- **Gums:** pink (*may have brown patches*), apthous ulcer, gingivitis (*swollen interdental papillae + bleeding*)
- **Teeth:** cavities, plaque. Palpate teeth for looseness
- **Roof of mouth:** color, architect

- **Tongue:** stick our tongue (*CNXII-hypoglossal*). Inspect undersurface using gauze (*cancer most often develops underneath/sides-smoking+drinking+50*). Palpate tongue for induration (*hardness*).
- **Pharynx:** ask pt to say "ah" (*CNX-Vagus*), look for symmetric rise of soft palate (*with CNX paralysis uvula deviates*). Inspect anterior & posterior pillars, uvula, tonsils

RANGE OF MOTION *See MSK Examination (TMJ joint)

NOSE**INSPECTION**

- **Nostrils:** apply gentle pressure to tip of nose. Note asymmetry, deformities.
- **Nasal Obstruction:** have pt occlude one ala nasi and blow out through nose
- **Otoscope:** tilt pt's head back, use larger speculum, inset into nostril avoiding septum. Identify septum, nasal mucosa (*color, bleeding, exudate*), middle turbinate, inferior turbinate. Note deviated, inflammation, perforation
 - *Ulcers/polyps from cocaine are usually on middle turbinates*
- **Transillumination of sinuses:** Frontal (*light up under eyebrow*), maxillary (*light down below eye, look through mouth at hard palate for glow*)
 - *Absence of glow = mucous in sinus*

PALPATION

- **Sinuses:** Palpate sinuses for tenderness – Frontal (*under bony brow*), maxillary
 - *Pain + fever + discharge = acute sinusitis*

EARS**INSPECTION**

- **Auricle:** deformities, lumps, lesions
- **External Ear Canal:** using otoscope with largest speculum, put hand on face to support, pull auricle out and posterior to straighten canal, insert otoscope. Inspect for discharge, swelling, cerumen, exotoses (*non-tender nodules in ear canal*)
- **Eardrum:** Identify handle of malleus, short process of malleus, pars flaccida, cone of light. Note color, discharge, bulging,
 - *Otitis externa=swollen, moist, pale, tender*
 - *Otitis media=red, bulging*
 - *Serous effusion: amber, bulging*

PALPATION

- **Lymph nodes:** pre & post auricular
- **Tug Test:** pull auricle or push on tragus (*pain=otitis externa*)
- **Behind ear** (*tenderness=otitis media*)

AUDITORY ACUITY

- **Whispered Voice Test** (*determines hearing loss*): occlude one ear (*move finger rapidly*), exhale fully, whisper "nine-four".
 - *Conductive: external/middle ear (cerumen, otitis media)*
 - *Sensorineural: cochlea, CNVIII (age, Meniere's)*
- **Webber Lateralization** (*only if hearing loss*): place vibrating 512Hz tuning fork (*human speech 300-3000Hz*) on head, ask where pt hears
 - *Normally heard midline, Conduction=heard in impaired ear, Sensorineural=heard in good ear*
- **Rinne Air/Bone Conduction:** place vibrating 512 hz tuning fork on mastoid, ask pt when no longer heard, then place beside ear canal (*U fwd*), ask pt if sound is heard
 - *Normally heard longer through air, Conduction heard longer through bone, Sensorineural heard longer through air*

EYES

INSPECTION

- **Eyes:** deviation, position, alignment
- **Eyebrows:** scaliness (*dermatitis*), lateral sparseness (*hypothyroid*)
- **Eyelids:** width of palpebral fissure (*increased in down syndrome*), failure to close (*CN VII palsy, damage to cornea*), Ptosis (*CN III palsy, Horner's syndrome, Bell's palsy*) Edema, color (*blepharitis, often with crusting*), sty, chalazion (*inflamed Meibomian gland*)
- **Lacrimal apparatus:** swelling, dryness, tearing (*inflammation, irritation, impaired drainage*)
 - Test for obstruction: pt looks up, press on lower medial canthus, look for fluid discharge (*mucopurulent=obstruction*)
- **Conjunctiva & Sclera:** pt looks up, depress lower lid with thumbs (*can also use thumb & finger to spread lids*). Have pt look side to side. Note color, vascular pattern
- **Cornea & Lens:**
 - Using oblique lighting, observe cornea and lens. Note corneal arcus/arcus senilis (*age, hyperlipidemia*), opacities (*grey on black within pupil=cataract, opacities covering iris and pupil=corneal scar*)
 - Corneal reflex with Kleenex (*sensory CNV, motor VII*)
- **Iris:** shine light from temporal side, look for abnormal crescent shadow from a bulging iris (*glaucoma, increased pressure*)
- **Size, Shape, Symmetry of Pupils:** Anisocoria: >0.4mm difference (*if pupillary rxn is normal, benign*)

VISUAL ACUITY

- **Snellen Eye Chart:** pt at 20 ft, put on glasses, cover one eye with card, ask to read smallest line that more than half can be read (*if pt wears glasses, record as #/# corrected*)
 - 20/20: first number=distance of pt, second number=distance of normal eye
 - Legally blind: 20/200 corrected.
 - Myopia: near-sightedness
 - Hyperopia: far-sightedness

VISUAL FIELDS BY CONFRONTATION

- **Fish Bowl:** have pt look in your eyes, wiggle fingers lateral, pt points when fingers are seen. If abnormal establish fields by testing one eye at a time (*most defects occur temporally*)
 - Prechiasmal defect: quadratic defect
 - Chiasmal defect (*pituitary tumor*): bitemporal hemianopsia
 - Postchiasmal lesion (*stroke*): homonymous hemianopsia

PUPILLARY REACTIONS

- **Pupillary Reactions to light:** darken room, pt look into distance, shine light obliquely
 - Direct rxn: constriction of same eye, Consensual rxn: constriction of opposite eye
- **Near Rxn** (*if pupillary rxn is abnormal*): finger 10 cm from pt, ask pt to into distance, then look at finger.
 - Pupillary constriction (*accommodation*) with near effort
 - Argyll Robertson: Accommodates, but doesn't reaction
 - Tonic (*Adie's*) pupil: tonically dilated
 - Horner: miosis (*SNS pblm*)
 - Near response: accommodation (*ciliary muscles*), converging (*medial rectus*), constriction (*pupillary constrictor muscle*):

EXTRAOCULAR MUSCLES

*Diplopia: loss of conjugate movement-CNIII, CNIV, CNVI (*monocular diplopia=cataracts, ptosis, astigmatism*)

*TIDAL: trochlear-in&down, abducens-lateral

- **Corneal Light Reaction:** Shine light 2 ft away, pt looks directly at light, look for symmetric light reflection slight nasal to centre of pupils (*asymmetry=strabismus*)
- **Cover-Uncover Test** (*strabismus/dyconjugate gaze=diplopia*): pt look at light, cover one eye, uncover, look for deviation/movement
 - Esotropia: inward deviation, exotropia: outward deviation
- **6 extra ocular movement** (*EOMS*): Make H pattern, pause in extremes to detect nystagmus (*few beats of nystagmus in extremes is normal*)
 - Nystagmus: involuntary jerky movement – slow and quick components (*named for direction of quick*). Indicated cerebellar disease
 - Lid lag is seen with hyperthyroid. When looking down, the sclera is visible between iris & upper lid (*normally upper lid slightly covers iris*)
 - Prosis: CNIII palsy, Horner's syndrome, myasthenia gravis
- **Convergence:** pt follows finger within 5-6cm of nose (*poor convergence=hyperthyroidism*)

FUNDUSCOPY

- Darken room, Begin with diopter at 0 (*diopter power converges light*). Have pt look straight ahead. Tilt handle 20° from vertical. Start 15" from pt at 15° lateral to pt's line of vision. Locate red reflex. Move in towards pupil (*keeping red reflex in view*)
 - Always use right eye to view pt's right eye, and left eye to view pt's left eye
- **Optic disc:** round, yellowish structure (*medial*), may need to follow blood vessels. Bring into focus by adjusting diopters ([-] for myopia, [+] for hyperopia).
 - Inspect for clarity (*nasal portion may be blurred*), color (*yellow-creamy pink*), size of physiologic cup (*half of disc, yellowish white*), symmetry of both discs
 - Look for papilledema (*anterior bulging of physiologic cup, blurring of optic disc margins*)
 - Observe spontaneous venous pulsations (*SVP*): presence indicates pressure is normal (*absence=increased intracranial pressure=meningitis, subarachnoid hemorrhage*)
- **Fovea & Macula:** lateral to disc (*macular degeneration=central vision loss*)
- **Retina:** arteries (*bright, small, red*), veins (*large, dark red*). Note size of vessels, lesions (*size, shape, color, measure in terms of disc diameter*). Vitreous floaters, drusen (*undigested cellular debris*)
- **Anterior structures:** use +10/+12 diopters to inspect cornea

Urinary History – PUSH RISK DHN

POLYURIA

- Large volumes of urine
- Determine fluid intake (diuretics, caffeine)

URGENCY/FREQUENCY

SUPRAPUBIC PAIN

- UTI
- Retention leads to overdistention

HEMATURIA

- Distinguish between hematuria and menstrual, medication, beats

RENAL/URETERAL COLIC

- Pain caused by kidney/ureteral stones
- Radiates to trunk, thighs, testicle/labia
- Radiates towards umbilicus

INCONTINENCE

- Stress incontinence: occurs with sneezing, coughing, laughing, lifting (women)
- Urge incontinence: difficulty holding urine once there is the urge
- Overflow incontinence: leaking, always feeling like bladder is full (BPH, stricture – men)
- Functional incontinence: due to immobility, MSK/Neuro pblms

SYSTEMIC SYMPTOMS

- Nausea & vomiting, fever & chills, fatigue

KIDNEY/FLANK PAIN

- Radiates anterior to umbilicus
- Dull steady ache (visceral – distension of renal capsule with pyelonephritis)
- Associated hematuria, fever, chills

DYSURIA

- Pain/difficulty with urination
- Often described as burning
- UTI, BPH, Stricture

HESITANCY/DECREASED STREAM

NOCTURIA

- Nocturia is defined as more than once at night
- Determine fluid intake

PROSTATE SYMPTOMS

- Start stop
- Frequency
- Urinating throughout night
- Pain with urination
- Leaking
- Weak stream
 - Dribbling

Urinary Examination

INSPECTION

- Masses, lesions, scars
- Pt's overall composure (pain, guarding)

PERCUSSION

- Costovertebral angle: use finger tip to check for tenderness, fist percussion (ulnar surface of fist onto flat hand)
- Flank: fist percuss down flank to lower back
- Bladder: percuss if it is distended above the pubic symphysis

PALPATION

- Kidney: with pt supine, one hand is just below and parallel to 12th rib, lift kidney anteriorly. Pt takes deep breath, on inspiration press abdominal hand down to capture kidney. Pt breathes out & stops, feel for kidney moving.
 - Note size, contour, tenderness
- Bladder: Palpate for suprapubic tenderness (infection)
 - Cannot be examined unless it is distended about symphysis pubic (BPH, stricture)

AUSCULTATION

- Renal Bruits: due to renal artery stricture (associated secondary hypertension)

Pediatric History – ABC MAIN DISH

CC

HPI

- FIFE
- OLDCARTS

PMH

- **ALLERGIES:** Medications, foods. What happened? Rash?
- **BIRTH HISTORY:**
 - Prenatal: medications, illnesses (diabetes, HTN/prot in urine, epilepsy), bleeding, x-ray, recreational drugs, alcohol, cigarettes, Age of mom/DAD, Prenatal Care? When? Who? Specialists (US, amnio, CVS)
 - GPTAL
 - Birth history: Vaginal or C-section (why?), Forceps, feet/head first, APGAR Scores, Birth weight, abnormalities at birth
 - Neonatal: problems breathing (needed O₂)/color/feeding, length of hospital stay
- **CHILDHOOD ILLNESSES:** Chickenpox, measles, whooping cough, strep throat, rheumatic fever, pneumonia, convulsions
- **MILESTONES:** see milestones chart
- **ASTHMA**
- **IMMUNIZATIONS:** See immunization chart
- **NUTRITION:**
 - Appetite for unusual things (clay, chalk, peeling paint)
 - Breastfed: how long, how often, vitamin D supplements
 - Ounces of formulae
 - Age of solids foods (6 months)
 - Vomiting, Diarrhea, Constipation, Fussy eater, Colic
 - Ounces of milk, veggies, fruits, protein (junk food, vitamins, Breakfast, lunch, dinners, snacks)
 - Height/weight/head circumference
- **DEVELOPMENT**
 - Any concerns with development
 - Difficulty keeping up with kids
 - Growth, weight gain, current weight
 - Activity
 - Concerns about development
 - Age of: roll over, sit without support, wave bye, recognize name, stand holding on, walk without support, talk, stairs without help, dress, tie shoes, sentences 3-4 words, toilet trained, school, complete what is started,
 - School: gets along with others, sleep through night, recurrent night mares, temper tantrums, grades at school (teacher report problems, how are they doing)
- **INJURIES**

- **SOCIAL & ENVIRONMENTAL HISTORY**

- Pets, household smoke, carpets, dust, pain, plaster, lead exposure
- Who lives at home
- Parents age/occupation/involvement
- Sleep in own room? Bed/crib/parent's bed? Baby on back
- Child-care during day?
- Smoke detectors, window guards, car seats, bike helmets, baby gates, door locks
- Discipline, TV time

- **HOSPITALIZATION/SURGERIES**

FAMILY HISTORY

- Grandparents, Parents, Aunts/Uncles, Siblings, Pt
- Cause & Age of death
- Genetic: sickle cell, hemophilia, Tay Sachs (carrier status)
- Illnesses: diabetes, asthma, CAD, HTN, Stroke, CA
- Miscarriages, children dying in infancy

REVIEW OF SYSTEMS

- **RESP:** breath through mouth, snore, wheeze, problems breathing, stops breathing > 5sec
- **GI:** diarrhea, vomiting, constipation
- **GU:** burning, pain, frequency, blood in urine
- **OTOLARYNGOLOGIC:** freq throat infections, headaches, ear infections, nosebleeds, cough, runny nose
- **DERM:** rashes, psoriasis, cradle cap

