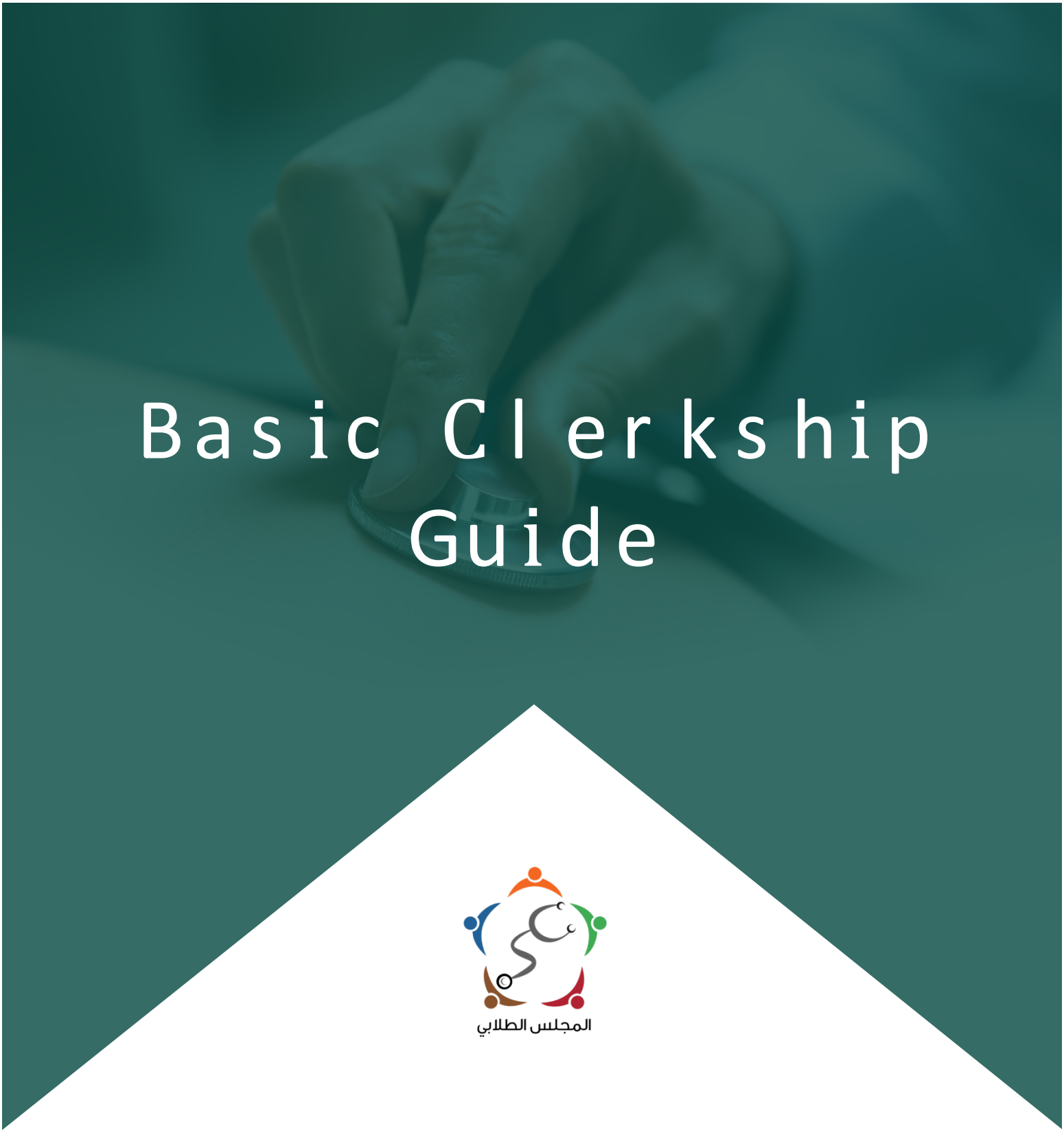
جامعة الملك سعود
King Saud University

كلية الطب
College of Medicine



Basic Clerkship Guide

المجلس الطلابي

KSUMSC

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هذا العمل مقدم لكم من أخوتكم دفعة **434** وقام بتحديثه أخوتكم دفعة **436** جامعة الملك سعود. وقد نبعت فكرته مما واجهناه من صعوبة في إيجاد مصدر شامل لدراسة المهارات الإكلينيكية وإتقانها. نتمنى أن يكون خير عون لكم خلال دراستكم وحياتكم المستقبلية.

ولا تنسونا من خالص دعائكم

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General History Taking

Personal Data:

- Name, Age, Occupation, Residence. (Ask them even if it was written on the paper in front of you)

History of presenting illness:

- SOCRATES:

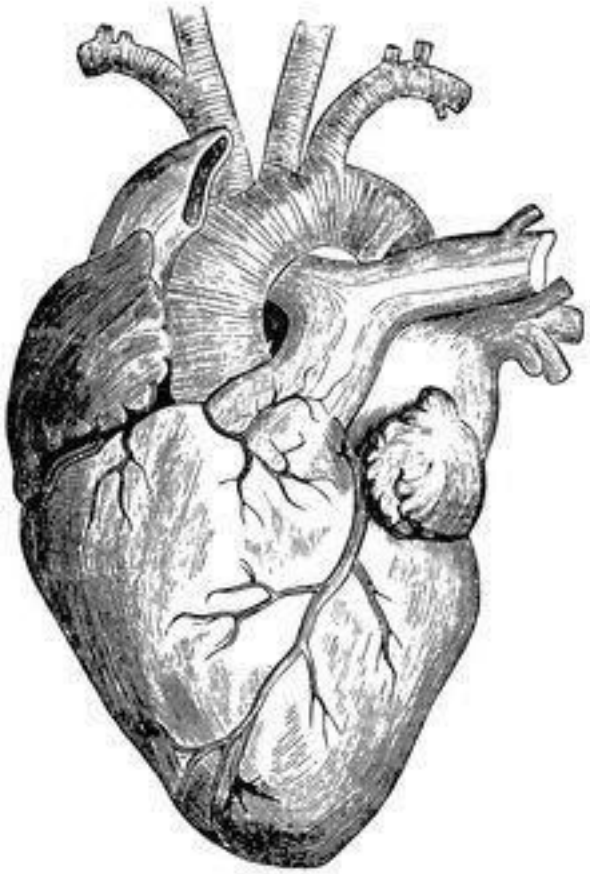
  Site, Onset (Rapid? Gradual? Continuous? Intermittent? Frequency?), Character, Radiates, Alleviating factors, Timing (Noticed when? Better or worse in night or day? Progressive?), Exacerbating factors, Severity.

Associated symptoms:

- Other specific questions related to the chief complaint.
- Symptoms related to the system ● Constitutional symptoms:
  - Fatigue
  - Fever
  - Night sweat
  - Weight loss
  - Nausea and vomiting

Risk Factors related to DDx:

- Medical history (always ask similar previous episodes? and was it diagnosed) , drugs, allergies.
- Surgical history; Trauma, Blood transfusion
- Social Hx: Alcohol, Smoking, sexual contact, marital status
- Family Hx: hx of the same illness in the family.



Cardiovascular System

Common Presenting Problems in the Cardiac System

★ Chest Pain

DDx:

- Cardiac: Ischemic or Nonischemic (Aortic Dissection, pericarditis).
- Pulmonary: PE, pneumonia, pleuritis, pneumothorax.
- GI: Esophageal (e.g.GERD, esophageal spasm, esophagitis), PUD, cholecystitis, pancreatitis.
- MSK: Muscle strain, costochondritis.
- Psychogenic: panic attack.

Angina		
1- Typical Angina	**2- Atypical Angina**	**3- Non-Cardiac Chest Pain**
Meet these 3Characteristics: • Retrosternal chest discomfort with typical quality and duration. • Provoked by exertion or emotion. • Relieved by rest or GTN or both.	Meet 2 of the characteristics that are mentioned in "Typical Angina"	Meet 1 or none of of the characteristics that are mentioned in "Typical Angina"

History Taking:

Personal Data:

- Age (CAD is usually in men above 50's and woman above 60's)

HPI:

- How long does it lasts?
  - Brief (2-20 min) → Angina
  - Very brief <15 sec → noncardiac (e.g. psychogenic, MSK)
  - Prolonged (>20 min) → MI, pericarditis, Pulmonary disorder, esophageal disease, aortic dissection.
- Site
  - Retrosternal(diffuse) → MI, PE
  - superficial structures(localized)→ Musculoskeletal pain
  - at the region of left nipple? → psychogenic
- Onset
  - Sudden onset → MI, PE, Pneumothorax, Aortic dissection, Panic attack
  - Gradual → GI, pneumonia
- Character
  - Pressure, squeezing, tightness, heaviness, burning, or strangling → MI

- Tightness or heaviness→ MI, GERD.
- Indigestion, (i feel I need to belch) → MI, GERD
- Tearing→ Aortic dissection
- Sharp stabbing(pleuritic pain)→ PE, pleuritis, pneumonia or pericarditis.
- Dull, persistent ache → psychogenic.

- Radiation
  - Right or left shoulder/arm or both → MI, pericarditis.
  - Neck, lower jaw or teeth → MI
  - Right shoulder → cholecystitis
  - Back → aortic dissection, pericarditis, pancreatitis, esophageal disease, PUD.
  - Epigastrium→ MI, GERD
- Alleviating factor (relieving)
  - Rest or Nitrates → Stable angina
  - Sitting up and leaning forward → pericarditis, pancreatitis
  - Antacids or food → GERD, PUD
  - Holding breath at deep expiration → Pleuritis
- Exacerbating Factors
  - Exertion, stress → Stable angina
  - Eating → Stable angina, GERD, PUD
  - lying down or changing position → pericarditis, pancreatitis
  - Respiration → PE, Pleuritis

Severity using CCS which is based on degree of limitation on ordinary physical activity	
Class1	No limitation
Class 2	Slight limitation
Class 3	Marked limitation
Class 4	With any physical activity ,at rest

- Associated symptoms:
  - SOB→ MI, PE, Pneumonia or pneumothorax
  - Syncope, palpitations, Hypotension → MI, PE
  - Hemoptysis → PE, pneumonia
  - Cough→ pneumonia
  - Waterbash (acid reflux) → GE
- Associated symptoms with angina(dyspnea, nausea, diaphoresis)

Risk factors:

- IHD risk factors:
  - Modifiable risk factors: HTN, DM, Hyperlipidemia, smoking, obesity, sedentary life style, emotional distress.
  - Non-modifiable: age, sex(male), family history of premature CAD(m<55,f<65) ,Hx of(MI ,any cardiac disease, PAD).
- PE risk factors: Hx of DVT or PE, Hx of Malignancy, Hx of Nephrotic syndrome, Hx of hypercoagulable state, immobilization or travel at long distance.
  - Hx of Marfan syndrome (aortic dissection).
  - Drugs: OCP

- Surgery or trauma: open heart surgery or any major surgery (e.g. hip replacement or abdominal surgery)
- Social: Smoking, alcohol, Drug abuse (septic embolism→ PE), Obesity.
- Family Hx: Premature CHD in first degree relative (Male <55, Woman <65), familial hypercholesterolemia.

Management of chest pain due to MI/angina:

1. In-patient or out-patient?
2. Medical treatment, primary preventive medications
3. Investigations:
   a. Basic: CBC (anemia),Metabolic (LFT,RFT,TSH,electrolytes)
   b. Specific :ECG,cardiac markers (BNP, Troponin, CK-MB), exercise stress test
   c. Radiology:ECHO(EF, LV function, valve abnormalities) , Chest x-ray (heart shadow , lung for pulmonary edema), cardiac CT or MRI.
4. Treatment:
   1. First stabilize the patient (Oxygen, vitals, BP)
   2. Medical: aspirin, dual anti platelets (aspirin +clopidogrel), morphine, nitroglycerine, beta blockers, statin, ACE/ARB.
   3. Invasive: PCI (within 90mins in STEMI, within 24-48h in NSTEMI/unstable angina) , CABG . (Fibrinolytics if PCI contraindicated or unavailable)
   4. Modify risk factors(tobacco cessation, exercise, control HTN)

★ Dyspnea (Heart failure)

Orthopnea	Paroxysmal Nocturnal Dyspnea "PND"
Dyspnea when lying flat. Typically described in terms of number of pillow the patient uses to breathe comfortably to sleep	Dyspnea that awake the patient from sleep.

DDx:

- **Acute:** PE, MI ,acute heart valve insufficiency, pneumothorax, anaphylaxis, foreign body, aspiration, pulmonary oedema
- **Sub acute:** acute asthma, exacerbation of COPD, or pulmonary oedema, pneumonia
- **Chronic:** CHF, COPD, cardiomyopathy, Pulmonary fibrosis,, Pulmonary HTN, valvular heart disease, or anaemia, Musculoskeletal disease

History taking:

Personal data:

- Age? (older?CHF.young?asthma Occupation ? (occupation exposure)

HPI:

- Onset: acute Vs chronic
- Sudden or gradual? very quickly (PE) instantaneously (Pneumothorax)
- Constant or progressive? Worsen progressively: pulmonary fibrosis, interstitial lung disease.
- Continuous or intermittent? If intermittent. When is it worse/better? Varies from day to day: asthma.
- Duration: How long have you been short of breath?
  - Seconds to minutes: (Asthma, PE, Pneumothorax, Foreign body)
  - Hour to days: (Acute exacerbation of COPD, Pleural effusion, Cardiac failure)
  - Weeks or longer: (Pulmonary fibrosis, COPD, Interstitial lung disease)
- Character: tightness? (asthma) shallow and fast breathing? (Restrictive pulmonary disease)
- Relieving factors : head elevation? (CHF),resting, inhaler?
- Aggravating? sleeping? (CHF) working?(occupation induced asthma) cold, pets, exercise? (asthma)
- Sevirity: How does the SOB affect your life? How much exercise can you do before your SOB stops you or slows you down? Can you walk up a flight of stairs (NYHA classification)

Limitations on Physical Activity	Symptoms with Physical Activity	Findings at Rest	Class
none	none	comfortable at rest	I
slight	symptomatic with greater than ordinary activities	comfortable at rest	II
marked	symptomatic with ordinary activities	comfortable at rest	III
any activity increases symptoms	symptomatic at less than ordinary levels of activity	may or may not be symptomatic at rest	IV

- Associated symptoms:
  - Chest pain? (MI, Pneumothorax, PE)
  - Cough? (Productive? Pneumonia, COPD, CHF. Nonproductive? Asthma, GERD)
  - Hemoptysis? (TB , PHTN , PE , Pneumonia , Acute bronchitis , Malignancy)
  - Rash and joint pain?(Interstitial lung disease)
  - Swelling of the leg? (DVT that cause PE)
  - Itching hives? lips (Anaphylactic).
  - CVS:
    - Chest pain
    - PND, orthopnea, lower limb edema: to exclude cardiac dyspnea
    - Syncope
    - Palpitations and Intermittent claudication
  - Respiratory:
    - Cough? Sputum? : Asthma (non-productive), Pneumonia, GERD, Aspiration, PE (non-productive with occasional scant hemoptysis), Flash pulmonary edema (pink frothy sputum), COPD and ILD
    - Wheezing?: Asthma, COPD, foreign body obstruction, Tumors, bronchiolitis
    - Hoarseness?
  - Hematologic (Anemia):
    - Palpitations, tachycardia, syncope, pale or cold skin, easy bruisability.
  - Psychiatric (Panic Attack)
  - Constitutional symptoms: fever, night sweat, weight loss (TB, lung disease)

Risk factors:

- Exposure to dust, animals (asthma)
- Recent prolonged immobilizations, OCP use or estrogen? (PE)
- History of cardiac problems (MI, CHF)? (CHF)

Medical:

- CHF, asthma, COPD, lung cancer, allergy, Previous episodes of SOB?,DM, HTN, high cholesterol, heart disease?

Drug history (Important):

- Cytotoxic agent: Methotrexate (for rheumatological disease) and nitrofurantoin (for UTI) can cause Interstitial Lung Disease
- Chemotherapy: (bleomycin) can cause pulmonary fibrosis. Doxorubicin: heart failure and anemia
- Radiation therapy to the chest can cause constrictive pericarditis and accelerated coronary artery disease
- OCP, Estrogen: PE
- Have you been taking your prescribed medications, and in the proper doses? Nonadherence
- with CHF (ACEI, BB) or COPD (bronchodilator, steroid, oxygen) medication often leads to an exacerbation.

Surgery:

- Trauma (pneumothorax), Hospital admissions, blood transfusions, allergies, surgeries?

Social:

- smoking? (COPD), occupation? (occupation exposure, asthma) Useful in assessing chronic dyspnea where exposure to lung toxins (asbestos) or organic material (causing hypersensitivity pneumonitis) or chemical associated with asthma may explain chronic dyspnea, recent immobilization (PE), contact with TB patients, travel history (TB)

Family:

- Serious heart condition? At what age? A family history of premature coronary disease is significant when a first-degree relative has had significant CAD before 55 if male and 65 if female
- Similar problem?

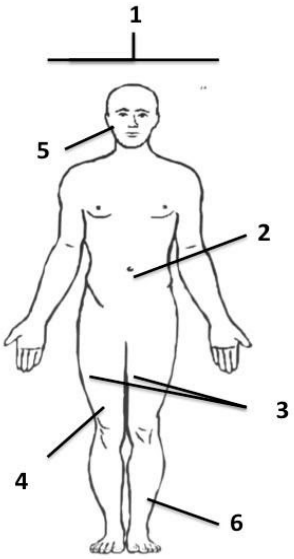
TABLE 4.2 History of dyspnoea: heart versus lungs

Favours heart failure	Favours lung disease
History of heart failure or infarction	History of smoking >10 packet years
History of valvular heart disease	History of asthma
Orthopnoea	Dust exposure
Paroxysmal nocturnal dyspnoea	History of lung disease
	Wheezing
	Relief with bronchodilators
	Cough
	Fever

Management of Heart Failure:

1. Investigations: If HF is suspected:
    - Transthoracic Echocardiography is the Initial test of choice
    - CXR to look for signs of pulmonary hypertension
    - Blood tests:
        - CBC for anemia, Electrolytes imbalance (CKD and HF have similar symptoms), Thyroid T4 & TSH (both hypo and hyper can cause it), Liver biochemistry (may be altered do to hepatic congestion), Brain natriuretic peptide (BNP) or (Pro BNP).
2. Treatment:
    - Lifestyle modifications (salt and water restriction)
    - Diuretic + vasodilator (ACEI/ ARB/ hydralazine+isosorbide) + BB + spironolactone.
        - Note: Digoxin and spironolactone should NOT be used in diastolic failure, BB should not be used in an acute setting.
        - Medications that lower mortality: beta blockers, ACEI, spironolactone.

Edema



Key terms	Definitions
1) Anasarca	Edema involving all aspects of the body: upper and lower extremities and the face.
2) Ascites	Collection of fluid in the peritoneal cavity.
3) Lipedema	Edema caused by fluid retained in the interstitial space by lipids in the dermis.
4) Lymphedema	Edema caused by obstruction of lymphatic drainage of the tissues. *usually unilateral
5) Myxedema	Edema resulting from hypothyroidism.
6) Pretibial myxedema	Not technically edema, the swelling on the anterior shins is due to coalescing of subcutaneous plaques due to Graves disease antibodies infiltrating dermal tissue.

DDx:

Non-pitting	Pitting (skin is intended and only slowly refills)	
	Bilateral	Unilateral
Hypothyroidism, Lymphedema	• Cardiac: CHF, right sided HF • Hepatic: Cirrhosis • Renal: Renal failure, Nephrotic syndrome	Deep venous thrombosis, Cellulitis

History Taking:

Personal data:

- Age (elderly: CHF), occupation (i.e: teacher, surgeon)

HPI:

- Site? unilateral/bilateral? facial (nephrotic, hypothyroidism)? ascending; legs→ abdomen (CHF)? descending; abdomen → legs (constrictive pericarditis)? sacral (in Bedridden)?
- Onset? (gradual → Systemic Or sudden → DVT) progressing and continuous(systemic) or intermittent(nephrotic)? Specific time of the day? all the day (lymphatic obstruction)
- Character? pitting or nonpitting?
- Alleviating factor (diuretics, leg elevation)?
- Exacerbating factor (long standing, increase sodium intake, non-compliance to medication → diuretics, lying flat)
- Severity level (to the ankle, below the knee,...), interfere with daily activity.
- Associated symptoms?
- Painful? redness? itching? warm? DVT,Cellulitis
- Prominent veins? varicose vein
- Constitutional symptoms: Tumor? lymphedema, fever? cellulitis.

- System related? Cardiac, Renal, GI,Endo

Risk factors:

- Medical hx: DVT, OCP, malignancy, (DVT), Drugs eg: ACEI, CCB, steroids? Hypothyroidism, HTN, DM? Prior MI? CHF , Renal failure
- Surgical or trauma hx: Major surgeries (DVT)
- Social hx: alcohol abuse (liver cirrhosis), travel to tropical areas, smoking, Diet (increase salt intake)
- family hx: cardiac or thyroid disease? contact family member with hepatitis?

★ Palpitation & syncope

What is palpitation? it is unexpected awareness of the heartbeat.

DDx:

- Cardiac
  - Arrhythmia: Atrial Fibrillation, Atrial Flutter, Supraventricular Tachycardia (SVT), Ventricular Tachycardia, Premature Atrial or Ventricular Contractions.
  - Hyperdynamic: thyrotoxicosis, hypoglycemia, fever, anemia, pregnancy, hypovolemia, stimulant.
- Psychiatry: Panic Disorder or Panic attack.

History Taking:

Personal Data:

- Age: elderly (structural heart Disease), Younger (Stimulants: caffeine)
- Gender: Women (SVT)

HPI:

- Onset: Sudden? SVT, VT, Panic attack.
  - Gradual and continuous? Sinus tachycardia, Anemia, thyrotoxicosis, VHD.
- Character: regular, forceful but not fast (panic attack), feeling of normal heart beat interrupted by missed or strong beat? (Premature contraction), Fast & completely irregular? (Atrial fibrillation),Fast & Regular? (SVT, VT)
- Aggravating: exercise, Stimulants?
- Relieving: deep breathing or holding it (valsava)? (SVT).
- Associated symptoms:
  - syncope ? (SVT,VT)
  - Chest pain? Fatigue?breathlessness?
  - polyurea? (SVT)
- Constitutional symptoms?
- Risk Factors:
  - Medical history: heart disease, thyroid disease, anemia, previous panic attack.
  - Clinical conditions associated with AF: Underlying heart conditions (e.g. valvular heart disease, heart failure, coronary artery disease, hypertension)
  - Social history: caffeine intake, alcohol, smoking, drug abuse
  - Family history: arrhythmia, structural heart disease

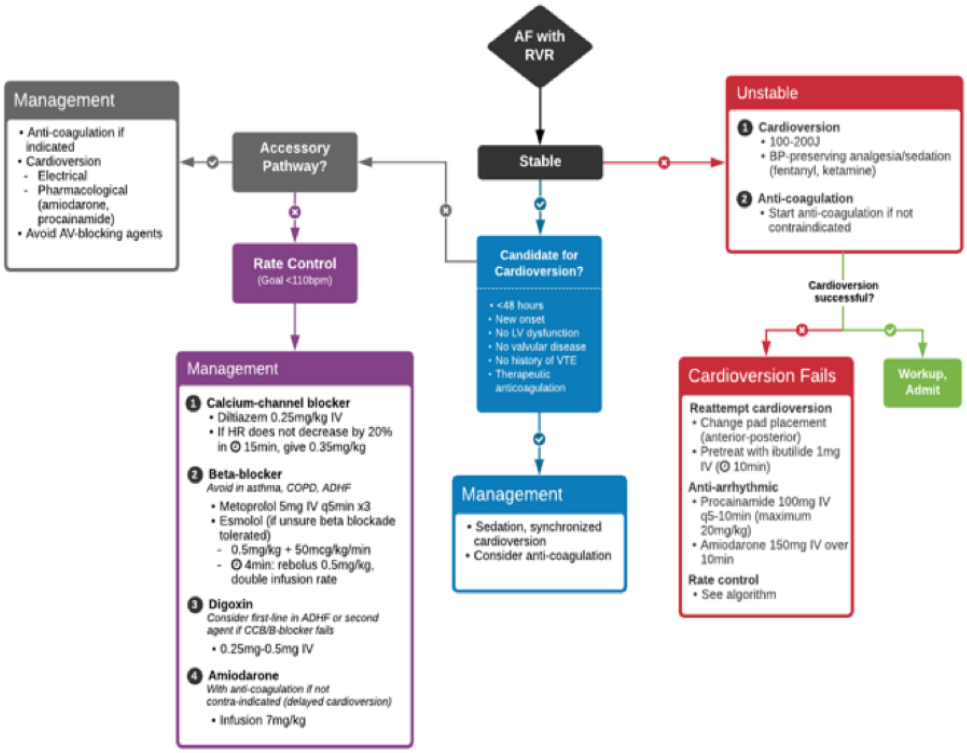
Management: depending on the underlying cause.

1. Investigations : CBC, electrolytes, RFT , ECG(arrhythmia), thyroid function test, cardiac markers(MI),chest xray, TTE, D-dimer(PE), echo.
2. If Afib

   First assess stability:

   - If patient presents with acute A fib---> patient is not hemodynamically stable---> electric cardioversion
   - if the patient is not present with acute A fib--->patient is hemodynamically stable ---> need to achieve the following 3 domains:

1. Control heart rate(beta blockers, CCB,digoxin)
2. Maintain sinus rhythm



Cardiovascular Examination

WIP3E: **W**ash your Hands, **I**ntroduce yourself, **P**ermission/**P**rivacy/**P**osition, **E**xposure
Position: Laying in bed at 45o
Exposure: full exposure of the trunk.

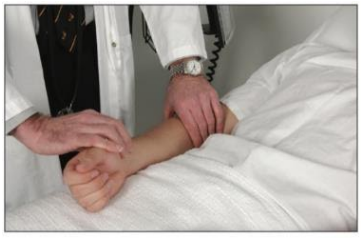
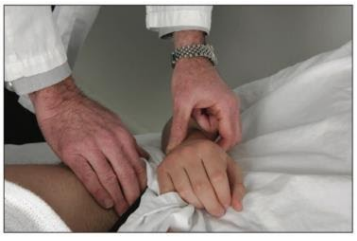
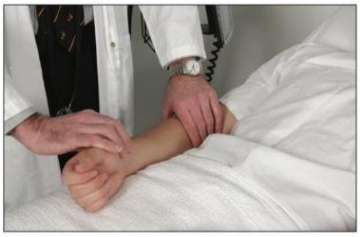
General appearance look for: **ABC2DE**

- Appearance: stressed, tachypneic
- Body built: Cachectic? Obese?
- Color: Cyncoed? Pale? (Anemia)
- Connections: to any devices: Holter monitor? Pacemaker? or intracardiac defibrillator?
- Distress: in pain, respiratory or neurological distress
- Else: orientation, consciousness, alertness

Hands:

- Inspect:
  Clubbing Yes, called Schamroth's sign.
  - Splinter hemorrhage
  - Osler's nodes? Janeway lesions
  - Tendon xanthomata
  - Subcutaneous nodules

- Palpate:
  Radial pulse: rate? rhythm?
  - At the wrist just medial to the radius.
  - Radio-radial delay.
  - Radio-femoral delay.

Face:

- Inspect:
  - Jaundice in sclera
  - pale conjunctiva
  - Xanthelasma
  - Arcus senilis at pupils
  - Mitral facies (rosey cheeks with a bluish tinge; mitral stenosis)

  Look in Patient's Mouth using a Torch Looking for:
  - High arched palate *(Marfan's syndrome)*

- Central cyanosis *(low blood perfusion)*
- Mucosal petechiae *(Infective endocarditis)*
- Normal clean teeth *(Maybe a source of organisms responsible for infective endocarditis)*

Neck:

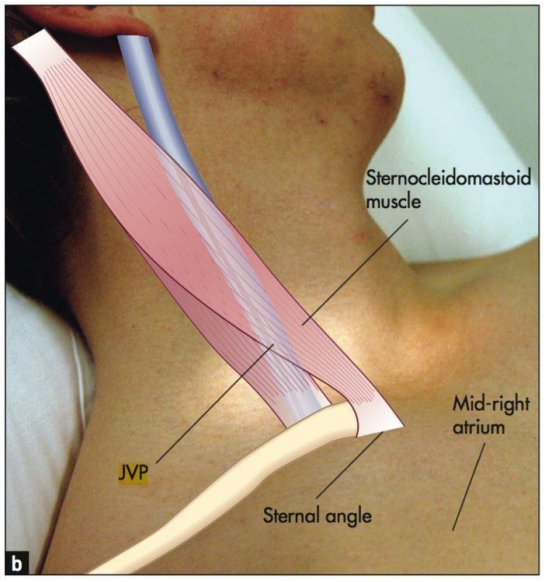
- Inspect:
  - Jugular venous pressure
  - Hepatojugular reflux: Press firmly with the palm over the middle of the abdomen for 10 sec, observe the JVP for a rise. In healthy individuals this should last no longer than 1-2 cardiac cycles (it should then fall)

- Palpate:
  - Carotid pulse: volume? character? (Medial to the sternocleidomastoid muscles)

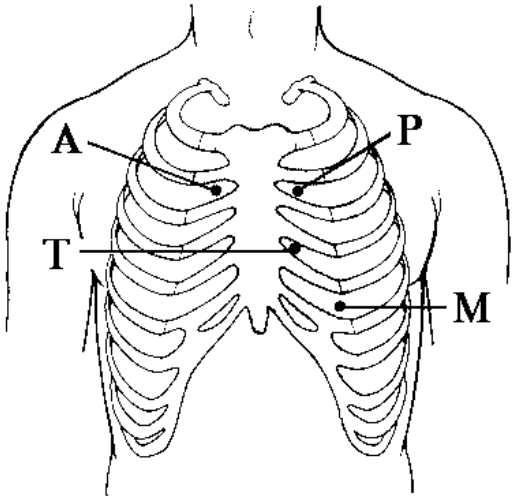
    NEVER PALPATE BOTH CAROTID ARTERIES SIMULTANEOUSLY
  - Measure the Jugular Venous Pressure (JVP):

Position: lying down at 45 to the horizontal with his or her head on pillows

1. Ask the patient to turn the head slightly to the left.
2. Look at the internal jugular vein medial to the clavicular head of sternocleidomastoid
3. Assuming that the patient is at 45 degrees, the vertical height of the jugular distension from the sternal angle should be <u>no greater than</u> <u>4 cm.</u>



Pericardium Examination

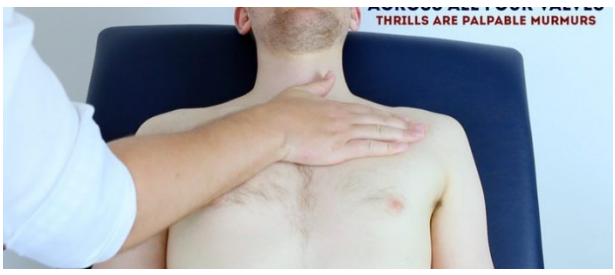


Inspect for:

- Shape and deformities: Pectus excavatum? (funnel shaped; depressed sternum) Pectus carinatum? (pigeon shaped; prominent sternum) Kyphoscoliosis? (curvature of the vertebral column).
- Scars: Lateral thoracotomy? Midline sternotomy? (CABG) Clavicular? (pacemaker)
- Apex beat: Visible pulsations or not (with the aid of a torch)

Palpate for:

- Apex beat: felt with tip of the fingers; in the lower most and the outermost pulsatile area in the chest → then count down from the mid-clavicle (normally in the 5th ICS/midclavicular line unless it's displaced)
- Parasternal impulse (Heaves): felt when the heel of the hand is rested just to the left of the sternum with the fingers lifted slightly off the chest.
  - If heaves are present you should feel the heel of your hand being lifted with each systole.
  - Causes of heaves RVH or severe left atrial enlargement.
- Thrills (palpable murmurs):
  - Using the flat of your hand, over the valve areas.
  - Thrills are best felt with patient sitting up or leaning forwards and in full expiration.
  - Apical thrills can be more easily felt with patient rolled over to the left side.