Pediatric Exam

INSPECTION

- Dysmorphic features, behavior & relationship w/ parent, nutritional status, LOC

VITAL SIGNS

- BP (ensure proper cuff)
- Temperature
- Heart Rate, Respiratory rate (Can do HR & RR in heart & resp. exam)

Blood Pressure = $70 + 2 \times \text{age}$

GROWTH

- Weight, Height/Supine length, Head Circumference (until 2 yrs) → Plot growth charts

HEENT

- Head:** Fontanelles & Head shape/size/symmetry & facial features
- Ears:** inspect for discharge, otoscopic exam of external canal & tympanic membrane, hearing?
- Eyes:** Red reflex, pupils, corneal light reflex for strabismus (shine a light 2 ft away & have child look at it, light should fall in center of both pupils), cover-uncover test, visual acuity, visual fields by confrontation, extraocular movements,
- Mouth & Throat:** pharynx & palate
- Nose:**
- Neck:** all lymph node chains, trachea, thyroid gland

CVS

- HR & pulse (radial & femoral)
- Inspect & palpate precordium
- Auscultate

RESPIRATORY

- RR & Pattern, effort of breathing & signs of distress (grunting, nasal flaring, retraction)
- Auscultation:** anterior & posterior chest
- Percuss** chest

ABDOMINAL

- Inspection:** abdomen for bulging masses, umbilicus, hernias (ask child to cough)
- Auscultation:** bowel sounds, bruits
- Percussion:** for abnormal dullness
- Palpation:** distension, tenderness, masses, liver, spleen, kidneys
- Femoral pulse & lymph nodes**
- Rectal exam if appropriate

Normal for liver to be palpable 1-2 cm below RT costal margin

Spleen can commonly be palpated just below the LT costal margin, but should not be grossly enlarged

Kidneys frequently palpable

SKIN

- Rashes, dermatological findings (birthmarks/nevi, macules, vesicles, petechiae, Mongolian spots, jaundice etc.)
- Trauma/child abuse

MSK

- Back for midline abnormalities (hair, pits, sacral dimples, scoliosis)
- Gait (check for intoeing or outtoeing), Legs (bowing or knee knocked)

NEUROLOGICAL

- Deep Tendon Reflexes
- You could do a complete cranial nerve, motor, sensory, coordination exam
- Developmental Milestones: Speech, reading ability, manipulate small objects, throw a ball, understand simple directions, walk, jump

GENITALS

- Male:** inspect penis, urethral meatus, scrotum, inguinal hernia, ensure both testes are descended
- Female:** vagina (rashes, discharge, intact hymen)
- Tanner Staging:** breast, pubic hair, penis
- Signs of sexual abuse

Infant Examination

INSPECTION

- Posture (arms & legs flexed), Movements/Activity/Alertness, Body Odor, dysmorphic features

VITAL SIGNS

- T (anal) HR & RR (Can do HR & RR in heart & resp. exam)

GROWTH

- Weight, Supine length** (mark on paper on exam table), **Head Circumference** (greatest circumference around occipitofrontal area) (until 2 yrs) → Plot **growth charts**

HEENT

- Head:** Fontanelles (flat & not bulging, Anterior closes @ 18 mths, Posterior closes @ 2 mths) & Head shape/size/symmetry & facial features, swelling/edema of soft tissues, bruising
- Ears:**
 - Newborn:** Pull pinna down & inspect external canal w/ otoscope, tympanic membrane not seen (filled w/ vernix)
 - Infant:** otoscope exam to check for otitis media/erythematous bulging tympanic membrane (pull pinna downwards until 4-6 mths, then upwards like in adults),
- Eyes:** Red reflex, pupils, corneal light reflex (if child old enough)
- Mouth & Throat:** cleft lip/palate, pharynx (easier if crying, try not to use tongue depressor)
- Nose:**
- Neck:** easily rotated from side to side so that chin touches each shoulder, nuchal rigidity, inspect for webbing, palpate for neck masses & lymphadenopathy

CVS

- HR** (use auscultation)
- Inspect** for cyanosis
- Palpate** precordium (PMI in xyphoid when less than <48 hrs)
- Auscultate** (diaphragm & bell, S3 & S4 common, murmurs common – most benign)
- Pulses:** femoral & brachial

RESPIRATORY

- RR:** observe 1-2 min (periods of apnea & periodic breathing are common) & pattern, effort of breathing & signs of distress (grunting, nasal flaring, retraction)
- Auscultation:** anterior & posterior chest

ABDOMINAL

- Inspection:** abdomen for bulging masses, umbilical cord stump, hernias, peristaltic waves
- Auscultation:** bowel sounds, bruits
- Palpation:** distension, tenderness, masses, liver, spleen, kidneys
- Anal patency

Normal for liver to be palpable 1-2 cm below RT costal margin

Spleen can commonly be palpated just below the LT costal margin, but should not be grossly enlarged

Kidneys frequently palpable

GENITALS

- Inspect:** ambiguity & diaper rash
- Male:** inspect penis, urethral meatus, scrotum, inguinal hernia, ensure both testes are descended
- Female:** vagina (rashes, discharge)
- Signs of sexual abuse

MSK

- Back for midline abnormalities (hair, pits, sacral dimples, scoliosis)
- Knee height** (flex knees & soles of feet flat on bed)
- Hips:** **Barlow** (back), **Ortolani** (outwards)
- Palpate **clavicles** to rule out fracture
- Extremities: all 4 extremities & 20 digits present?

NEUROLOGICAL

- Cry** (strong cry normal = normally functioning airways)
- Tone & strength**
- Primitive Reflexes:** (signals extinction)
 - Infant Lying Supine: Palmar grasp** (3-5mths), **Plantar grasp** (9- 12mths), **Rooting** (3-4mths) → Touch corner of mouth & infant turns head, **Babinski** (1 year)
 - Infant held in hands: Moro/startle** (3-5mths), **Placing & stepping** (2-5 months), **Landau** → infant prone in your hands & infant's head will extend above plane of trunk, legs extended. If you press head down, legs go into flexion; release head & legs extended; Appears @ 4-5 mths, **Parachute** → baby turned face down towards the mat & arms will extend like baby trying to catch himself. Appears 8-9 mths.
- Developmental milestones: 4 mths: no head lag when infant pulled into sitting position, 5 mths: reach & grasp objects, 7 mths: transfer objects hand to hand, 8 mths: sit w/out support, 8 mths: pincer grasp

SKIN

- Derm findings** (rashes, birthmarks/nevi, macules, vesicles, petechiae, milia (tiny white spots, bruises/lacerations, dryness, flaking, crusting)
- Color:** cyanosis, central & acrocyanosis, Pigmentation (Mongolian spots, nevi, café au lait spots, strawberry nevi/capillary hemangioma)
- Child Abuse** signs

Age (Months)	Gross Motor	Fine Motor	Language	Social/Personal
2	<ul style="list-style-type: none"> Lifts head to 45 degrees in prone 		<ul style="list-style-type: none"> Coos 	<ul style="list-style-type: none"> Responsive smile
4	<ul style="list-style-type: none"> Rolls front to back 	<ul style="list-style-type: none"> Hands to midline 	<ul style="list-style-type: none"> Laughs 	
5	<ul style="list-style-type: none"> Rolls back to front 			
7	<ul style="list-style-type: none"> Sits independently on hard surface 	<ul style="list-style-type: none"> Transfers objects hand to hand 		<ul style="list-style-type: none"> Distinguishes stranger from family
9	<ul style="list-style-type: none"> Transitions well in and out of sitting 	<ul style="list-style-type: none"> Lifts small object with scissor grasp 	<ul style="list-style-type: none"> Bisyllabic babbling (consonant-vowel-consonant) Responds to name and "no" 	
12	<ul style="list-style-type: none"> Pulls to stand and cruises, may take independent steps 	<ul style="list-style-type: none"> Neat pincer grasp 	<ul style="list-style-type: none"> One word plus "mama" or "dada" Follows simple command with gesture 	<ul style="list-style-type: none"> Shifts gaze to follow a point by another.
18	<ul style="list-style-type: none"> Walks independently 	<ul style="list-style-type: none"> Makes tower of 3-4 cubes 	<ul style="list-style-type: none"> 15-20 single words Points to 1-4 body parts 	<ul style="list-style-type: none"> Points to distant object to share enjoyment.
24	<ul style="list-style-type: none"> Jumps with both feet 	<ul style="list-style-type: none"> Imitates vertical stroke and circular scribble 	<ul style="list-style-type: none"> Vocabulary of 50 words with 2 word combinations Follows 2 step commands 	<ul style="list-style-type: none"> Puts on simple garments
36	<ul style="list-style-type: none"> Pedals a tricycle 	<ul style="list-style-type: none"> Copies circle 	<ul style="list-style-type: none"> Large vocabulary 3-5 word sentences Names many familiar objects or pictures 	<ul style="list-style-type: none"> Toileting accomplished

2, 4, 6 months – Hib/DTP and Pneumococcus

12 months – MMR, Menjugate C

15 months – Pneumococcus booster, Varicella (chicken pox)

18 months – Hib/DTP, MMR

4-6 years – DTP (do not give Hib)

Grade 7 (12 years) – Hepatitis B

Grade 8 (13 years, girls) - HPV

14 years – dTap booster

Every 10 years – Td booster

Yearly – Influenza (Between 6mths and 2 years, or a child with a chronic illness). Other healthy children, it is not recommended by the Ped Society.

Age Group	Respiratory Rate	Heart Rate Awake	Heart Rate Sleeping
Newborn (up to 30 days) 3-5 kg	30-50 <60	100-140	80-160
Infant (30 days to 6 mths) 6-7 kg	20-30 <40	100-140	75-160
Infant (6-12 mths) 8-9 kg	20-30 <40	100-140	91-110
12-18 months	20-30 <40	100-140	91-110
Toddler (2-3 yrs old)	20-30 <30	80-110	70-120
School age (4-5 yrs old)	20-30 <30	80-110	60-90
6-8 yrs old	18-26 <30	65-110	60-90
8-10 yrs old	18-26 <30	65-110	60-90
12-15 yrs old	18-26 <30	65-110	60-90
Adolescent (15+)	15-23	70-110	50-90

Psychiatric Interview & Mental Status Exam

Memory problems - Driving Hazards: Trail A (Numbers) & Trail B (Number & letters)

3 D's of positive psychotic symptoms: Dementia, delirium depression

Dementia: stealing delusions, Suspicious

Delirium: nightmare, frightening, bizarre delusions

Depression: nihilistic delusions (self does not exist), Auditory hallucination (insults/condemnation)

ID: Age, birth-place, date of birth, place of residence, marital status (*quick cognitive screen*)

HPI: Onset, Duration, Precipitants, Rx Response

Mental Status Exam

***ABC SEPT TIMS-J:** Appearance, Behaviour, Concentration, Speech, Emotion (affect & mood), Perception, Thought process, Through content, Insight, Memory, Suicide, Judgment

Observable

- **LOC:** alert, confused, oriented
- **Appearance:** gait, grooming, posture, emotion, expression
- **Behaviour:** grimace, agitation, tremors, tics
- **Speech:** quantity, rate, loudness, articulation, fluency, repetition
- **Cooperation:** irritable, aggressive, indifferent
- **Reliability**
- **Thought process:** logical, flight of ideas, rambling
- **Insight:** what brings you to the hospital? What do you think is wrong?
- **Judgment:** pt response to situations
- **Emotion:**
 - Affect: labile, blunted, flat, inappropriate

Specifically ask/test

- Mood: down, blue, low
- **Thought content:** delusions, obsessions, suicide, insight into illness, word finding, sense of time (*memory of past*), anxiety, feelings of depersonalization
- **Perception:** hallucinations
- **Orientation (MMSE)**
- **Memory (MMSE):** Remote (*birthdays, anniversaries, schools, history*) vs. recent (*weather, apts, meds*)
- **Cognitive functioning (MMSE)**
- Suicide/harm to others

Cognitive Functioning

- **Mini-Mental Status Exam:** Orientation, Registration, Attention & Calculation, Recall, Language
 - See following page
- **Clock-drawing:** comprehension, abstract thinking, planning, visual memory, frontal
 - "This is a clock face. Fill in the #s, and set the clock to 10 past 11" (*do not say "hands"*)
 - Four point scoring system: 0= intact, 1=mild impairment, 2=moderate, 3=severe
- **Frontal Lobe:** concentration, attention, verbal fluency, abstract ability, insight, judgment
 - **Word Fluency:** Phenomic prime (F): list as many words with letter F in 1 min (14+)
 - Semantic prime: name 4-legged animal in 1 min (14+)
 - **Perseveration:** Draw three intersecting circles, ask pt to copy it and continue the pattern
 - **Abstract ability:** what is similar about a bus & an airplane? Table & chair? Orange & apple? Sculpture & painting

PMHx:

- Development: trauma, losses, injuries (*head injury +/- LOC*)
- Adjustments to: school, relationships, retirement, change
- Substance Use: Alcohol, Caffeine, nicotine, OTC, illicit meds, pharm
- Previous illnesses & Treatment
- Past Psychiatric history:
 - Counseling
 - Suicide attempts
 - Violence
 - Previous diagnoses
 - Medications (past, current)/Tx

Social Hx

- Place of birth
- As a child: family structure, parent's occupations, rel'nship w parents/siblings/friends, abuse
- As a teen: friends, relationships, school, activities, sex, trouble, relationship with parents
- As an adult: work, finances, education, relationships, family, goals for future,
- ADLs (*physical, functional*)

FamHx

- Family psychiatric history: Dx, visits, counseling, suicide, substance use
- Dementia, Alzheimer's, Major depression, memory problems
- Age of onset

ROS: CNS, H&N, CVS, RESP, GI, GU, MSK, DERM

MMSE

Tell pt: "assign concentration & memory"

Mild cognitive impairment: 24-26

Moderate cognitive impairment: 10-20

Severe cognitive impairment: <10

Does not test frontal lobe or executive functions

[1] **ORIENTATION** (10)

- Day (1)
- Date (1)
- Month (1)
- Year (1)
- Season (1)
- Place (1)
- Floor (1)
- City (1)
- Country (1)
- State (1)

[2] **REGISTRATION** (3)

- Repeat 3 words: house, tree, car

[3] **ATTENTION & CALCULATION** (5)

- Spell world backwards

[4] **RECALL** (3)

- House, Tree, Car

[5] **LANGUAGE** (2)

- Name object: watch, pencil

[6] **REPETITION** (1)

- No ands, ifs, or buts

[7] **3-STAGE COMMAND** (3)

- Take this paper in your RT hand (1)
- Fold the paper in half (1)
- Place the paper on the floor (1)

[8] **READ** (1)

- Read the following and do what it says: "Close your eyes"

[9] **WRITING** (1)

- Write a full sentence with punctuation (must have verb & subject)

[10] **COPYING** (1)

- Copy intersecting pentagons. Must intersect, both must have 5 points

Psychiatric Assessment of the Depressed Patient - SIGECAPS

***Major depression:** 5 symptoms, **Minor depression:** 4 symptoms

***Melancholic:** severe depression, neurovegetative (no eating, sleeping, energy), circumstances have no effect

***Atypical depression:** increased sleep, increased eating, reactive mood (mood changes with circumstances)

***Catatonic:** rare, psychiatric emergency – cannot eat, drink, communicate

***3 groups of symptoms:** emotional, physical, cognitive

***Secondary depression:** depression caused by medical condition (physical symptoms of depression are hard to distinguish from medically related = focus on emotional/cognitive for diagnosis)

Neurovegetative symptoms moving in opposite directions (inc sleep, dec appetite) suggest medical illness

DIAGNOSIS:

- Depressed mood + 4/8 SIGECAPS or Anhedonia + 4/7 SIGECAPS for 2+ weeks
- Must have dysfunction/disability (work, school, interpersonal – different from premorbid function)
- Dysthymia: does not meet major depression diagnosis, symptomatic for >2 years

DEPRESSION

- Characterize every symptom in terms of: Duration, Frequency, Intensity
- Establish that symptom is distinctly different from premorbid
- Characterize “worst episode”

SIGECAPS

- **Depressed mood:** use words such as “sad”, “blue”, “low”, crying/tearful (uncontrollable)
- **Sleep:** oversleeping, undersleeping
- **Interest/Motivation:** desire, initiating, maintaining, completing, satisfying, anticipating
- **Guilt/Worthlessness**
- **Energy:** low energy=physical inability (not low interest)
- **Concentration/Indecisiveness:** reading book, watching movie making decisions
- **Appetite/Weight:** desire to eat, food selection, reduced/increased intake
- **Psychomotor agitation/retardation:** agitated/irritated, fidgety, slow thinking, slow movement
- **Suicide**
 - Have you ever attempted suicide in the past
 - Have you ever felt that life isn’t worth living?
 - Have you ever thought of harming yourself?
 - Do you think about death?
 - Have you thought about suicide?
 - How often?
 - Do you have a plan?
 - How compelling is the idea? Would you follow through?

PMHx

- Attempted suicide?
- Psychiatric illness?
- Counseling?
- Medications/Treatment responses in past
- Substance abuse

SOC: Life events: reactive/precipitating events

FamHx

- Psychiatric illness
- Suicide attempts
- Substance abuse

MENTAL STATUS EXAM

Psychiatric Assessment of the Bipolar Patient - DIGFAST

***Use clear, simple questions requiring short answers**

***Rapid-cycling bipolar:** rapid fluctuation in mood occurring daily/weekly (4+ episodes in 1 year)

***Depressive phase has higher risk of suicide (mania has lowest risk)**

DIAGNOSIS

- **Mania:** Euphoria + 3/7 DIGFAST or Irritable + 4/7 DIGFAST for 1+ weeks (or hospitalization)
- **Depression:** Depressed mood + 4/8 SIGECAPS or Anhedonia + 4/7 SIGECAPS for 2+ weeks
- Must have dysfunction/disability (work, school, interpersonal)

BIPOLAR:

***Mania is associated with dysfunction, hypomania is not**

- **Type 1:** Manic episode (with or without major depression)
- **Type 2:** hypomania + major depression
- **Cyclothymia:** hypomanic + subthreshold depression > 2 years
- Characterize episodes in terms of: quantity, duration, severity
- How long? How often? When was your last? How many? Sx between episodes?

DIGFAST

- **Distractibility:** unable to focus for extended duration of time
- **Insomnia:** decreased sleep, energy is high (versus depression where insomnia + low energy)
- **Grandiosity:** special abilities, inflated self-esteem
- **Flight of ideas:** racing thoughts, rapid progression of thought process
- **Activities:** inc. goal-directed functioning (inc: socializing, libido, productivity, projects) inc. creativity
- **Speech:** increased talkativeness/pressure speech
- **Thoughtlessness:** lack of judgment, impulsiveness, disinhibition, pleasure seeking, sexual indiscretions, reckless driving, spending sprees, sudden travel

SAFETY

- Suicide, thoughts of harming others, aggression, impulsiveness
- Substance abuse
- Driving

PSYCHOTIC SYMPTOMS

***Occur in 50% of manic episodes**

- **Hallucinations:** heightened awareness of environment can lead to hallucinations
- **Delusions:** Grandiose delusions (having special powers), paranoid delusions

PMHx

- Attempted suicide?
- Psychiatric illness? Counseling?
- Anxiety: bipolar disorder has higher rates of comorbid anxiety
- Medications (current & previous) /Treatment responses in past (Mania-exacerbated by steroid use)
- Substance abuse: bipolar has high comorbid substance use
 - Can precipitate/exacerbate mood swings (high rates of suicide, poor outcome)

SOC

***Identify how the following are affected by bipolar disorder**

- Marital status, living situation, employment, source of income, spending behaviour
- Recent travel

FAMHx

- Psychiatric illness, Suicide attempts
- Substance abuse

MENTAL STATUS EXAM

Psychiatric Assessment of the Psychotic Patient

**Diagnosis of Schizophrenia: 2 or more (delusions, hallucinations, disorganized speech, catatonia, negative symptoms) for 1 month + Dysfunction + signs for >6 months*

**Prodromal (social withdrawal, behaviour change), active ([+] & [-] Sx), residual ([-] Sx)*

**Will need to obtain collateral information (consent from pt, remember confidentiality)*

**Always do lab tests to rule out physical causes*

ENGAGEMENT

- Ask pt their understanding of the interview, their goals for the interview
- Explain interview process
- Ensure confidentiality
- What lead to the consult?
- Why now?

PSYCHOTIC SYMPTOMS

Positive:

- **Delusions:**
 - Others intent harm, controlled by outside forces, mind reading, special skills, things happen because of you, thoughts are broadcasted, thoughts being taken away, change of body
- **Hallucinations**
 - Auditory: hearing things (*inside/outside head*) - # of voices, running commentary (*play-by-play*), telling what to do
 - Visual: seeing things
 - Olfactory, Feeling

Negative:

- **Affect:** flatness
- **Amotivation/Apathy**
- **Alogia:** poverty of speech
- **Anhedonia:** lack of interest

PMHx

- Attempted suicide?
- Psychiatric illness? ADHD, neuro, pregnancy complications, developmental issues, childhood anxiety. Counseling?
- Medications (*Current, previous*)/Tx
- Substance use
- Legal history: pre/post morbid

SOC:

- Development, Abuse growing up
- Family style: nuclear, fragmented
- Education, jobs, income, living, unemployment
- Relationships, children
- Premorbid personality
- Social supports

FamHx

- Psychiatric illness
- Suicide attempts
- Substance abuse

MENTAL STATUS EXAM

Special Interviews

Addictions Interview (102)-----79

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Addictions Interview – CAGE WSIB SCS FDF

***Substance abuse:** maladaptive pattern of substance use – continued use despite social, legal problems, failure to fulfill obligations, being in hazardous situations (driving)

***Substance dependence:** maladaptive pattern of substance use leading to impairment & distress – includes tolerance. Withdrawal

**If patient is not willing to quit, make a goal to cut back*

***Harm reduction:** needle-exchange, methadone clinics

***Treatment:** disulphiram (nausea), naltrexone (opiate agonist)

CAGE:

*2/4 = risk for alcohol abuse

- **Cut back:** “Do you ever feel the need to cut back?”
- **Annoyed:** “Do you ever feel annoyed with other telling you to cut back?”
- **Guilt:** “Do you ever feel guilty about drinking?”
- **Eye-opener:** “Do you ever wake up wanting a drink?”

Other Things to ask about:

- WSIB
 - **Withdrawal:** what happens if you don't drink/get high? Do you get shaking, jittery, sweaty? Do you hallucinate? Have you had a seizure?
 - Is patient interested in withdrawal management?
 - **Safety:** Drinking and driving? Unprotected sex? Needle sharing? Family violence? Safety of children (*report child abuse*)
 - **Intoxication:** slurred speech, disinhibition, unsteady gait.
 - *Gone to work intoxicated? Driven intoxicated?*
 - **Binge:** large consumptions at one time (*men: 5+ drinks/occasion, female: 4+drinks/occasion*)
- SCS
 - **Social supports**
 - **Co-dependency:** Diagnosis of psychiatric illness? Have you seen a psychiatrist?
 - **Suicide**
- FDF
 - **Function:** interfering with relationships, work, obligations
 - **Depression/Anxiety**
 - **Family History**
- Quantity: # drinks/week -- Establishing problem drinking
 - **Males:** 14 drinks/week
 - **Females:** 9 drinks/week

Stages of Change

- [1] **Precontemplation:** not ready to change
 - [2] **Contemplation:** thinking about change
 - [3] **Preparation:** ready to change soon, preparing to change
 - [4] **Action:** In process of changing
 - [5] **Maintenance:** has been changed for a while
- Relapse:** occurs when patient uses again

Substance-Dependence criteria

WET TICK
Withdrawal
Excess use
Tolerance
Time spent acquiring, using, Recovering from use of drug
Interference with roles
Inability to **C**ut down
Continues use despite
Knowledge of Harm

Substance-Abuse Criteria

SLOP
Social
Legal
Obligations
Physically hazardous

Adolescent Interview – HEEEDSSS

HOME

- Who do you live with?
- What are relationships like at home? Who are you closest with? Who can you talk to at home?
- Any changes at home?
- Do you feel safe at home? Any physical violence? Ever felt like running away? (why?)

EDUCATION

- What's your favourite subject at school? How are your grades?
- Any recent changes? Have you changed schools?
- What are your future education/employment plans?
- Do you feel safe at school? Is there anyone you feel safe talking to?
- Problems at school? Suspended, trouble? Have you ever considered dropping out?
- Describe friendships at school

EMPLOYMENT

- Are you working? Where?

EATING

- How is your appetite? Diet?
- Have there been any recent weight changes? Are you happy with your body?
- Have you dieted before?
- How much exercise do you get each day?
- Do you worry about your weight? How often? Have you ever made yourself throw up? Have you taken diet pills? Have you ever not eaten to try and lose weight?
- Screen time?

ACTIVITIES

- What do you and your friends do for fun? Where? When?
- What do you and your family do for fun? Where? When?
- Sport? Music? Activities? Church?
- Hobbies? Reading? TV? Video games?

DRUGS

- Do any of your friends smoke? Drink alcohol? Do drugs?
- Do you smoke? Drink alcohol? Do drugs?
- If there are any problems in your family with alcohol or drugs?
- Do you drink or do drugs when you're alone
- Safety:
 - **C:** Have you ever been in a car driven by someone who'd been drinking/doing drugs?
 - **R:** Do you ever use alcohol or drugs to relax, fit in, feel better?
 - **A:** Do you ever use drugs/alcohol when you're alone
 - **F:** Do you forget things while drinking/doing drugs
 - **F:** Do your family or friends ever tell you to cut down
 - **T:** have you ever gotten into trouble while using drugs/alcohol

SAFETY

- Have you ever been serious injured? How?
- Do you wear a seatbelt? Safety equipment (helmets)?
- Have you ever ridden with a drunk/high driver?
- Violence at home? School? Work? Neighborhood? Have you ever not felt safe?
- Abuse (physical, sexual)?
- Have you ever been bullied?

SEX

- Have you ever been in a romantic relationship? Are you currently in a relationship?
- Have your relationships ever been sexual? Are you sexually active now?
- Are you interested in Boys? Girls? Or both?
- Have you ever been forced/pressured to do something sexual you didn't want to? Has anyone ever touched you inappropriately?
- Birth control? Condoms? STDs?

SUICIDE/DEPRESSION

- How have you been feeling lately?
- Do you feel sad/down more than usual?
- Are you bored all the time? Have you lost interest in your usual activities?
- Do you have trouble falling asleep?
- Have you thought about hurting yourself? Have you ever tried hurting yourself?
- Do you use drugs/alcohol to feel better?

Geriatric Interview – MAD DIVE CHAPS PAIN

**Address by last name*

**ROS is very important*

**May need to involve family, but ensure that pt would like family present (not being controlled by family)*

MMAD DIVE CHAPS PAIN

- **Memory:** 3 item recall
- **Medications:** polypharmacy (*underuse/overuse*), compliance, many drug reactions
- **ADLs**
 - Physical ADLs: bathing, dressing, toileting
 - Instrumental ADLs: shopping, cooking, housekeeping
 - Household safety: counsel about falls
- **Delirium:** MMSE
- **Depression:** screen for depression (*SIGECAPS*)
- **Immunizations:** influenza (*yearly over 50*), Pneumococcal (*every 5 years over 65*), Zoster (*over 60*)
- **Vision:** difficulty driving, watching television, reading
- **Exercise:** 30 min moderate 5X/week, Able to do work around house? Strenuous activities (*stairs, heavy lifting, fast walk*). Leg Mobility – Are you able to get up walk around easily
- **Cancer screening:** Colon (*every 10 years after 50*), Mammogram (*every 2 years 50-70*), Pap (*within 3 years of being sexually, every year, after 3 negatives can go every 2-3 years until 70+10 negatives*), PSA/rectal (*yearly after 50*)
- **Hearing**
- **Advanced directives:** Proxy, DNR
- **Palliative care plans**
- **Smoking & Alcohol:** CAGE, smoking cessation
- **Pain:** acute versus chronic (*usually MSK*): FIFE, OLDCARTS
- **Abuse:** elder abuse (*financial, physical, emotional*)
- **Incontinence**
- **Nutrition/Weight loss:** At risk for undernutrition (*vitamins B12, D, Ca²⁺*)

ROS

Cross Cultural Interview - BECI

BELIEFS/VALUES/EXPECTATIONS

EXPLANATORY MODEL (CAWT)

- Cause: "What causes this?"
- Alternative healers
- Works: "How does this work?"
- Treatment: "How is this treated?"