- If there is RVH then palpate the epigastric area:
  - if there is pulsation on your fingertip → RVH.
  - Pulsation on the right side of your hand → liver.
  - Pulsation on your palm → aortic aneurysm

Percuss for: (Not usually done)

- Cardiac outline

Auscultate:

- First use the diaphragm of your stethoscope and auscultate systematically starting with the mitral valve, then the tricuspid valve, then the aortic valve, then the pulmonary valve.
- When you're done listening with the diaphragm use the bell again and listen to the four valves, then auscultate the carotid artery for carotid bruit then go to the mid axillary line for to see if there is radiation of the murmur.

How to present heart sounds?

After you auscultate comment as the following:

1. Are heart sounds present?
2. Are s1 and s2 present equally?
3. Any extra heart sounds (S_3 and S_4)
4. Any additional sounds such as clicks or snaps
5. Describe if there are any murmurs
6. Presence or absence of pericardial rub

Example: Normal S1 and S2, no added sounds, or murmurs were heard.

The abdomen:

- Examine the abdomen for hepatomegaly/ascites. "See abdominal examination"

The back:

- Inspect back for sacral edema
- Auscultate the lung bases for crackles

Lower limb:

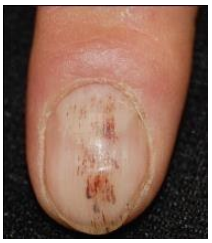
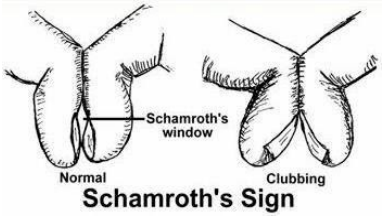
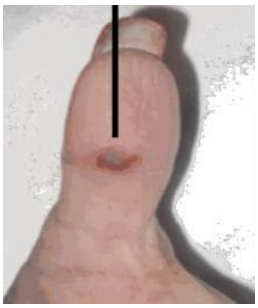
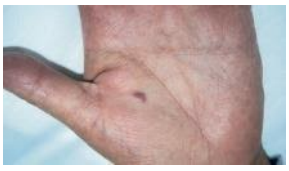
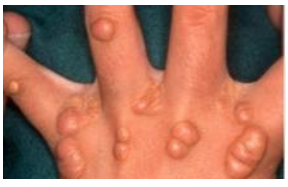
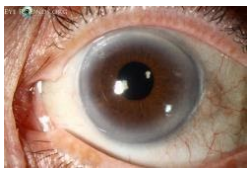
- Inspect the lower limb for edema and check peripheral pulses.

➽***End your examination with:***

- Respiratory examination
- Peripheral vascular examination

*Note: If you were asked to do cardiovascular examination, start focused (pericardium) and then do general; to gain time, but ideally the general should be done first.

Physical Signs in Cardiovascular Examination

Sign	Site	Causes	Image
Splinter hemorrhage: linear haemorrhages lying parallel to the long axis of the nail	Nail beds	1. Infective endocarditis 2. Trauma in manual workers (most common) 3. Vasculitis	
Clubbing: Loss of the angle between the nail bed and finger.	Nail bed	**CLUBBING:** • **C**yanotic congenital heart disease • **L**ung abscess • **U**lcerative colitis & crohn's disease • **B**ronchiectasis, Bronchogenic carcinoma • **I**nfective endocarditis • **N**othing (Idiopathic) • **G**raves	
Osler's nodes: Red, raised, tender palpable nodules	pulps of the fingers (or toes) or on the thenar or hypothenar eminences	Infective endocarditis	
Jenway lesions: Non-tender erythematous maculopapular lesions	Palms of the hand or sole of the foot	Infective endocarditis	
Tendon xanthomata: Yellow or orange deposits of lipid in the tendons	Over the tendons of the hand and arms	Type II hyperlipidemia	
Arcus senilis	edge of cornea	hyperlipidemia	

Rheumatic Fever

1. Personal Data
2. Ask general q's about the CC: onset, duration, relieving factors, aggravating factors, frequency?
3. Roll out other DDx of the CC:joint pain? is it migratory? how many joint is involved? is there morning stiffness?
4. Ask about the presence of the associated Symptoms: restlessness, clumsiness, skin lesions or nodules, chest pain
5. ask about the Risk Factors:
    a. social hx: Poverty? living in crowded areas?
    b. Family hx: FHx of RF?

Physical Examination of RF	
General	Polyarthritis; Large joints are predominantly affected Epistaxis
Heart	(Carditis); pericardial rub, effusion, tachycardia, muffled heart sounds, a gallop rhythm, pansystolic murmur of mitral regurgitation
skin	Subcutaneous nodules usually occur over bony prominences such as the olecranon, external occipital protuberance and vertebral bodies Erythema marginatum
CNS	chorea, emotional lability

Infective endocarditis

Key points to ask:

- constitutional symptoms, skin lesion and nodules
- Complications: weakness, arthralgias, headache, meningitis (septic empoli). shortness of breath (heart failure). hematuria (glomerulonephritis)
- Medical hx: hx of rheumatic fever, endocarditis, artificial prosthetic heart valves, congenital heart disease, heart transplant, previous dental procedure
- Social hx: iv drug use

Physical Examination of IE	
General	fever, weight loss, pallor
Hands	Splinter hemorrhages, clubbing, Osler's nodes, Janeway lesions
Arms	Evidence of intravenous drug use
Eyes	Pale conjunctivae, Roth's spots
Heart	Signs of underlying heart disease: 1. Acquired: mitral regurgitation, mitral stenosis, aortic stenosis, aortic regurgitation 2. Congenital: patent ductus arteriosus, ventricular septal defect, coarctation of the aorta
Abdomen	Splenomegaly
CNS	Evidence of embolisation
Urinalysis	Haematuria

HTN

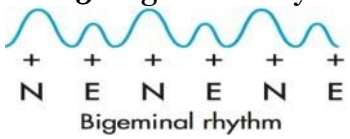
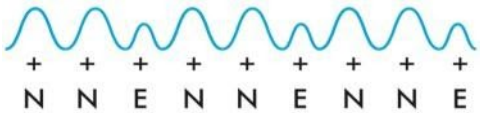
Patients may present with headaches, nosebleeds, visual symptoms, or neurological symptoms

History Taking:

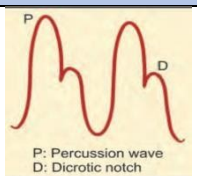
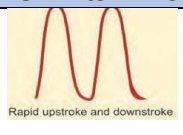
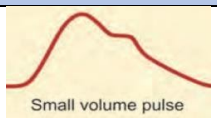
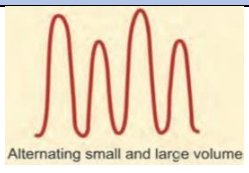
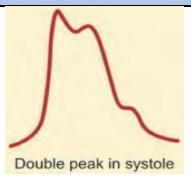
- Ask about Age? Gender? occupation?
- Time ? Duration ? character? aggravating and relieving factors ?
- Cardiovascular risk factors:Smoking, DM, IHD, TIA or previous stroke or MI High cholesterol, Obesity , Age>55 for men and>65 for women , Family history of CVD ● Medication
- You should Identify the cause of high blood pressure either primary or secondary. There are some features that may lead to a suspicion of an underlying cause (secondary hypertension): Young patient, Rapid onset of hypertension, Sudden change In BP Unresponsive to medication.
- Look for signs that indicate end organ damage:

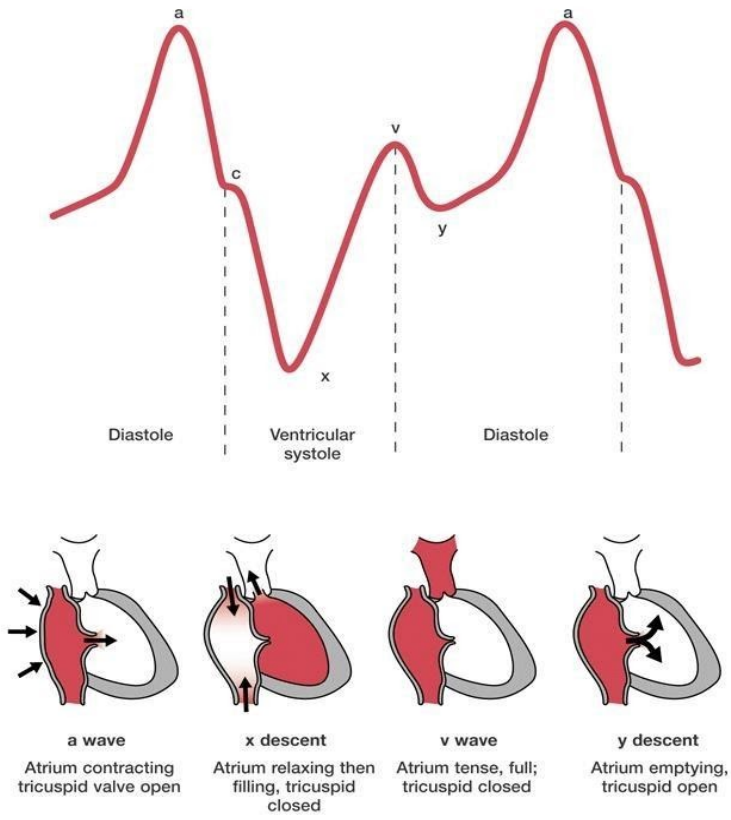
Cardiovascular disease	• Symptoms of cardiac failure include: ○ Shortness of breath ○ Ankle oedema ○ PND ○ Orthopnoea. • Angina may also be reported. • Examination may reveal: Cardiac murmurs, thrills, or heaves. • Left ventricular hypertrophy diagnosed either by echocardiography or by ECG.
Cerebrovascular disease	• Any history of symptoms of a TIA or CVA should be obtained. These may include speech difficulties, visual disturbance, or transient focal neurology. • Carotid bruits may indicate carotid artery stenosis and warrant further duplex imaging to determine blood flow and degree of stenosis.
Renal failure	May be asymptomatic, but urinary symptoms such as decreased or increased frequency of urination, pruritus, lethargy, and weight loss may suggest renal damage
Retinopathy	This is often asymptomatic, but may present with visual loss or headaches

Arterial Pulse

Observation	Normal	Abnormal
Rate	60-100 beats/min	• Bradycardia: <60 beats/min • Tachycardia: >100 beats/min
Rhythm	Sinus rhythm	1. Irregularly irregular: e.g. A fib 2. Regularly irregular: e.g. Sinus arrhythmia (the normal raising with each inspiration and slowing with each expiration) 3. Bigeminal rhythm: e.g. ectopic beat  Bigeminal rhythm 4. Trigeminal rhythm: e.g. 2nd degree AV block "Wenckebach phenomenon"  Trigeminal rhythm
Radiofemoral delay	both occur together	A noticeable delay in the arrival of the femoral pulse wave suggests the diagnosis of Coarctation of the aorta
Radial-radial delay	both occur together	A delay can be due to: dissection of the thoracic aorta, subclavian artery stenosis on one side
Volume	Normal volume pulse	• Small volume: heart failure • Large volume: AR
Postural blood pressure	No difference between standing & setting	A fall of more than 15 mmHg in systolic or 10 mmHg in diastolic due to e.g. Antihypertensive drugs.

- Pulse volume depends on stroke volume & Arterial compliance.
- Pulse character best assessed in carotid arteries.

Abnormal Arterial Pulse Character					
 	 	 	 	 	
Normal	Anacrotic pulse: Severe AS	Collapsing: AR, PDA, AV fistula	Small volume: heart failure, shock, AS	Pulsus alternans: Severe LVF	Pulsus bisferiens: AS with AR



Jugular Venous pressure (JVP)

Sign	Explanation	Causes
High JVP	More than 4 cm above the sternal angle	• Volume overload • Right-sided heart failure • Tricuspid stenosis or regurgitation • Constrictive pericarditis • Cardiac tamponade • Superior vena cava obstruction
Kussmaul's sign	Raised JVP during deep inspiration, best elicited with the patient sitting up at 90 degree and breathing quietly through the mouth	• Constrictive pericarditis • Restrictive cardiomyopathy • Cardiac tamponade • Right-sided heart failure • Tricuspid stenosis
Hepatojugular reflux	Positive if JVP raises transiently and remain elevated for the duration of the compression.	• Right-sided heart failure • Tricuspid regurgitation

Waves	**Canon a wave:** when the right atrium contracts against the closed tricuspid valve.	● Complete heart block
	Giant a waves: large but not explosive a waves with each beat.	• Tricuspid stenosis • Pulmonary stenosis • Pulmonary hypertension
	Large v waves: visible waves welling up into the the neck during each ventricular systole.	● Tricuspid regurgitation

JVP vs Carotid artery.

Carotid artery	Jugular
Medial to sternocleidomastoid	Lateral to sternocleidomastoid
palpable	visible but not palpable
One peak per heart beat	Two peaks per heart beat
No variation with posture and respiration	Variation with posture, respiration and abdominal compression
Not Obliterative	Obliterable

Types of apex beat	Impulse	Causes
Pressure loaded (heaving)	forceful and sustained impulse	• Aortic stenosis • Hypertension
Volume loaded (thrusting)	Displaced, diffuse, nonsustained impulse	• Aortic regurgitation • Advanced mitral regurgitation • Dilated cardiomyopathy
Dyskinetic apex beat	Uncoordinated impulse	- Left ventricular dysfunction
Double impulse	Two distinct impulses are felt with each systole	- Hypertrophic cardiomyopathy
Tapping	when the first heart sound is palpable	• Mitral stenosis • Tricuspid stenosis (rare)

Note: Apex can be normally impalpable in about 50% of adult.

Other causes of impalpable apex beat (**DOPES**):

- **D**eath (or shock)
- **O**besity (thick chest wall)
- **P**ericardial effusion
- **E**mphysema, other COPD
- **S**inus inversus (dextrocardia).

Heart sounds		
	S1	**S2**
Feature	• Best heard at apex • Occurs just before or coincident with the upstroke of the carotid pulse (any murmur detected with the pulse is systolic murmur)	It is softer, shorter and at a slightly higher pitch than S1, Best heard at the aortic and pulmonary area
Cause	Closure of mitral and tricuspid valve at the onset of ventricular systole.	Closure of aortic and pulmonary valve at the end of systole (two components)
Abnormalities	**Loud** in mitral stenosis, **Soft** in first-degree heart block, LBBB, Mitral regurgitation.	**Loud S2:** • A2: Systemic hypertension, Congenital aortic stenosis • P2: Pulmonary hypertension **Soft S2:** Aortic regurgitation, calcified aortic valve **Splitting of S2**: Increased normal splitting (wider on inspiration): RBBB, Pulmonary stenosis, VSD **Audible splitting of S2:** When the closure of P2 occurs later than A2, best appreciated in pulmonary area. Splitting of S2 is wider on inspiration because of increased venous return to RV a. Fixed splitting (no respiratory variation) : ASD b. Reversed splitting (when P2 occurs first and splitting occurs in expiration): LBBB, severe aortic stenosis, coarctation of the aorta.
	S3	**S4**
	A low pitched mid-diastolic sound using the bell of the stethoscope.	A late diastolic sound pitched slightly higher than S3, best heard at the apex with the bell, always pathological.

Causes	• Physiological (in high cardiac output): fever, pregnancy, young adult, athletes. • Pathological: Aortic regurgitation, Mitral regurgitation, CHF, VSD.	• forceful atrial contraction against a poorly compliant ventricle. • Aortic stenosis, systemic hypertension, ischemic heart disease, advanced age.

Notes: when both S3 and S4 are present the rhythm is described as a quadruple rhythm. It usually implies severe ventricular dysfunction

✓Other Heart Sounds:

- **The opening snap**

- A high-pitched sound at a variable distance after S1. It is due to sudden opening of stenosed valve.
- Best heard at the lower left sternal edge with the diaphragm of the stethoscope
- Heard in mitral stenosis

- **A systolic ejection click**

- Occurs in cases of congenital aortic or pulmonary stenosis where the valve remains mobile.

- **A non-ejection systolic click** Occurs in Mitral valve prolapse.
- **A diastolic pericardial knock**

- Due to abrupt diastolic filling of the ventricles
- Caused by constrictive pericardial disease

- **A pericardial rub**

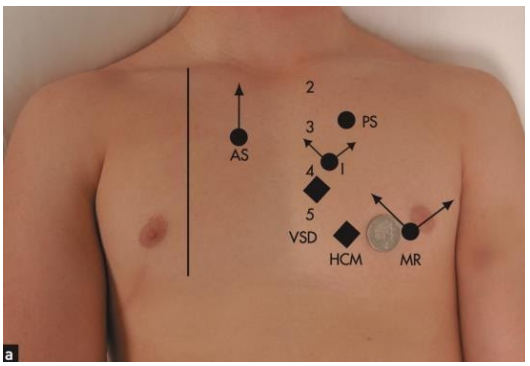
- A sound due to sliding of the two inflamed layers of the pericardium in pericarditis
- The sound can vary with posture and respiration, it tends to come and go. Best heard along the left sternal edge in 3rd & 4th ICS

Murmurs

Area of greatest intensity and Radiation

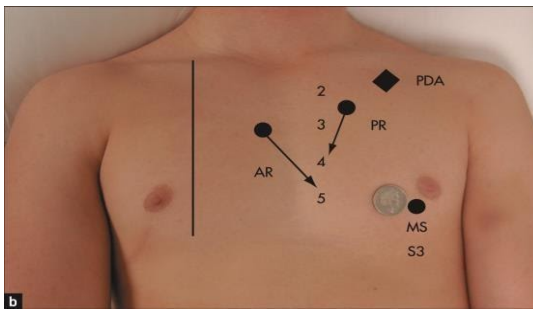
A. Systolic murmurs:

AS = aortic stenosis
MR = mitral regurgitation
PS = pulmonary stenosis
VSD = ventricular septal defect



B. Diastolic murmurs and sounds:

AR = aortic regurgitation
MS = mitral stenosis
S3 = third heart sound
PR = pulmonary regurgitation
PDA = patent ductus arteriosus (continuous murmur).



Loudness and pitch

- Grade 1/6 very soft and not heard
- Grade 2/6 soft, but can be detected
- Grade 3/5 moderate; there is no thrill
- Grade 4/6 moderate; with thrill
- Grade 5/6 loud; thrill easily palpable
- Grade 6/6 very loud; can be heard even without placing the stethoscope right on the chest

Effect of Different Dynamic Manoeuvres on Cardiac Murmurs:

	HOCM	MVP	AS	MR
Valsalva or standing (decreases preload)	↑	↑	↓	↓
Squatting, leg raise or lying down (increases preload)	↓	↓	↑	↑
Hand grip (increases afterload)	↓	↓	↓	↑

All murmurs increase by inspiration are right sided murmurs (in the pulmonary or tricuspid). All murmurs increase by expiration are left sided murmur (in the aortic or mitral)

Neck bruits:

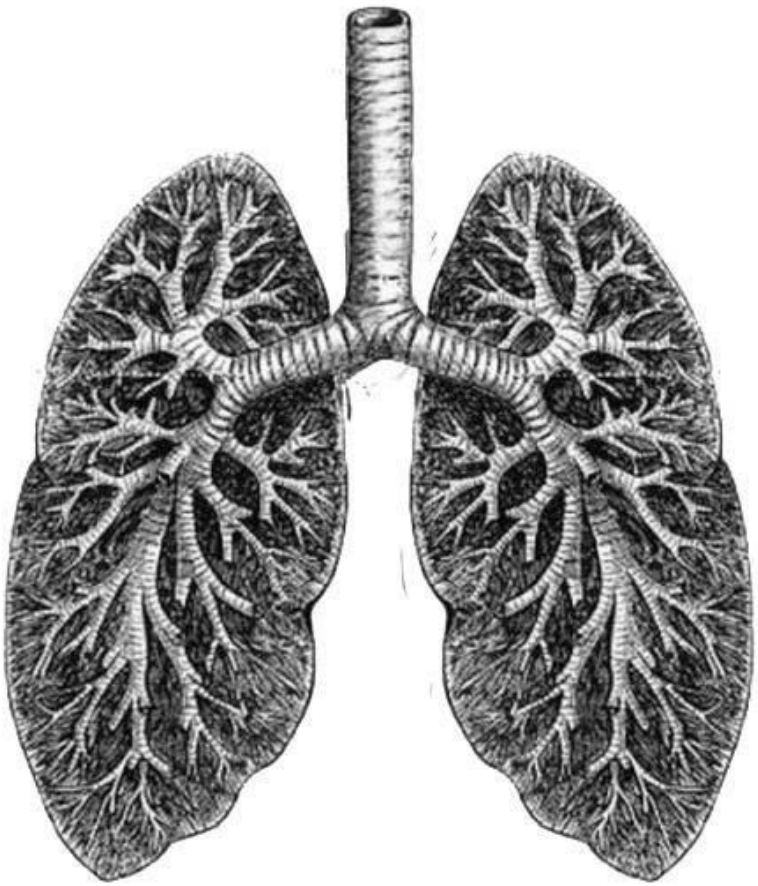
- The murmur of aortic stenosis can be audible in the neck
- Carotid artery stenosis → cause of carotid bruit which will not be audible over the base of the heart.
- Thyrotoxicosis → systolic bruit due to the increased vascularity of the gland.

TABLE 7.1 Features of important valve lesions and congenital abnormalities

	Site	Timing	Radiation	Character	Accentuation and manoeuvres	Other features
Aortic regurgitation	Aortic area	Early diastolic	Lower left sternal edge	Decrescendo	Expiration, patient leaning forwards	Wide pulse pressure, eponymous signs
Aortic stenosis	Aortic area	Systolic	Carotids	Ejection	Expiration	Separate from heart sounds, slow-rising pulse
Mitral stenosis	Apex	Middle and late diastolic	–	Low-pitched (use stethoscope bell)	Presystolic accentuation, left lateral position, exercise	Loud S1, opening snap
Mitral regurgitation	Apex	Pansystolic or middle and late systolic (mitral valve prolapse)	Axilla or left sternal edge	Blowing (MVP)	Longer and louder with Valsalva (MVP)	Parasternal impulse (enlarges left atrium)
Ventricular septal defect	Lower left sternal edge	Pansystolic	None	Localised	–	Often associated with a thrill
Tricuspid regurgitation	Lower left and right sternal edge	Pansystolic	–	–	Louder on inspiration	Big *v* waves, pulsatile liver
Hypertrophic cardiomyopathy	Apex and left sternal edge	Late systolic at left sternal edge, pan-systolic at apex	–	–	Louder with Valsalva, softer with squatting	S4, double-impulse apex beat, jerky carotid pulse

MVP = mitral valve prolapse.

Any murmur will make the sound of its corresponding sound decrease "muffled" **except** mitral and tricuspid stenosis will cause loud sound. E.g. aortic regurgitation will have muffled S_2 (S_2 is closure of aortic and pulmonary valve), mitral regurgitation will create muffled S_1 (S_1 is closure of mitral and tricuspid valve.



Respiratory System

Common Presenting Problems in the respiratory System

★ Cough

DDx:

Acute cough (<3 weeks)	Chronic cough (>3 weeks)
• Upper Respiratory Tract Infection. • Exacerbation of COPD/ asthma. • Sinusitis. • Allergic Rhinitis. • Pneumonia.	• Post nasal drip. • Asthma. • Gastroesophageal Reflux Disease (dry cough). • Lung Airway disease: COPD, Bronchiectasis (very productive cough), Tumor, Foreign Body. • Lung Parenchymal disease: Interstitial Lung disease (dry cough), Lung Abscess. • Drugs: ACE Inhibitors (dry cough).

History taking:

Personal data

- (name, age, gender, occupation, residency).

Chief complaint and history of presenting illness

- Questions related to cough: since when? Is it productive* or dry? (ask about amount, color, blood) Pattern of cough (seasonal changes, worse in the morning/ during the day/ at night and awakening from sleep). Is it painful? Does it cause syncope?
- Progression of cough (was it dry then productive? Is it worsening? + aggravating (exercise?) and relieving factors.
- Constitutional symptoms (fever, weight loss, night sweats, fatigue).
- Questions related to ddx: smoking (COPD), heartburn/ worse after eating or drinking (acid-reflux), sinus problems (URTI), frequent throat clearing (post-nasal drip), wheezes (asthma, COPD), chest pain (pneumonia), SOB (COPD, CHF), medications (side effects), recurrent infections during childhood (bronchiectasis) and hoarseness of voice (acid-reflux, malignancy).

Past medical history

- Pre-existing pulmonary disease.
- Chronic diseases (CHF, liver diseases (alpha-1 antitrypsin deficiency)).
- Atopic diseases.

Medications and allergies

- Medications that cause cough: ACE inhibitors, B-blockers, chemotherapy (Bleomycin).

Vaccinations and blood transfusions.

Family history:

- Pulmonary diseases.

- Similarly symptoms.
- Allergies (ex. if it's a child and the mother has eczema suspect asthma).
- Chronic diseases.

Social history

- (smoking, alcohol (aspiration pneumonia), traveling, contact with a sick patient, IV drug use).

*Characteristics of sputum:

Pink frothy sputum	Pulmonary edema
Foul smelling, dark color and purulent sputum	Lung abscess
Yellow to green sputum	Bronchiectasis
Blood	Bronchiectasis, malignancy, TB, bronchitis

Investigations and Treatment depend on the diagnosis, but we mostly start with PFTs and chest x-ray.

★ Hemoptysis (coughing up blood)

DDx:

- TB.
- Pneumonia/ bronchitis.
- Bronchiectasis.
- Cancer.

History taking:

Personal data

- (name, age, gender, occupation, residency).

Chief complaint and history of presenting illness:

- Since when? color of the sputum (dark or bright red)? Is it mixed with the sputum?
- Amount of blood*:
    - Mild → less than 20 mL in 24 hours (streaks of blood).
    - Massive → more than 250 mL in 24 hours (medical emergency).
- Blood elsewhere (urine, stool), easy bruising.
- Progression + aggravating and relieving factors.
- Constitutional symptoms (fever, weight loss, night sweats, fatigue, chills).
- Questions related to ddx: recent travel/ contact with a sick patient (TB), previous history of cancer/ smoking (bronchogenic carcinoma), recurrent infections during childhood (bronchiectasis), neck stiffness (tuberculous meningitis), signs of shock (PE), hematuria (wegner's/ goodpasture syndrome).

Past medical history:

- Pre-existing pulmonary disease.
- Cancer.
- Chronic diseases (HIV).

Medications and allergies.

Vaccinations (BCG) and blood transfusions.

Family history:

- Pulmonary diseases.
- Cancer.
- Chronic diseases.

Social history

- (smoking, alcohol, traveling, contact with a sick patient, recent immigration, imprisoned).

*Distinguish between hemoptysis, hematemesis and nasopharyngeal bleeding:

Favors hemoptysis	Favors hematemesis	Favors nasopharyngeal bleeding
1. Mixed with the sputum. 2. Occurs immediately after coughing.	1. Follows nausea. 2. Mixed with vomitus; follows dry retching. 3. Symptoms related to significant blood loss are commonly present (ex. orthostatic dizziness).	Blood appears in the mouth.

Investigations and Treatment depend on the diagnosis, but we mostly start with chest x-ray, CBC and sputum culture.

★ Chronic obstructive pulmonary disease (COPD)

DDx:

- CHF (orthopnea, PND).
- Asthma (since childhood, sinusitis, rhinitis, eczema).
- Bronchiectasis (recurrent infections in childhood, very productive cough).
- TB (hemoptysis, constitutional symptoms).

History taking:

Personal data

- (name, age, gender, occupation, residency).

Chief complaint and history of presenting illness

- Onset, wheezing, cough, SOB, chest tightness/ pain (SOCRATES), sputum production and hemoptysis, headache or drowsiness (CO_2 retention).
- Pattern of symptoms (worse in the morning?).
- Precipitating/ risk factors (smoking, exposure to air pollution).
- Constitutional symptoms (fever, weight loss, night sweats).
- If diagnosed → age of onset and diagnosis, progression of the disease, current treatment and response.
- Impact on daily living (number of days missed from work), limitation of activities, economic impact.
- Ask about complications: effect on sleep, symptoms of cor-pulmonale (LL edema, reduced exercise intolerance).

Past medical history

- Pre-existing pulmonary disease.
- Liver cirrhosis (antitrypsin deficiency).
- Chronic diseases.