COMMUNITY/FAMILY INVOLVEMENT

INTERPRETER (WRAG)

- Word-for-word interpretation
- Relationship to patient
- Agenda of interpreter
- Goals/objections for the interview

Guidelines for Interpreters

- Address pt directly
- Sit face to face with pt (interpreter can sit in between)
- Use short sentences
- Do not use medical jargon
- Do not use metaphors

Aboriginal Culture

- Respect
- Non-interference
- Silence
- Lack of eye-contact
- Story telling

Boundary Issues

EMPATHY: "I can understand you must be really angry about that", "That sounds pretty frightening. I am glad you came in"

ACTIVE LISTENING

REFLECTION "What approaches have you tried to figure this out" "What do you think the pros and cons would be?" "Who else have you talked to about this?" "What supports are available to your from different choices?"

ACKNOWLEDGE the challenge: "You sound upset, tell me about it" "I have a sense that something is bothering you. Can you tell me about it?"

VALIDATE: "I can understand that you felt very frustrated by the long wait and answering the same Q's over and over. Our complex health care system can see very unsupportive when you are not feeling well"

SUMMARIZE: "You described many concerns. I hear about 2 different kinds of pain; one in your groin that is fairly new and one in your upper abdomen that you have had for months"

RE-DIRECT: "Let's just focus on the groin pain first. Can you tell me what it feels like?"

APOLOGIZE: "I am sorry to keep you waiting"

POLITELY INTERRUPT: "Mrs. M, I am sorry I am going to have to interrupt you, but we only have 15 minutes today, and I want to make sure I get your main concern addressed. Can you tell me about.."

PROBLEM SOLVE/CONSENSUAL AGENDA: "What do you hope to accomplish here today? This is what I hope to do during out visit"

SET A 2nd APPOINTMENT: "I know we have more to talk about. Can you come again next week? We will have a full hour then"

ONUS ON PT: "I want you to get the best care possible" "I appreciate your interest in me, but today I would just like to focus on you" "I'm really touched by through. But it is not necessary. I do this work because I care about your health, but this is well above what I can accept." "I need us to have a professional Dr-patient relationship, so that I can give you the best care possible"

CRYING PATIENT: pause, offer tissues, empathy, wait for pt to recover, supportive comment "I am glad you were able to express your feelings"

SET BOUNDARIES/LIMITS: "You are a very important pt. However, I do have other pts who also require care. So, in order to be fair to them, we can only talk for 15 minutes today" "I would like you to respect my needs, so that I can continue to be available to you" "I do want to help you w/ this, but I'm very busy, so I need you to wait for your scheduled visit. Come to visits w. a list of things that are most important to you" "I noticed the comment you just made, and I am trying to be as professional as I can with you, but the comment you just made was inappropriate"

TERMINATE: "I've tried everything I can to help you, but nothing seems to be working. What would you suggest we do to resolve the problem?" "I think I've done everything I can to help you, but you've chosen not to follow my suggestions. I can help you find another physicians, or I would be happy to see you again when you agree to follow the rules we discussed"

Breaking Bad News - SPIKES

SETTING

- In person
- Separate room/**privacy**
- Visitor: ask who they are/relationship
- Would pt like to continue with visitor present ("I assume you're happy to have me talk about your results/condition with your spouse present?")
- **"How are things today?"**

PERCEPTION

- **"What do you know about your condition?"**
- How close is pt's perception to reality (denial?)
- Assess pt's emotional state, educational level, articulation

INVITATION

- **"How much do you want to know about your condition?"**
 - Some pt's need denial to acclimatize or buffer distress
 - Usually more distress occurs by not discussing (75-97% of pts want to know)
- "If you change your mind or have any questions, ask me at anytime"
 - Must always explain/provide full info if tx will make significant different

KNOWLEDGE

- **Aligning:** reinforce what pt has said correctly
- **Educating:** bring pt perception close to medical facts
 - **Warning shot:** "Thing are more serious than you may understand them"
 - Info in small chunks
 - No med speak
 - Check reception, **"Does this make sense?"**
 - Clarification: **Get pt to repeat** general drift
 - **Repeated important point**
 - **Diagrams/**written msg: write down diagnosis, your name, websites
 - Pamphlets/brochures (make sure you read them first)
 - Tell pt. **"it's hard to remember all this"**
 - Adapt your communication level to pt's
 - Listen for pt's concerns
 - **Elicit pt's shopping list:** worries, concerns, questions (arrange in order of importance)

EMOTIONS & EMPATHY

STRATEGY & SUMMARY

- **Contract:** what will happen in future, tx, management – "We'll deal with each pblm as it arises"
- **Coping strategies, support systems** (friends, relatives, counselor)
- Summary
- **Closing:** Questions
 - "This is not the last time to discuss issues, **jot down any questions/concerns** and we'll discuss them next time"

Procedures

Glucometer (102-Lab4)-----89

Injections (102-Lab4)-----90

ECG (103-Lab3)-----93

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Peripheral Venous Access - IV/Venipuncture (104-Lab4)-----97

Splinting/Casting (105-Lab4)-----99

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NG Tube (108-Lab4)-----107

Arterial Blood Gases (109-Lab3)-----109

Lumbar Puncture (110-Lab2)-----113

Sutures (111-Lab3)-----117

Glucometer

PREPARATION

- **Consent/Explain procedure**
- **Indications:** to test blood sugar (*diabetic, hypoglycemic episode*)
- **Contraindications:** coagulopathy, infection at site
- **Risks/Complications:** infection, pain, bleeding
- **Equipment:** Test strips, bandaid, cotton swab, glucometer, lancet, test samples to calibrate

UNIVERSAL PRECAUTIONS

**Glucometer does not require a sterile field*

- Wash hands, Gloves, Protective Eyewear

PROCEDURE

- **Calibrate:** put test strip into glucometer with gray electrode side up. Wait until you see a flashing drop on the screen. Apply test solution (*squeeze a small drop onto wax paper, bring test strip to lightly touch test solution*)
 - Test samples: Low<3.5 ---- Normal: 3.5-6.5 ---- High>6.5
- **Test Blood:** wash hands thoroughly with soap & water, insert test strip, obtain blood sample with lancet, milk finger, bring tip of test strip to lightly touch drop of blood, wait for results, remove & dispose of test strip, discard lancet & test strips in sharps disposal

Plasma Glucose Levels (Venous samples)

Casual PG 11.1 mmol/L \geq diabetes

FPG < 5.6 mmol/L normal
 5.6 - 6.0 mmol/L at risk
 6.1 - 6.9 mmol/L impaired fasting glucose (IFG)
 \geq 7.0 mmol/L diabetes

75-g OGTT < 7.8 mmol/L normal
 7.8 - 11.0 mmol/L impaired glucose tolerance (IGT)
 \geq 11.1 mmol/L diabetes

FPG = Fasting Plasma Glucose

OGTT = oral glucose tolerance test

Prediabetes = IFG, or IGT, or IFG and IGT together

Injections

**ID: Tb tests, allergy tests ---- Very slow absorption rate (Tb test read 48-72 hours later), local effect (not systemic)*

**SC: allergy shots, heparin, insulin ---- Slower absorption (do not want fast absorption with insulin=can cause hypoglycemia)*

**IM: Immunizations, B12 ---- rapid absorption, rapid systemic effect*

**Ampules: single does of injectable meds in liquid form (flick head to move fluid into body, snap head using gauze)*

**Vials: can be multidose*

**Z-tracking: done for IM injections that can leak (iron). Pull skin to side before injecting, allow 10 second for medication to diffuse into muscle, remove needle, release skin. Exercise limbs afterwards to assist absorption*

PREPARATION

- **Consent/Explain procedure**
- **Indications:** not able to take oral meds, meds not absorbed orally, require onset of action, chemical restraint
- **Contraindications:** indications not met, allergy to med, clotting/anticoagulation issues, injection site has inflammation, rash, infection, wound
- **Risks/Complications:** nerve injury, too rapid drug response, pain, localized bleeding, tissue necrosis
- **Equipment:** Needle, syringe, medication, alcohol swabs/alcohol, gloves, cotton swabs & bandaid, sharps container
 - **IM:** 1.5' needle & 25G & 2-3 mL syringe
 - **SC:** 5/8' needle & 25G & 1-3 mL syringe
 - **ID:** 5/16' needle & 30 G & 1mL syringe

UNIVERSAL PRECAUTIONS

**Injections is not a sterile procedure*

- Washes hands prior to procedure, wears gloves, ensures no wounds/ concerns at site
- Do not recap needle, place sharps in sharps container

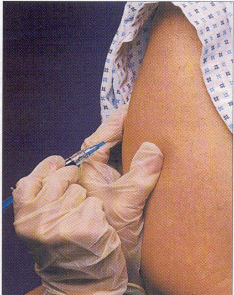


PROCEDURE

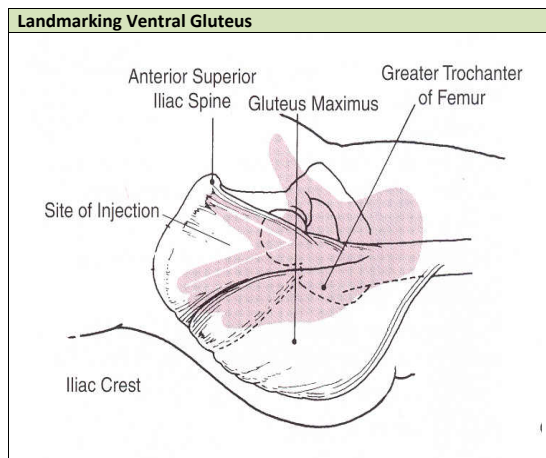
- Correct patient, medication
- Verify Expiry date
- Swab Vial with alcohol
- Choose correct gauge & length of needle
- Draw up appropriate amount of medication: Draw up equivalent amount of air to medication, push needle through vial (be sure not to touch the needle to the outer edges of the vial). Push air into vial, and draw up appropriate amount of medication
- Remove air bubble by tapping syringe, push up medication to remove air
- Site Selection & Preparation: no wounds/concerns at site, cleanse site w/ alcohol
- Landmark:
 - **Deltoid:** find acromion & go 2.5-5 cm below, grasp muscle before injecting, darting motion, 90 degrees, release muscle, aspirate back, no blood = OK to inject
 - **Vastus Lateralis:** Anterior lateral aspect of thigh, middle third (*infants, increased change of damage to femoral nerve after 7 months*)
 - **Lateral gluteal:** Heel of LF hand on RT trochanter. Thumb to groin. Index on ASIS. Middle finger towards iliac crest, spread finger to create V, inject V area
 - **Dorsogluteal:** Divide gluteus into quadrants, line from hip to crack & mid-buttocks. Upper outer quadrant (*chance of damaging sciatic nerve, or administering into fat instead of muscle in larger pts*)

OSCE Preparation Notes

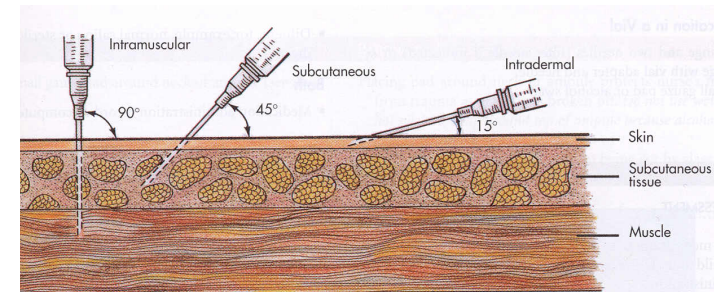
- Inject (90°/IM --- 45°/SC --- 15°/ID), pull back to ensure no in blood vessel, inject, withdraw needle. do not recap, place in sharps container
 - IM:** hold syringe like a dart, often the muscle is pinched (*though no indicated in resources*),
 - SC:** Hold as if doing IV if administering at 45° angle, or like holding a dart at 90° if pinching fatty SC skin and using a shorter needle. (stomach, back of arm, thigh)
 - ID:** between thumb and index, pull skin taunt, bevel up, inject slowly to create bleb about ¼" (*mosquito bite*). If done for allergy testing, mark the area of the wheal

Age	0-1 year	1-3 years	3 years – adult
IM Sites	Vastus lateralis	Vastus lateralis & Deltoid	Deltoid, Dorsogluteal, Ventrogluteal

Landmarking Deltoid	Landmarking Dorsogluteus	Landmarking Vastus Lateralis
		



OSCE Preparation Notes



INJECTIONS			
Ensures all materials in place before starting procedure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Demonstrates the ability to switch a pre-attached 21G x 1" needle to a 25G x 1.5" needle for performance of intramuscular injection	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Confirms correct solution/medication and verifies expiry date of solution/medication	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Swabs top of vial with alcohol	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chooses correct gauge and length of needle for procedure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Injects appropriate amount of air into vial and withdraws correct amount of solution/medication	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Safely removes air bubbles	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SKILL PERFORMANCE			
Identifies potential site for intramuscular, subcutaneous and intradermal injections	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Inspects site for intramuscular, subcutaneous and intradermal injections prior to injection (for wounds, bruising, tattoos, is aware of bleeding risks such as Coumadin, coagulation deficiencies)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Describes the steps in preparing the injection site	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lists the steps in the injection procedure in order	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Performs an intramuscular, subcutaneous and intradermal injection on an injection simulator	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
UNIVERSAL (STANDARD) PRECAUTIONS			
Washes hands prior to procedure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wears gloves	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ensures there are no wounds or concerns at site	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cleans site with alcohol (even soap and water if appropriate)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Does not recap needle	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Places sharps in appropriate container	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

ECG**PREPARATION**

- **Consent/Explain procedure**
- **Indications:** measuring electrical conductivity of heart – chest pain, shortness of breath, syncope, drug overdose, palpitations, unconscious patient, brady/tachycardia
- **Contraindications:** pt agitated/seizuring = wont have proper reading
- **Risks/Complications:** none
- **Equipments:** Alcohol swab, ECG Machine, 6 Chest Leads, 3 Limb Leads, 1 ground lead

UNIVERSAL PRECAUTIONS

*ECG does not require a sterile field

- Wash hands & cleanse electrode site if necessary

PROCEDURE

- Prepare pt: displace/remove hairy skin, clean skin with alcohol, allow to dry.
- Connect cabled to ECG machine
- **Electrodes:** 9 electrodes are placed on the body: 6 on the chest, 3 on the limbs
 - 6 Chest Lead: these divide the body in the transverse plane
 - Anterior=V1-V4, Lateral=V5, V6 (posterior is another type of ECG all together)
 - V1=4th RT intercostal space, V2=4th LT intercostal space, V4=LT 5th intercostal space, mid-clavicular line, V3=between V2 & V4. V5=horizontal to V4 anterior axillary line, V6=horizontal to V5, mid-axillary line
 - Recall: sternal angle related to 2nd rib
 - Standard Limb leads: Right arm, left arm left leg, Right leg ground lead
- Input patient data: Press **F1-ID** (Auto 12), Enter pt data, use **F2** to scroll to next line, Select **F6-DONE** to enter
- Wait until tracing is free from artifact.
- Request pt to lie still, relax, breath slowly
- Select **Rhythm** to start to print.

INTERPRETATION – RRAHI

*The classic diagram is Lead I & II

*Lead II is the rhythm strip

*aVR can be put upside down and look through back of page=opposite of

- **Rate (Lead II):** Count the number of large squares between 2 R peaks - 300, 150, 100, 75, 60, 50 (300/# or large squares)
 - Normal rate: 60-100
- **Rhythm (Lead II)**
 - Check P before every QRS: is the rhythm sinus generated
 - Length of PR interval? (Normal = less than 5 small squares or less than 0.2 sec)
 - Length of QRS (Normal = less than 3 small squares or less than 0.12 secs)
 - Biphasic QRS in V₁ (RT) or V₆ (LT) = bundle branch block
- **Axis (Lead I & aVF)**
 - QRS upright in leads I & aVF = Normal
 - Negative QRS in Lead I & Positive QRS in Lead aVF = RT axis deviation
 - Positive QRS in Lead I & Negative QRS in lead aVF = LT axis deviation
 - Thumb Analogy: Lead I (Left thumb), aVF (right thumb) = deviation is the thumb still up (Both positive = normal)

• **Hypertrophy**

- **Atrial (Lead V₁):** Biphasic = Right atrial hypertrophy
- **LT ventricular: (V₁, V₂, V₅, V₆):** S wave high (V₁ or V₂) + R wave height (V₅ or V₆)
 - Greater than 35mm = Left ventricular hypertrophy

• **Infarction/Injury/Ischemia:**

- Necrosis: Q wave > 1mm
- Infarction: ST elevation (II, III, aVF = inferior, V1-V4=anterior, aVL, V5, V6=Lateral)
- Ischemia: ST segment depression (V2, V3)
- Fibrosis: T-wave inversion

Note: 1 big square or 5 small squares = 0.20 second
1 small square = 0.04 second

Lead II	Atrial Fibrillation	
	Atrial Flutter (sawtooth)	
	Supraventricular Tachycardia	
	Ventricular Tachycardia	
	Ventricular Flutter	
	Ventricular Fibrillation	
	Torsades des pointes	
Lead II, III, aVF	Typical MI evolution	

ECG			
Describes the ideal patient environment to perform this test and identify factors that may affect the ECG tracing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ensures the correct settings on the electrocardiogram machine and input of identifying data	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SKILL PERFORMANCE			
Demonstrates the correct placement of leads when using the ECG machine	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Demonstrates the correct use of an electrocardiogram machine by producing a suitable/valid tracing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Assess the quality of the ECG tracing for correct paper speed, correct downward P wave in lead V1 and correct height of QRS complex	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Spirometry

*FVC (Forced Vital Capacity): The total amount of air you can blow out after full inspiration

*FEV1: The amount of air you can blow out in 1 second²

PREPARATION

- **Consent/Explain procedure**
- **Indications:** history, physical exam or lab findings of pulmonary disease, assess severity or progression of disease, evaluate surgical pts, evaluate disability or impairment, asthma diagnosis, COPD diagnosis
- **Contraindications:** nausea, vomiting, vertigo, hemoptysis of unknown origin, pneumothorax, recent abdominal or thoracic surgery, recent eye surgery, recent MI or unstable angina, thoracic aneurysm, unstable respiratory status, unable to follow directions, increased ocular pressure
- **Risks/Complications**
- Equipment: Spirometry machine, mouthpiece, filter, noseplug

UNIVERSAL PRECAUTIONS

*Spirometry is not a sterile procedure

- Make sure there is a new mouth piece for each patient

PROCEDURE

*Patient should not take puffer before coming for the test

- Measure pt height & weight
- Turn spirometer ON
- Calibrate: connect calibration syringe to sensor, extend knob, press CAL button, enter ambient temperature. Press START. Pump syringe two times. Press STOP. Enter Syringe volume (6 Litres). Press ENTER. Press PRINT
- Press PATIENT DATA button and enter pt information. ENTER. When finished press MENU
- Have Pt Standing
- Explain to pt: need to have a good seal, breathe in as much as you can, breath out as much as you can
- Perform Pulmonary Function Tests
 - **FVC (Forced Vital Capacity):** Press FVC button, pt wears nose plug, press START, wait 1 sec, pt to **inhale maximally** & pause, ensure pt has good seal around mouthpiece, pt exhales explosively & continues to **exhale hard for as long as possible**, press STOP, repeat 2x - pressing START each time, press PRINT
 - **SVC (Slow Vital Capacity):** Press SVC function key, pt wears nose plug, press START, wait 1 sec, pt to insert mouthpiece after a normal exhalation (*ensuring a good seal*), pt to **breathe normally 3x**, and after 3rd exhalation, **inhale maximally** to total lung capacity, pause, and then **exhale maximally**, press STOP, repeat 2x beginning - pressing start each time, press PRINT
 - Need to have a filter on mouth piece because pt is breathing in through mouthpiece
 - **MV (Minute Ventilation):** press MV, pt wears nose plug, press START, wait 1 sec, pt inserts mouthpiece **and breathe normally for 60 seconds**, press STOP, press PRINT
 - Need to have a filter on mouth piece because pt is breathing in through mouthpiece

INTERPRETATION

- FEV (Forced expiratory volume): the amount of air expired in 1 second
- FEV1/FVC = 75÷8-%
- Increased ratio = restrictive airway disease (*air cannot get in bc lungs cannot expand = fibrosis*)
- Decreased ratio = obstructive airway disease (*air cannot escape = COPD*)

LABORATORY ACTIVITY: PREPARATION OF MATERIALS			
Ensures all materials in place before starting procedure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SKILL PERFORMANCE			
Enters patient data into the spirometer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Performs an FVC test	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Performs an SVC test	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Performs an MV test	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
UNIVERSAL (STANDARD) PRECAUTIONS			
Identifies the application of universal precautions in the performance of any pulmonary function test	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Peripheral Venous Access: Venipuncture

PREPARATION

- **Consent/Explain procedure**
- **Indications:** diagnostic tests (*CBC, electrolytes, liver function tests, renal function/BUN/Creatinine, INR/PTT, Tox screen*), microbiological tests (*differentiate bacterial & viral infections, cultures, determine sepsis*)
- **Contraindications:** infection, phlebitis, AV fistula, lymphadema (*post mastectomy*), scarring, distal to a previous site, coagulopathy
- **Risks/Complications:** bruising/hematoma, bleeding & delayed clot formation, arterial puncture, cellulitis, anemia, lab test error
- **Equipment:** eyewear, gloves, blood collection tubes, tourniquet, iodine & alcohol swabs, gauze, vacutainer holder, vacutainer needle, tape.
 - Put vacutainer needle inside vacutainer holder

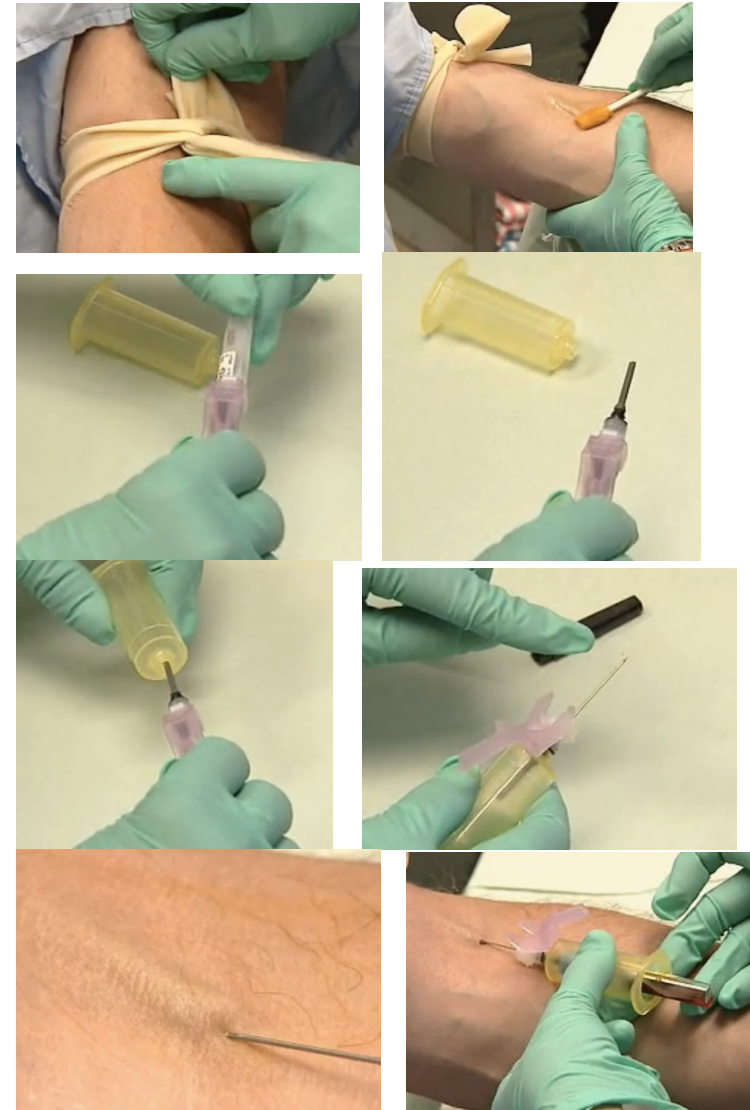
UNIVERSAL PRECAUTION

**Venipuncture does not require a sterile field, but you want pts skin to remain sterile*

- Eyewear, wash hands, gloves
- Dispose of sharps in sharps container & blood contaminants in biohazard bag

PROCEDURE

- Equipment ready, universal precautions
- Prepare needle by taking the white part off & screwing it into the vacutainer.
- Make sure tubes are labeled
- Put the tourniquet proximal to vein (*upper arm*), Find good vein (*antecubital easiest/best*)
- Stimulate skin to make vein engorge (*tap it*)
- Cleanse with alcohol
- Take needle & vacutainer unit with tube & advance needle into vein
- Once in vein, push vacuum tube into the cylinder over inner needle & blood draws into tube
- Remove tube, rotate in hand to mix blood with contents, Add another tube. Continue until all tubes are filled. *Remove tourniquet with last vial*
- Remove needle & vacutainer unit from vein & apply pressure over vein
- Apply bandage & ask pt to apply pressure
- Dispose of sharps & wash hands



Peripheral Access: IV

**IVs go into the veins that are best seen: antecubital, cephalic (lateral volar forearm), basilic (medial volar forearm), dorsum of hand (metacarpal veins)*

**Medications: 20G-22G needle*

**Volume resuscitation: 18G-16G*

**Trauma/Burn/Hemorrhage: 14G (Bore)*

PREPARATION

- **Consent/Explain procedure**
- **Indications:** Give fluids (*maintenance, volume replacement*), transfusion, medications, access for unexpected emergencies
- **Contraindications:** infection, phlebitis, AV fistula, lymphadema, scarring, distal to a previous site
- **Risks/Complications:** hematoma, cellulitis, phlebitis, infection/sepsis, vessel spasm, scarring, arterial puncture, interstitial IV's, extravasation (*soft tissue ulceration due to IV catheter being in interstitium instead of vein and administering potent drug*), fluid overload, electrolyte imbalance, Paradoxical air embolus, anemia
- **Equipment:** eyewear, gloves, IV solution/bag & IV tubing (*to connect to catheter when it's in place*), tourniquet, iodine swab, alcohol swab, gauze, Jelco peripheral IV catheter, see through dressing, tape

UNIVERSAL PRECAUTIONS

**Venipuncture does not require a sterile field, but you want pts skin to remain sterile*

- Eyewear, wash hands, gloves
- Dispose of sharps in sharps container & blood contaminants in biohazard bag