Social history

- Smoking

+ve signs on examination:

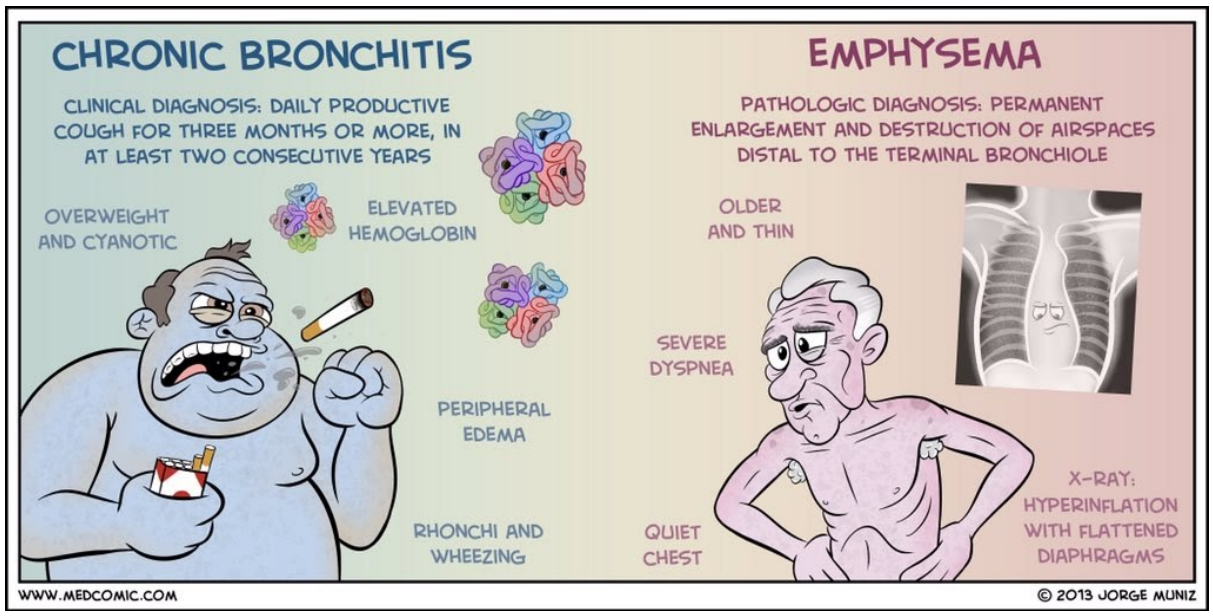
- General: use of accessory muscles, expiration through pursed lips, nicotine staining on fingernails, cyanosis, muscle weakness, raised JVP if there's cor-pulmonale, peripheral edema, no clubbing (if present, suspect lung cancer).
- Barrel-shaped chest.
- Palpation: reduced chest expansion on the affected side, Hoover's sign, tracheal tug (downward pulls of the trachea).
- Percussion: hyperresonant with decreased liver dullness (due to hyperinflation).
- Auscultation: reduced breath sounds with early inspiratory crackles and rhonchi.
- Signs of heart failure may be present in late stages of the disease (loud P_2).

Investigations:

- The most accurate diagnostic test: PFT, spirometry will show an obstructive pattern (↓FEV1/FVC ratio) with **no reversibility.**

Treatment:

- Stable COPD: SABA (albuterol) → LAMA (tiotropium) → LABA (salmeterol) + ICS → Phosphodiesterase-4 inhibitor (theophylline) → Systemic steroids (prednisolone) → Pulmonary rehabilitation.
- COPD exacerbation:
    - Antibiotics: azithromycin or doxycycline.
    - Steroids: prednisolone if the patient can tolerate oral intake, or IV methylprednisolone.
    - Oxygen therapy: if O2 saturation is less than 88% or PaO2 is less than 55 mmHg (keep O2 saturation between 88-92%).



★ Asthma

DDx:

- COPD (older age).
- Bronchiectasis (history of recurrent infections during childhood).
- Pneumonia (in asthma exacerbation).
- Airway obstruction.

History taking:

Personal data

- (name, age, gender, occupation, residency).

Chief complaint and history of presenting illness:

- Onset, wheezing, cough, SOB, chest tightness/ pain (SOCRATES), sputum production and hemoptysis.
- Pattern of symptoms (seasonal? episodic? number of days and nights per week/month).
- Precipitating factors (infections, allergens, smoking, exercise, stress, drugs, occupation, food, changes in weather, GERD).
- Constitutional symptoms (fever, weight loss, night sweats).
- If diagnosed → age of onset and diagnosis, progression of the disease, current treatment and response, frequency of using SABA, need for oral corticosteroids and frequency of use.
- Impact on daily living (number of days missed from school/ work), limitation of activities, effect on sleep and growth, economic impact.

Past medical history:

- Sinusitis, rhinitis, eczema or nasal polyps.
- Chronic diseases.
- History of exacerbations: ask about signs and symptoms, rapidity of onset, duration, frequency (number of exacerbations in the past year), severity (hospitalization, admission to ICU).

Family history:

- asthma, allergy, sinusitis, eczema or nasal polyps, chronic diseases.

Social history:

- social factors that interfere with adherence such as substance abuse, social support, level of education.

Gynecological history

- (if menses or pregnancy are affecting asthma).

+ve signs on examination:

- Exacerbation: inspiratory and expiratory wheezing, dry or productive cough, tachypnea, tachycardia, prolonged expiration, use of accessory muscles.

- Signs of severe asthma: appearance of exhaustion and fear, inability to speak because of breathlessness, drowsiness due to hypercapnia, cyanosis, reduced breath sounds/ silent chest (status asthmaticus).

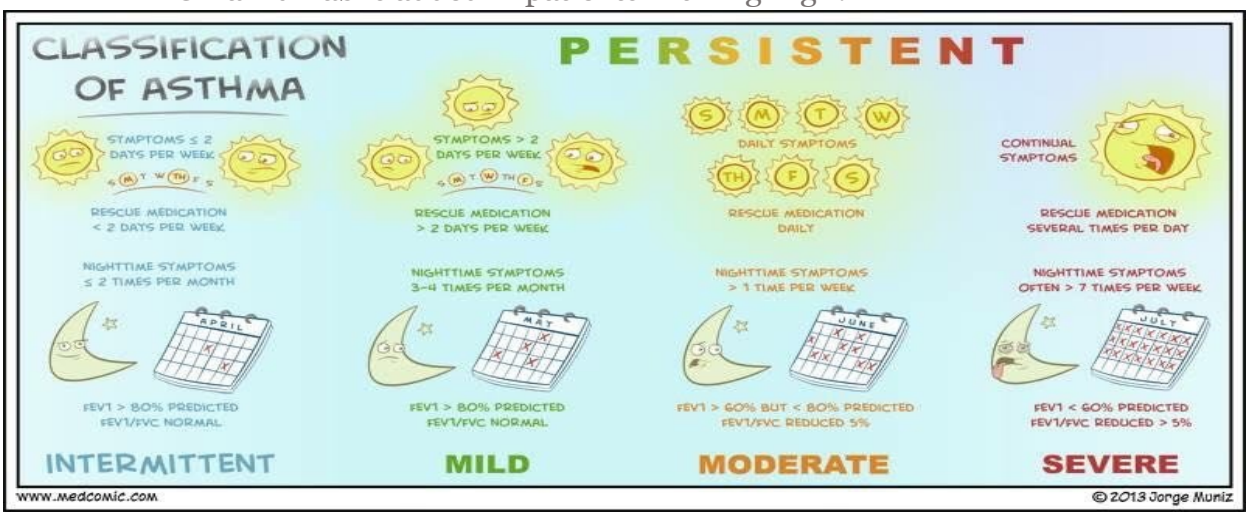
Investigations:

- The most accurate diagnostic test **in an asymptomatic** patient is PFTs, spirometry will show a decrease in FEV1/ FVC ratio (FEV1 is reduced more than FVC):
    - If PFTs are normal, we do methacholine challenge test (reduction in FEV1 of more than 20% is considered positive). If it's negative then the patient doesn't have asthma.
    - If PFTs are not normal, we do albuterol response test (increase in FEV1 of more than 12% and 200 mL is considered positive. If it's negative then the patient doesn't have asthma.
- The best initial test in acute asthma exacerbation is peak expiratory flow or arterial blood gas.

Treatment: Depending on severity:

Category	Diurnal symptoms	Nocturnal symptoms	FEV1	Treatment
I	<2/week	<2/month	80%	SABA when needed
II	3-6/week	3-4/month	80%	SABA + ICS (or LTA)
III	≥1/day	≥5/month	60-80%	SABA + ICS + LABA
IV	≥1/day	Frequent	≤60%	SABA + maximum ICS + LABA + tiotropium
V	Refractory			Add systemic corticosteroids

*Omalizumab is added in patients with high IgE.



★ Interstitial lung disease (ILD)

DDx:

- Idiopathic pulmonary fibrosis (>6 months).
- Sarcoidosis (extrapulmonary manifestations).
- Hypersensitivity pneumonitis (bird keeping).
- Asbestosis (asbestos exposure → working in a shipyard).

History taking:

Personal data

- (name, age, gender, occupation (mining, shipyards, quarrying, sandblasting, farming, residency).

Chief complaint and history of presenting illness:

- Onset, SOB, hemoptysis, dry cough, exercise intolerance and wheezing.
- Duration of the illness (is it better during vacations/ worse during work days?).
- Progression of the disease.
- Hobbies (bird keeping).
- Extrapulmonary manifestations: ocular, cutaneous (erythema nodosum/ papules), myocardial (cor-pulmonale), rheumatologic (joint pain), GI and neurologic (facial palsy).
- Constitutional symptoms (fever, night sweats, weight loss).

Past medical history:

- Pre-existing pulmonary disease.
- Chronic diseases.

Medications (amiodarone, bleomycin, previous radiation) and allergies.

Family history (of pulmonary diseases).

Social history (smoking, travel history).

+ve signs on examination:

- General: cyanosis, clubbing may be present.
- Palpation: chest expansion is slightly reduced.
- Auscultation: late or pan-inspiratory crackles over the affected lobes.
- Signs associated with connective tissue disease: rheumatoid arthritis, SLE, scleroderma and dermatomyositis.

Investigations:

- Chest x-ray is the best initial test, high resolution CT scan is more accurate than chest x-ray, the most accurate test is lung biopsy.

Treatment: depending on the underlying etiology:

Disease	Treatment
Idiopathic pulmonary fibrosis	Pharmacological: pirfenidone Non-pharmacological: lung transplantation
Sarcoidosis	A trial of steroids *Conditions that mandate the use of steroids in sarcoidosis: uveitis, involvement of the heart and CNS, pts who develop hypercalcemia.
Asbestosis	Stop smoking
Silicosis	No effective therapy but screen them yearly for TB.

★ Pneumonia

DDx:

- TB (history of travel, hemoptysis).
- Bronchiectasis (recurrent infections in childhood, very productive cough).
- COPD (worse in the morning, chronic).
- Brucellosis (drinking unpasteurized milk, joint pain).
- +ve signs on examination:
- Palpation: dullness, chest expansion is reduced on the affected side.
- Increased vocal fremitus and vocal resonance on the affected side.
- Auscultation: bronchial breath sound, late or pan-inspiratory crackles, egophony (E to A). Pleural rub may be present

History taking:
Personal data (name, age, gender, occupation, residency).

Chief complaint and history of presenting illness:

- Onset, dyspnea, productive cough (timing, smell), pleuritic chest pain (worse during inspiration?), hemoptysis.
- Duration of the illness, precipitating factors.
- Progression of the disease.
- Hospital visits in the past 90 days.
- Constitutional symptoms (fever, weight loss, night sweats).
- Close contact with a sick person.
- Drinking unpasteurized milk or eating uninspected/ raw meat.

1. Past medical history:

- Pre-existing pulmonary disease.
- Sinusitis, rhinitis.
- Previous hospitalization/ ventilation.
- Chronic diseases.

Medications (prescribed meds and response to them/ over the counter meds) and allergies.

Vaccinations and blood transfusions.

Social history (smoking, alcohol drinking, recent travel).

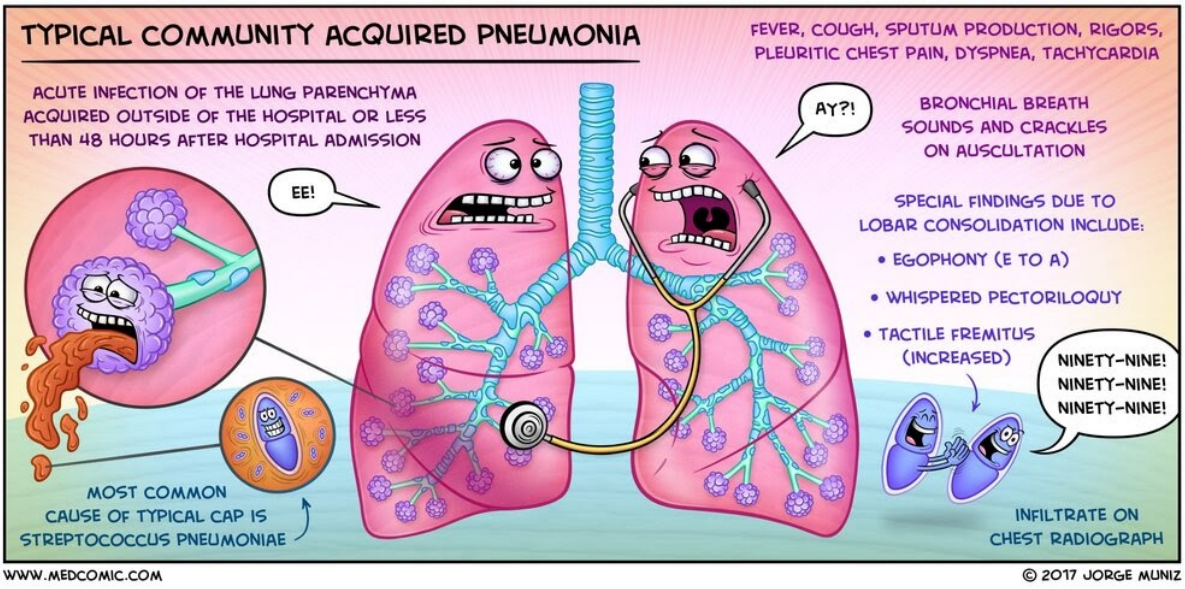
Systemic review (ask about joint pain).

Investigations:

- Initial test is chest x-ray, SpO2.
- Criteria for admission: CURB-65.

Treatment:

Patient presents with cough + fever → do chest x-ray and measure oxygen saturation		
-ve CXR **-outpatient-**: give the patient **either:** 1. macrolides (azithromycin). 2. Doxycycline. 3. Fluroquinolones (moxifloxacin).	Cavitation on CXR **-inpatient-**: cavitary lesion, do CT scan to determine the cause, if it's abscess give the patient 3rd generation cephalosporins and clindamycin.	Consolidation on CXR **-inpatient-**: assess exposure to hospitals: 1. Yes → hospital acquired pneumonia: give piperacillin + tazobactam, and vancomycin to cover MRSA. 2. No → 3rd generation cephalosporins and macrolides **or** fluroquinolones.



★ Tuberculosis

DDx:
- Pneumonia (acute).
- Lung cancer.
- Brucellosis (drinking unpasteurized milk, joint pain).
- Sarcoidosis (non-caseating granuloma).

History taking:
Personal data
- (name, age, gender, occupation, residency).

Chief complaint and history of presenting illness:
- Onset, dyspnea, cough, hemoptysis, fatigue.
- Duration of illness.
- Progression of symptoms.
- Recent travel to areas with high TB rates (ex. india).
- Constitutional symptoms (fever, weight loss, night sweats).
- Close contact with a sick person.
- Undergone PPD test before and what was the result.
- Drinking unpasteurized milk or eating uninspected/ raw meat.

Past medical history:
- Chronic diseases.
- HIV.
- Previous diagnosis of TB and what was done.

Medications and allergies.

Vaccinations (BCG) and blood transfusions.

Family history (same symptoms).

Social history (smoking, alcohol, IV drug use).

Systemic review (ask about joint pain).

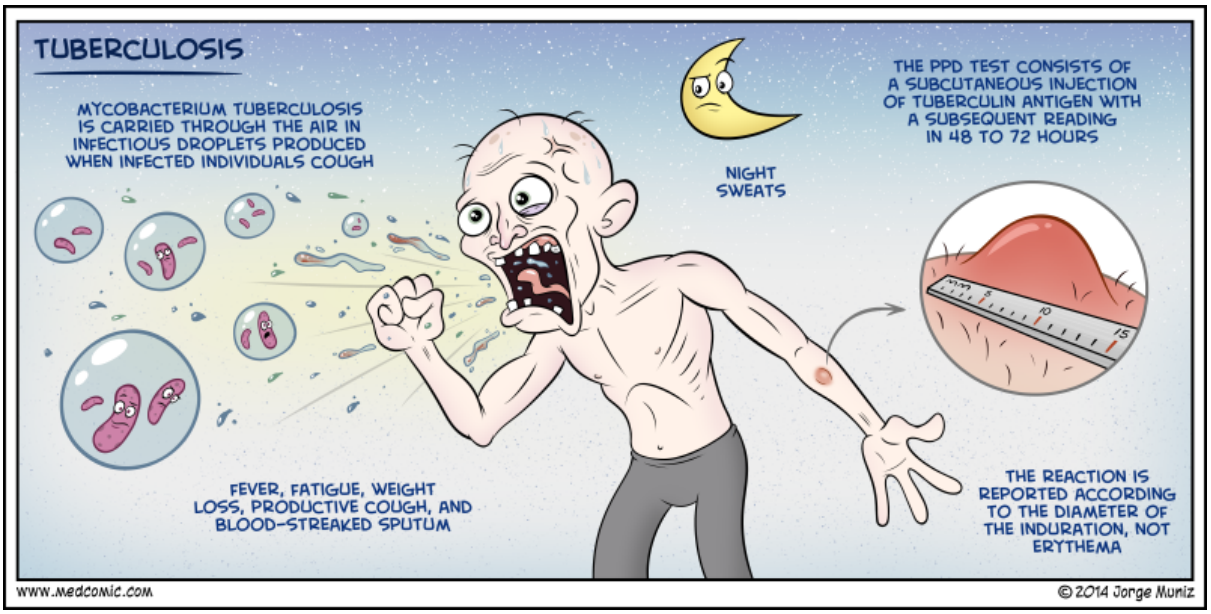
+ve signs on examination: depends on the time of presentation, they could be asymptomatic.
- Tracheal compression → stridor accompanied by respiratory distress.
- Recurrent laryngeal nerve involvement → hoarseness.
- Paralysis of phrenic nerve → dullness to percussion on the affected base, absence of breath sounds.

Investigations:

- Asymptomatic: PPD (alternative is interferon gamma assay):
  - If -ve and the patient has never been exposed, stop the investigation (depending on why they did the test).
  - If +ve and there was an exposure, do chest x-ray:
    - If -ve → latent TB, give the patient Isoniazid and vitamin B6 for 9 months.
    - If +ve do AFB test → if -ve treat as latent T, if +ve it's an active TB give the patient the 4 TB drugs.
- Symptomatic: do chest x-ray and AFB/ smear:
  - If both -ve: do nucleic acid amplification test (NAAT) to confirm it's -ve.
  - If both +ve: active TB, give the patient the 4 TB drugs.
  - If CXR is +ve but AFB is -ve: give the patient Isoniazid and vitamin B6.

Treatment: RIPE:

1. Rifampicin: red discoloration of body fluids.
2. Isoniazid: peripheral neuropathy (you have to give B6 with it).
3. Pyrazinamide: hyperuricemia.
4. Ethambutol: eye problems (red/ green color blindness).



★ Brucellosis

Differential diagnosis:
- TB (history of travel, hemoptysis).
- Bronchiectasis (recurrent infections in childhood, very productive cough).
- COPD (worse in the morning, chronic).
- Pneumonia (contact with a sick person, hospitalization).

History taking:
Personal data (name, age, gender, occupation, residency).

Chief complaint and history of presenting illness:
- Onset, dyspnea, productive cough (timing, smell), chest pain, hemoptysis.
- Accompanied by joint/ muscle pain, headache, chills, lethargy and weakness?
- Duration of the illness, precipitating factors.
- Progression of the disease.
- Constitutional symptoms (fever, weight loss, night sweats).
- Close contact with a sick person.
- Drinking unpasteurized milk or eating uninspected/ raw meat.

Past medical history.
- Pre-existing pulmonary disease.
- Sinusitis, rhinitis.
- Previous hospitalization/ ventilation.
- Chronic diseases.

Medications and allergies.

Vaccinations and blood transfusions.

Family history.

Social history (smoking, alcohol, recent travel).

+ve signs on examination:
- Hepatosplenomegaly may be the only finding, however, the patient could have muscle weakness, joint swelling, tenderness and limited range of motion.

Investigations: Blood, CSF and urine cultures.

Management: Doxycycline and gentamicin. Add rifampin for bone and heart infections.

Respiratory examination

WIP3E: **W**ash your hands, **I**ntroduce yourself, **P**ermission, **P**rivacy, **P**osition, **E**xposure.
Position: Sitting (to examine front and back).
Exposure: full exposure of the trunk.
In respiratory examination we do: inspection (general and chest), palpation, percussion, auscultation.
*Also mention that you'll do vital signs.
***DON'T FORGET TO COMPARE BOTH SIDES.**
*If you are asked to do focused respiratory examination, do the **CHEST PART** only.

Inspection (general and chest):

1. **General:**

i. ***ABC2DE:*** Appearance, body built, color, connections to any devices, distress, else (orientation, consciousness, alertness).

ii. ***Hands****:*

1. Nails: clubbing, peripheral cyanosis.
2. Fingers: tar staining.
3. Muscle wasting/ weakness, palmar erythema.
4. Temperature (both hands and arms).
5. Pulse rate: tachycardia and pulsus paradoxus are important signs of severe asthma.
6. Flapping tremor (asterixis): occurs with severe co2 retention, ask the patient to dorsiflex the wrist with the arms outstretched and to spread out the fingers. If it doesn't immediately appear, it can be accentuated by gently hyperextending the patient's wrist.

iii. ***Face:***

1. Eyes: pallor and horner's syndrome (constricted pupils, partial ptosis and anhidrosis).
2. Nose (you may need a speculum and a torch):
   a. Nasal polyps → Asthma.
   b. Engorged turbinates → Allergy.
   c. Deviated septum → Nasal obstruction.
3. Mouth: oral hygiene (broken/ rotten tooth stump), tonsillar enlargement (URTI) and central cyanosis below the tongue.

iv. ***Neck:***

1. Assess the carotid and JVP (internal jugular vein) by placing the patient on 45 degrees. Differences between them:

mnemonic: POLICE	Carotid artery	Internal jugular vein
Palpation	Palpable	Non-palpable
Occlusion	Non-occludable	Readily occludable
Location	IJV is between the 2 heads of sternocleidomastoid muscle, lateral to carotid	

Inspiration	No changes with inspiration	Drops with inspiration
Contour	IJV has biphasic waveforms	
Erection/ position	Doesn't change with position	Drops when sitting erect +ve hepatojugular reflux

v. Chest:

***FRONT:**

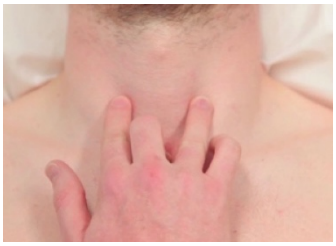
1. Shape and deformities: pectus excavatum, carinatum, barrel chest or kyphoscoliosis.
2. Scars: lobectomy, pneumonectomy, midline sternotomy (tracheostomy), lateral thoracotomy (chest tube).
3. Prominent veins (could indicate SVC syndrome).
4. Subcutaneous emphysema (air under the skin).
5. Movement of chest wall and symmetry during inspiration:
   - Females: thoracoabdominal.
   - Males: abdominothoracic.
6. Use of accessory muscles during breathing (sternocleidomastoid, platysma and the strap muscles of the neck).
   - Apex beat: visible or not.

***BACK:**

1. Shape and deformities: scoliosis, kyphosis, kyphoscoliosis.
2. Scars.
3. Symmetry.

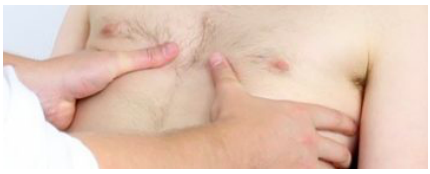
Palpation (chest): *ask the patient if he has any pain before starting

***FRONT:**



1. Tracheal position: check if the trachea is centrally located, put your index and ring fingers on the sternoclavicular junctions while your middle finger is on the trachea.
2. Tracheal tug (a sign of hyperinflation): downward displacement of the trachea with inspiration. It is demonstrated when the finger resting on the tracheal feels it move inferiorly with each inspiration.
3. Palpate the neck and supraclavicular lymph nodes.
4. Palpate the ribs for bony tenderness (rib fracture).
5. Feel the apex beat (fifth intercostal space, mid-clavicular line).
6. Tactile vocal fremitus: ask the patient to say (ninety nine in English or أربعة وأربعين بالعربي).
7. Chest expansion: ideally, it is measured by hand or meter over the three areas: upper middle and lower. تحط يدك حول صدر المريض وتقول له ياخذ نفس عميق وتشوف إذا فيه اختلاف

- At the apex of the lung: place your hands on the apices and observe their movement up and down with each respiratory cycle.



- Middle and lower zones (below the nipple): place your hands as a circle around the chest and observe your thumbs moving apart with each respiratory cycle. A separation of 3-5 cm is considered a good expansion.comment if normal symmetrical chest expansion.

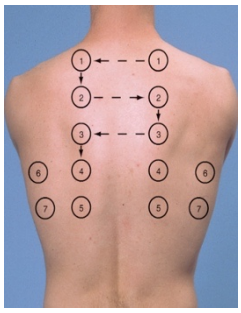
***BACK:**

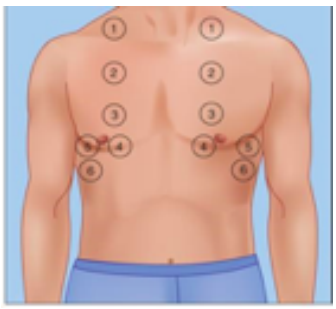
1. Tactile vocal fremitus.
2. Chest expansion.

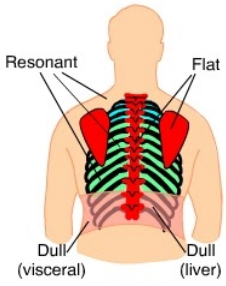
Percussion (chest):

***FRONT:** Normally it is resonant and symmetrical in both sides, you may also check for liver dullness to assess the extent of the diaphragm.
Normally, the upper level of liver dullness is the sixth intercostal space in the right midclavicular line. If the chest is resonant below this level it's a sign of hyperinflation (emphysema or asthma).

***BACK:** Normally it is resonant and symmetrical in both sides, don't forget to ask the patient to join his hands when percussing the upper lobes to move the scapula out of the lung fields.







Auscultation (chest):

***FRONT:**

1. Using the diaphragm of the stethoscope, it's important to compare each side with the other.
2. Remember to listen high up into the axillae and, by applying the bell of the stethoscope above the clavicles, to listen to the lung apices.
3. Describing breath sounds:
   a. Intensity: normal or reduced.
   b. Type of breathing and if there's any added sounds*.
4. Vocal resonance:
   . Ask the patient to say (ninety nine or أربعة وأربعين), if there's consolidation vocal resonance will increase.
   a. Aegophony: ask the patient to say "e" and if it sounds like "a" that means there's consolidation.
   b. If vocal resonance is increased → whispering pectoriloquy test: ask the patient to whisper (1,2,3..etc), normally they will not be clear, if they are clear, it confirms the presence of consolidation.

***BACK:**

1. Don't forget to ask the patient to join his hands when auscultating the upper lobes.
2. Describe breath sounds.
3. Vocal resonance and whispering pectoriloquy test.

*Normal breath sounds:

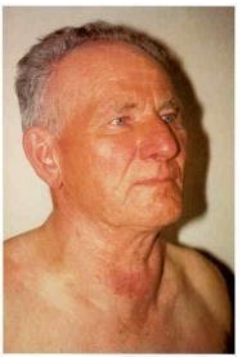
1. Vesicular: inspiratory phase longer than expiratory phase with no gap.
2. Bronchial: inspiratory phase equal to expiratory phase with gap in between. It's heard normally over the trachea and apex (other than these two is considered abnormal -usually consolidation-).

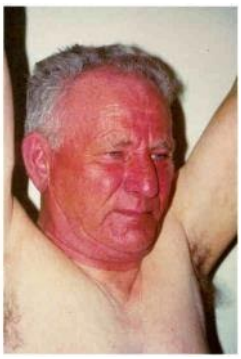
*Added (adventitious) sounds:

Wheezes (continuous)	• Must be timed in relation to the respiratory cycle (inspiratory/ expiratory). • Why is wheezing louder on expiration? (this is because the airways normally dilate during inspiration and are narrower during expiration). An inspiratory wheeze implies severe airway narrowing. ○ (wheezing) high-pitched → acute airway obstruction → asthma, acute bronchitis. ○ (rhonchi) low-pitched → chronic airway obstruction COPD. • A fixed bronchial obstruction, usually due to a carcinoma of the lung, tends to cause a localised wheeze, which has a single musical note. • It must be distinguished from stridor which sounds very similar to wheezing but is louder over the trachea and is always inspiratory.
Crackles (non-continuous)	• Caused by the opening and closing of small airways. • Crackles can be described according to their timing (early or late) and intensity (fine (rales), medium, coarse (crepitations)): ○ Early inspiratory crackles —> COPD. ○ Late inspiratory crackles —> CHF ○ Fine crackles —> interstitial lung disease. ○ Medium crackles —> CHF ○ Coarse —> bronchiectasis or any disease that leads to retention of secretions.
Pleural friction rub	• When thickened, roughened pleural surfaces rub together as the lungs expand and contract, indicates pleurisy, which may be secondary to pulmonary infarction or pneumonia. • The difference between pleural friction rub and pericardial friction rub is when the patient stops breathing the pleural friction rub stops while the pericardial continues.

Others:

1. Pemberton's sign: ask the patient to lift the arms over the head and wait for one minute, note the development of facial plethora, cyanosis, inspiratory stridor and non-pulsatile elevation of JVP. This occurs in SVC obstruction.
2. Legs: edema may suggest cor-pulmonale, look for signs of deep venous thrombosis.
3. Sacral edema.
4. Respiratory rate on exercise.

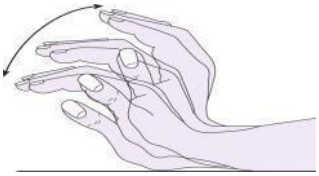




Mention that you'll end your examination with CVS examination.