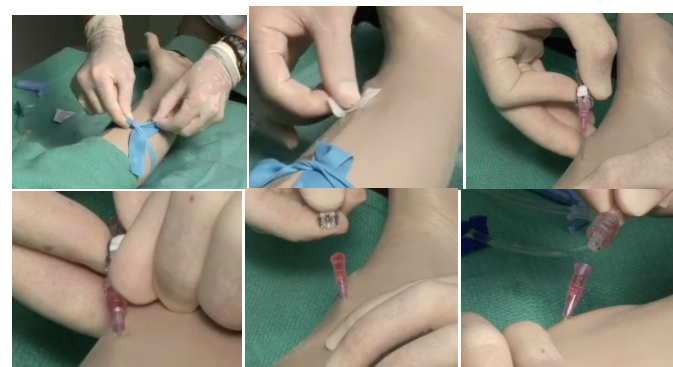
PROCEDURE

- Equipment ready, universal precautions
- Flush the saline lock: obtain 3ml saline from saline vial with needle, flush saline (holding upright) until saline dribble over, set aside
- Tourniquet on proximal to vein, look for good vein → **Site Selection:** 1) Most prominent vein (*1st choice: forearm, 2nd choice: dorsum of hand, 3rd choice: antecubital*)
 - Remember if you blow a vein; always try again on a more proximal one.
- Stimulate skin to make veins engorge (*tap*)
- Cleanse with alcohol swab
- Take IV in one hand, bevel up, 15 degrees from parallel to skin surface, stabilize vein, puncture skin & advance needle/catheter unit into vein until see flash back, reduce angle and advance 3-5 mm more (*to be sure the plastic catheter in vein also*)
- Now advance plastic catheter only, all the way
- Remove tourniquet
- W/ other hand press vein proximal to the catheter tip (*to prevent back bleeding when removing central needle*)
- Push button & needle recoils in safety case
- Connect IV tubing & ensure flows well or IV saline lock cap
 - If putting saline lock on, flush the 3ml in the syringe into the IV, remove needle
- Clean Pt. Secure with tape & Tegaderm
- Dispose of sharps & wash hands

IV Solutions

- Crystalloid: water and solutes (*quickly moves into intravascular space within an hour*)
 - Isotonic: Normal Saline, Ringers lactate (*for resuscitation, volume replacement, third space losses [ascities, inflamed organ], rehydration*)
 - Trauma: give 3 liters per minutes of warmed solutes (*blood, colloid, crystalloid*)
 - Hypotonic (*maintenance*): 50% Normal Saline, D5 (*for pts that can't take oral fluids*)
 - **Child:** 4+2+1 rule: first 10kg = 4cc per kg per hr, second 10kg = 2cc per kg per hour, every additional 10 kg = 1 cc per kg per hour
 - **Small adult:** 100-125 cc/hr
 - **Large adult:** 125-150cc/hr
- Colloid: Pentastarch & albumin (*large molecules maintain fluid within vascular space*)

LABORATORY ACTIVITY: PREPARATION OF MATERIALS			
Lists equipment and supplies needed for routine venipuncture	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Describes preliminary procedures in the venipuncture collection	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SKILL PERFORMANCE			
Identifies potential sites for venipuncture collection	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Inspects site prior to venipuncture collection	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Describes the steps in preparing the venipuncture site	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lists the steps in the venipuncture procedure in order	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Performs a venipuncture on a venipuncture simulator	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
UNIVERSAL (STANDARD) PRECAUTIONS			
Washes hands prior to procedure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wears gloves	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Does not recap needle	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Places sharps in appropriate container	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



Splinting/Casting

*Closed #: skin intact

*Open #: bone has pierced skin

*Sprain: damage to ligament

*Wrist#: Volar Splint (Colles fracture)

*Scaphoid Fracture: Thumb Spica Cast (at risk for avascular necrosis)

*Distal Fibula: Lower Leg Back Slab (usually due to inversion roll)

PREPARATION

- **Consent/Explain procedure**
- **Indications:** fractures, dislocations, sprains, tendon injuries, soft tissue infections/injuries, chronic injuries to prevent contractures, post surgical, congenital disorders, pain control, control blood loss, protect alignment, limit movement, protect neurovascular structures, protect area from further injury, allows pt mobilization
- **Contraindications:**
- **Risks/Complications:** thermal injury, pressure sores, dermatitis/infection, DVT, inappropriate position, delayed union/ non-union, muscle atrophy, reduction joint mobility, OA, compartment syndrome, reflex sympathetic dystrophy, avascular necrosis, complex regional pain syndrome
- **Equipment:** stockinette, padding (webroll), cast material (plaster or fiberglass) or splint material
 - Plaster of Paris: water at room temperature (too hot and it will dry to fast)

UNIVERSAL PRECAUTIONS

*Splinting/Casting is not a sterile procedure

- Gloves
- Protective Eyewear

GENERAL PROCEDURE

- **Physical Exam:** Inspection (type of fracture, superficial wounds, debris), Palpation (distal pulses, capillary refill, feeling, assessing pain)
- **MSK exam:** ROM, wiggling fingers/toes
- **Neurovascular exam**
- **Immobilize pt, position limb**
- **Apply stockinette:** measure length of stockinette need (should extend 3-4cm beyond area to be casted), cut hole for thumb is applicable (use your own palm length as a guide)
- **Roll padding over stockinette;** begin distally, overlapping by 50%. Webroll can be torn to better contour the base of the thumb. Poke a hole in the centre of the webroll and put over thumb
- **Find and hold the free end of the plaster.** Soak plaster in room temperature water. Squeeze roll to remove excess water.
- **Roll plaster over padding.** It can be smoothed out with the flat palmer surface of the hand. (no pumps=pressure sores). Begin distally. When moving around thumb, pinch plaster.
- **Fold stockinette and padding over first layer of plaster to create smooth cast edge.** Continue applying plaster
- **Mold with hands**
- **Removing cast:** wear ear protection, ear plugs. Using oscillating cast saw

VOLAR SPLINT/SLAB

Wrist fracture

Position Patient

- Seated, elbow on a table, wrist elevated
- Slight wrist extension
- Hand in position of "holding a pop can"

**Roll on webroll**

- Start distal at the wrist
- Place on the skin, do not pull
- Unroll with the 'free' end against the skin, under the webroll
- Overlap each layer by 50% the webroll's width
- Tear edge of webroll to fit tidily around thumb (or poke a hole)
- Extra padding at bony prominences and areas of swelling
- Roll should extend from distal palmar crease to antecubital fossa

Plaster

- Dip plaster in water
- Squeeze out excess water from plaster and smooth the sheets
- Use accordion technique (fold roll into slab to be placed on pt's forearm)
- Apply plaster slab to injured limb
- From elbow crease (distal to radial head) to proximal MCP crease (patient should be able to flex elbow unencumbered)
- Ensure plaster does not extend beyond padding
- Mold to hand and forearm
- Use palms, not fingers, to avoid pressure points
- Verify proper positioning of limb/joints

Roll on gauze

- Placing, not pulling
- Cover all plaster to avoid sharp edges
- Tape the end of the gauze
- Allow plaster to dry and harden
- Roughly ten minutes to be dry to the touch and sufficiently solid
- Can take 48 hours for plaster to dry fully

Elastic bandage (optional)

- Roll on, distal-to-proximal, and secure with clips provided
- Sling (optional)

THUMB SPICE CAST

Scaphoid fracture

Position Pt: holding can of pop, MCPs & elbow joint free

Apply stockinette

Webroll: wrap around wrist, around thumb twice, partially tearing padding to lie flat, 2 wraps around hand, continue wrapping proximally to 2 finger widths below the antecubital fossa, fold down ends leaving MCP's free.

Plaster roll: Start at wrist, 2 wraps around thumb, several more wraps around base of hand, ensure wrist is in neutral position. Extend cast proximally to the elbow & then return distally

Mold: Pt make OK sign (thumb touches index finger) & mold in that position. Ensure thumb in line w/ radius & MCP & elbow joint free to move.

**LOWER LEG BACK SLAB**

Distal fibular fracture

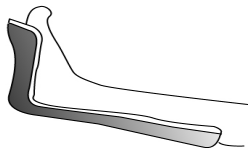
Position: pt lie prone on table with foot of injured leg over edge of table. Place the ankle at 90°, and hold in this position

Stockinette applied (*slightly longer than final cast will be*)

Cotton wool is rolled around foot & then ankle making a figure 8 & then rolled up towards knee (*overlap 50%*). Additional cotton wool padding applied on heel & malleoli

Plaster Slab: Cut a slab that extends from below the toes to below the head of the fibula. Wet slab & ring out water like accordion. 1st slab applied from posterior side starting closest to knee & then moving towards ankle & foot. 2nd slab applied from lateral side, from the side of the knee, over the foot & around the ankle. 3rd lateral slab on other side. To accommodate swelling, the lateral slabs should not meet on the anterior side. The ends of stockinette are folded over the cast to create a smooth edge.

Elastic Band: Can wrap cotton around before applying elastic band. slabs secured in place by winding a crepe bandage around them in the same manner as the cotton wool. Press down on metatarsals to ensure foot is plantargrade until plaster begins to set



Cast Care Instructions: elevate/ice, wiggle, examine daily, do not get wet, do not cover, do not lean on hard surface, do not stick anything in cast

Warning Signs: change in color (blue/white), cold/numbness//tingling, swelling (not relieved by elevation), sores on skin at edge of split/cast, pain, bad smell, fluid leakage, splint/cast falling apart



SPLINTING & CASTING			
Ensures all materials in place before starting procedure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Identifies anatomical landmarks for three types of fractures: forearm, tibia, fibula and wrist	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Identifies the risks for correct application/sizing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Prepares plaster for casting or splinting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SKILL PERFORMANCE			
Positions the appropriate extremity in the correct angle in order to apply the cast or splint	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Applies an arm splint: <ul style="list-style-type: none"> - applies sock - wraps joint with appropriate tightness to length of sock - applies splint material - holds the splint and the limb in the appropriate position, ensuring the splint is not compromised 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Applies a lower leg splint: <ul style="list-style-type: none"> - applies sock - wraps joint with appropriate tightness to length of sock - applies splint material - holds the splint and the limb in the appropriate position, ensuring the splint is not compromised 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Applies a thumb spica cast: <ul style="list-style-type: none"> - applies sock - wraps joint with appropriate tightness to length of sock - applies casting material - holds the cast and the limb in the appropriate position, ensuring the cast is not compromised 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Examines the patient at the end of the casting or splinting procedure to ensure safe cast or splint application	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Explains safe patient movement once a cast or splint is in place	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Reviews concerns and cast/splint care with patient	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Discusses the signs and symptoms of possible neurological or vascular compromise with the patient	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Completes an examination for neurological and vascular compromise	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Removes a thumb spica cast using the reciprocating saw	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
UNIVERSAL (STANDARD) PRECAUTIONS			
Identifies the application of universal precautions in the case of closed fractures	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Catheterization

**The smaller the number, the small the size*

**Pediatric patients: 5, 6, 8, 10 French*

**Male Adults: 16-18 French*

**Female Adults: 14-16 French*

PREPARATION

- **Consent/Explain procedure**
- **Indications:** immobility, unconscious, upcoming surgery, measurement of fluids in-out, male urethral stricture, bladder atony, obtain sterile specimen, treat urinary retention, bladder outlet obstruction, decompress the bladder, obtain specimen
- **Contraindications:** tumor causing difficult catheterization, stricture causing false urethral passage/bleeding, pelvic fracture in M, urethral injuries/tear
- **Risks/Complications:** Trauma, demented pts who remove, infection/bacterial colonization/bacteruria (*usually occurs within 48-72 hours even with sterile technique*), stone formation, stricture in M, urethral tear in M & F, retained catheter, paraphimosis, bladder spasm
- **Equipment:** Catheter Kit: Foley catheter (16-18 French) sterile gloves/drape, cleansing solution, cotton swabs, forceps, sterile water (10 cc), syringe (10 cc), lubricant, collection bag & tubing

UNIVERSAL PRECAUTIONS

**Catheterization is a sterile procedure*

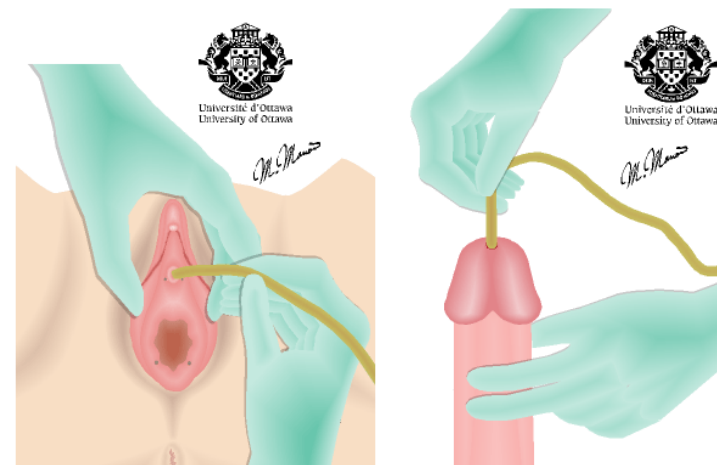
- Maintain sterile field
- Gloves
- Eye Protection
- Gown

PROCEDURE

**Make sure to always pull foreskin back*

- Pt supine, legs spread, feet together
- Put Protective eyewear on
- Open cath kit using sterile technique (*the initial opening is always away for you, last flap towards you*)
- Using forceps, remove sterile gloves, remove all the equipment and place on sterile field.
- Pour iodine into container (for models use the one not in the cath kit, otherwise this can be done after putting on sterile gloves)
- Open the Foley catheter and place on the sterile field
- Discard forceps
- Apply Sterile Gloves
- Remove Foley catheter from sterile sheath, Check balloon patency: draw up 10cc sterile water into syringe, attach syringe to Foley Catheter, inflate balloon, deflate balloon. Remove syringe, and put on sterile field. Lubricate tip of catheter.
- Prepare sterile field: Place a sterile drape between pt's legs (*shiny side down*), place the fenestrate (*drape with hole*) over the vagina/penis
- Non-dominant hand: separate labia/hold penis. Maintain this hand for entire procedure (*this hand is no longer sterile*)
 - Lift penis perpendicular to pt's body
- Dominant hand: use forceps and grasp cotton dipped in iodine to clean peri-urethral mucosa, anterior to posterior, inner to outer, one swipe per swab (*3X, one swipe from front to back*)
- Place the drainage basin with the end of the catheter between pt's thighs

- Pick up catheter with dominant hand with end coiled in basin, identify urinary meatus & insert 1-2 inches further then where urine is noted
- Inflate balloon (10 cc sterile water), connect catheter to drainage system. Gently pull back on catheter to ensure balloon engaged bladder neck.
- Secure cath to inner thigh. Drainage bag placed below bladder level
- Clean patient, discard of equipment
- Evaluate cath function/ amount. Color/ odor & quality of urine
- Remove gloves, dispose of equipment. wash hands
- Document size of cath used, amount of water in balloon, pt's response & urine assessment