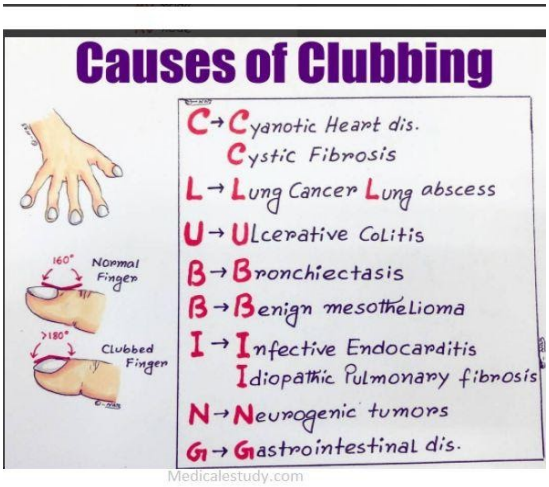
Physical Signs in Respiratory Examination

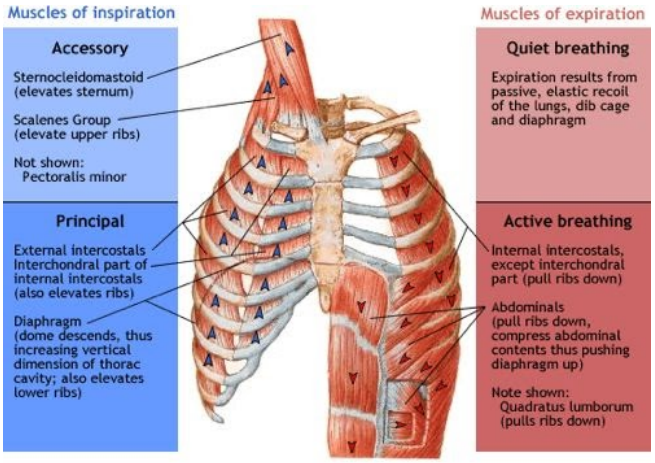
General	Dyspnea	• Normal breathing range (16-25) • Tachypnoea: more than 25 • Bradypnoea: less than 8
	Cyanosis	Central cyanosis: blueness of the tongue and oral cavity (due to fall in arterial O2)
		Peripheral cyanosis: blueness of the hands and feet (due to cold or circulatory disease)
	Stridor (requires urgent attention)	• Loud, inspiratory, intense sound with constant pitch • Best heard over the extrathoracic airways • Causes: foreign body, tumor, infection
	Hoarseness	Causes: Laryngitis (most common), use of inhaled corticosteroids for asthma, GERD, recurrent laryngeal nerve palsy associated with carcinoma of the lung (usually left- sided), laryngeal carcinoma.
Hands	Pulsus paradoxus	A fall of systolic blood pressure of >10 mmHg during the inspiratory phase • Severe asthma • cardiac tamponade

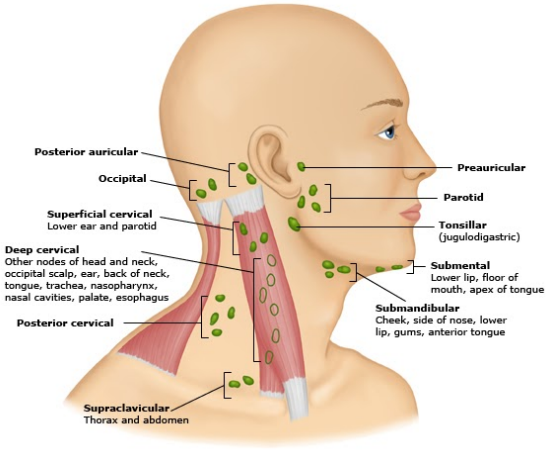
	Flapping tremor (asterixis)	 Three failures: 1. Respiratory failure (high co2) 2. Liver failure (high ammonia) 3. Chronic renal failure (high urea)
Others	Nasal polyps	Asthma
	Crowding of the pharynx (reduction in the size of the velopharyngeal lumen)	Sleep apnoea
	Tenderness over the sinuses	Acute sinusitis
	Facial plethora or cyanosis	Superior vena cava obstruction
	Horner's syndrome (a constricted pupil, partial ptosis and loss of sweating)	Apical lung carcinoma (Pancoast's tumor)

Respiratory diseases

Disorder	Pleural effusion	Consolidation	Emphysema	Pneumothorax	Collapse
Chest expansion	Decreased	Decreased	Decreased	Decreased	Decreased
Tracheal deviation	Contralateral	-	-	Contralateral	Ipsilateral
Fremitus	Decreased	Increased	Decreased	Decreased	Decreased
Percussion	Stony dullness	Dull	Hyper-resonant	Hyper-resonant	Dull
Pectoriloquy	Decreased	Increased	Decreased	Decreased	Decreased
Breath sounds	Decreased	Bronchial	Crackles	Decreased	Decreased

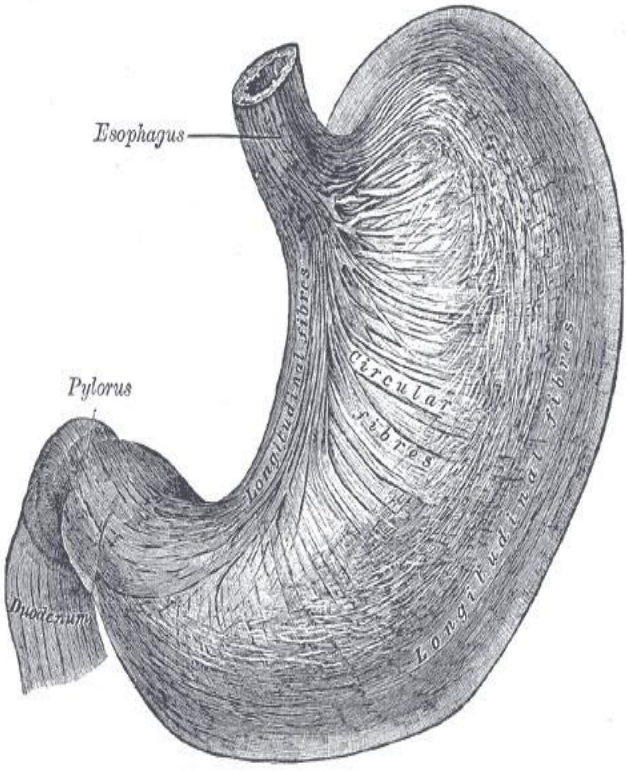






LIST 10.2 Causes of tracheal displacement

1. **Towards the side of the lung lesion**
   Upper lobe collapse
   Upper lobe fibrosis
   Pneumonectomy
2. **Away from the side of the lung lesion (uncommon)**
   Massive pleural effusion
   Tension pneumothorax
3. **Upper mediastinal masses, such as retrosternal goitre**



Gastrointestinal system

Common Presenting Problems in Gastrointestinal system

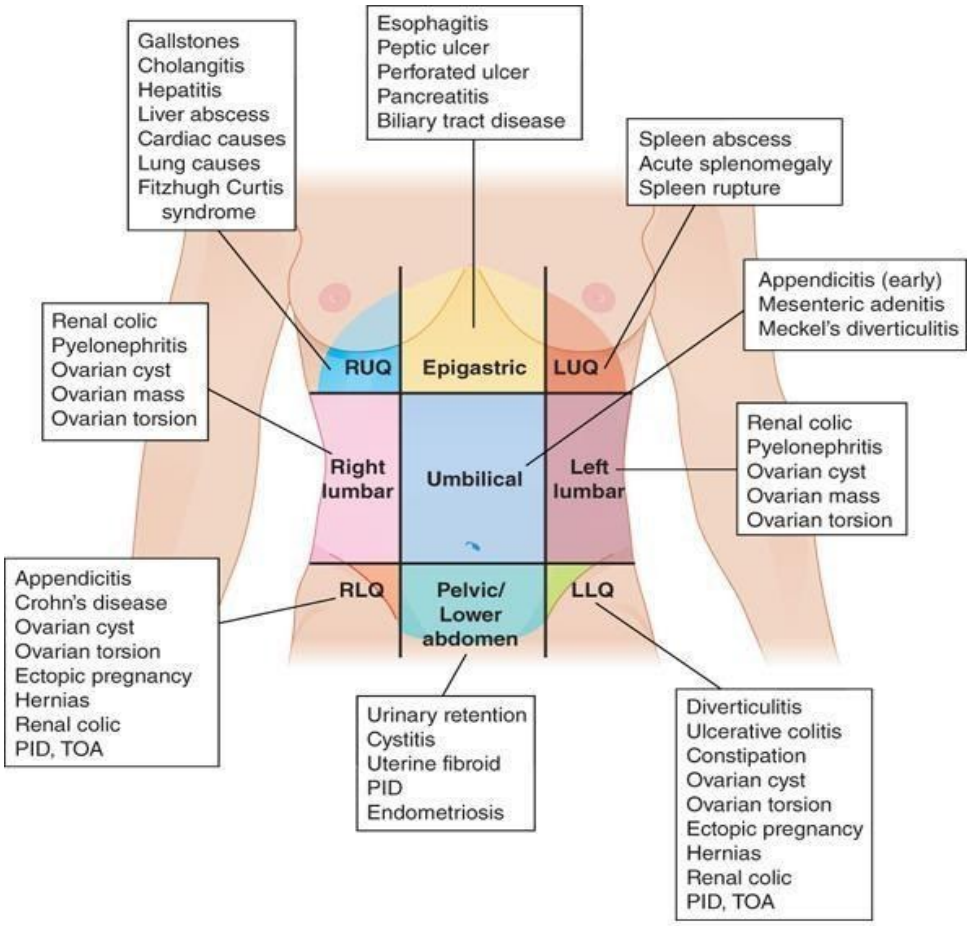
Abdominal pain:

Acute Causes						
Disease	**Timing**	**Location and Radiation**	**Associated Symptoms**	**Comments**	**Investigations**	**Management**
Appendicitis	Sudden onset	Often starts *periumbili-cal* with migration to *RLQ*	Nausea, Vomiting, Anorexia, Fever	-Severe abdominal pain. -More common in children and young adults.	-Clinical diagnosis -USS abdo/pelvis if gyne differentials -Inflammatory markers -Urine βHCG: rule out ectopic	-Appendectomy
Diverticulitis	Persisten t	*LLQ*	-Fever, anorexia, Nausea, Vomiting, Abdominal distension	-Hx of diverticulosis	-Inflammatory markers: raised -Flexible sigmoidoscopy or CT abdo/pelvis	-NPO + IVF -Antibiotics
★ **Pancreatitis**	Acute onset, Constant	*mid-abdomin/epi gastr-ic* pain that often radiates to the *back*	Nausea, Vomiting	-Severe pain -Hx of biliary colic, alcohol abuse *Causes of acute pancreatitis?* -Idiopathic -Gallstones -Ethanol -Trauma -Steroids -Mumps -Autoimmune (eg. PAN) -Scorpion Venom Hyperlipidaemia, Hypercalcaemia -ERCP -Drugs (azathioprine, thiazides, valproate, asparaginase, allopurinol) -Pregnancy *Complications of acute pancreatitis?* Early: -Shock, Acute kidney injury, ARDS, Sepsis, Hypocalcaemia,hyperglycaemia,pancreatic necrosis	-Clinical diagnosis 2 of 3: 1. Typical mid-epigastric pain 2. Lipase raised x3 (more specific than amylase) 3. CT only if diagnostic uncertainty or suspected infection -Not improving or deteriorating = infection: CT + guided biopsy -LFT To find the etiology (not diagnosis): -USS abdo (exclude gallstones in all patients) -Triglycerides -immunoglobulins (autoimmune pancreatitis) ***Ranson's criteria:*** 11 parameters, 5 assessed at admission and 6 during the next 48hr, predicts mortality **-Admission criteria GALAW:** Glucose >200 mg/dl Age >55 LDH >350 AST>250	-NPO, IVF, analgesia -Start feeding when anorexia&pain resolve -Stop causative meds -No antibiotics unless proven infection -Cholecystectomy during same admission if gallstone pancreatitis. -ERCP: theraputic only if cholangitis or nonresolving biliary obstruction.

				Late: -Pancreatic necrosis, pseudocyst (May need internal (via stomach) or external drainage), Abscess, Thrombosis-splenic/gastroduodenal arteries	WBC>16,000 **-Initial 48-hr criteria C HOBBS:** Calcium <8 mg/dl Decrease in Hematocrit >10% PaO_2 <60 mmhg BUN increase >4 mg/dl Base deficit >4 mg/dl Fluid Sequestration >6L	
Bowel Obstruction (Adhesion) Bowel Obstruction (Incarcerated/ strangulated hernia)	intermittent	-	Nausea, Vomiting, Constipation Absence of flatus	-Cramp-like abdominal pain -Hx of abdominal or pelvic surgery/hernia	-AXR: distended bowel loops -CT abdo/pelvis: confirm and determine cause	-NPO+IVF -NG tube -Laparoscopy/laparotomy depending on cause
Cholecystitis	-	*RUQ* radiates to the right *shoulder or back*	Fever, Nausea, Vomiting	-Hx of cholelithiasis and biliary colic. Exacerbated by eating (especially fatty foods) -More common in women than men -Risk factors: obesity, age over 50, pregnancy	-LFTs: obstructive picture if CBD stones/cholangitis -Inflammatory markers: raised -Abdominal USS	**Biliary colic:** -Analgesia -Elective Cholecystectomy **Cholecystitis:** -Antibiotics -Cholecystectomy (emergency/6w) **CBD stone** -Continuous IV infusion (prevent hepato-renal syndrome) -ERCP
Cholangitis		*RUQ*	Fever, Jaundice	-Charcot's triad: RUQ, pain, fever, and jaundice		-IV antibiotics -Treat cause
Nephrolithiasis	-	*Flank* radiating to the *groin*	Nausea, Vomiting, Diaphoresis,Hematuria, Frequency, Urgency	-Severe abdominal -Previous hx of stones -May be renal angle tenderness	-UA: microscopic haematuria -KUB X-ray -CT KUB	-Analgesia -Smooth muscle relaxants (nifedipine/tamsulosin) -Antibiotics if infection -Pelvic stone: - <2cm – ESWL - >2cm – PCNL -Ureteric stone - <5mm – conservative - <1cm – ESWL - >1cm - ureteroscopy

Pyelonephritis			-Fever, chills, rigors -Loin pain -Urinary frequency and dysuria	-Loin tenderness -Renal angle tenderness	-UA + culture: positive leukocytes and nitrites -Inflammatory markers: raised	-Antibiotics
Perforated PU / peritonitis	Sudden, Constant	*Epigastric*	-	-All movement, including respiration, makes the pain worse causing the patient to lie immobile on the bed. -Guarding -Rebound tenderness -Hx of Ulcer, -H.pylori, -NSAID use	-Erect CXR: air under diaphragm -CT abdo/pelvis: reveal cause	-Urgent repair
Aortic dissection	-	*Thorax or abdomen,* radiates to the *back*	-	-Severe, sharp or tearing pain -Hx of HTN -Increased risk in Marfan and Ehlers-Danlos syndrome or other collagen vascular disorders	-CXR: widened mediastinum -CT angio or transoesophageal echo -ECG: may be signs of MI	-Type A → surgical repair -Type B → BP control
Ectopic pregnancy	-	unilateral *pelvic*	Amenorrhea, vaginal bleeding	- Hx of recent early pregnancy or missed last menstrual period	-Urinary βHCG: +ve -Serum βHCG + trend -Transvaginal USS	-Laparoscopy/laparotomy (or methotrexate if uncomplicated) -Anti-D prophylaxis (if required)
Acute intestinal ischemia	Constant	*Periumbilical* nonradiating	-	-Age >50 years -Recent hx of postprandial abdominal pain -Hx of atrial fibrillation, coronary artery disease, MI, and CHF -Risk factors include smoking, HTN, hyperlipidemia, and DM Soft abdomen (pain out of proportion to exam)	-VBG: ↑lactate -CT abdo/pelvis: ischaemic bowel -Mesenteric angiography: if required	-Aggressive IV fluids -Antibiotics -Surgical bowel resection -Heparin may be used

	Chronic Causes
Disease	**Characteristics**
IBS	Abdominal pain with alteration of bowel habits; pain relieved with defecation; may be associated with diarrhea or constipation, or both; exacerbated by psychosocial stressors
PUD	Epigastric pain, may be worsened or relieved by food, hx of NSAID and alcohol use, hx of black stool, hematemesis
IBD (ulcerative colitis)	Bloody diarrhea is the principle symptom, defection may relieve lower abdominal cramps
IBD (crohn's disease)	Crampy abdominal pain, intermittent diarrhea, weight loss, fatigue, Family hx of inflammatory bowel disease
Chronic cholecystitis	Upper abdominal indigestion-like pain after eating, Hx of gallstones
Celiac disease	Nonspecific abdominal pain, bloating; diarrhea; greasy, foul-smelling stools; weight loss; anemia, ataxia, osteoporosis
GERD	Burning epigastric/chest pain, heartburn, regurgitation worse with some foods and recumbence; improved by antacids
Chronic intestinal ischemia	Dull, crampy, periumbilical abdominal pain, comes after the meal by 1h, the patient is usually smoker and having other atherosclerotic disease (CAD, intermittent claudication)



Personal Data:

- Age: Young? appendicitis, Old? Diverticulitis.
- Gender: female? biliary colic.

HPI:

- Site:
  - Epigastric? (pancreatitis, peptic ulcer, MI, aortic dissection).
  - RUQ? (Cholecystitis, gallstone, hepatitis).
  - RLQ? (appendicitis, inguinal hernia).
  - LUQ? (Pancreatitis, Peptic ulcer).
  - LLQ? (Diverticulitis, Inguinal hernia)
- Onset:
  - <12w? (acute).
  - >12w? (chronic)
- Character:
  - Colicky? (intestinal obstruction, Gallstone, Renal colic,IBS).
  - Dull? (MI, bowel ischemia).
  - Tearing? (Aortic dissection).
  - Burning? (Peptic ulcer).
  - Sharp? (Appendicitis)
- Radiation :
  - To the back? (pancreatitis, aortic dissection, PU).
  - To the right shoulder? (Cholecystitis, biliary colic).

    - To the left shoulder? (Splenomegaly, splenic infarction)
    - To the neck? (GERD).
- Relieving:
    - Eating? (Duodenal ulcer)
    - Lean forward? (pancreatitis)
    - Stay still? (peritonitis)
    - Defecation? (IBS)
    - Antacids? GERD
- Aggravating:
    - Eating? (pancreatitis, gastric ulcer, mesenteric ischemia)
    - Fatty food? (Gallstone)
    - Dairy? (Lacctose intorolerance)
    - Movement? (Appendicitis, peritonitis)

Associated symptoms:
- N&V? (pancreatitis, intestinal obstruction)
- Diarrhea (infection, malabsorption, IBD)
- Jaundice? (Cholangitis)

Constitutional symptoms:
- Weight loss?
    - With decreased appetite (GI malignancy).
    - With increased appetite ? (Malabsorption, hypermetabolic state)
- Fever? (Appendicitis, cholangitis, cholecystitis, IBD)
- Anorexia? Pancreatitis, appendicitis.

Risk Factors:
- Medical:
    - hx of gallstone (pancreatitis)?
    - H.pylori infection? (Ulcer)
- Social:
    - Obesity,pregnancy? (gallstone)
    - Alcohol? (pancreatitis, liver disease)
    - Stress (IBS)
- Medications:
    - antibiotic use? (pseudomembranous colitis)
    - hx of NSAID? (ulcer)
- Surgical: previous surgery?

Management:
Check out the table above.

★ Dysphagia

DDx:

- Oropharyngeal dysphagia:
  - Neuromuscular → stroke, MS, Myasthenia gravis
  - Structural → zenker's diverticulum
  - Itragenic
- Esophageal dysphagia:
  - Mechanical → esophageal CA, strictures, esophageal webs/rings, Goiter.
  - Motility → achalasia, diffuse esophageal spasm, scleroderma.

HPI:

	Question	Hint
Site	• Where does it hold-up?	• Cervical region→ Oropharyngeal • Esophageal → The lesion is at or below the region to which they point.
Onset	• Sudden? Progressive? • Is it persistent or intermittent (if intermittent how many times)? • Have you experienced sudden onset of dysphagia after swallow large piece of meat (steakhouse syndrome)?	• Sudden → Stroke • Progressive → Tumor (usually solid then liquid), achalasia • Intermittent suggests lower esophageal ring (only with big bolus), spasm (unrelated to food/swallowing). • Esophageal ring
Character	• Do you have trouble swallowing solids or liquids,or both solid and liquid? • Do you have difficulty initiating a swallow?	• Solid only→ mechanical e.g. cancer or stricture • Both →motility e.g. Achalasia • Oropharyngeal dysphagia
Alleviating	• Symptoms relieved by repeated swallows? • Do you ever have to bear down or raise your arms over your head to help a food bolus pass?	Motility disorder

Time	For how long?	Short period suggest inflammatory process
Exacerbating	● Symptoms experienced after repeated swallows? ● Symptoms worse with very hot or cold liquids?	● Myasthenia gravis ● Motility (spasm)

Associated Symptoms:

• Do you hear gurgling noise when you swallow? • Do you feel like you have bad breath?	Zenker diverticulum
• Do you regurge old fool?	• Distal esophageal obstruction • Zenkers's diverticulum, achalasia
• Dysarthria	Stroke
• Is it painful when you swallow (odynophagia)?	esophagitis
• Oral thrush • Oral ulcers	• Candida • HSV
• Chest pain?	Spasm (relieved by nitrates but unlike ischemic heart disease it's unrelated to exertion).
• Blood in stool	Tumor, PU
• System involved: Upper GI	Heartburn (if he has Hx of long standing → peptic stricture)
• Constitutional symptoms	Tumor

Risk factors:

- Medical: Oropharyngeal or esophageal cancer, Stroke, Parkinson, Myasthenia gravis or any neuromuscular disorder, MS, GERD, scleroderma/CREST.
- Surgery or trauma (head injury): on your larynx, esophagus, stomach, or spine.
- Medications: potassium chloride, ferrous sulfate and NSAIDs.
- Caustic ingestion (alkaline or acid): strictures

- Social: Smoking, alcohol, Obesity, Radiation therapy, allergies.
- Family Hx: of same symptoms, Achalasia, Neuromuscular disorder, Cancer.

Management: mainly barium swallow, endoscopy, and manometry.

Zenker's diverticulum:

Investigations: barium swallow. Endoscopy is contraindicated (perforation).
Treatment: surgical resection.

- **Achalasia**

Mechanism: loss of inhibitory neurons of the LES > can't relax and open with swallowing.
Causes: idiopathic(most common), chagas disease, cancer.
Investigations: Barium swallow (Bird's beak) > easophageal manometry (confirm) > upper endoscopy (R/O adenocarcinoma [pseudoachalasia]).
Treatment: 1st line: Heller myotomy or pneumatic dilation (risk of perforation), 2nd line: Botox (if unfit for surgery), 3rd line: CBB and nitrates.

- **Esophageal cancer:**

Causes: alcohol/smoking: squamous carcinoma upper 1/3, GERD: adenocarcinoma lower 1/3
Investigations: Barium swallow (luminal narrowing) > upper endoscopy & biopsy. Endoscopic US: staging. CT: local spread. Bronchoscopy: asymptomatic spread into bronchi.
Treatment: resection / chemotherapy / radiation.

- **Diffuse esophageal spasm:**

Investigations: barium study (corkscrew) > manometry (most accurate).
Treatment: CCB, or nitrates.

- **Rings and webs:**

Causes: Schatzki's ring, Plummer-Vinson syndrome (dysphagia+IDA).
Investigations: Barium swallow (luminal narrowing) > upper endoscopy.
Treatment: dilation when found during endoscopy + iron treatment for PVS.

- **Esophagitis:**

Investigations: Endoscopy with biopsy
Treatment: antacids (PPI/ H2 blockers)+disease specific.

- **Scleroderma:**

Main clue: Hx of scleroderma (CREST) with GERD.
Investigations: Manometry (most accurate).
Treatment: PPIs

Constipation

DDx

- Stricture or fissure
- Carcinoma
- Diverticular disease
- Hemorrhoids
- IBS (alternating with diarrhea, stress, certain foods)
- Bowel obstruction (usually results in obstipation[1])
- Hypothyroidism (cold intolerance, weight gain, menorrhagia)
- Starvation or change in diet
- Psychological distress

Causes of bowel obstruction:

- Small bowel obstruction: hernia, adhesion, crohn disease, appendicitis, intussusception (in children)
- Large bowel obstruction: malignancy (95%), diverticular disease (3%)

	small bowel	**large bowel**
Pain	• Early symptom • Central (periumbilical) • Short intermittent cramps	• Late symptom • Localized in the lower third of abdomen • Long intervals between cramps
Vomiting	• Develops early. • With pyloric obstruction, the vomitus is watery and acid. • High small bowel obstruction produces a bile-stained vomit. • Large amounts. • No or little odor.	• Develops later. • brown vomit with foul smelling • feculent vomitus • small volume • Foul odor • Vomiting is unusual
Constipation	late	early
Distension	usually no distension	usually there is distension

HPI

- When? and for how long? (acute: obstruction, fissure, chronic: IBS, Carcinoma)
- How often do you have a bowel movement?
- Are your stools hard or difficult to pass? (fissure, psychological)
- What do the stools look like (stool form, e.g. small pellets)?
- Do you have mucus on your stool?

Severe intestinal obstruction where patient can't pass both gas and stool

- Any blood in the stools? if yes.. Fresh blood or clotted (Malignancy, UC)
- Do you strain excessively on passing stool?
- Do you feel there may be a blockage at the anus area when you try to pass stool? (Tumor, Hemorrhoids)
- Do you ever press your finger in around the anus (or vagina) to help stool pass?
- Has your bowel habit changed recently?
- Do you have pain on defecation? (fissure)
- Aggravating factors? food, caffeine, stress

Associated and constitutional symptoms

- Weight loss, Diarrhea, Abdominal pain, Vomiting (how much? how often? colour&content?) , cold-intolerance, Nausea, Fever, Loss of appetite, Bloating and Lower back pain

Risk factors

- Medical: Endocrine diseases (e.g. hypothyroidism, hypercalcaemia, diabetes mellitus,pheochromocytoma,hypokalaemia).
- Medications: opioids/codeine, antidepressants, or calcium antacids, CCB, Anticholinergics, iron.
- Surgical: Previous procedures (adhesions)
- Social: Diet and exercise, Smoking (UC)
- Family hx: Do you have a history of colon polyps or cancer? Any family history of colon cancer?

Examination of constipation

- Most examinations will be normal
- Lymphadenopathy, abdominal mass, anaemia would be suspicious for colorectal carcrinoma
- Digital rectal examination is essential: look for fissures/haemorrhoids, impacted stool, blood/mucus

Investigations:

- Blood tests: CBC, Calcium, U+Es (dehydration), Thyroid function tests
- Abdominal X-ray (to r/o obstruction), Colonoscopy, Barium enema, CT abdomen, Bowel transit studies, Anorectal physiology studies

Treatment:

- For most patients: reassurance + advice plenty of fibre hydration
- Laxatives: for mild-moderate symptoms if general measures do not work:
    - Bulking agents (Bran, Ispaghula hulk, methycellulose) Stimulant laxatives (Senna, Bisacodyl, docusate sodium) Stool softeners (arachis oil enemas, liquid paraffin), Osmotic laxatives (Lactulose).
- Behaviour therapy

Diarrhea

DDx:

- Acute (<14d): infection, drugs, beginning of chronic cause.
- Chronic (>1 month):
    1. Colonic ⇒ IBD, IBS, colon cancer
    2. Small intestine ⇒IBD
    3. Malabsorption ⇒ celiac, lactose intolerance, small bowel bacterial overgrowth SBBO, pancreatic
    4. Endocrinological: Hyperthyroidism, carcinoid syndrome
    5. Factitious: laxatives or exogenous thryoxine

HPI:

- Onset: Acute? chronic?
- Characteristic:
    - Volume and frequency?
        - Large volume and less frequency→ small intestine.
        - Low volume and high frequency→ large intestine.
- Content:
    - Contains blood? → IBD, cancer, infectious (Shigella, Salmonella, Campylobacter) .
    - Mucous → IBS, ulcerative colitis.
    - Oily or greasy → malabsorption.
- Aggravated by:
    - Milk product→ lactose intolerance.
    - Wheat, barley → Celiac
- Awaken the pt from sleep → exclude IBS

Associated symptoms:

- Abdominal pain: Periumbilical (small bowel) Lower abdomen (Large bowel→ ulcerative colitis, bacterial dysentery), Right iliac fossa (Crohn's disease), Epigastric (chronic pancreatitis), if there is a pain, is it relieved with defecation → IBS
- Abdominal bloating (IBS, celiac disease, lactose intolerance).
- Nausea and vomiting (viral gastroenteritis, food poisoning) (how much?/how often?/colour&content?)
- Tenesmus / urgency (UC)
- Joint pain or redness (IBD)
- Rash (celiac dermatitis herpetiformis)
- Fatigue, pallor (celiac)
- heat intolerance, weight loss, tremors, oligomenorrhea/amenorrhea (hyperthyroidism)
- Flushing and wheezing: carcinoid syndrome

Constitutional symptoms:

- Fever (infection, IBD)
- Weight loss (cancer, celiac)

Risk Factors:

- Medical: Hyperthyroidism, AIDS (inc risk of infections), Diabetes (SBBO).
- Surgical: gastric bypass (SBBO)
- Medications: Recent antibiotic (clostridium difficile), laxative
- Social: ate from a restaurant? (infection), Recent travel? (infection), Smoking? (cancer)
- Family hx: similar symptoms (infection), of IBD, colon cancer, IBS

Investigations:

- Stool sample: Stool osmolar gap, Microscopy, culture and sensitivity, C. diff toxin, Ova, cysts and parasites, Faecal elastase (pancreatic insuff).
- Blood tests: CBC, Inflammatory markers, U&Es, Venous blood gas, LFT, Thyroid function tests, anti-endomysial and anti-transglutaminase antibodies.
- Upper endoscopy.
- Flexible sigmoidoscopy , Colonoscopy with biopsies.
- Hydrogen breath test (SBBO, lactose intolerance)
- urine 5-HIAA (carcinoid syndrome)
- Abdominal X-ray, ultrasound, CT abdomen/pelvis.

Management:

- ABC, Fluid resuscitation
- Antibiotic: Most infectious diarrheas will resolve spontaneously, give antibiotics only if there's abdominal pain, blood in the stool, and fever >7 days. Give antibiotics If suspecting an infectious exacerbation of IBD.
- Gluten-free diet (*celiac*), lactose-free diet (*lactose* intolerance; remove all dairy products except yogurt).
- Loperamide.

★ GI Bleeding

Hematemesis (Vomiting Blood)

DDX:

- **Peptic Ulcers (Most common)**
- **Gastro-esophageal Varices:**
  - Signs of liver disease e.g. RUQ pain, weakness, fatigue, anorexia, jaundice, portal HTN (e.g.ascites), hepatic encephalopathy (e.g. confusion).
  - Risk factors for liver disease e.g. Alcoholism, contact with hepatitis patient, unprotected sex, needle-stick injury, blood transfusion, Schistosomiasis, Thrombotic disease (budd chiari)
- **Mallory-Weiss Tear:**
  ○ Usually small and self-limited episodes of hematemesis (Resolve spontaneously)
  ○ hx of retching, vomiting, coughing or straining.
  ○ Risk factors e.g. pregnancy, alcohol, hiatal hernia.
- **Malignancy:** Constitutional symptoms, blood in the stool, smoking, alcohol, old age.
- **Coagulopathy:** Anticoagulants
- **Acute gastritis**
- **Angiodysplasia**

Personal Data: Name? Age? Residency? Occupation?

Chief Complaint: what brought you to the hospital? For how long?

HPI:

- How many times have you vomited blood? What is the volume? What was the color? (Bright or dark,Fresh or clotted)? coffee ground emesis
- Does the blood come with coughing? To rule out confusion with hemoptysis

- **Associated symptoms:**

- Abdominal pain? (Epigastric → Peptic ulcer, RUQ → Varices) → Yes? SOCRATES
- Bloating/distention? (Liver disease, esophageal varices)
- Dysphagia (solid\liquid or both? where does it hold up?)? Odynophagia? GERD? Water brash? Infections or pill-induced esophageal ulceration, Esophageal ulcer
- Yellowish discoloration Jaundice? Esophageal varices, Pruritus?
- Change in stool character Diarrhea/constipation (frequency now vs. past)? Color? Blood in stool?
- Pain in defecation (fissure)? Tenesmus? Incomplete emptying?
- Change in urine color? Blood?

- Chest pain? severe palpitations? cold/clammy extremities? dizziness and confusion? severe bleeding, hypovolemic shock
- Fatigue? Pallor? SOB or chest pain? anemia from chronic bleeding

- **Constitutional symptoms:** Fever? Weight/appetite change (How many Kg in how much time? Was intentional?)? Fatigue? Night Sweats?

- **Red Flags\ Risk factors:** Have you done any procedure (upper endoscopy)? Medications? (NSAIDs, Anticoagulants, Immunosuppressants, Antibiotics Bisphosphonates)? Smoking? Alcohol? any sort of contact with a Hepatitis patient?

PMH: hx of H.pylori? hx of Rheumatoid arthritis? Peptic ulcer

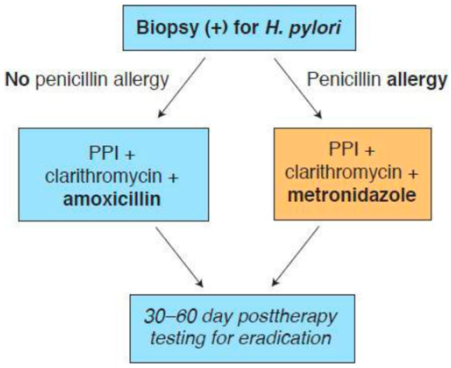
Family Hx: similar symptoms? GI disorders? Malignancy? Bleeding disorders? Chronic diseases (DM, HTN..)?

Social Hx: Caffeine? Peptic ulcer

Investigations:
- CBC → hemoglobin, hematocrit level.
- Coagulation profile (Platelets count, PT, PTT, INR), blood type & crossmatch
- LFTs and renal function
- BUN-creatinine ratio elevated with upper GI bleeding

Management:
1. Immediate risk assessment (Rockall score \ GBS \ AIMS65)
2. Resuscitation: Stabilize the pt. ABC, O2 Saturation, establish 2 IV lines access
3. hemodynamic status (give Packed RBC if Hb < 7 g/dL)
4. IV fluids (0.9% Saline) if pt volume deplete
5. Pain relief if there is pain
6. Upper GI endoscopy to reach cause\source of bleeding then treat accordingly, Initial & most accurate, diagnostic and therapeutic, early endoscopy from 6 to 24 hrs after initial presentation → may be delayed if pt has active ACS or suspected
7. Treat underlying cause.
8. Follow up and prevent recurrence.

- **Peptic Ulcers (Most common):** PUD is treated with PPI, but will recur unless H. pylori is eradicated. So when we confirm this ulcer is related to PUD you need 2 things:
  - Eradication therapy: best initial therapy is PPI combined with clarithromycin and amoxicillin.
  - In those who do not respond to therapy or penicillin allergic, metronidazole and tetracycline can be used as alternative antibiotics.



- Adding bismuth may aid in resolution in resistant ulcers.
- CONFIRM ERADICATION BY UREA BREATH TEST or stool antigen post-therapy by 30-60 day

So not only eradicate then you are done No!! Confirm eradication because If not eradicated => Recurred ulcer and bleeding

- **Gastro-esophageal Varices:**

In addition to fluids, blood, platelets, plasma:

- Octreotide (somatostatin) decreases portal pressure.
- Banding performed by endoscopy obliterates esophageal varices.
- Transjugular intrahepatic portosystemic shunting (TIPS) is used to decrease portal pressure in those who are not controlled by octreotide and banding.
- Propranolol or nadolol is used to prevent subsequent episodes of bleeding.
- Antibiotics to prevent SBP with ascites.

- **Mallory-Weiss Tear:** There is no specific therapy and it will resolve spontaneously. Severe cases with persistent bleeding are managed with an injection of epinephrine to stop bleeding or the use of electrocautery.

- **Malignancy:** No resection = no cure
- Surgical resection (esophagectomy) in addition to chemotherapy & radiation.
- Stent placement is used for lesions that can not be restricted surgically just to keep the esophagus open for palliation and to improve dysphagia.

- **Acute gastritis:** Treat with PPI.
- **Angiodysplasia:** Endoscopic coagulation

Indications for surgery:

A. Hemodynamically unstable patients who have not responded to IV fluid, transfusion, endoscopic intervention, or correction of coagulopathies.

B. Severe initial bleed or recurrence of bleed after endoscopic treatment failed twice.

C. Continued bleeding for more than 24 hours.

D. Visible vessel at base of ulcer (30% to 50% chance of rebleed).

E. Ongoing transfusion requirement (five units within first 4 to 6 hours).

Lower GI bleeding

DDX:

- Diverticulosis (Most common)
- Hemorrhoids
- Anal fissure
- Colon cancer/polyps
- Angiodysplasias
- Colitis

Keywords:

- Hematochezia: Bright red blood per rectum, source typically left colon or rectum
- Bloody diarrhea
- Melena: black/Tarry stool foul-smelling stool, indicate that blood has remained in GI tract for several hours, commonly upper GI is involved

Personal Data: Name? Age? (elderly: diverticulitis, ischemic colitis, Malignancy) Residency? Occupation?

HPI:

- Onset: When did you first notice this symptom?
- Character?
  - Can you describe what you saw in the toilet bowl?
  - Frequency? volume? What was the color? Bright\dark, Fresh\clotted? Mucus?
  - Volume: was it a cup of fresh blood or only small clots mixed with the stool? (to assess the blood loss)
- Was the bleeding associated with defecation only or was it spontaneous?
- Painless? (Diverticular disease, Colonic angiodysplasia, Ischemic colitis)
- Painful? (anal fissure)

- **Associated symptoms:**

- Abdominal pain? (LLQ → Diverticular disease, Lower abdomen→ ischemic colitis, UC) →Yes? SOCRATES
- Bloating/distention? (Liver disease, esophageal varices)
- Change in stool character? frequency now vs. past? (Diarrhea → Diverticular disease \ ischemic colitis \ Crohn's, Constipation → Diverticular disease, UC, HEMORRHOID)
- Pain in defecation (fissure)? Tenesmus? Incomplete emptying?
- Dysphagia (solid\liquid or both? where does it hold up?)? Odynophagia? GERD? Water brash?
- Nausea/vomiting? (Amount? Frequency? Color? Hematemesis)
- Yellowish discoloration Jaundice? Pruritus?
- Change in urine color? Blood?
- Chest pain? severe palpitations? cold/clammy extremities? dizziness and confusion? severe bleeding, hypovolemic shock
- Fatigue? Pallor? SOB or chest pain? anemia from chronic bleeding

- **Constitutional symptoms:** Fever? Weight/appetite change (How many Kg in how much time? Was intentional?)? Fatigue? Night Sweats?
- **Red Flags\ Risk factors:** Have you done any procedure (colonoscopy)? Medications? (Antiplatelets agents, heparin and warfarin (Blood thinning drugs), steroids)? any sort of contact with a Hepatitis patient?

PMH: Hx of Diverticular disease? Varices or portal hypertensive gastropathy? Hemorrhoids? anal fissure? Colorectal cancer? IBD? Bleeding disorders?

Past Surgical Hx: Previous procedure (iatrogenic tear of the liver)? Blood transfusions?

Family Hx: Similar symptoms? GI disorders (IBD)? Malignancy? Bleeding disorders? Chronic diseases (DM, HTN..)?

Social Hx: Recent travel (Infection)? Have you engaged in anal sexual activity?

Investigations:

- CBC
- Coagulation profile (Platelets count, PT, PTT, INR), blood type & crossmatch
- LFTs
- Colonoscopy initial test in pt >50
- Occult blood initial test
- barium enema
- Stool cultures
- Radionuclide imaging
- CT angiography

Treatment:

1. Immediate risk assessment (Rockall score \ GBS \ AIMS65)
2. Resuscitation: Stabilize the pt. ABC, O2 Saturation, establish 2 IV lines access
3. hemodynamic status (give Packed RBC if Hb < 7 g/dL)
4. IV fluids (0.9% Saline) if pt volume deplete
5. Pain relief if there is pain (NSAIDS)
6. Colonoscopy to reach cause\source of bleeding then treat accordingly, Initial & most accurate, diagnostic and therapeutic, early endoscopy from 6 to 24 hrs after initial presentation → may be delayed if pt has active ACS or suspected
7. Treat underlying cause.
8. Follow up and prevent recurrence.

- **Diverticulosis (Most common):**
- High fiber foods (such as bran) to increase stool bulk, Psyllium if the patient cannot tolerate bran.

- If diverticulitis present, manage with IV antibiotics and bowel rest, surgery if no response to medical treatment or in case of perforation, abscess, fistula, strictures or obstruction.

- **Hemorrhoids:**
- General measures to ease symptoms:
    - Sitz bath
    - Application of ice packs to anal area and bed rest
    - High-fiber, high-fluid diet
    - Topical steroids
    - Stool softeners to reduce strain
- Rubber band ligation for internal hemorrhoids
- Surgical (hemorrhoidectomy)– Perform surgery if:
    - The condition does not respond to conservative methods
    - If severe prolapse, strangulation, very large anal tags, or fissure is present.
- **Anal fissure:**
- General measures to ease symptoms:
    - Sitz bath
    - Application of ice packs to anal area and bed rest
    - High-fiber, high-fluid diet
- Vasodilators (applied topically as cream) like Calcium Channel Blockers ex: nifedipine
- Botox (to paralyze internal sphincter and relieve pressure)
- Surgery (Lateral internal sphincterotomy LIS)

- **Colon cancer/polyps:** Surgical resection
- **Angiodysplasia:** Colonoscopic coagulation

- Indications for surgery same as mentioned earlier

Jaundice

DDX:

Prehepatic	Hepatic	Post hepatic
• Haemolytic Anemia • Congenital defect: Gilbert's disease or Crigler-Najjar syndrome • Physiologic jaundice of the newborn	• Viral Hepatitis • Alcoholic hepatitis • Nonalcoholic steatohepatitis • Toxin (Cocaine) • Primary biliary cirrhosis • Vascular injury • Autoimmune hepatitis • impaired conjugation	• Gallstones • Primary sclerosing cholangitis • Cholangiocarcinoma • Budd-chiari syndrome

Personal Data: Name? Age? Residency? Occupation?

HPI:
- Onset: When did you first notice this symptom?
    - **Sudden:** Choledocholithiasis- Acute hepatitis - cholangitis, sepsis, hemolysis.
    - **Gradual:** Cancer in the head of the pancreas, Chronic hepatitis, CHF.
- Does the discoloration change with time, stress, fasting or menstruation?
    - Gilbert syndrome

- **Associated symptoms:**

- Abdominal pain? (RUQ → Cholecystitis, Cholangitis, Gallstones, Acute hepatitis) →Yes? SOCRATES
- Bloating/distention? (Liver cirrhosis)
- Pruritus? Change in urine color (Dark urine)? Change in stool color (pale)? High level of bilirubin (obstructive jaundice)
- Nausea/vomiting? (Amount? Frequency? Color? Hematemesis)
- Dysphagia (solid\liquid or both? where dose it hold up?)? Odynophagia? GERD? Water brash?
- Change in stool character? frequency now vs. past? blood in stool? blood in urine?
- Pain in defecation (fissure)? Tenesmus? Incomplete emptying?
- Confusion? (Liver cirrhosis)
- Increased or easy bruisability?

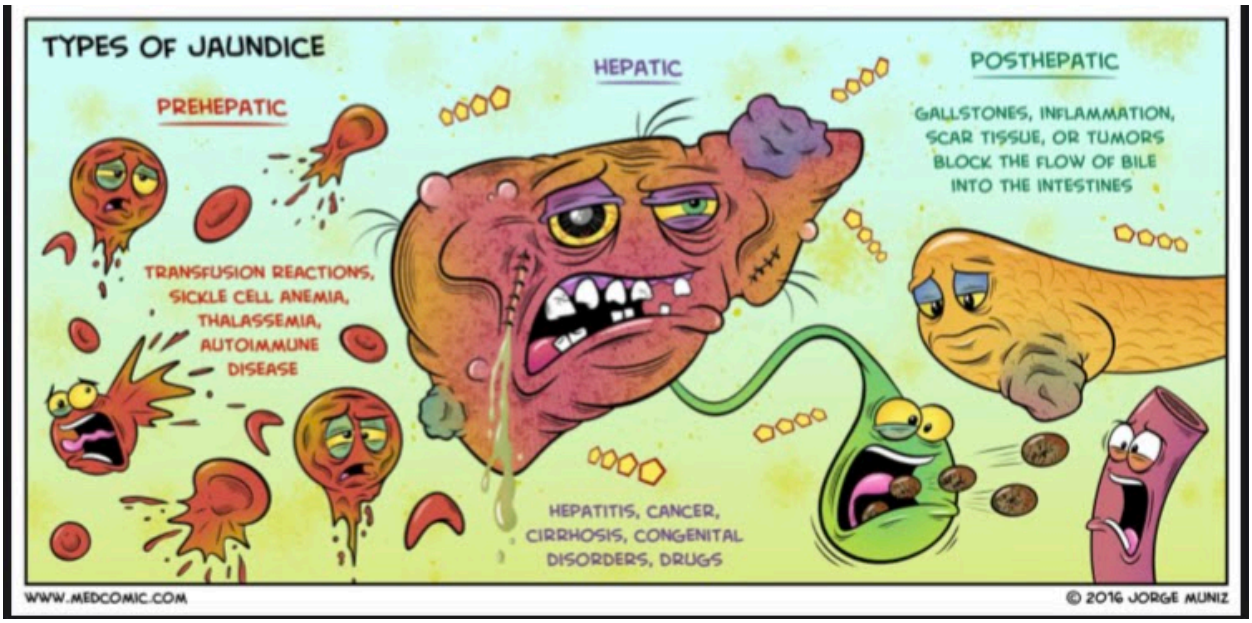
- **Constitutional symptoms:**
    - Fever? Weight/appetite change (How many Kg in how much time? Was intentional?) Fatigue? Night Sweats? Tumor of the head of pancreas\hepatobiliary carcinoma
    - Fever with rigor and chills might indicates cholangitis

- **Red Flags\ Risk factors:** Medications? (drug induced hepatitis)

PMH: Hx of liver cirrhosis? hepatitis? biliary stones? hemolytic anemia? GI cancer? Sickle cell disease?

Past Surgical Hx: Stricture of the bile duct? Blood transfusion? (HBV, HCV, hemolysis)

Social Hx: Alcohol? (alcoholic hepatitis), Food poisoning? (hepatitis A), Recent travel? (hepatitis E), Unprotected sex?



Investigations:

- Labs: LFT, ALT, AST, ALK-P, Bilirubin, Albumin, PT
- Serum levels of total conjugated and unconjugated bilirubin
- according to the cause:
- unconjugated hyperbilirubinemia: CBC, reticulocyte count, haptoglobin, LDH
- hemolysis: peripheral smear
- conjugated hyperbilirubinemia: LFTS
- biliary tract obstruction: Ultrasound (or CT scan)
- Additional tests: endoscopic retrograde cholangiopancreatography [ERCP], percutaneous transhepatic cholangiography [PTC])- depending on the findings of the above tests
- Liver biopsy may be indicated in some cases to determine the cause of hepatocellular injury

Treatment: Treat the underlying cause

Abdominal Examination

WIP3E: Wash your Hands, Introduce yourself, Permission/Privacy/Position, Exposure

Position: Lying flat with the head resting on one pillow

Exposure: Ideally from nipple to mid thighs

1. **General appearance look for: ABC2DE**

a. Appearance: Well or ill ,young middle aged or old
b. Body built: normal, cachectic, obese
c. Color: pale, cyanosed or jaundiced
d. Connections: NGT, IV line.
e. Distress: In pain,
f. Else: conscious, alert Vital signs

2. **Inspection**

- *Hands*
  - Leukonychia
  - Koilonychias
  - Clubbing
  - Palmar erythema
  - Pallor
  - Dupuytren's contracture (alcoholic liver disease)
  - Flapping tremor (asterixis)
- *Arms*
  - Bruises or petechiae
  - Scratch marks
- *Eyes*
  - Pale conjunctiva
  - Jaundice
  - Kayser-Fleischer rings (wilson's disease)
- *Mouth*
  - Angular stomatitis, glossitis
  - Fetor Hepaticus
  - Mouth ulcers
  - Gum hypertrophy, pigmentation, or candidiasis
- *Chest*:
  - gynecomastia
  - Spider naevi
- *Abdomen:*
  - Inspect the abdominal contour and comment (Normal abdomen contour that moves Symmetrically with respiration)
  - Distention: (causes of distention are 5 Fs: Fat, Flatus, Feces, Fluid, Fetus, Functional) (ascites causes full flanks so comment on the flanks whether concave or convex)

- 3Ps → Prominent veins, prestalisasis, visible Pulses.
- 4Ss → Scars, skin lesions (e.g. cautery marks), stria, stoma bags.
- Umbilicus: inverted or everted.
- Hernia: ask the patient to cough.

3. **Palpation:**

Before starting the palpation:

- Make sure that your hands are warm.
- Your eyes should be on the patient's face throughout the examination for signs of discomfort.
- Ask if the patient has pain or tenderness anywhere before you begin and examine this area last!

Superficial palpation:

- Start from the right iliac fossa by gently resting one hand on the patient's abdomen and pressing lightly → move anticlockwise direction to reach left iliac fossa (but don't forget to palpate the periumbilical region).
- Look for superficial masses, tenderness or guarding signs on the patient's face.

Deep palpation:

- Repeat the same process but with pressing more *firmly* and *deeply*.
- Look for deep masses or organomegaly.

Liver	*Usually not palpable -Start at the right iliac fossa, put your hand parallel to the right costal margin. • With each expiration, the hand is moved 1 -2 cm closer to the right costal margin. - Mark the lower edge of the liver by a marker or ask the patient to point it. - Go to the right 2nd intercostal space, at the midclavicular line, and start to percuss, liver dullness is usually at the 5th or 6th intercostal space. • Measure the liver span <u>lf there is hepatomegaly you must comment on:</u> a. Edge: tenderness, consistency, regularity, and pulsation. b. Surface: smooth or nodular. c. Span: normal liver span 8-12 cm and it is more in men than women.
Spleen	*Usually not palpable • Palpate from Right iliac fossa going obliquely to LUQ (because spleen is enlarged obliquely). • Move your hand between breaths. lf you can't palpate it, use bimanual maneuver; role the patient to the right side and do palpation by bimanual push at the 11th and 12th ribs area to feel the spleen notch.

Kidneys	*Usually not palpable • Examine both kidneys by placing your left hand behind the patient's loin between the 12th rib and the iliac crest→ lift the loin and kidney forwards (when moving one hand the other should be constant) → place your right hand anteriorly just below the right costal margin → feel any masses between the two hands as the patient breath. • This is called kidney balloting.

4. Percussion:

Spleen	*Percuss over the lowest intercostal spaces in the left anterior axillary line over Traube's triangle (this usually tympanic) then Ask the patient to take a deep breath: • Remains tympanic on inspiration → splenomegaly less likely. • Shift from tympanic to dullness → splenomegaly more like
Bladder	*Percuss from the umbilicus down the midline, look for suprapubic dullness it could indicate an enlarged bladder or pelvic mass.

5. **Auscultation**
   - Bowel sounds: auscultate for 30 seconds, if not heard listen up to 2 minutes.

(Exaggerated sounds indicate obstruction and absence of sound indicate paralytic ileus.)

   - Aortic bruits: bruits are presents in arteriosclerosis or aneurysm.
   - Renal artery bruit: Positive in renal artery stenosis.
   - Friction rub: auscultate over the liver and spleen. Presence indicate possible peritoneal abnormality.
   - Venous hum: between xiphisternum and umbilicus. present in portal hypertension.

Examining ascites:

- *Bulging Flanks:* Observes whether the flanks are pushed outward.
- *Causes:* Ascites or Obesity.

1. Flank Dullness: Percussion note is tympanic* over the umbilicus and dull over the lateral abdomen and flank areas.

***The tympany over the umbilicus occurs in ascites because bowel floats to the top of the abdominal fluid.**

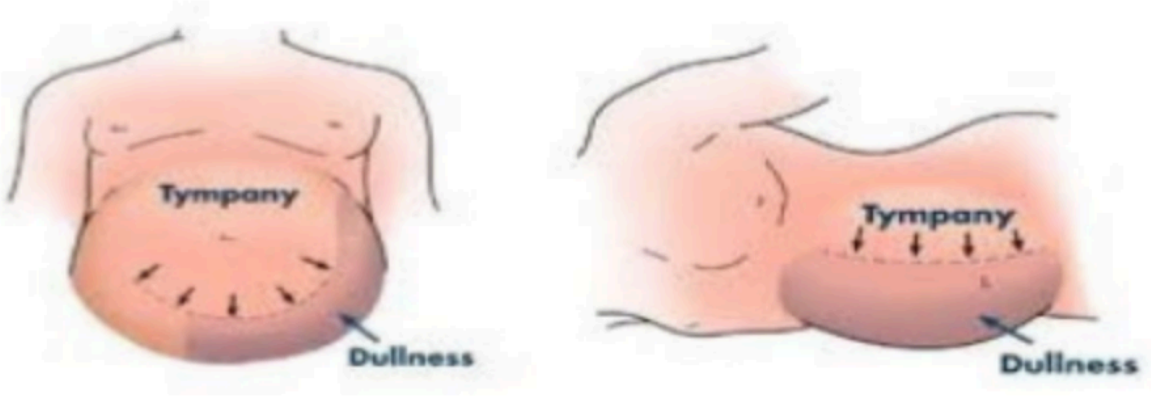
2. If dullness is detected in the flanks, the sign of **shifting dullness** should be sought.

A. **Shifting Dullness:** Detect small amount of fluid.

-With your hand flat and the fingers directed downward, start percussing with the other hand from the midline, and move to the left flank (away from you)

-When you find the area of dullness, fix your hand, roll the patient to your side, and wait for 30 seconds(so that fluid can move inside the abdominal cavity), then percuss again, If the area becomes resonant, the test is positive.

**Positive test:* When ascites is present, the area of dullness will shift to the dependent site(umbilicus) and the area of tympany will shift toward the top/left flank.



B. **Fluid thrill:** Usually positive in huge ascites

-Ask the patient to place one hand firmly on the center of his/her abdomen. the examiner places the fingertips of one hand along one flank, and with the other hand firmly gives a sharp tap along the opposite flank.

**Positive test:* The examiner is able to detect "a shock wave" of fluid moving against the fingertips pressed along the flank.

➽ ***End your examination with:***

○ Per rectal and external genitalia examination.

Things to elicit during you examination:

Rigidity Vs Guarding

Rigidity	Guarding
Constant contraction of the abdominal muscles. -Pathological only (Always associated with tenderness.) -ndicates peritoneal irritation. • Involuntary.	Resistance to palpation due to contraction of the abdominal muscles. -May result from tenderness or anxiety. -Protective reflex in sensitive patient. -Voluntary or involuntary.

- **Rebound tenderness:** Press your hand firmly & steadily on the patient's abdomen for a minute or two, and then release suddenly > if the patient felt a sudden stab of pain upon removal then this is positive (it detect early sign of visceral inflammation).

- **Mass**: Any mass should be examined for the following Site (which quadrant), Size & shape, Surface (regular or irregular), hard or soft? Mobile or not? Does it move with inspiration? pulsatile or not?
  - How to differentiate an intra abdominal mass from mass in the abdominal wall? Ask the patient to fold the arms across the upper chest and sit halfway up. An intraabdominal mass disappears or decreases in size, but one within the layers of the abdominal wall will remain unchanged.

1. **Succussion splash:** A splashing noise due to excessive fluid retained in an obstructed stomach.
   - To elicit the sound In a case of suspected gastric outlet obstruction; grasp both hips with your hands > place your stethoscope close to the epigastrium > shake the patient vigorously from side to side.

2. **Full bladder:** An empty bladder is impalpable. In case of Urinary retention, the full bladder may be palpable above the pubic symphysis and may reach as high as the umbilicus. It's typically regular, smooth, firm and oval-shaped.

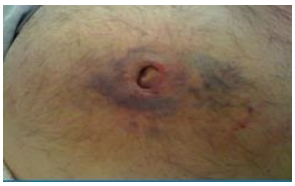
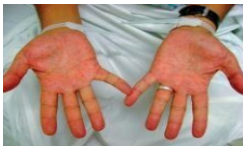
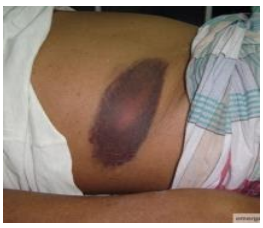
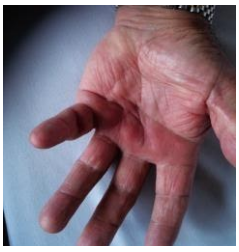
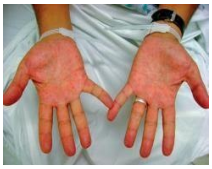
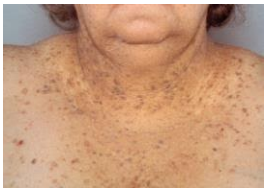
3. **Aorta**: Normal Aortic pulsation may be felt in the epigastrium esp. in a thin person.
   - To examine the aortic pulse place two fingers parallel to each other on the outermost palpable margins of the pulse and notice their movement with systole:
     - Upward movement = pulsatile.
     - Outward movement (away from each other) = expansile (suggestive of AAA).

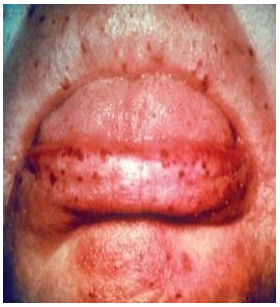
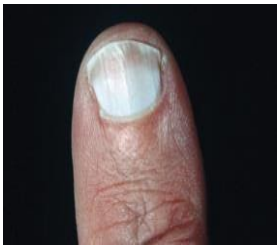
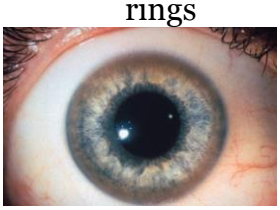
- **Murphy's Sign:** Positive in Cholecystitis.

Place your palpating hand just below the costal margin, approximately midclavicular (this is just above the gallbladder) > Then ask the pt to breath in.
-*A positive Murphy's sign* is when the patient stops breathing in due to pain that is caused by the diaphragm pushing the inflamed gallbladder into the palpating hand.

- **Rovsing's sign:** In Acute appendicitis, palpation in the left iliac fossa produces pain in the right iliac fossa.

- **Psoas sign:** Pain with lifting extended right leg against resistance. Positive in Retrocecal appendicitis or other retroperitoneal irritation (abscess of Crohn disease, pancreatitis, pyelonephritis).

Signs may be noticed during the examination			
Sign	*Cause*	*Sign*	*Cause*
 Cullen's sign	Pancreatitis	 Palamr Erythma	Hyperthyroidism pre gnancy Co2 retention chronic liver failure
Grey Turner's Sign 	Pancreatitis	Dupuytren's contracture 	Alcoholic liver disease 
Acanthosis Nigricans 	insulin resistance Cushing syndrome obesity	Leukoplakia 	immnucoprmized

	Hereditary haemorrhagic telangiectasia involving the lips	Angular stomatitis 	Iron Deficiency anemia
Leukonychia 	Hypoalbumin-emia	Kayser-Fleischer rings 	Wilson's disease

Hepatomegaly causes:

- Hepatocellular Carcinoma
- Right heart failure
- Leukemia, Lymphoma
- Hemochromatosis
- Amyloidosis
- Tender liver

Hepatitis causes:

- Rapid liver enlargement (e.g. right heart failure,Budd-Chiari* syndrome [hepatic vein thrombosis])
- Hepatocellular cancer
- Hepatic abscess
- Biliary obstruction cholangitis

Pulsatile liver causes:

- Tricuspid regurgitation
- Hepatocellular cancer
- Vascular abnormalities

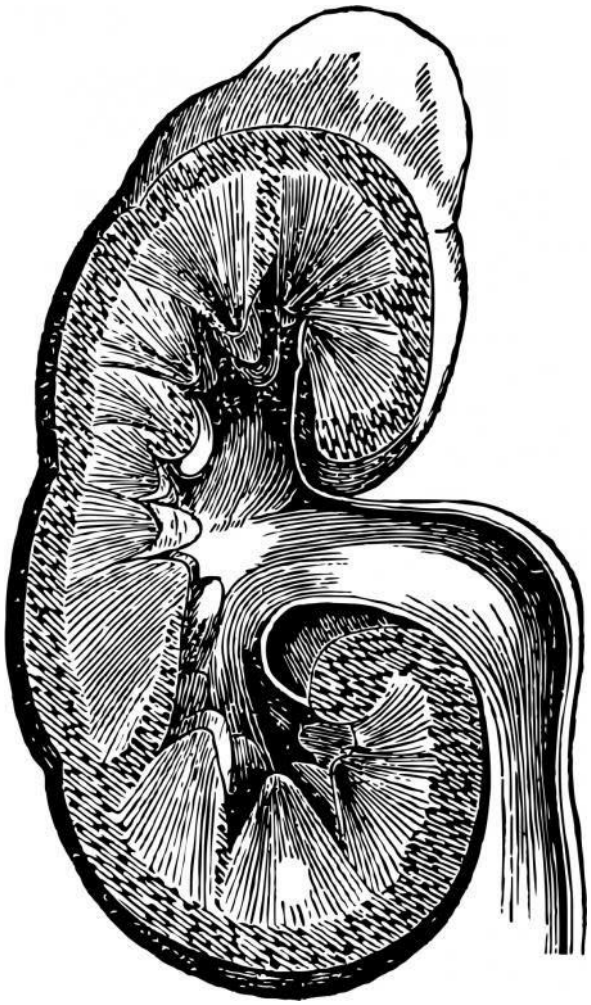
Liver Cirrhosis (Chronic Liver Disease) signs and symptoms:

- Spider Angioma (Spider Nevi)
- Jaundice
- Yellow sclera
- palmar erythema
- asterxis

- Gynecomastia
- Ascites
- Encephalopathy
- Testicular atrophy

Differential diagnosis of Abdominal masses:

Right Hypochondrium	Epigastric	Left Hypochondrium
• Cholecystitis (tender ++) • Cholangiocarcinoma (tender +; irregular) • Hepatomegaly • Liver cancer (firm, lumpy)	• Hepatomegaly • Pancreatic abscess/ pseudocyst • Gastric carcinoma	• Splenomegaly • Gastric carcinoma • Pancreatic abscess/ pseudocyst • Kidney disease e.g. polycystic kidney, hydronephrosis, cyst, tumour, TB • Colon disease e.g. carcinoma, faeces, diverticular abscess
Right Flank	**Periumbilical**	**Left Flank**
• Hydronephrosis (smooth, spongy) • Renal carcinoma (smooth, firm, nontender)	• Abdominal aortic aneurysm (pulsatile; occasionally expansile) • Tumour • Hernia • Crohn's disease	• Hydronephrosis • Renal carcinoma
Right Iliac fossa	**Suprapubic**	**Left Iliac Fossa**
• Colon cancer • Crohn's disease (multiple tender, sausage shaped) • Hernia • Appendix mass/abscess • Other abscess (amoebic, actinomycosis)	• Distended bladder (firm- extended from pubic symphysis) • Neuroblastoma (in children)	• Diverticular abscess • Hernia • Colorectal tumour



Renal System

Common Presenting Problems in the Renal System

★ Hypertension

- Primary/Essential hypertension: Unknown, environmental and genetic factors.
  - Risk factors: old age, obesity, sedentary lifestyle, high salt intake, family history and race.
- Secondary hypertension: underlying cause.
  - Renal disease (The most common cause of 2ndry HTN): CKD, renal artery stenosis.
  - Endocrine disease: Cushing syndrome, Pheochromocytoma, Primary hyperaldosteronism (Conn's syndrome).
  - Obstructive sleep apnea.
  - Coarctation of aorta (narrowing of aorta).
  - Drugs: OCP, steroids, NSAIDs.
- Hypertensive crisis:

hypertesive emergency	**hypertensive urgency**
SPB>180 mmHg and/or DBP> 120 mmHg	
Sever and acute elevation of BP with new onset or worsening organ damage.	Elevation of BP without evidence of acute hypertension organ damage.