CATHETERIZATION			
Lists equipment and supplies needed for the male and female catheterization procedure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Describes preparatory steps involved for the male and female catheterization procedure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SKILL PERFORMANCE			
Identifies anatomical landmarks on the male and female catheterization simulators	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Performs appropriate draping of the patient	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Describes the steps in the male and female catheterization procedures in order	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Performs catheterization of male and female simulator	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Maintains sterile technique throughout the procedure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Demonstrates what to do if equipment becomes unsterile during completion of procedure (e.g. dropped on floor, gloved hand touches non-draped, unclean area)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
UNIVERSAL (STANDARD) PRECAUTIONS			
Applies Universal (Standard) Precautions for the male and female catheterization procedures: - cleanses site - drapes site - sets up tray - uses gloves - maintains sterile field while inserting and collecting specimen - demonstrates technique for re-acquiring sterile field after breaking same (dropping something not in sterile field) - disposes of equipment and excess urine appropriately	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

NG Tube

*Bowel obstruction/Gastric lavage: #18 French(larger)

*Feeding Purposes: #14 French (smaller)

*Monitor: electrolytes, BUN, Creatinine

PREPARATION

- **Consent/ explain procedure**
- **Indications** : gain access to stomach, drain gastric contents, diagnosis of active GI bleed, decompress distended stomach, obtain gastric specimen, introduce GI passage, treat gastric immobility (*paralytic ileus*), bowel obstruction, drainage/lavage in drug overdose/poisoning, prevention of vomiting/aspiration, assessment of GI bleed in trauma pts, enteral feeding, administering medication
- **Contraindications** : severe facial trauma (*cribriform plate disruption/possibility of inserting tube intracranially*), signs of portal hypertension (*esophageal varices*), suspected C-spine injury, penetrating neck wound
- **Risks/complications** : aspiration, aspiration pneumonia, tissue trauma, gagging/vomiting, respiratory problem (*accidental insertion in bronchus*), stenosis of esophagus (*long-term NG tube*), fluid electrolyte imbalance (*if gastric contents are removed*), necrosis of nostril cartilage (*pressure from wrongly tapes NG tube*), poor oral hygiene
- **Equipment**: protective equipment, NG tube, catheter tip irrigation 60 mL syringe, lubricant with 2% Xylocaine jelly, adhesive tape, suction device or drainage bag, stethoscope, cup of water, emesis basin, pH indicator strips, kidney basin, gloves, gown, ice in basin

UNIVERSAL PRECAUTIONS

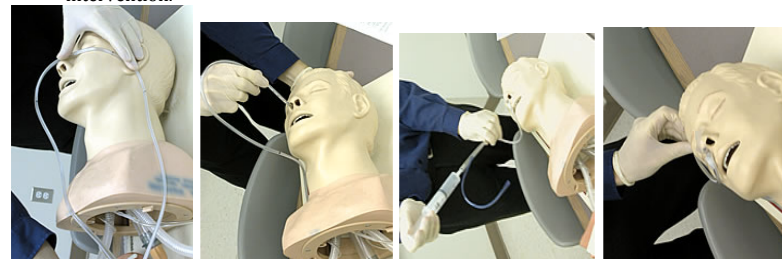
*NG Tube is not a sterile procedure

- Wash hands
- Gloves, face & eye protection, gown

PROCEDURE

- Prepare equipment, cut tape
- Wash hands, put on non-sterile gloves, eye-protection
- Partially pre-freeze the tube in ice while getting ready
- Pt sitting upright (*optimal neck/stomach alignment*)
- Examine nostrils for deformity/obstruction to determine best insertion site
- Measure tubing (*bridge of nose/earlobe/ half way btw sternum & navel*), mark this length on tube (*usually between 2-3 last black bars*)
- Lubricate 2-4 inches of tube, squirt of xylocaine jelly in nostril, spray of xylocaine in back of throat
- Lightly tilt back pts head, Pass tube via nares posteriorly, into the oropharynx. Stop. Allow pt to have head slightly flexed. Hand patient water with straw.
- Ask pt to swallow, and advance tube past pharynx, into esophagus, then into stomach. Continue advancing tube until mark is reached. Need to push relatively fast, stop if you meet resistance
- Withdraw tube if changes occur in resp. status, tube coils in pt's mouth, pt begins to cough/turns blue
- Check for placement: attach syringe to free end of tube & aspirate & test pH to ensure acidic gastric contents (*should be below 4-5*). Obtain x-ray to verify placement before instilling any medications/ feedings
 - "Old School": inject air into tube and listen with stethoscope for pop

- Secure tube with tape: cut piece of tape up the middle until half-way. Put the thick uncut part on the nose, put one smaller cut piece on tube, the other cut piece wrap around the tube (*make sure not have tube pulling up against nasal cartilage=atrophy*). Tape NG tube to pt's shirt.
- If for suction, remove syringe from free end of tube; connect to suction; set machine on type of suction and pressure as prescribed
- Mark the NG tube at the naris to identify if it moves
- Document reason for NG tube, type & size of tube, nature & amount of aspirate, type of suction & pressure setting if for suction, nature and amount of drainage & effectiveness of the intervention.

**LABORATORY ACTIVITY:
PREPARATION OF MATERIALS**

Lists equipment and supplies needed for the nasogastric tube insertion and placement	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Describes preparatory steps involved for the nasogastric tube insertion and placement	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

SKILL PERFORMANCE

Identifies basic anatomy required for correct nasogastric tube placement	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Describes the sizing associated with nasogastric tubing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Performs appropriate draping of the patient	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Describes the steps involved for the nasogastric tube insertion and placement	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Check both nares to see if there is any anatomical abnormality	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ensure that there are no risk factors contraindicating NG placement	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Measure distance from nare to stomach	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Place nasogastric tube in ice	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Coat tip of tube with xylocaine viscous jelly	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Have syringe, stethoscope and water glass with straw prepared	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Insert nasogastric tube into nare gently up to marking from measurement- having patient drink water at same time (pay attention to respiratory status during this procedure)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Reassess respiratory status	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Aspirate with syringe for stomach contents	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Insert air into stomach and listen with stethoscope	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Secure tube making sure that tape is not pulling on tube to put pressure on nose and cause permanent damage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

UNIVERSAL (STANDARD) PRECAUTIONS

Applies Universal (Standard) Precautions for the nasogastric tube insertion procedure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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Arterial Blood Gases

**Done in acute care for pts with respiratory disease at risk for inadequate lung ventilation and tissue oxygenation*

**Done in pts with metabolic diseases, drug overdoses, and those at risk for acid-base abnormalities*

PREPARATION

- **Consent/ explain procédure**
- **Indications :** Assess respiratory or metabolic disturbances (*information on lung ventilation-PCO₂, & tissue oxygenation-PO₂*), decreased LOC, shock/sepsis, intoxication, Resp distress/failure, hypoxemia, carboxyhemoglobin (CO), methemoglobin (1-2%)
- **Contraindications :** No absolute, Relative = coagulopathy, poor collateral flow (*Allen's test*), absence of pulse, infection/wound at site,
- **Risks/complications:** local pain, hematoma/bleeding, vasovagal episode,
RARE: radial artery aneurysm/dissection, transection of collateral branches, arterial thrombosis
- **Equipment :** gloves, alcohol swab, lidocaine, 25G needle w/ 1 cc syringe, ABG kit (*heparin syringe w/ 23G needle, rubber cube, rubber cap*), towel roll, 2x2 sponge, bag of ice, tape, patient label
- **Site:** usually radial artery at wrist (*can also be done with brachial artery at antecubital fossa, femoral artery below inguinal ligament, dorsalis pedis in foot*)

UNIVERSAL PRECAUTIONS

**Not a sterile procédure*

**Do not recap arterial blood gas syringe*

- Wash hands
- Gloves
- Face/Eye protection
- Gown

PROCEDURE (Radial, femoral, pedal)

**Radial artery is very superficial, can easily be missed by going too deep, do not go deeper, instead pull back*

**Can use inject SC lidocaine 0.1-0.3cc*

- Allen's Test (*check radial & ulnar artery for ulnar collateral bloodflow*)
- Position wrist palm upright, slightly hyperextended on the towel roll (*Radial artery*). Tape pt down across palm
- Check pulse – Palpate radial artery
- Iodine then Alcohol swab area
- Check pulse again, keep fingers on artery for landmarking
- Stab radial artery at a 30-45 degree angle, bevel up, while holding syringe like a pen (*always in a straight path*). Put the needle in just distal to fingers palpating radial artery
- Slowly advance needle until "flash" of blood (*the needle will already be drawn back with air in it, can adjust to 1/5-2cc*)
- Allow 1-1.5 cc of blood to be drawn (*the pressure in the artery will fill the syringe, it is not necessary to draw sample manually*)
- Apply pressure as needle is removed
- Safety cap needle, remove needle, put on cap
- Push out any air
- Roll sample btw hands to mix heparin (*5-10 s*),
- Compress artery for 5 min, Recheck pulse
- Put patient tag on syringe, put syringe in biohazard bag, put on ice

INTERPRETING RESULTS

pH: 7.35 – 7.45

PaCO₂: 35- 45 mmHg

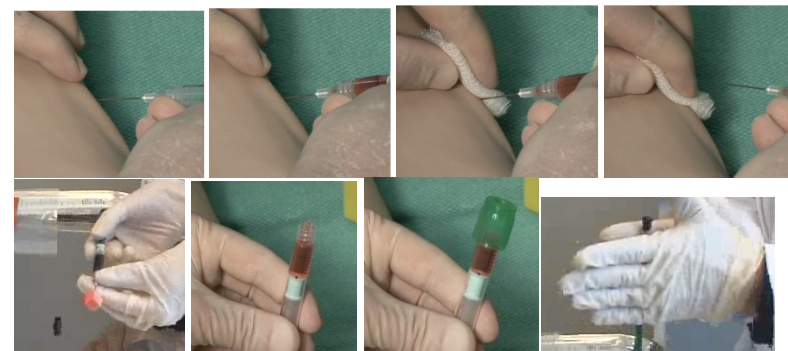
HCO₃⁻: 22-26 mmol

Acidosis or Alkalosis: look at the pH to determine

Metabolic: PaCO₂ & HCO₃⁻ will be moving in the same direction as the pH

Respiratory: PaCO₂ & HCO₃⁻ will be moving in the opposite direction as the pH

ARTERIAL BLOOD GASES			
Lists equipment and supplies needed for drawing arterial blood gases	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Describes physical examination steps involved for drawing arterial blood gases	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SKILL PERFORMANCE			
Identifies basic anatomical landmarks on a simulator appropriate for drawing arterial blood gases	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Explains the indications for drawing arterial blood gases	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Explains the risks associated with drawing arterial blood gases	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Completes the procedure of drawing arterial blood gases on a simulator	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
UNIVERSAL (STANDARD) PRECAUTIONS			
Applies Universal (Standard) Precautions for drawing arterial blood gases	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



Lumbar Puncture

**Done for analysis of cerebral spinal fluid*

**Epidural, Dural, Subdural, Arachnoid, Subarachnoid (this is where CSF is)*

**Spinal cord usually ends at L1 (can go lower in some ppl)*

PREPARATION

- **Consent/ explain procedure** (*Signed consent*)
- **Indications:** suspicion of CNS infection (*bacterial such as meningitis, viral, fungal*), assessment of disease (*Subarachnoid hemorrhage, lymphoma, leukemia, Guillian-Barre syndrome, MS, vasculitis*), analyze CSF, measure CSF pressure, Infusion of anesthetic, chemo, contrast agent (*myelography*)
 - When LP is done to diagnosis SAH, the CSF will be centrifuged, if the CSF is yellow (*Xanthochromia*), then the blood was already in the CSF, if the RBC form sediment and the CSF is clear, the RBCs are due to trauma from the LP
- **Contraindications:** Absolute = Raised intracranial pressure (*decreasing pressure at puncture side can cause trans-tentorial or uncal herniation*), focal neurological signs (*which may indicate increased ICP*), coagulopathy, spinal epidural abscess, skin infection, acute spinal cord trauma. Relative = previous spine surgery, spinal deformity, patient agitation
 - In cases of suspected increased intracranial pressure, a CT scan can be performed
- **Risks/complications:** Post LP-headache, Post LP-backpain, bleeding/spinal hematoma, infection, cerebral herniation, parasthesias/radiculopathies
- **Equipment:** assistant, gloves, mask, gown, chlorhexidine or iodine, xylocaine w/out epinephrine, lumbar puncture kit (*4x4 sponges, sterile fields, 25G 5/8' & 22G 1.5' needle for anesthesia, spinal needle 20-25G (cutting or atraumatic), 4 collecting tubes, 3 way stopcock & manometer, 1 band-aid*)

UNIVERSAL PRECAUTIONS

**Sterile Procedure*

- Gloves
- Mask, eyewear
- Gown

PROCEDURE

- **Focal neurological testing:** to rule out increased intracranial pressure. Papilloedema, headache, nausea, vomiting, decreased LOC
- **Prepare LP tray**
- **Patient position:** LT lateral decubitus: curl into fetal, arching back "like a cat" (*opens space between spinous processes*), prevent upper shoulder from rolling forward (*keep pt's hips and shoulder perpendicular to bed*); back at edge of bed, pillow under the head. Pt Sitting: legs dangling, using bedside table to rest arms & head on pillow
- **Landmarking:** Find posterior iliac crests & draw imaginary line across them; this intersects the L4 spinous process (*L3-L4 space above, L4-L5 space below*). Identify & press the L4-L5 space w/ a blunt object. You can use L3-L4, L4-L5 or L5-S1. Do not go above L2-L3.
- **Prepare anesthetic bottle**
- **Open LP Tray using sterile procedure**
- **Poor cleansing solution (Chlorhexidine) on LP tray**
- **Prepare for sterile procedure:** wash hands, Gown, eyewear, Put on sterile gloves (you are now sterile – can only touch sterile field)
- **White sterile sheet:** slightly under pt shiny side down (*keep sheet folded over hand to remain sterile*)