DDX:

- Depending on the patient's presenting complaint and clinical manifestation.

History Taking:

- Patients may be asymptomatic or may present with headaches, nosebleeds, visual symptoms, neurological symptoms, symptoms of underlying secondary cause.
  - Ask about Age? Gender? occupation?
  - Time? Duration? character? aggravating and relieving factors?
  - Diagnosed previously with HTN? Duration? Compliance to medication?
  - Associated symptoms of renal, cardiovascular, CNS or endocrine system.
  - Cardiovascular risk factors: Smoking, DM, IHD, MI, High cholesterol, TIA or previous stroke, Obesity, Age>55 for men and>65 for women.
  - Habits: salt intake, lifestyle and activity, stimulants abuse like cocaine, psychosocial stressors.
  - Family history of CVD, HTN or renal disease.
  - Medication
  - You should Identify the cause of high blood pressure either primary or secondary.
    - There are some features that may lead to a suspicion of an underlying cause (secondary hypertension): Young patient, Rapid onset of hypertension, Sudden change In BP, Unresponsive to medication.

- Look for signs that indicate end organ damage

Cardiovascular disease	• Symptoms of cardiac failure include:
	  ◦ Shortness of breath
	  ◦ Ankle oedema
	  ◦ PND
	  ◦ Orthopnoea.
	• Angina may also be reported.
	• Examination may reveal: Cardiac murmurs, thrills, or heaves.
	• Left ventricular hypertrophy diagnosed either by echocardiography or by ECG.

Cerebrovascular disease	• Any history of symptoms of a TIA or CVA should be obtained. These may include speech difficulties, visual disturbance, or transient focal neurology. • Carotid bruits may indicate carotid artery stenosis and warrant further duplex imaging to determine blood flow and degree of stenosis.
Renal failure	• May be asymptomatic, but urinary symptoms such as decreased or increased frequency of urination, edema, pruritus, lethargy, and weight loss may suggest renal damage.
Retinopathy	• This is often asymptomatic, but may present with visual loss or headaches.

Physical Examination:(mainly CVS exam)

- Two blood pressure measurements 2 minutes apart on each arm.
- Calculate the BMI.
- Fundoscopic exam: looking for AV nicking, papilledema (seen in hypertensive emergencies), cotton wool spots, hemorrhages.
- Check for neck bruits and raised JVP (cardiovascular disease).
- Auscultate the heart for rate and murmurs (cardiovascular or valvular disease).
- Check the PMI (point of maximal impact) looking for signs of hypertrophy or cardiomegaly.
- Auscultate the chest (pulmonary edema).
- Check for abdominal bruits (for renal artery stenosis or cardiovascular disease).
- Assess all peripheral vasculature (cardiovascular or diabetic disease).
- Evaluate for lower extremity edema (cardiovascular disease).
- Getting a good baseline neurological exam is important even if the examination is non focal.
- Examine the thyroid: looking for thyromegaly or polyps or other signs of hyperthyroidism (a cause of secondary hypertension).

Management:

- **Initial investigations**:
  - Electrocardiogram (ECG) →Ischemia or signs left ventricular hypertrophy.
  - Urinalysis →Proteinuria or hematuria.
  - Blood glucose
  - Serum urea and Electrolytes: Potassium→ blood pressure medications can cause potassium derangements (ACE inhibitors, ARBs, and Potassium Sparing Diuretics), Sodium→ (↓ or ↑ aldosterone), Calcium→ nephrolithiasis, blood urea nitrogen (BUN), Serum Creatinine or estimated GFR → (hypertensive nephropathy).
  - Serum Lipid profile: following a 9- to 12-hour fast (total cholesterol, high-density lipoprotein [HDL] cholesterol, low-density lipoprotein [LDL] cholesterol, and triglycerides).
  - Urinary albumin excretion or albumin/creatinine ratio (ACR).
  - Chest x-ray (if suspected cardiomegaly)
- **Further investigations** as indicated and depending on the secondary causes.

- **Treatment**: depends on the type and cause of hypertension, the comorbidities and the age of the patient.
  - Lifestyle modification: Weight Reduction, Dietary Sodium Reduction, Low fat diet, Physical Activity, avoid smoking or Alcohol Consumption.
  - Antihypertensive medications: Thiazide diuretics, ACE inhibitors, ARBs, Calcium channel blockers or B-Blocker.
  - For patients who have high blood pressure and kidney disease, ACE inhibitor and angiotensin II receptor blocker (ARB) drugs lower blood pressure and can protect the kidneys from further damage, but treatments need to be individualized.
  - Checking blood pressure on a regular basis and keeping it under control, and compliance to medication.

★Hematuria

- Hematuria: bleeding from the urinary tract.
- Macroscopic/gross Hematuria: The presence of blood in the urine in sufficient quantity to be visible to the naked eye.
- Microscopic Hematuria: present of at least 3 RBC per high-power field on urine microscopy.

DDX of Hematuria

A. Non glomerular

- Stones: Renal calculus (Flank pain radiates to the testis) or Ureteral calculus (Severe colicky pain radiating from loin to groin).
- Infection: Pyelonephritis (Flank pain, fever, chills, vomiting, costovertebral angle tenderness), Cystitis (Frequency/urgency, suprapubic pain), Prostatitis (Perineal or rectal pain, urinary frequency, urgency, tender prostate), Urethritis (Common in young, Urethral discharge, frequency and urgency are frequently absent), infection with Schistosoma haematobium.
- Renal TB (Malaise, weight loss, Hx of TB exposure).
- Tumors: Benign prostatic hyperplasia (voiding & storage symptoms), bladder carcinoma (smoking, above 50 of age) or prostate carcinoma (above 50 of age, family Hx).
- Trauma (renal or abdominal injury).
- Iatrogenic (indwelling catheter or any recent procedure).
- Drugs (Rifampicin, anticoagulant or blood thinner).
- Inherited disorders (Sickle cell anemia).
- Exercise induced
- Hematuria Mimics: Menstruation, Rhabdomyolysis (myoglobinuria), Intravascular hemolysis (hemoglobinuria).

B. Glomerular

- Primary glomerulonephritis**:**
  - IgA Nephropathy (Recurrent gross hematuria, associated with upper respiratory tract infection).
  - Post infectious glomerulonephritis (gross hematuria, 1 to 2 weeks post-pharyngitis).
  - Idiopathic (e.g. focal glomerulosclerosis).
- Secondary glomerulonephritis:
  - Granulomatosis with polyangiitis (Wegner): (Hemoptysis & hematuria).
  - Goodpasture: (Hemoptysis & hematuria).
  - SLE (15 and 45 years, more common in females, malar rash, arthralgia).
- Familial:
  - Thin basement membrane (benign familial hematuria).
  - Hereditary nephritis: (Alport's syndrome).

History taking:

HPI

- Do you see blood in your urine? Or Have you been told that there is blood in your urine? (to determine if the patient has gross or microscopic hematuria)
- When did it start? How did you notice it ?

- Is it painful or painless?
    - Painless Hematuria → malignancy, bleeding disorder, drugs related.
    - Painful Hematuria → Renal stone, UTI, trauma but does not r/o malignancy.
- If it's painful ask about the timing of pain:
    - Before hematuria: stone (Hx of pain for 1 weak then developed hematuria).
    - After hematuria: clot, colic, malignancy or arteriovenous malformation.
- Does the urine contain clots? Non-glomerular source
- If there are clots, what is the shape?
    - Pipes like? Bleeding from the ureter
    - Balls like? Bleeding from the bladder
- Is the blood present:
    - At the beginning? Lesion from the urethra or distal to the bladder neck.
    - At the end? Lesion from the bladder neck, bladder trigone or posterior urethra.
    - Throughout? Haemorrhagic, cystitis, renal or ureteral source, malignancy.
- Is this the first episode? (IgA nephropathy present with multiple episode over years to months)
- Red flags:
    - Increased age (older than 40-50), male sex, present of constitutional symptoms or heavy smoking history.
- Risk factors:
    - Did you exercise vigorously prior to the hematuria? (Exercise Induced Hematuria)
    - Have you had a recent injury to your abdomen, back or flank? (Trauma)
    - Are you having your menstrual period? (Vaginal source or Endometriosis)
    - Have you recently had Urinary catheter, Urinary Procedure or UTI? (Iatrogenic or Recurrent UTI)
    - Have you recently had URT symptoms OR sore throat?
    - If the hematuria starts after the symptoms by 1-3 days: most likely IgA nephropathy.
    - If after 1-3 weeks: Post infection GN.
- Associated symptoms
    - Urinary symptoms?
    - Fever? Pyelonephritis, Acute prostatitis, Prostatic abscess and Renal cell carcinoma.
    - Sharp pain in your lower abdomen or above the groin? Renal calculus.
    - Suprapubic pain? Cystitis
    - Flank pain? Pyelonephritis, Papillary necrosis, Renal calculus and renal infarction
    - Voiding and storage symptoms? BPH
    - Weight, appetite loss and malaise? Malignancy
    - Swelling of the eyelids or feet? GN
    - Deafness? Alport's syndrome
    - Hemoptysis? Wegener's, Goodpasture
    - Joint or skin rash? GN secondary to SLE, polyarteritis nodosa
    - Easy bruising, bleeding from other sites? Bleeding disorder

Past medical

- Have you ever had Kidney stone? Urinary calculus
- Have you ever had gout? Uric acid stone
- Do you have sickle cell anemia?

- Hx of Nephrotic syndrome? Renal vein thrombosis
- Hx of endocarditis? GN

Are you taking drugs?

- Anticoagulants?
- Cyclophosphamide? Hemorrhagic cystitis , bladder cancer.
- Rifampin? discoloration of the urine.

Family history

- of renal disease, stones or malignancy.

Social hx:

- Smoking? Bladder cancer
- Occupation? Leather, dye, rubber, tire manufacturing? Bladder cancer.
- Hx of traveling (e.g. Egypt)? Schistosoma haematobium → bladder cancer.
- Contact with sike? TB

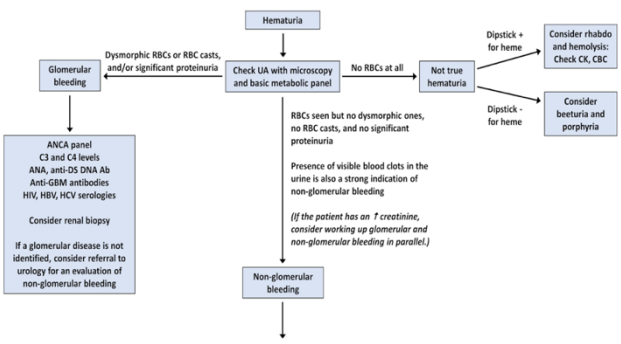
Physical examination

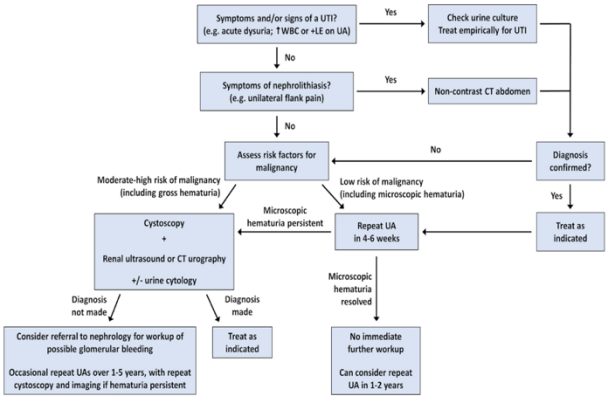
- Haemodynamic status: adopt an ABCDE approach if the patient is unwell.
- Examine for signs of anaemia: pallor (including conjunctiva), Obvious bruising or bleeding.
- Evidence of pharyngitis (GN).
- Systemic signs: Arthralgia, lymphadenopathy, purpuric rashes.
- Oedema.
- Hypertension.
- Abdominal examination is essential, alongside potential digital rectal examination and/or examination of the external genitalia depending on the presentation.

Management

- **Investigation:**
  - Urinalysis (urine dipstick testing) is usually the primary investigation.
  - Blood: CBC, Urea and Electrolytes, Creatinine, Albumin:Creatinine ratio, blood glucose, prostate specific antigen (PSA).
  - Imaging: Renal tract US and/or CT.
  - Cystoscopy.

- **Treatment**: Depends on cause.





★Nephrotic Syndrome

- It's defined as:
  - Heavy proteinuria (>3.5g/24h)
  - Edema
  - Hypoalbuminemia
  - Hyperlipidemia

- The key with nephrotic syndrome is an excess amount of protein in the urine, whereas nephritic syndrome is where there is an excess amount of blood in the urine.

- The causes of Nephrotic syndrome:
  - Membranous nephropathy (the most common cause in adults).
  - Minimal change disease (the most common cause in children).
  - Focal segmental glomerulosclerosis.
  - Other secondary causes: Diabetes mellitus, Amyloid.

DDX of nephrotic syndrome:

- Congestive heart faluire (the JVP in CHF is elevated, while in nephrotic syndrome it's normal or low unless there is concomitant renal failure).
- Liver cirrhosis (signs of chronic liver failure on examination help in differentiating nephrotic syndrome from liver cirrhosis).
- Diabetic nephropathy.

History taking

Patients may present with one or more of the following: Edema, Foamy urine, Fatigue, loss of appetite, Nausea & vomiting, Abdominal pain, Weight gain due to fluid retention, SOB if having pleural effusion, thrombotic complication like deep venous thrombosis or pulmonary embolism may be the first presentation.

HPI

- Age?
- All the Details of the chief complaint
  - If edema→ site? unilateral/bilateral? onset? characteristic pitting or non pitting? painful or painless? continuous or intermittent? alleviating factors? exacerbating factors? (edema of nephrotic syndrome is usually gradual, intermittent, generalized and involves the face, pitting and painless).
- History of cardiac disease? (CHF), HTN? DM? (Nephropathy)
- Associated symptoms
  - Changes of urine? hematuria? any urinary symptoms? (frothy urine)
  - Cough? chest pain? SOB? (pulmonary edema or pleural effusion)
  - Overlying skin? redness? itching? (DVT, cellulitis)
  - Joint pain? Rashes? (exclude autoimmune)
  - Abdominal pain, nausea/vomiting?
  - Yellowish discoloration of the body? (cirrhosis and chronic liver disease)
  - Systems related symptoms? Cardiac, renal, GI. endocrine.
- Risk factors for HIV or viral hepatitis?
- Constitutional symptoms: fever? Weight changes? loss of appetite? fatigue?

Past Hx

- Similar complaints? chronic disease?

Drug history?

Family Hx

- Of Similar complaints? DM, HTN, Cardiac disease, kidney disease?

Social Hx:

- Alcohol? (liver cirrhosis), smoking? Diet?

Physical examination

- General appearance and Vital signs
- General physical exam (LL edema, facial edema, Peripheral pulses, lymph nodes)
- Abdominal exam
- Chest: chest expansion and auscultation
- CVS: heart auscultation and evaluation of JVP.

Management

- **Investigation**:
  - Urinalysis
  - Urine protein/creatinine ratio.
  - Serum creatinine (Rule out acute renal failure, assess glomerular filtration rate).
  - Serum albumin (Assess degree of hypoalbuminemia)
  - Serum urea and electrolytes
  - Blood glucose
  - Lipid panel (Assess degree of hyperlipidemia).
  - Serologic studies for infection and immune abnormalities.
  - Renal US.
  - Renal biopsy if indicated.

- **Treatment**:
  - For edema: bed rest, salt restriction and diuretics (thiazide, furosemide or other loop diuretics).
  - For treatment of the proteinuria, ACE inhibitors or ARBs.
  - Immunosuppressive therapies with corticosteroids, mycophenolate mofetil, azathioprine ect..
  - For risk of venous thrombosis patients should start on prophylactic anticoagulation.

Polyuria

DDx:

- Endocrine: Diabetes mellitus, diabetes insipidus, Cushing's syndrome
- Renal: Acute Kidney injury, relief of urinary tract obstruction
- Iatrogenic: Diuretic therapy, alcohol, lithium
- Metabolic: Hypercalcemia, potassium depletion
- Psychological polydipsia

HPI:

- Onset: sudden (Central) or gradual (excessive water intake, DM)?
- Duration? Is it the first time? (Acute or chronic?)
- Ask about the amount of fluid consumed? (to distinguish between polyuria and frequency)

Associated symptoms:

- polydipsia , fatigue , visual problem , numbness , tingling , loss of sensation(DM)
- Weight loss? (malignancy or chronic infection, DM)
- Night sweats (malignancy or chronic infection)

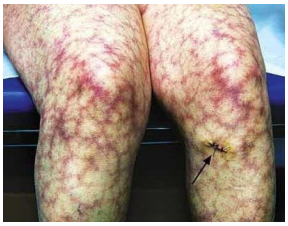
Risk factors:

- History of hypertension,
- Acute kidney injury, hypercalcemia, urinary tract obstruction.
- History of meningitis, psychiatric illness, head injury or brain surgery (DI)
- IV fluid or feeding tubes
- Drugs such as diuretic, Alcohol, lithium.

Chronic Kidney Disease (CKD)

key points to ask CKD pt:

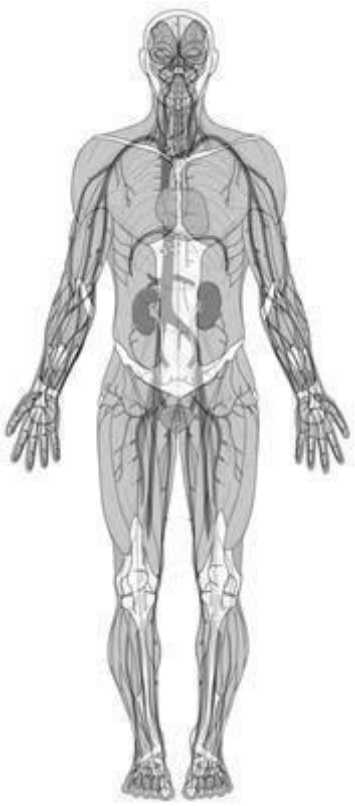
- Weakness and loss of appetite
- Nausea and occasional vomiting
- Swelling and puffiness of the face
- Dyspnea ● Persistent itching ● Past medical hx:
  hx of long standing diabetes or HTN, Glomerulonephritis.
  - ○ hx of recurrent UTI, stones or BPH.
  - ○ hx of urologic intervention.
  - ○ hx of autoimmune disease e.g. SLE, rheumatoid arthritis..
- Family hx:
  first degree relative with CKD.
  - ○ family hx of polycystic kidney disease or alport syndrome.
- Medication hx:
  Frequent use of NSAIDs or pain-killers , long-term exposure to nephrotoxic antibiotics or radiocontrast agents, chemotherapeutic use.



livedo reticularis

CKD	
1. General inspection	• pale anemic, confused or drowsy (uremia) • hyperventilation (metabolic acidosis) • bronzing of the skin (iron overload)
2. Hands	• Pallor of the palmar crease • Muscular twitches or cramps (high Ca)
3. Arms	• surgically created arteriovenous fistulas or shunts (used for haemodialysis access) in the wrist or forearm. • Scratch marks and excoriations (due to uraemic pruritus) • Bruising and bleeding • High BP
4. Face	● Eyes- anemia, Band keratopathy (Ca deposition in the cornea),hypertensive or diabetic changes in the fundus ● Mouth- uremic fetor, mucosal ulcers.
5. Neck	• Raised JVP • Carotid bruits (generalised atherosclerotic disease)

6. Chest	● CVS- pericardial friction rub or signs of cardiac tamponade, CHF. ● Resp.- signs of pleural effusion or pulmonary edema.
7. Abdomen	• Inspection- peritoneal dialysis catheter, nephrectomy or renal transplant scars, distended abdomen (large polycystic kidneys or ascites) • Palpation- enlarged kidneys (bulges forward), perinephric abscess (bulges backward), transplanted kidney (in the iliac fossa), enlarged bladder (obstructive cause), hepatomegaly as a result of hepatic cysts (seen in PKD). • Percussion- Ascites. • Auscultation- bruits (renal artery stenosis)
8. Back	Using the base of your fist, try to elect: • Bony tenderness over the spine (renal osteodystrophy) • Renal angle tenderness (Murphy's kidney punch)
9. Lower limbs	• Edema • livedo reticularis (atheroembolic disease) • signs of peripheral neuropathy (sensory > motor) or myopathy.



Hematological System

Common presenting problems in Hematological system

★ Fatigue:

DDx:

- Anemia, Leukemia or lymphoma.

Personal History:

- Age, Gender.

HPI:

- Onset.
- Duration.
- Progression.
- Exacerbating factors (Physical efforts, exertion) → Muscle weakness, cardiopulmonary disease.
- Relieving factors (Weekend, night rest) → Chronic occupational stress, sleep deprivation.
- Impact on life.

Associated Symptoms:

- Constitutional symptoms: Fever, night sweat, weight loss, appetite → Infection, lymphoma.
- Continued sore throat, rashes, skin changes → Infectious mononucleosis
- Lymph node enlargement → Lymphoma
- SOB, palpitation, chest pain → Anemia
- Back pain, diffuse bony pain → Metastatic carcinoma, Multiple myeloma.
- Excessive thirst, urination → DM.
- Abdominal pain, diarrhea, rectal bleeding → IBD.
- Sleep disturbance → Depression, Sleep apnea.
- Cold intolerance, constipation, voice changes, muscle cramp, hair changes → Hypothyroidism.

PMH:

- DM, HTN, Hypo/Hyperthyroidism, Anemia.

Medication History:

- Radiotherapy, NSAIDs and bisphosphonates, Antidepressant, Antihistamines, Benzodiazepines.
- Hypnotics, Narcotics, heroin.

Surgical History:

- Recent surgery → Postoperative fatigue
- Bariatric surgery → B12 deficiency and malabsorption

Family History:

- Same symptoms, Inherited hemoglobinopathies (thalassemia, Sickle cell anemia) /G6PD/Hemophilia/ GI cancer)

Social History:

- Travel → Parasitic infection.
- Sexual partners → HIV.
- Alcohol consumption → Alcoholism.
- Mood → Depression, Anxiety.
- Stressors → Stress related or psychogenic fatigue.
- Poor diet → Anemia
- Ill contacts.
- Tobacco.

Menstrual History

Investigations:

- Monospot test → (heterophile antibodies) EBV infection
- LDH, AST, ALT → hepatic involvement in infectious mononucleosis
- CBC → microcytic, hypochromic anemia
- Peripheral smear → lymphocytosis with > 10% atypical lymphocytes in infectious mononucleosis.
- Serum iron, ferritin, transferrin, total iron binding capacity (TIBC) → Iron deficiency anemia.
- TSH, FT3, FT4 → hypothyroidism

Treatment:

- According to the etiology

Epistaxis

Personal data:

- Gender (male → hemophilia)

HPI:

- Character? color (bright or dark red)
- Severity? assessed by frequency and amount

Associated symptoms:

- Petechiae, ecchymosis , purpura → superficial bleeding due to platelets disorder
- Bruises, hematuria, Hemarthrosis → deep bleeding due to coagulation disorder
- Fatigue, palpitation, SOB → symptoms of anemia (due to blood loss)
- Chest pain, diaphoresis, hyperthermia → cocaine or other sympathomimetics ingestion
- Confusion, cold hand, low urine output, shaking (hypovolemic shock) → as complication of bleeding

Risk factors:

- Past medical hx: hemophilia , VW disorder and platelets disorder
- Surgical hx: previous maxilofacial or skull base surgeries
- History of trauma
- Medication: use of Anticoagulants.

Investigations:

- CBC
- Coagulation profile
- Cross matching
- CT
- Angiography

Treatment:

- Immediate measures:
  - Begin fluid resuscitation if the patient is hemodynamically unstable.
  - Keep the patient calm.
  - Elevate the patient's upper body and bend their head forward.
  - Apply cold packs and sustained, direct pressure by pinching the nose at the nostrils for 5–10 minutes in order to occlude the bleeding vessel.
  - Apply topical vasoconstrictors (e.g., oxymetazoline, phenylephrine).
- If epistaxis continues after 10–15 minutes:
  - First-line: cauterization of the bleeding vessel using silver nitrate or electrocautery
  - Second-line: nasal packing using gauze impregnated with petrolatum and antibiotics (for Staphylococcus aureus coverage).
- If epistaxis persists: arterial embolization or endoscopic ligation of the bleeding vessel

- Anterior ethmoidal artery for anterior epistaxis
- Sphenopalatine artery for posterior epistaxis
- Nasal packs can cause toxic shock syndrome if left in place for more than 24 hours.

Splenomegaly

Causes of splenomegaly		
Infective	Bacterial	• Infective endocarditis • Typhoid • TB • Septicemia • Abscess
	Viral	• infectious mononucleosis • hepatitis • Cytomegalovirus • HIV
	Protozoal	• Malaria (common in Africa, causes massive splenomegaly)
	Parasitic	• Hydatid cyst • Kala azar (داء اللشمانيا)
Inflammatory		• Rheumatoid arthritis • Lupus • Vasculitis • Infiltrations (e.g. amyloid, sarcoid)
Neoplastic		• Metastases • Leukaemia (e.g Chronic myeloid leukaemia causes massive splenomegaly) • Lymphoma (e.g primary lymphoma of the spleen) • Primary tumors
Haemolytic Disease		• Hereditary spherocytosis • Acquired hemolytic anemia • Thrombocytopenic purpura
Hematological		• Thalassemia • Sickle cell • anemia • myelofibrosis
Storage Diseases		• Gaucher's disease
Deficiency Diseases		• Severe iron-deficiency anaemia • Pernicious anaemia
Splenic Vein Hypertension		• Cirrhosis (portal hypertension) • Portal /Splenic vein thrombosis

Personal data:

- Occupation: (Hydatid disease More common in rural sheep-farming regions,
- Age (hereditary spherocytosis in children)

HPI:

- Onset:
  - Acute → congestion
  - Chronic → sickle cell anemia
- character: painful or painless
- Relieving factors: blood transfusion
- severity: Size

Associated symptoms:

- LUQ pain, early satiety (massive enlarged)
- SOB, palpitation, fatigue (sickle cell Anemia, thalassemia), itching (polycythemia vera)
- Jaundice, ascites, RUQ pain → liver disease
- Petechiae, easily bruising, fatigue, fever → hematological malignancy
- joint pain, rash (SLE , RA)

PMH:

- History of Sickle cell anemia, thalassemia, SLE, Rheumatoid arthritis, chronic infection, Liver cirrhosis.
- history of trauma
- past surgical
- blood transfusion

Social History:

- Travel history: Did you travel recently? Where? (endemic diseases like malaria, schistosomiasis)
  - Typhoid: "malaise, headache, fever, cough, constipation initially and then diarrhea"
  - TB: "weight loss, night sweats and a cough"
- Drug abuse: septic emboli from endocarditis can cause splenic abscess.

Surgical History:

- Ask about history of blood loss for deficiency cause

Treatment

- Treatment of underlying disease
- Splenectomy in case of symptomatic cytopenia
- After splenectomy there is an increased risk of infection by encapsulated pathogens, possibly leading to overwhelming post-splenectomy infection (OPSI) → prevention with vaccinations against pneumococci, meningococci, and Haemophilus influenzae type B

★ Anemia

Defined as Hemoglobin concentration of <13.5 g/dl in men <11.5 in women.

DDx :

Microcytic Anemia (MCV <80 fl)	● Iron deficiency ● Thalassemia ● Anemia of chronic disease
Normocytic Anemia (MCV 80-95 fl)	● Acute blood loss ● Hemolytic anemia: (sickle cell anemia – malaria – drugs- G6PD deficiency) ● Bone marrow failure, ● Pregnancy ● Secondary anemia due to liver or renal disease
Macrocytic anemia (MCV>95 fl)	● Megaloblastic; Vitamin B12 deficiency, Folate deficiency and pernicious anemia. ● Non-megaloblastic; Alcoholism, Hypothyroidism, myelodysplasia.

Personal data :

- Age, Gender, residency

History of presenting illness:

- Symptoms of anemia are fatigue, palpitations, SOB, headache, postural dizziness, chest pain, angina of effort, syncope.

Associated symptoms:

- hx of bleeding from other sites (e.g. bleeding per rectum, vomiting blood, hematuria, hemoptysis, heavy menstrual bleeding) (heartburn? may indicate GERD and PUD → blood loss due to GI bleeding)
- Constitutional symptoms; Fever, loss of appetite and weight loss.
- Symptoms of hemolytic anemia: jaundice, scleral icterus, dark urine, hepatosplenomegaly
- Symptoms of iron deficiency: ex. Pica, hair thinning/lose
- Dysphasia ? " Plummer-Vinson Syndrome: triad of dysphagia, iron-deficiency anemia and esophageal web
- Neurological symptoms ex. Peripheral neuropathy → B12 deficiency

Risk factors

● Medical History:

- History of gastric ulcer and gastrointestinal cancer
- History of malabsorption (crohn's disease, celiac disease)
- hx of Liver and kidney diseases

- hx of chronic disease associated with anemia (e.g. Rheumatoid arthritis,SLE), condition associated with iron deficiency (e.g. pregnancy)
- Drugs e.g. NSAIDs and bisphosphonates → GI bleeding , Blood thinning drugs ex.(Heparin, warfarin, Aspirin), Metformin → B12 deficiency, Phenytoin or sulfa medications → folate deficiency, herbal medication.
- Recent ingestion of beans → G6PD
- Bony deformities "extramedullary erythropoiesis in thalassemia"

● **Surgical History:** Gastric surgery e.g. bariatric surgery (B12 deficiency and malabsorption), recent operations (Acute blood loss)

● **Family History:** same symptoms, family hx of Inherited hemoglobinopathies (thalassemia, Sickle cell anemia) /G6PD/ Hemophilia/ GI cancer

● **Social History:**
- Travel → (parasitic infections e.g. hookworm and malaria),
- Alcohol → interfere with absorption of nutrients such as folate
- Vegetarian diet → iron and B12 deficiency

Investigations:

● **CBC :** the best initial test
- Hb → severity of anemia
- MCV → type of anemia > normocytic, macrocytic or microcytic anemia
- Platelet and WBCs → pancytopenia → aplastic anemia
- RDW → ↑ in IDA

● Iron studies → IDA → iron↓, ferritin↓, TIBC↑, transferrin saturation↓
● Electrophoresis → hemoglobinopathies → thalassemia, Sickle cell anemia
● Peripheral blood smear → to check hyper-segmented neutrophils to determine the etiology of macrocytic anemia – to check sickled cell in sickle disease – target cells
● Reticulocyte count → hemolytic anemia
● Methylene blue stain → Heinz bodies in G6PD
● Prussian blue stain → Sideroblastic anemia

Treatment:

● If patient is symptomatic with severe anemia or heart disease → blood transfusion
● Based on the etiology:
- IDA → replace iron with ferrous sulfate
- Thalassemia → thalassemia trait is not treated, thalassemia major is managed with chronic transfusion lifelong
- Macrocytic anemia→ replace what is deficient, B12 or folate replacement
- Sickle cell anemia → hydroxyurea " prevent the recurrence of crisis – folic acid – pneumococcal vaccination "because of auto-splenectomy"
-Erythropoietin replacement in anemia related to kidney disease

★ VTE (DVT and PE)

Diff dx of DVT → cellulitis "Unilateral swelling"

Clinical presentations:

- DVT: **unilateral** unexplained extremity swelling – pain – warmth – erythema – cramps and heaviness, especially in calf – increased visible skin veins – blue-red or cyanotic discolouration
- PE: dyspnea – tachypnea – pleuritic chest pain – cough – fever – symptoms of shock or syncope with massive PE – hemoptysis – leg pain or swelling "DVT"

HPI:

- Ask about above-mentioned symptoms
- Onset?? Rapid onset
- Recent surgery?

PMH and PSH:

- History of thrombophilia: factor V Leiden mutation – protein C/S deficiency – antithrombin deficiency – SLE " antiphospholipid syndrome"
- Ask about conditions which may be risk factors: history of DVT In suspected case of PE – recent surgery ex. joint replacement – major trauma " endothelial injury " – cancer – pregnancy or postpartum state – polycythemia

Medication history:

- OCP? HRT?

Family history:

- History of inherited thrombophilia? Cancer?

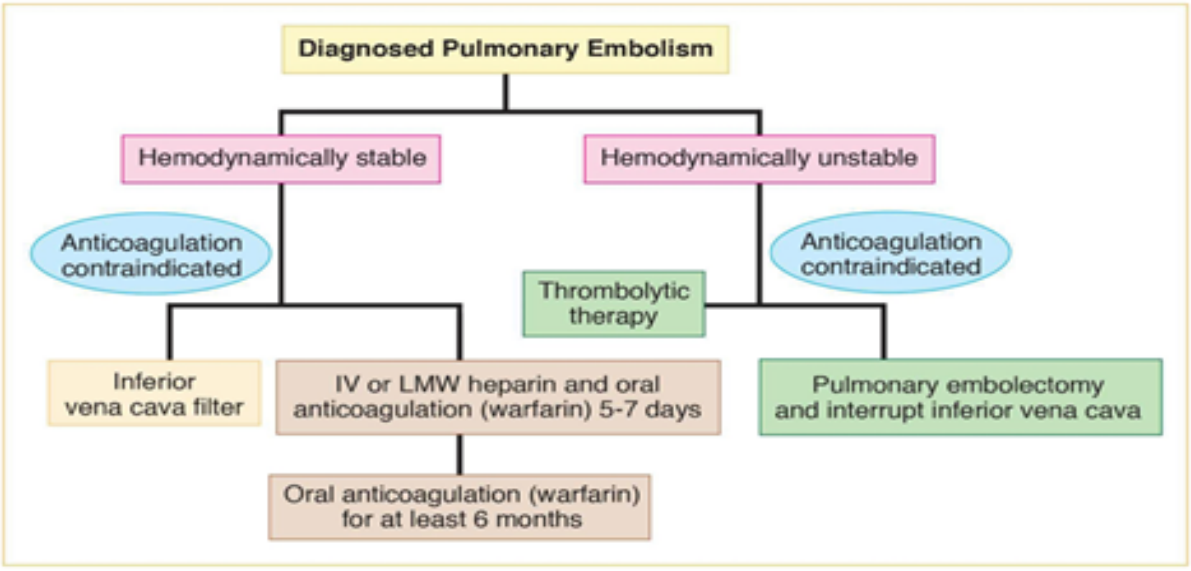
Social history:

- Prolonged bed rest and immobility? Travel?
- Smoking?

Investigation:

- Chest x Ray – ECG – ABG: the best initial tests
- CT angiogram (spiral CT): standard of care
- V/Q scan: if spiral CT is contraindicated, ex. In whom the renal toxicity of the contrast for the CT angiogram should be avoided
- D-dimer: if probability of PE is low
- Lower extremity Doppler: you do not need a spiral CT or V/Q scan to confirm a PE if there is a clot in legs because they will not change therapy

Treatment:



- NOACs: ex. Rivaroxaban – Apixaban – dabigatran

★SCD and Vaso-occlusive crises

Most individuals with skill cell disease are Diagnosed at birth or during infancy

Presentations and HPI:

- **Vaso-occlusive crisis**
  - **Pain**?? Most commonly in **extremities**, chest, back and thighs – sudden in onset – may be localized or migratory, continuous or throbbing
  - Triggers include stress, exposure to cold, **infection** (**ask about fever?**), hypoxia (ask about high altitude?)
- **Acute chest syndrome** half of affected patient have antecedent painful **VOC**
  - SOB – cough – fever – chest, rib and Sternal pain?
- Splenic sequestration
  - Symptoms of anaemia
  - Left side abdominal pain, nausea, vomiting, lethargy and irritability
- Stroke "mechanical obstruction of blood vessels by dens sickled RBCs"
  - Headache ? Hemiparesis ? Aphasia ? facial drop ?
- Priapism

PMH:

- Vaccination history?
- History of acute or chronic complications?, previous episode of same symptoms?
- History of transfusion?
- History of biliary colic "bilirubin gallstone from chronically elevated bilirubin levels"
- History of infections ? "particularly encapsulated organisms, ex. Osteomyelitis from salmonella"
- Visual disturbance → retinopathy "retinal infarction"

Family History:

- History of sickle cell disease?

Investigation:

- CBC → Hb (anemia) – WBC ↑ (infection as an etiology of VOC)
- Peripheral smear → the best initial test, to check sickled cell in sickle disease and Howell-Jolly bodies
- Electrophoresis → the most accurate test

Treatment:

- Begin with oxygen/hydration/analgesia

- If fever or a white blood cell count higher than usual is present, then antibiotics are given. Use ceftriaxone, levofloxacin, or moxifloxacin
- Folic acid replacement is necessary on a chronic basis
- Give pneumococcal vaccination because of auto-splenectomy
- Hydroxyurea prevents recurrences & Blood transfusion in severe anemia

Hematological Examination

WIP3E: **W**ash your Hands, **I**ntroduce yourself, **P**ermission/**P**rivacy/**P**osition, **E**xposure
Position: Laying in bed
Exposure: full exposure to the body.

General appearance look for: **ABC2DE**

- Appearance: stressed, tachypneic
- Body built: Cachectic? Obese?
- Color: Cyncoed? Pale? Jaundice?
- Connections: to any devices: Holter monitor? Pacemaker? or intracardiac defibrillator?
- Distress: in pain, respiratory or neurological distress
- Else: orientation, consciousness, alertness

Hands:

- Inspect:
  - Nails → Koilonychia
  - Palmar crease → Pallor
  - Fingers → Arthropathy (haemophilia)

Arms:

- Inspect:
  - Petechia
  - Scratch marks → Myeloproliferative disease, lymphoma
  - Bruising → Thrompocytopenea
  - Pigmentation → Lymphoma
  - Ulceration → Haemoglobinopathy
- Examine:
  - Epitrochlear nodes
  - Axillary lymph node

Face:

- Inspect:
  - Sclera → Jaundice, pallor, conjunctival suffusion
  - Mouth → Gum hypertrophy (leukemia), ulcrations, infection, angular cheilitis (anemia), atrophic glossitis (anemia), tonsillar enlargement (leukemia).
- Examine: **While patient is in a sitting position**

- Cervical nodes
- Feel the supraclavicular area

While your pt is **sitting** feel the bones for any tenderness which indicates myeloma or carcinoma (Spine, clavicle, sternum, shoulders)

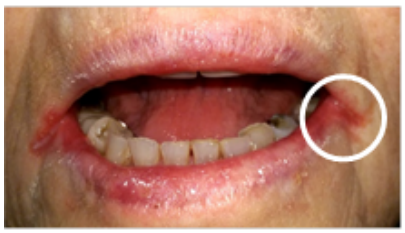
Legs: **Pt is laying in bed again**

- Inspect:
  - Petechia
  - Scratch marks → Myeloproliferative disease, lymphoma
  - Bruising → Thrompocytopenea
  - Pigmentation → Lymphoma
  - Ulceration → Haemoglobinopathy
- Examine:
  - Neurological aspect → peripheral neuropathy (Vit B12 diff)

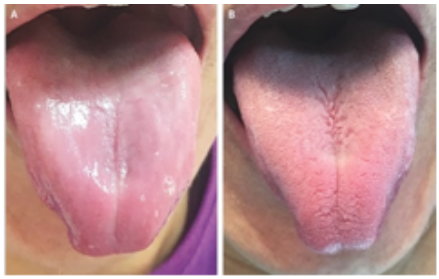
Abdomen:

- Feel for splenomegaly and hepatomegaly
- Inguinal lymph node

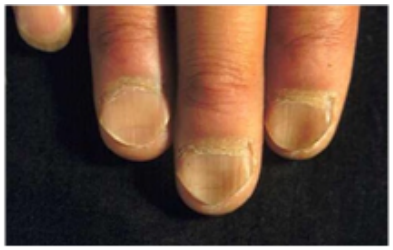
Finish your examination with rectal and pelvic examination for evidence of bleeding



angular cheilitis

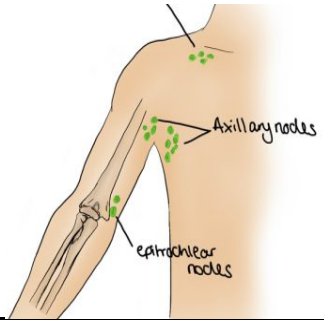


atrophic glossitis



normal

koilonychia



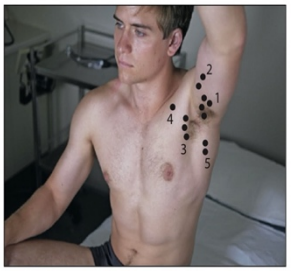


Figure 6.18 The axillary lymph nodes. 1 = central, 2 = lateral, 3 = pectoral, 4 = infraclavicular, 5 = subscapular.

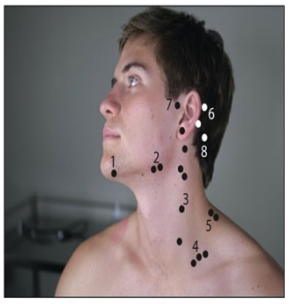
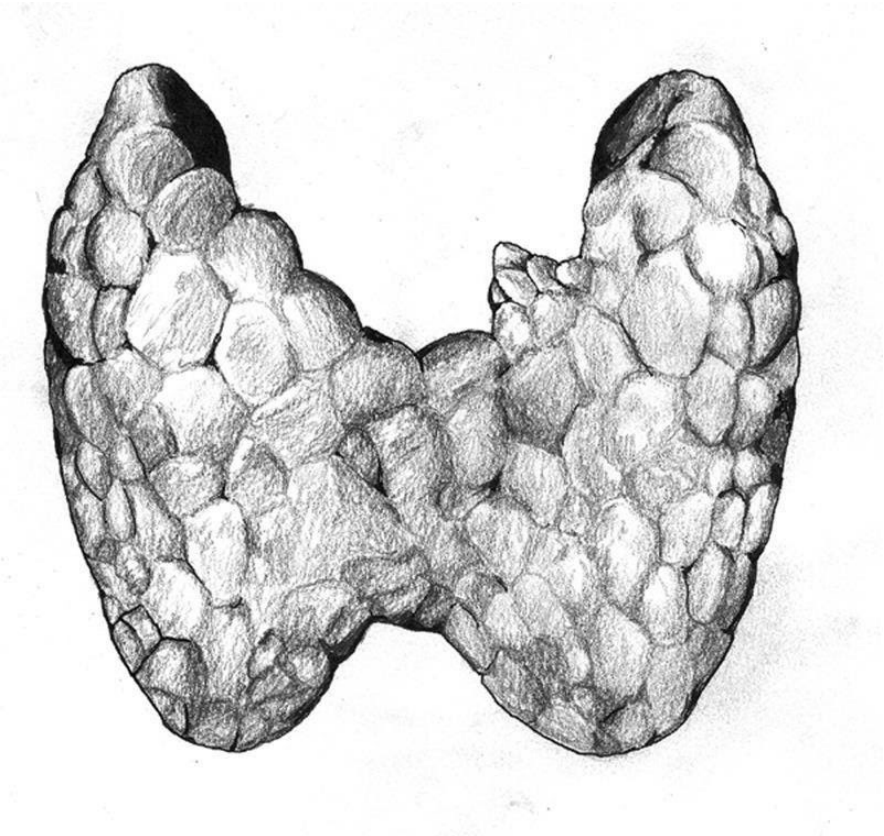


Figure 6.19 Cervical and supraclavicular lymph node groups. 1 = submental, 2 = submandibular, 3 = jugular chain, 4 = supraclavicular, 5 = posterior triangle, 6 = postauricular, 7 = preauricular, 8 = occipital.

Epitrochlear nodes	**The axillary lymph nodes:** 1= central, 2= lateral, 3= pectoral 4= infraclavicular, 5= subscapular	**Cervical and supraclavicular lymph nodes:** 1= submental, 2= submandibular, 3= jugular chain, 4= supraclavicular 5= posterior triangle, 6= postauricular 7= preauricular, 8=occipital



Endocrine system

Common presenting problems in Endocrine system

DM

The patient may come with one of the following or more:

- Polyuria
- Polydipsia
- Weight loss
- Blurred vision.

Or even they can present with either hypoglycemia episode or DKA as the first manifestation of Diabetes.

Key points to ask suspected DM patient:

- Onset
- Duration
- Relieving and aggravating factors
- Frequency? of any of the above.
- Rule out other DDx of polyuria, polydipsia:
    - Drink water at the night (physiological)
    - Hx of Brain infection/surgery or tumor (central
    - Lithium use (Nephrogenic DI)
    - Do you feel excessive thirst (psychogenic Polydipsia)
    - Diuretics intake?

If they are already diagnosed:

- Type of diabetes
- When and how did he diagnose?
- Type of drug used (Insulin or oral hypoglycemic)
- Do they take the drug regularly? It is important to assess the compliance in each visit.
- How many times they measure it per day
- What are the readings
- what was the last measured HBA1C, ?
- Hx of any hospital admission or ICU due DM?

Ask about diabetes complications:

- Blurred vision? (retinopathy)
- Numbness? (Neuropathy)
- Angina, fatigue ? (CVD)
- Frothy urine, edema, (nephropathy).
- Recurrent skin infection, UTI, (low immunity)
- Nausea and vomiting, abdominal pain (DKA).
- Palpitation, sweating, dizziness (Hypoglycemia episode)

Risk Factors:

Past Medical History

- Autoimmune disease?
- HTN?
- Obesity?
- Steroid intake?
- Hyperlipidemia?

Social History

- Smoking , Alcohol
- Exercise
- Diet

Family history

- DM and other Autoimmune Disease?

★ Diabetic Ketoacidosis (DKA)

It is one of important endocrine emergencies, and it is one of complications of DM in type 1 usually but can happen in type 2 especially who are on insulin injection. Most of the time there is a trigger or precipitated factor that's why you have to ask about them in the history and take them into consideration in the management plan to prevent further episodes. Some example for circumstances you may see DKA:

- Diabetic patient who skip one of his insulin therapy.
- Diabetic patient with stressful conditions such as (Infections, Sepsis, Surgery, MI, vigorous exercise or change in diet).
- Undiagnosed diabetic patients may come to the ER with DKA as the first presentation.

The patient may come and present with one of the following or more:

- Nonspecific abdominal pain
- Vomiting and Nausea
- Polyuria, Polydipsia and weight loss
- Fatigue or weakness
- Mental status changes
- Comatose (rare)

<u>Key points to ask suspected DKA patient:</u>

Onset (it is acute, and present to ER)
Duration (it is ranging from hours to day or two)
SOCRATES for pain analysis
Relieving and aggravating factors
Frequency? of any of the above. (especially vomiting we have to dig more in history and ask him about the amount and frequency of that vomits, and don't forget to ask about symptoms of dehydration such as thirsty, palpitation and dizziness).
Rule out other DDx of abdominal pain and vomiting and other presentation of DKA:

o Cardiac cause such as MI can present with epigastric pain, nausea and vomiting (can co-exist with DKA as is considered as precipitated factor)
o Acute Abdomen including obstruction or perforation or other GI cause pancreatitis, gall stone.
o Systemic cause such as sepsis, shock, or infection (because in sever DKA may present with unstable vitals such tachypneic, hypotensive and drowsy)

<u>If they are already diagnosed:</u>

- Type of diabetes
- Type of drug used (Insulin or oral hypoglycemic)
- When and how did he diagnose?
- Do they take the drug regularly? It is important to assess the compliance in each visit.
- How many times they measure it per day? What are the readings ?
- What was the last measured HBA1C?
- Hx of any hospital admission or ICU due DM?

Ask about diabetes complications:

- Numbness? (Neuropathy)

- Blurred vision? (retinopathy)
- Angina, fatigue ? (CVD)
- Frothy urine, edema, (nephropathy).
- Recurrent skin infection, UTI, (low immunity).
- Foot deformity, ulcer, (Diabetic foot)
- Nausea and vomiting, abdominal pain (DKA).
- Palpitation, sweating, dizziness (Hypoglycemia episode)

Risk Factors:
You have to figure out the stressors or precipitating factor for DKA , which are most commonly one of the following:
o having an infection, such as flu or a urinary tract infection (UTI) or even sepsis from wound infection due to diabetic foot.
o Do not follow the treatment plan, such as missing doses of insulin or decrease it.
o an injury or surgery
o taking certain medicines, such as steroids
o binge drinking alcohol or using illegal drugs
o vigorous exercise or sudden change in diet
Sometimes, there's no obvious trigger

Past Medical and Surgery History and medications:
- HTN? Hyperlipidemia? Autoimmune disease ? Obesity ?
- Steroid intake? Allergy?
- Surgery? Trauma?

Social History
- Smoking , Alcohol
- Exercise
- Diet

Family history
- DM and other Autoimmune Disease?

Key points to look for in PHYSICAL EXAMINATION with suspected DKA patient:

Vital signs:
- Vital signs may show various findings depending on the volume status, extent of academia, and presence of infection in the presenting patient.
- Vitals consistent with dehydration may be observed (hypotension, reflex tachycardia)
- Drowsy and alter mental states

General Examination:
- Signs of dehydration: dry mucous membranes and poor skin turgor .
- Fruity breath odor: this is caused by the presence of acetone (a ketone) in the blood

Respiratory exam might reveal:

●Kussmaul respirations are “classically” seen in DKA. Kussmaul breathing is a type of
hyperventilation that is the lung’s emergency response to acidosis and causes a labored, deeper breathing rate.
● Signs of pulmonary infection: crackles/auditory findings on auscultation may be present
in some patients.

Abdominal exam could be notable for:
●Generalized/nonspecific abdominal pain may be observed in DKA.
●Abdominal pain that might suggest pancreatitis/or other underlying abdominal pathologies.

It is important to utilize the physical exam in such patients to try and localize if there is any source of infection that requires targeted treatment.

After the patient is stabilized you can complete your examination with other systems especially Neuro-Vascular and foot examination.

MANAGEMENT of suspected DKA patient:

- Clinical Workup Of Diagnosing DKA by:
  - Ketones in the serum and Hyperglycemia
  - Urinalysis can reveal Ketones or Glucose
  - Serum blood gasses to assess for academia and high anion gap.

●Clinical Workup Of Searching For Precipitant by:

- Complete blood count (CBC): high white blood count in patients with an infection
- EKG + serum troponin values: these studies can help diagnose an MI.
- Serum lipase and amylase: these serum values can help to confirm pancreatitis.
- Urinalysis can be used to search for signs of infection: Leukocyte esterase positive Nitrates positive, Presence of WBCs or Cultured pathogen from urine.

●TREATMENT:

- The overall goal of treatment is to stop the acidosis by halting the ketogenic state!
- This is a serious condition that can be fatal if not treated correctly and promptly and most of the time need to be admitted to ICU or medical ward with close monitoring.
- DKA patients need: Fluid resuscitation, Insulin treatment and Potassium replacement.
- Once serum glucose is lowered (250-200 mg/dl) patients should be switched to 5% dextrose to avoid causing hypoglycemia.
- Treating the underlying precipitants: to make sure we direct treatment to what has caused this DKA in the first place. Common major causes of DKA (Infections, Pancreatitis and MI).
- Make sure to check if the medical regiment is clear with a patient who has DKA. This can be done after the patient is stabilized.

Physical Signs of Endocrine System

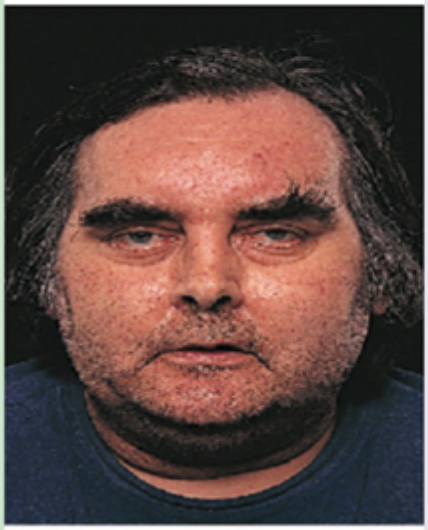
★ Cushing's disease/syndrome

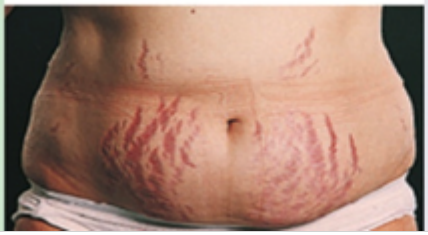
Cushing's disease is not the same as Cushing's syndrome. Cushing disease is a specific type of Cushing syndrome. It occurs when a pituitary tumor causes the body to make too much cortisol. While Cushing's syndrome refers to the general state characterized by excessive levels of cortisol in the blood. It can occur for reasons other than a pituitary tumor, including (Tumors of the adrenal glands producing cortisol or Certain types of cancer, elsewhere in the body, can make ACTH, which is called ectopic ACTH production. The most common cause of elevated cortisol levels is taking medications that have cortisol, including: hydrocortisone, prednisone pills, skin ointments, asthma inhalers and joint steroid injections, so you have to keep all these as a differential in any patient present with a clinical picture of Cushing's.

Symptoms

Weight gain (central)
Change of appearance
Depression
Insomnia
Amenorrhoea/ oligomenorrhoea
Poor libido
Thin skin/ easy bruising
Hair growth/acne
Muscular weakness
Growth arrest in children
Back pain
Polyuria/polydipsia
Psychosis

Old photographs may be useful





Signs

Moon face
Plethora
Depression/ psychosis
Acne
Hirsutism
Frontal balding (female)
Thin skin
Bruising
Poor wound healing
Pigmentation
Skin infections
Hypertension
Osteoporosis
Pathological fractures (especially vertebrae and ribs)
Kyphosis
'Buffalo hump' (dorsal fat pad)
Central obesity
Striae (purple or red)
Rib fractures
Oedema
Proximal myopathy
Proximal muscle wasting
Glycosuria

The patient may come and present with one of these listed above:

Key points to ask suspected Cushing's:

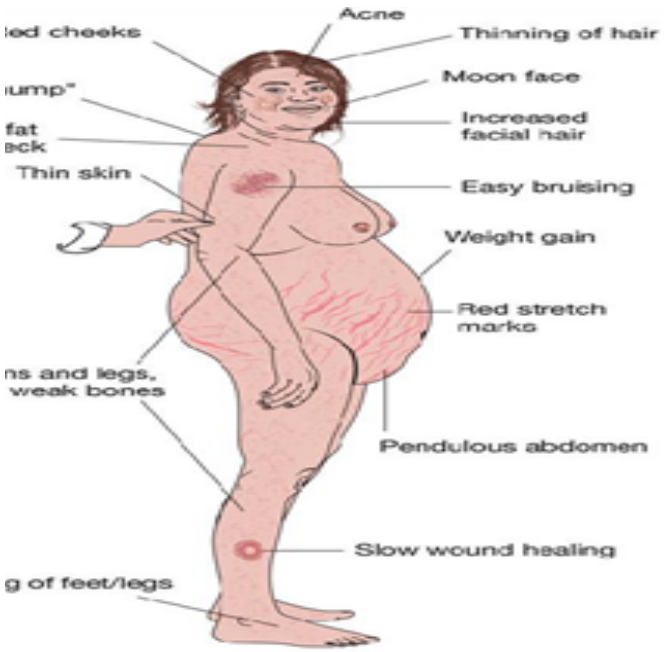
o According to the chief complain you can direct your questions toward that symptoms in details to rule out other differential dx for each symptom.
o You have to ask about all other symptoms of Cushing other than the chief complain.
o You have to try to find the underline Causes by asking about associated symptoms and risk factors such as:
- Headaches, Vision problems, Acromegaly, Infertility and Changes in menstrual cycles in women (in case of Cushing's disease most commonly due to pituitary adenoma patient may present with pressure symptoms or with impair of other Pituitary hormones)
- Constitutional symptoms and other symptoms such as Cough, Wheezing, Shortness of breath, Chest pain, Diarrhea and skin flushing which suggested (Ectopic ACTH-producing tumors like small cell lung carcinoma or carcinoid tumors)
- Ask about Low potassium levels, Rapid or irregular heartbeats, Feelings of anxiety, panic, fear, Tremor and Sweating, all these symptoms may give you a hint about impaired adrenal hormones level such as aldosterone or adrenaline (which may reveal underlying Adrenal tumor).
- Ask about Medications especially steroids in all forms (Exogenous Cushing's Syndrome due to Glucocorticoid administration)
- Any medical conditions such Pregnancy, alcohol use disorder, morbid obesity, polycystic ovarian syndrome, end-stage renal disease, severe major depressive disorder, and poorly controlled diabetes. (All these can cause Pseudo-Cushing's Syndrome)

Ask about Cushing's complications:

- Metabolic syndrome, consisting of hypertension, visceral obesity, impairment of glucose metabolism, and dyslipidemia.
- Musculoskeletal disorders, such as myopathy, osteoporosis, and skeletal fractures
- Neuropsychiatric disorders, such as impairment of cognitive function, depression, or mania
- Immunosuppression during active disease causes susceptibility to infections, possibly complicated by sepsis.
- Impairment of reproductive and sexual function.
- Dermatological manifestations, mainly represented by acne, hirsutism, and alopecia.

If child, ask about growth is it affected or not.

Key points to look for in PHYSICAL EXAMINATION with suspected Cushing's:

Cushing Disease/Syndrome	
	
1. General inspection	• Moon face • Hair growth (Hirsutism) • Central (Truncal) Obesity with thin extremities.
2. Eyes	• Examine the eyes for Bitemporal hemianopsia or papilledema.
3. Arms	• Proximal myopathy (examined by asking the patient to squat) • High BP
4. Face	• Frontal Balding (Female) • Facial plethora • Acne
5- Chest and Abdomen	• Gynecomastia • Purple Striae
6-Back	• Buffalo hump • Bony tenderness over the vertebra (due to osteoporosis)

7-Skin	• Poor wound healing • Pigmentations • Thin Skin/easy bruising • Skin Infections
8-Other	• Amenorrhea/Oligomenorrhea • Growth arrest in children • edema

MANAGEMENT of cushing syndrome/disease :

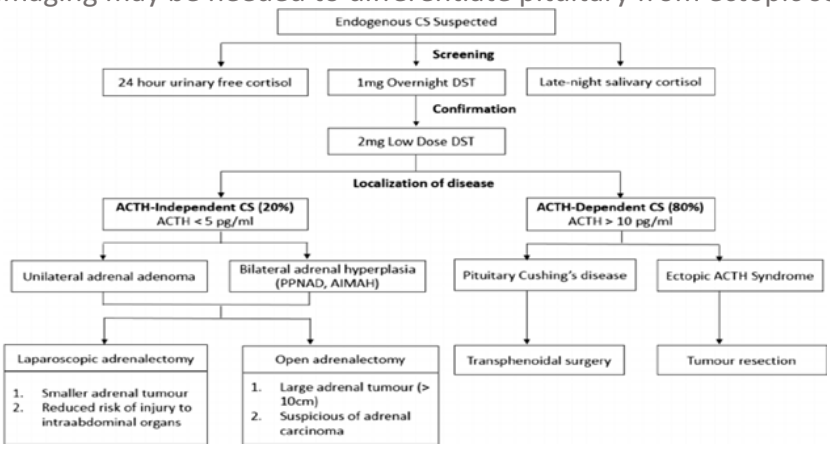
There are 4 main causes of Cushing syndrome. It is important to distinguish where the abnormal cortisol is coming from by investigation because the treatments are different based on the source.