- **Prepare manometer, prepare test tubes (standing upright), prepare anesthetic:** Draw up anesthetic with 22G needle)
- **Site preparation:** 4% chlorhexidine in circular fashion 3X (*only one swipe per sponge, the first circle is widest, and each subsequent is smaller*)
- **Blue sterile drape:** remove adhesive tape cover, align hole over LP area (*can wipe off excess chlorhexidine*)
- **Local Anesthesia** (*3 cc of 1% lidocaine*)
 - Use the 25G needle, at 45°, to create a skin wheal/bleb w/ local in SC (*lidocaine*)
 - Use the 22G needle, straight, to enter the subcutaneous & intraspinal space. Draw back on plunger to ensure not in subarachnoid space. Gradually w/draw needle while injecting anesthetic along path LP will follow.
- **Ensure Anesthetic is working**
- **Spinal Needle Insertion:** check to make sure stylet slides in & out easily. Recheck landmarks. Warn pt they may feel an odd sensation in their back. W/ cutting needle on, insert bevel parallel to spine-
- towards pt's side (*up if pt in LT lateral position, RT or LT if sitting upright, this ensures that the bevel doesn't tear ligament fibers versus pushing through*), so the bevel is thus directed in the horizontal plane. Direct needle 10-20° cephalad (*toward umbilicus*). Advance needle with thumb on tip of stylet. Direct needle ~ 1-1.5 inches or until a "pop" is felt. Remove stylet & wait 2 sec for CSF drainage. If none, advance 1-2 mm at a time, checking for CSF return w/ each advance.
 - *Knob on stylet is on same side as bevel*
 - *Needle passes through ligaments*
- **Opening Pressure:** Once CSF is obtained, remove stylet, and insert the 3-way stopcock so that side port in upward & close circuit to patient, install manometer on side port & close circuit to air. Wait until CSF stabilized (*will bob up & down, then stabilize*). Measure pressure. Should be 5-20 (*if greater than 20, can have increased ICP, just take fluid quick*)
 - *The side port point to closed*
- **Collection of CSF:** Obtain test tubes (*4-5 tubes, numbered*). Open circuit to air on manometer. Collect 1.5- 2 cc in tube 1. Once manometer is emptied remove it (*keep stop cock on*), continue collecting 1-2cc in the remaining tubes. Tubes will be sent for **cytology, cell count, culture & sensitivity, viral, glucose & protein.**
 - **Tube 1:** Cell Count
 - **Tube 2:** Gram stain, Culture, Antigen testing
 - **Tube 3:** Glucose, protein, immunoglobulin
 - **Tube 4/5:** Cytology, PCR
 - *If there are 5 tubes, tube 4 is another cytology count*
- **Remove Needle:** Remove stop-cock. Replace stylet fully into needle. Remove needle. Apply pressure w/ gauze at the puncture site
- **Put pt on back:** for a few hours, reduces post-LP headache



LUMBAR PUNCTURE			
Lists equipment and supplies needed for performing a lumbar puncture	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Describes the correct positioning of a patient on which a lumbar puncture is to be performed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Explains the basic information required to be covered with the patient when obtaining informed consent for the lumbar puncture	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SKILL PERFORMANCE			
Identifies basic anatomy required for completing positioning and site preparation for a lumbar puncture	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Explains the indications for performing a lumbar puncture	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Explains the risks associated with performing a lumbar puncture	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Practices positioning and landmarking on a group member	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Completes the procedure of performing a lumbar puncture on a simulator	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
With sterile technique prepares site with cleansing, draping and wearing gloves and gown	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Prepares kit so easy progression with procedure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Landmarks site and identifies tissue layers to progress through and feelings at different layers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Freezes at skin and into tissue	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Inserts needle -- noting levels and feeling on needle as inserting using constant drawing back on needle as proceeding	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Paying attention to fluid drawn as progressing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Once in position -- removes needle and collects fluid	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Name types of tubes to be collected with lp fluid collection (cytology, culture and sensitivity, viral, biochemistry/sugar, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Removes catheter appropriately	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Dressing/pressure to the site	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SKILL PERFORMANCE (cont'd)	Performed Skill	Observed Skill	Not Done
Positioning after procedure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
UNIVERSAL (STANDARD) PRECAUTIONS			
Applies Universal (Standard) Precautions for safety to patient/simulator, to self and with biohazard and sharp disposal	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Suturing

*0 to 11-0 (finest): 7, 6, 5, 4, 3, 2, 1, 0, 2-0, 3-0, 4-0, 5-0, 6-0, 7-0, 8-0, 9-0, 10-0, 11-0

*Face, Extremities: 3-0, 4-0, Abdomen: 3-0, Fascia: 0, 2-0

*Primary intent: wound closure immediately following injury, prior to granulation tissue

*Secondary intent: allowing wound to heal on its own, wound is cleaned and dressed (amputations)

*Tertiary intent (Delayed primary closure): patient return 3-4 days later for closure, wound is packed & kept moist (done for pts who initially presented >24 hours after injury, contaminated wounds, crush wounds, animal bites)

*Epinephrine is contraindicated in ears, fingers, toes, nose, penis

PREPARATION

- **Consent/explain procédure :**
- **Indications:** Deep wound, when secondary intent has poor cosmetic outcome, facial wounds
- **Contraindications:** patient presenting >12hr (extremity) or 24hr (face/scalp), infection, foreign debris that cannot be removed, animal bite, crush wound, amputation, too much tension on wound, deep space under skin, compound fracture
- **Risks/complications:** wound infection, dehiscence (ripping open), retained foreign body, unrecognized deep structure injury, scar, toxicity from anesthetic,
- **Equipment:** eyewear, gown, suture tray (surgical drape, gauze, antiseptic solution, saline solution, non-toothed forceps, toothed forceps, scissors, needle driver, straight hemostat, curved hemostat)

UNIVERSAL PRECAUTIONS

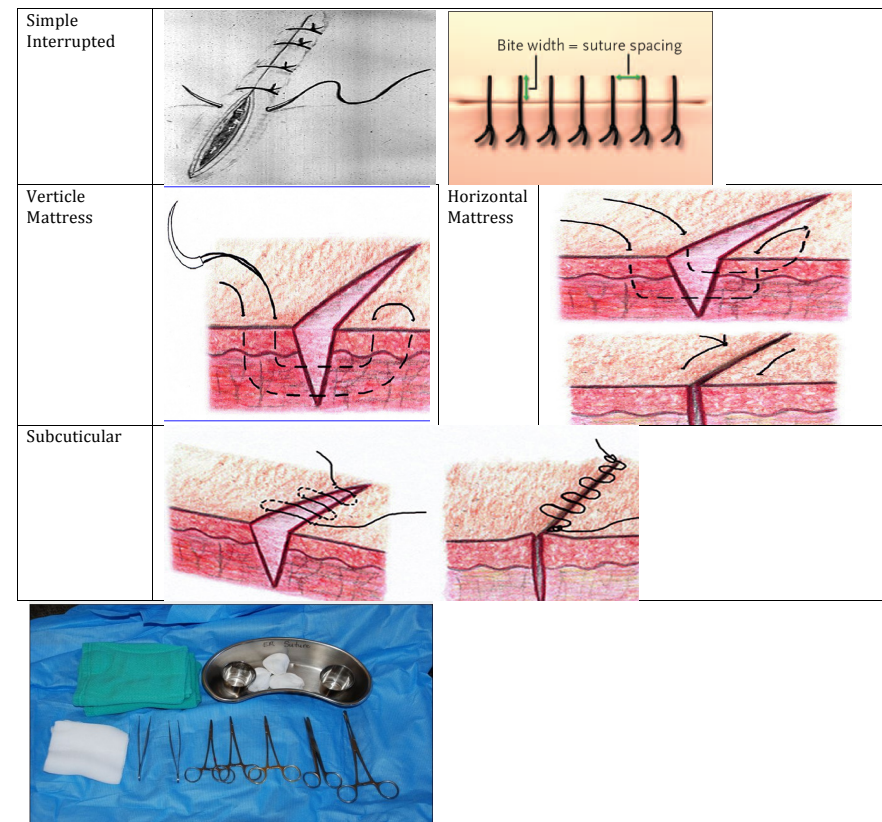
*Suturing is a universal procedure

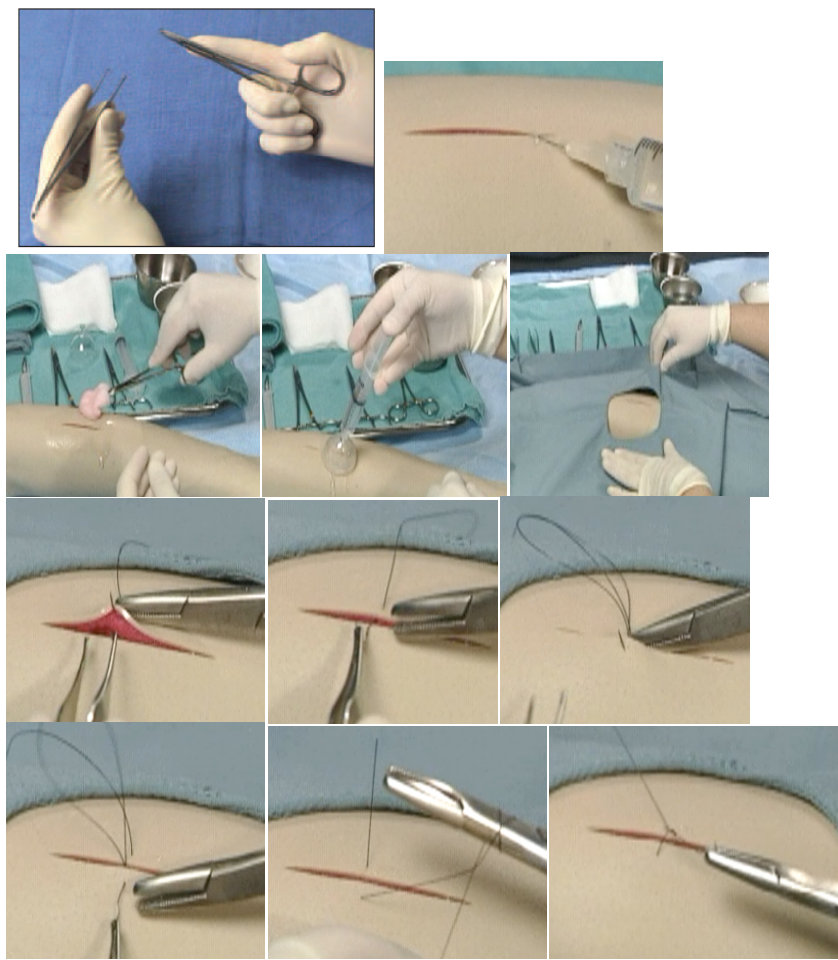
- Wash hands
- Gown
- Eyewear
- Sterile gloves

PROCEDURE

- **Wound Preparation:** clean area with antiseptic (providine, chlorhexidine)
- **Irrigation:** use 18 gauge needle to splash normal saline at high pressure through wound. Use 50-100CC of irrigant per cm (decreases bacterial count, removes foreign bodies)
- **Debride:** remove foreign bodies, remove devitalized tissue, create sharp wound edge (devitalized tissue increases risk of infection, sharp edges align better)
- **Anesthetize wound:** Local can be used (lidocaine 4% - 20 minutes to work), Local (Lidocaine 1-2% +/- epinephrine) – using 25G needle, slowly inject local within wound between dermis and subcutaneous tissue (always remember to draw-back)
- **Needle:** using needle drivers, grasp needle 2/3 away from the point
- **Gripping instruments:** Hold forceps in left hand, hold needle driver in right hand (thumb and fingers wrapped around end of needle drivers-not through the holes)
- **Simple interrupted:** Elevate fold of skin with forceps, using needle drivers, push needle through the epidermis & dermis. Transfer needle from needle driver to forceps to pull needle through. Transfer needle back to needle drivers, and pull majority of suture thread through skin. Elevate second piece of skin with forceps, using needle drivers, push needle through the epidermis & dermis. Transfer needle from needle driver to forceps to pull needle through skin. Transfer needle back to needle driver, pull suture thread through skin to align edges. Remove needle from needle drivers, grasp thread with left hand, wrap thread twice around needle drivers, using needle drivers grasp loose end of thread, pull tight to make knot. Repeat knot with needle drivers (only require to wrap thread once around).
- **Mattress sutures:** used for wounds with increased tension (joints, swelling), naturally everts
- **Subcuticular:** done on face, abdomen. Decreases appearance of scar. Finish with steri strips
- **Knot tying:** done when tying intradominally where instruments cannot reach

- **Dress tissue:** no more than 48 hours, otherwise there is increased risk of infection
- **Tetanus:** immunize if they have not had Td in last 10 years, if wound is dirty give if >5 years
- **Antibiotics:** grossly contaminated wounds, crush injuries, open fractures, tendon injuries, bite wounds (5-7 days)
- **Patient Education about wound care:** can remove dressing in 48 hours, can dress and shower after 24 hours, clean with plain water, dry well (hair dryer, pat dry), elevate if swelling occurs, be aware of signs of infection (pain, swelling, redness, fever, streaking proximally)
- **Guidelines for suture removal:**
 - Face: 4-5 days
 - Scalp/Trunk: 7-10 days
 - Extremities: 10-14 days
 - Joints: 14 days





SUTURING			
Washes hands	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lists equipment and supplies needed for suturing puncture	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Puts on glasses	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Describes the correct positioning of a patient on which suturing is to be performed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Consider the tetanus status	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SKILL PERFORMANCE			
Assess laceration for gross anatomy affected by laceration with gloves	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Select freezing solution and sutures	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Using betadine create a sterile site around laceration	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Apply sterile gloves	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Create a sterile area with draping	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Draw up and inject appropriate freezing solution into and around incision (consider amount for toxicity and use/absence of epinephrine)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Irrigate laceration with normal saline in amounts 100-250mL	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Recognize that violating the sterile field requires new gloves and new whatever was violated (syringe, needle driver, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Complete anatomical assessment looking for vessels, tendons, bones, comminuted bone pieces	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Approximate wound edges for healing and suturing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Commence suturing with interrupted sutures starting at mid point and halving laceration, care with V flaps	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
UNIVERSAL (STANDARD) PRECAUTIONS			
Applies Universal (Standard) Precautions for safety to patient/simulator, to self and with biohazard and sharp disposal	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>