- Investigation:

Diagnosis is usually suspected based on the characteristic symptoms and signs. Confirmation (and identification of the cause) generally requires hormonal and imaging tests such as :

o Urinary free cortisol measurement:
o Dexamethasone suppression test:
o Midnight cortisol measurements: If results of previous tests are indeterminate, the patient is hospitalized for measurement of serum cortisol at midnight, which is more likely to be conclusive.
o Plasma ACTH measurement: Pituitary causes are distinguished from nonpituitary causes by adrenocorticotropic hormone (ACTH) levels.
o Imaging by:

- MRI or CT of the head. Pituitary imaging is done if ACTH levels and provocative tests suggest a pituitary cause.
- CT or PET of chest, pancreas, and adrenals. If testing suggests a nonpituitary cause these imaging may be needed to differentiate pituitary from ectopic sources.



Treatment:

o Tumors are usually treated surgically or with radiation therapy.

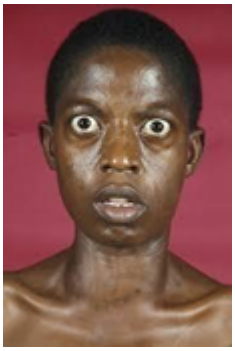
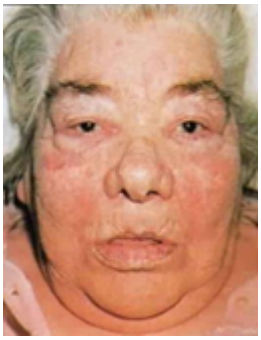
o Metyrapone or ketoconazole may be given to suppress cortisol secretion prior to definitive treatment
o In case of Iatrogenic Cushing syndrome responds to reduction in steroid dosage

Thyroid disease (Hyperthyroidism & Hypothyroidism)

Whenever the patient present with S/S of thyroid disease you should ask about:

- Compressive symptoms e.g. SOB, choking sensation, dysphagia, hoarseness.
- Risk factors of thyroid disease e.g. radiation, other autoimmune disease , Iodine intake.
- S/S/ of hypo- and hyperthyroidism are summarized collectively in table bellow :

	Hyperthyroidism	Hypothyroidism
Symptoms and Signs		
General	Heat intolerance, sweating, weight loss, increased appetite, malaise. Hands: Onycholysis, clubbing, sweating,warmth.	Cold intolerance, edema, mild obesity, weight gain.
CNS	Nervousness, irritability, insomnia, tremor,hyperreflexia.	Psychosis, dementia, ataxia, carpal tunnel syndrome, hyporeflexia, muscle cramps.
CVS	Palpitation, breathlessness,tachycardia.	HTN, heart failure, bradycardia, pericardial effusion.
GIT	Vomiting, diarrhea.	Constipation.
Musculoskeletal	Muscle weakness, proximal muscle wasting.	Muscular hypertrophy, proximal myopathy, myotonia.
Eyes	Staring and protrusion eyes(exophthalmos), lid lag, lid retraction,, chemosis.	Loss of hair at the outer third of the eyebrow, periorbital puffiness.

Others	loss of libido, gynecomastia, tall stature in children, goiter.	Myxedema,Large tongue, dry thin hair, deep voice, deafness, goiter.
Pictures		

- Signs only in graves: puffiness of the eyes, Exophthalmos, lid retraction, myxedema.

HypErthyroidism

Hyperthyroidism has many causes; these may involve excessive stimulation of a normal thyroid gland (eg, by thyroid-stimulating hormone [TSH], human chorionic gonadotrophin [hCG], ingestion of iodine or iodine-containing drugs), excessive hormone synthesis by an abnormal thyroid (eg, Graves disease, toxic nodular goiter), excessive release of thyroid hormones (eg, due to thyroiditis), or ingestion of excessive quantities of thyroid hormone. Most symptoms and signs are the same regardless of the cause. Exceptions include infiltrative ophthalmopathy and dermopathy, which occur only in Graves disease.

The patient may come and present with one of these symptoms and signs listed below:

Symptoms

Weight loss
Increased appetite
Irritability/behaviour change
Restlessness
Malaise
Stiffness
Muscle weakness
Tremor
Choreoathetosis
Breathlessness
Palpitation
Heat intolerance
Itching
Thirst
Vomiting
Diarrhoea
Eye complaints*
Goitre
Oligomenorrhoea
Loss of libido
Gynaecomastia
Onycholysis
Tall stature (in children)
Sweating

*Only in Graves' disease

Signs

Tremor
Hyperkinesis
Psychosis

Tachycardia or atrial fibrillation
Full pulse
Warm vasodilated peripheries
Systolic hypertension
Cardiac failure

Exophthalmos*
Lid lag and 'stare'
Conjunctival oedema
Ophthalmoplegia*
Periorbital oedema
Goitre, bruit
Weight loss

Proximal myopathy
Proximal muscle wasting
Onycholysis
Palmar erythema

Graves' dermopathy*
Thyroid acropachy
Pretibial myxoedema

*Only in Graves' disease

Ask about Hyperthyroidism complications:

- Osteoporosis
- Cardiac: like atrial fibrillation that increases your risk of stroke, and congestive heart failure
- Thyrotoxicosis crisis: Thyroid storm causes sudden intensification of the symptoms of hyperthyroidism and present to ER with (fever, marked weakness and muscle wasting, extreme restlessness with wide emotional swings, confusion or delirium, psychosis, coma, nausea, vomiting, diarrhea). Even may present with cardiovascular collapse and shock. Thyroid storm is a life-threatening emergency requiring prompt treatment.

MANAGEMENT of Hyperthyroidism:

- **Investigation**

o Blood test : mainly thyroid function test including TSH, Free T4, plus T3
o Imaging : including Radioiodine uptake test, Thyroid scan and Thyroid ultrasound.
o If thyrotoxicosis factitia is suspected, serum thyroglobulin can be measured; it is usually low or low-normal—unlike in all other causes of hyperthyroidism.
o Thyroid blood tests may give false results if you're taking biotin, B vitamin supplement that may also be found in multivitamins.

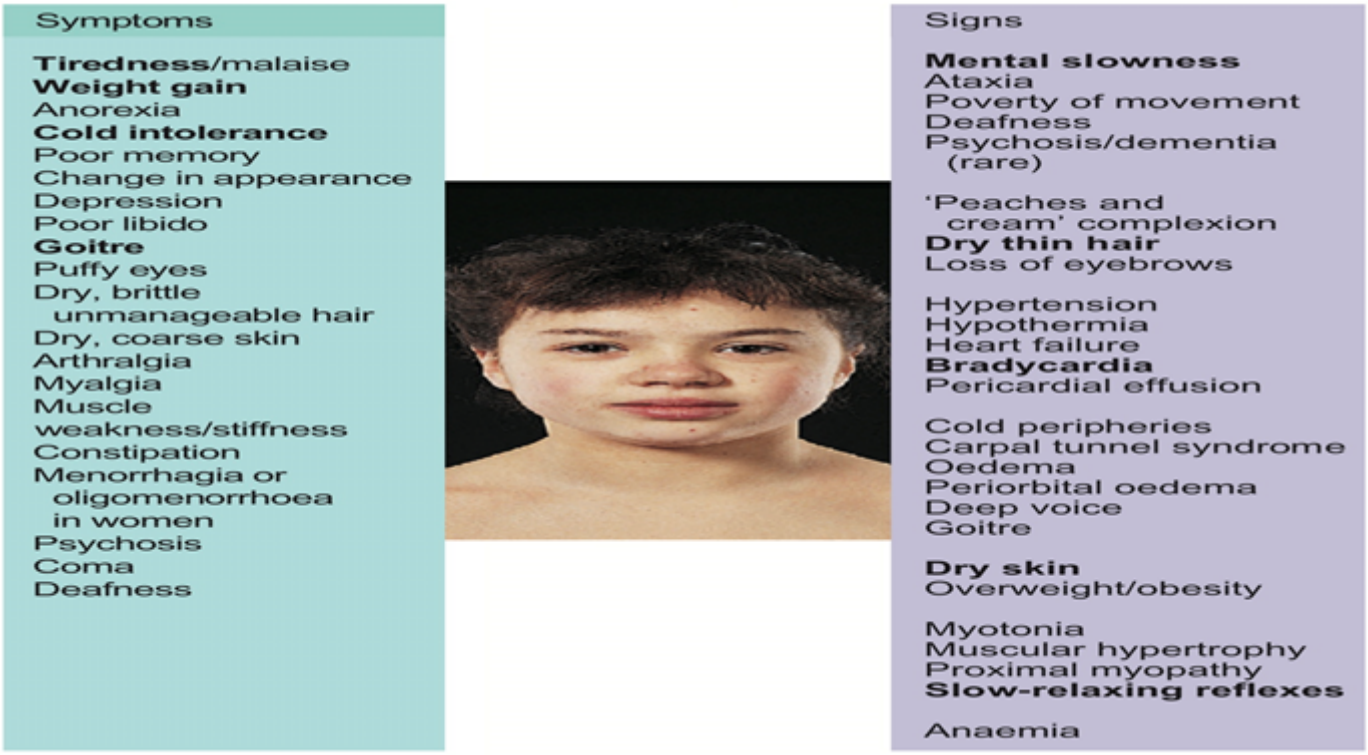
- **Treatment:**

o The best approach for you depends on your age, physical condition, the underlying cause of the hyperthyroidism, personal preference and the severity of your disorder. Possible treatments include: Anti-thyroid medications, Radioactive iodine and Surgery (thyroidectomy).
o Symptoms and signs of hyperthyroidism due to adrenergic stimulation may respond to beta-blockers. Propranolol is indicated in thyroid storm, Esmolol should be used in the intensive care unit because it requires careful titration and monitoring.

Hypothyroidism

Hypothyroidism is thyroid hormone deficiency. It is diagnosed by clinical features and by low levels of thyroid hormones. Symptoms develop insidiously and typically include cold intolerance, constipation, and cognitive and/or personality changes; later, the face becomes puffy and the facial expression dull.

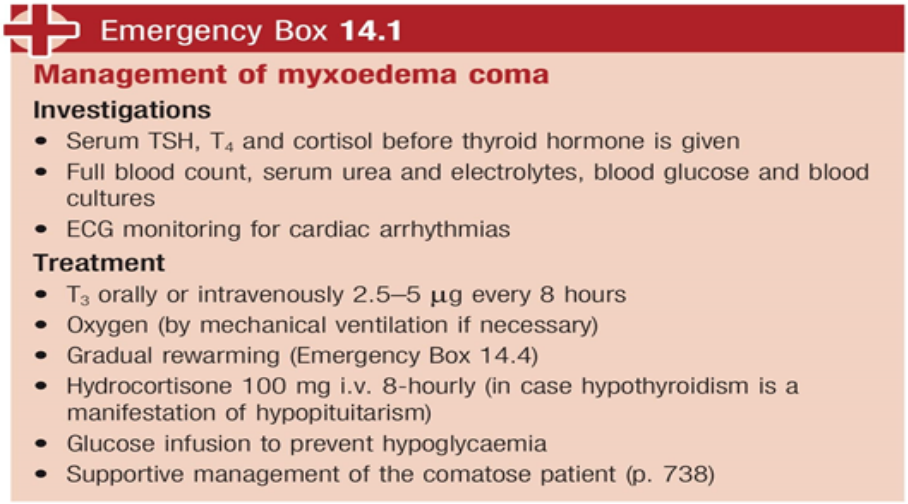
The patient may come and present with one of these symptoms and signs listed below:



MANAGMNENT of Hypothyroidism:

o Serum TSH is the best diagnostic test.
o Management includes administration of thyroxine. Oral T4 (L-thyroxine) is the preferred and is given in the lowest dose that restores serum TSH levels to the midnormal range.
o Ask about symptoms of Hyperthyroidism in any patient who is on thyroxine.

o Myxedema coma is a life-threatening complication that requires rapid diagnosis and treatment.



Emergency Box 14.1

Management of myxoedema coma

Investigations

- Serum TSH, T_4 and cortisol before thyroid hormone is given
- Full blood count, serum urea and electrolytes, blood glucose and blood cultures
- ECG monitoring for cardiac arrhythmias

Treatment

- T_3 orally or intravenously 2.5–5 μg every 8 hours
- Oxygen (by mechanical ventilation if necessary)
- Gradual rewarming (Emergency Box 14.4)
- Hydrocortisone 100 mg i.v. 8-hourly (in case hypothyroidism is a manifestation of hypopituitarism)
- Glucose infusion to prevent hypoglycaemia
- Supportive management of the comatose patient (p. 738)

Thyroid Examination

WIP3E: Wash your Hands, Introduce yourself, Permission/Privacy/Position, Exposure.
Position: Sitting
Exposure: Complete exposure of the head and neck down to clavicles

General appearance look for: **ABC2DE**

- Appearance:
- Body built: Cachectic? Obese?
- Color: Cyncoed? Pale? (Anemia)
- Connections: to any devices: Holter monitor? Pacemaker? or intracardiac defibrillator?
- Distress: in pain, respiratory or neurological distress
- Else: orientation, consciousness, alertness

General inspection:

- Look for any sign of:
  - Hyperthyroidism: Weight loss, Anxiety, Frightened facies of thyrotoxicosis, Sweaty
  - Hypothyroidism: Overdressed, Facial myxedema, Look for signs of mental and physical sluggishness
- Nails: Onycholysis, thyroid Acropathy (phalangeal bone overgrowth) , peripheral cyanosis.
- Hands: Termer, palmar erythema.
- Pulse: Tachycardia, Bradycardia with regular or irregular rhythm
- Arms: Ask the patient to raise the arms above the head to test for proximal myopathy.
- Tap the arm for abnormal briskness reflexes

- Eyes: Inspect from the front, side and above to look for
  - Exophthalmos a protrusion of the eyeball from the orbit
  - complications of Exophthalmos: chemosis, Conjunctivitis, corneal ulceration.
  - Lid retraction: The sclera is visible above the iris
  - Lid lag: by asking the patient to follow your finger as it descends at a moderate rate from the upper to the lower part of the visual field
  - Periorbital edema
- Chest: Gynecomastia (due to increased prolactin)
- Legs: pretibial myxedema, proximal myopathy, Knee reflex

Neck inspection:

- Look at the front and sides of the neck for any masses, scars, pigmentation, dilated veins and overlying skin
- Ask the patient to swallow and watch the neck movement: Only a goiter or thyroglossal cyst will rise during swallowing.
- Ask the patient to protrude tongue: If the mass moves it is most likely thyroglossal cyst

Neck palpation: "Ask if there is any pain before palpation then stand behind the patient"

- Flex the neck slightly, put your thumbs behind the neck and the rest of your fingers in front and then palpate the thyroid lobe and the isthmus.
- Repeat the assessment while the patient swallowing and protruding the tongue
- While you palpate the glands comment on:
  - Size: Feel particularly carefully for a lower border, because its absence suggests retrosternal extension
  - Shape: Note whether the gland is uniformly enlarged or irregular and whether the isthmus is affected.
  - Consistency: Soft (normal), Firm (Simple goiter), Rubbery hard (Hashimoto's thyroiditis), Stony hard (carcinoma.)
  - Tenderness: Feature of thyroiditis
  - Mobility: carcinoma may be tether the gland

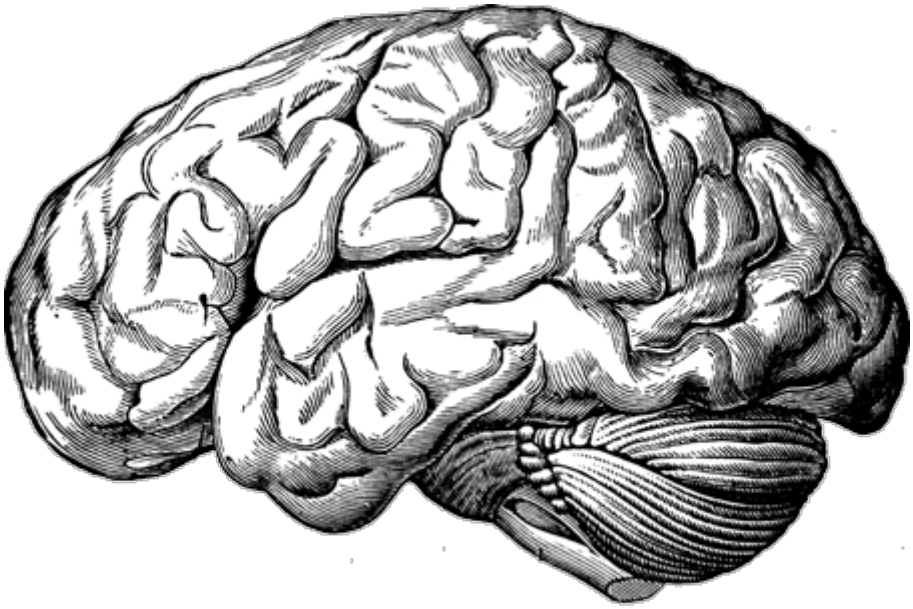
- Palpate the cervical and supraclavicular lymph nodes.
- From The front: assess the trachea if it central or not

Percussion:

- Percuss over the upper part of the manubrium,
- Change from resonant to dull indicate retrosternal goiter

Auscultation:

- Ask the patient to take a deep breath and hold it Then Use the bell to listen over each lobe for a bruit



Neurology

★ Headache

DDx

- Primary**:**
  - Migraine, Cluster, Tension, or Primary stabbing/coughing/exertional-related.
- Secondary:
  - Medications overuse, Sinus headache, Raised ICP (brain tumors, intracranial hemorrhage), Infections (meningitis, encephalitis), Inflammatory (temporal arteritis, other vasculitis, arthritis), Referred pain from other structures (Neck or orbit).

Headache			
Types	**Tension**	**Migraine**	**Cluster**
Site	Bilateral frontal pain that spread to the entire head	Unilateral (on one side might alternates)	Unilateral orbitotemporal pain (does not alternates)
Onset	• Once or twice per week • 4-6 hours	• Once or twice per months • 4 hours or more	• 1-4 per day • Episodic pain, same time every day • 15 - 180 min
Character	Band like pressure	Pulsatile or throbbing pain which gradually get worse	Intense pain
Radiation	-	Radiate to the neck on the same side as pain	No radiation
Alleviating factors	• Analgesics • Rest	• NSAIDS • Triptan	• Oxygen • Sumatriptan
Timing	Afternoon (after work)	Weekends	Morning
Exacerbation	Emotional stressors, depression, insomnia	Relation to food, emotions, meneses	Movement or activity or sleep
Severity	Not severe	Severe	Severe

Associated symptoms		Preceded by flashing lights or zig zag lines (migraine with Aura), and associated with photophobia, nausea and vomiting	Lacrimation, rhinorrhea and flushing of the forehead

Other causes of headache:

Headache cause	Characteristic
Secondary (Tumor, obstructive sleep apnea)	Comes after waking up in the morning.
Raised intracranial pressure	Generalized headache, worse in the morning, with drawozeniss and vomiting.
Temporal (Giant cell) arteritis	Persistent unilateral headache over the temporal area associated with Visual disturbance (blurry vision diplopia), tenderness over temporal artery, jaw claudication, systemic symptoms such as muscle pain, fatigue, weakness and weight loss.
Meningitis	Generalized headache of gradual onset with photophobia, fever and neck stiffness.
Acute sinusitis	Headaches with pain or fullness over the cheeks, forehead or behind the eyes.
Wisdom tooth	Drinking or eating sweet, hot, or cold foods or fluids.
Subarachnoid hemorrhage	"Worst headache of my life".
Trigeminal neuralgia	Sudden attacks of stabbing unilateral facial pain, triggered by touching the face, chewing, speaking or brushing teeth.
Caffeine withdrawal headaches	Weekends "when patient usually drink coffee only at work in weekdays".
Cervical spondylitis	Headache over the occipital and neck steadiness.

Associated Symptoms

Red flags:

- Sudden onset ⇒ Subarachnoid hemorrhage, Cerebral venous sinus thrombosis, Pituitary apoplexy, Meningitis.
- Focal neurological symptoms⇒ Intracranial mass lesion
- Constitutional symptoms⇒ Neoplastic (lymphoma or metastases), Meningoencephalitis, Inflammatory (vasculitic)
- Raised intracranial pressure (worse on weakening/laying down, associated vomiting)⇒ Intracranial mass lesion
- New onset aged > 60 yrs ⇒ Temporal arteritis

1. Other symptoms:
   - Fever alone with no red-flags → viral syndrome, sinusitis, meningitis.
   - Nausea, Vomiting → migraine, increased ICP.
   - Otalgia, hearing loss → otitis media
   - Reddened eyes, excessive lacrimation, nasal congestion, facial swelling→ Cluster headache
   - +/- Aura, photophobia → migraine

Risk Factors related to Headache:

- Medical hx: HIV, Malignancy, HTN ,DM, Brain abscess, Stroke, Anemia, Hx of migraine, Congenital brain deformity, Hemophilia.
- Drugs: Anticoagulant, Antiplatelets, Vasodilators (Nitrates).
- Surgical hx: (specifically intracranial surgery), Trauma (posttraumatic headache), blood transfusion.
- Social Hx: Smoking, Sexual contact (HIV).
- Family Hx: Tumors, Migraine.

Approach/investigations:

- Depending on the case and presentation management may change : as a general rule if a patient comes to you with unstable vitals you manage those first by **ABCs.**
- **Complete neurologic examination**
- If examination is abnormal or if a serious underlying cause is suspected, an **imaging study (CT/ CTA or MRI)** is indicated.
- **Lumbar puncture** (**LP**) is required when *meningitis* (stiff neck, fever)
- The **psychological state** of the pt should also be evaluated because a relationship exists between pain and depression.

Treatment:

- Migraine:
  - Acute: Acetaminophen, NSAIDs, Triptans (sumatriptans), Ergotamine derivatives.
  - Prophylactic: Beta blockers, Tricyclics, SSNRIs, Valproic acid and Topiramate.

- Tension headache: Acute: NSAIDS and acetaminophen. Prophylactic: TCA.
- Cluster headache: Acute: 100% oxygen or triptans. Prophylactic: CCB.

- Subarachnoid hemorrhage:
    - Maintain systolic BP at 110- 160 mm Hg (high pressure can provoke more bleeding while low pressure can provoke cerebral ischemia), give corticosteroids (to prevent hydrocephalus), CCB (ex: nimodipine to lower risk of spasm in blood vessel).
    - Angiography to determine the anatomic site and surgical correction (usually with embolization or clipping of the AVM).

- Meningitis: start on empiric therapy with vancomycin and ceftriaxone (then switch antibiotics based on CSF culture and sensitivity) + dexamethasone for bacterial meningitis.

Signs of meningism:

- Neck stiffness: With the patient lying flat in bed, slip your hand under the occiput and gently flex the neck passively (i.e. without assistance from the patient). Bring the chin up to approach the chest wall
- Brudzinski sign: spontaneous flexion of the hips during flexion of the neck by the examiner and indicates meningism.
- Kernig's sign: Flex each hip in turn, then attempt to straighten the knee while keeping the hip flexed.

★ Weakness

DDx:

- CNS: Stroke,TIA, neoplasm, infection, MS, myopathies
- PNS: Peripheral neuropathy, Guillain-Barre, Lumbar Eaton
- Radiculopathies: compression, cervical spondylosis.

History:

Personal Data:

- Age (stroke more common elderly), occupation (heavy lifting can cause desk prolapse).

History of presenting illness:

- Site:
  - Bilateral weakness (MS, Neuromuscular junction disorders, Guillain-Barre syndrome)
  - Unilateral (Stroke) systemic (myopathy)
- Onset:
  - Sudden (Stroke, intracranial hemorrhage)
  - Gradual (Myasthenia gravis, Guillain-Barre syndrome, Hyperparathyroidism, myotonic dystrophy or spinal cord atrophy)
  - Steadily worsen (MS)
- Character:
  - Rapidly progressive descending tetraparesis (botulism, organophosphate poisoning, brainstem stroke)
  - Rapidly progressive ascending paraparesis (GBS)
  - Rapidly progressive descending paraparesis (spinal cord compression).
- Alleviating factors:
  - Exercise? (Joint disease, Lumbar eaton),
- Exacerbating factors:
  - All daily activity? (Hypothyroidism)
  - Exercise? (Muscular dystrophy, MS)
  - Heat exacerbates the symptom? (MS)
- Time Course:
  - Comes and goes? (myasthenia gravis)
  - Steadily worsen? (MS)
  - Gradually improve?
- Severity: Is the weakness preventing you from daily activity?

Associated symptoms:

- Constitutional symptoms (malignancy)
- CNS Symptoms (MS, stroke , Myasthenia gravis, brain tumor)
- Hyperthyroidism symptoms

Risk Factors related to DDx:

- Medical history of:
  - Injury (head or spinal) Cancer , Hyperthyroidism, heavy exercise
  - HTN, Hypercholesterolemia, vascular disease, atrial fibrillation, MI > Stroke
  - Hematological disorders
- Medications Hx: (drugs, allergies)
  - Hx of injection drugs or Organophosphate poisoning
  - Estrogen use
  - Anticonvulsants, antidepressants, anti HTN, Steroids, anticoagulants or antiplatelets drugs
- Surgical Hx
  - Previous operations? (nerve compression/ infection)
  - Trauma, Blood transfusion
- Social Hx:
  - Smoking?
  - Alcohol?
  - Sexual contacts? HIV
  - Tick exposure
- Family Hx:
  - Neurological or mental disease
  - Other family member developed the same weakness > Botulism or Organophosphate poisoning

Approach/investigations:

Firstly if the patient is unstable, perform **ABCs** then commence with a thorough neurological examination.

- CT of head and spine (myelogram) (stroke and spinal compression)
- MRI of head and spine (stoke, and spinal compression)
- ECG
- Echocardiogram, carotid duplex, and 24-hour Holter monitor.
- LP and CSF studies (GBS)
- EMG, Creatinine kinase (GSB, myopathies)

Complete imaging and laboratory studies, within 60 minutes of patient arrival.

Treatment : ABCs

- Ischemic Stroke:
  - t-PA if presented within 3 hours of symptom onset and in the absence of any contraindication.
  - If presented out of t-PA window but within 12 hrs or imaging shows live brain tissue then surgical intervention may be indicated.

- Hemorrhagic stroke:
  - Anti-hypertensives.
  - Osmotic diuretics to decrease ICP.
  - Surgical intervention (clipping the aneurysm or embolize the vessel with a catheter).

- Spinal cord compression
  - High dose dexamethasone immediately.
  - Treat the underlying cause (tumor->radiation/ oncology. herniated disk and epidural abscess-> surgical decompression)

- Guillain barre syndrome:
  - Treat as soon as possible and most importantly monitor patient vital capacities.
  - IV immunoglobulin and plasmapheresis.

- MS:
  - Acute relapses; IV methylprednisolone followed by oral prednisone.
  - Disease modifying :(IFN)-β1a, glatiramer acetate

Important

TABLE 53-3 CLINICAL DIFFERENTIATION OF WEAKNESS ARISING FROM DIFFERENT AREAS OF THE NERVOUS SYSTEM

Location of Lesion	Pattern of Weakness	Associated Signs
Upper motor neuron		
Cerebral cortex	Hemiparesis (face and arm predominantly, or leg predominantly)	Hemisensory loss, seizures, homonymous hemianopia or quadrantanopia, aphasia, apraxias, gaze preference
Internal capsule	Hemiparesis (face, arm, leg may be equally affected)	Hemisensory deficit; homonymous hemianopia or quadrantanopia
Brainstem	Hemiparesis (arm and leg; face may not be involved at all)	Vertigo, nausea and vomiting, ataxia and dysarthria, eye movement abnormalities, cranial nerve dysfunction, altered level of consciousness, Horner's syndrome
Spinal cord	Quadriparesis if midcervical or above Paraparesis if low cervical or thoracic	Sensory level; bowel and bladder dysfunction
	Hemiparesis below level of lesion (Brown-Séquard)	Contralateral pain/temperature loss below level of lesion
Motor unit		
Spinal motor neuron	Diffuse weakness, may involve control of speech and swallowing	Muscle fasciculations and atrophy; no sensory loss
Spinal root	Radicular pattern of weakness	Dermatomal sensory loss; radicular pain common with compressive lesions
Peripheral nerve		
Polyneuropathy	Distal weakness, usually feet more than hands; usually symmetric	Distal sensory loss, usually feet more than hands
Mononeuropathy	Weakness in distribution of single nerve	Sensory loss in distribution of single nerve
Neuromuscular junction	Fatigable weakness, usually with ocular involvement producing diplopia and ptosis	No sensory loss; no reflex changes
Muscle	Proximal weakness	No sensory loss; diminished reflexes only when severe; may have muscle tenderness

★ Ataxia

DDx:

Acute symmetrical ataxia	Subacute/ chronic symmetrical ataxia	Unilateral ataxia
• Alcohol intoxication • Viral infection or a post infectious syndrome • Vestibular nerve or labyrinthine disease	• Hypothyroidism • Lyme disease, tabes dorsalis and prions • Alcohol and other toxins • Paraneoplastic syndrome • Subacute cortical cerebellar degeneration • Inherited condition • Bilateral proximal leg weakness	• Stroke • Tumors (cerebellar glioma or metastatic tumor) • Multiple sclerosis • Progressive multifocal leukoencephalopathy • Congenital malformations

History

Personal Data:

- Age, occupation.

History of presenting illness:

- Site: unilateral or bilateral ?
- Onset: Acute? Subacute? Chronic?
- Time Course: Intermittent? Progressively increasing ?

Associated symptoms:

- Visual blurring?
- Unclear ("scanning") speech.
- Hand in coordination.
- Tremors with movement.
- Weakness in extremities? (Subacute combined degeneration).
- Dizziness, or light-headedness (vestibular or labyrinthine disease).

Constitutional symptoms: weight loss, loss of appetite, night sweats,nausea and vomiting.(tuomor)

Risk Factors related to DDx:

- Medical history of:
  - Freiderich's ataxia, malignancy, hypothyroidism, previous stroke, HTN, Hypercholesterolemia, vascular disease, atrial fibrillation, MI > Stroke, Hematological disorders.

- Medications Hx: (drugs, allergies)
  - Benzodiazepines
  - Lithium
  - Phenytoin
  - Chemotherapy

- Surgical Hx
    - Previous operations? (nerve compression/ infection)
    - Trauma, Blood transfusion
- Social Hx:
    - Smoking?
    - Alcohol?
    - Sexual contacts? HIV
- Family Hx: cerebellar disorders?

Approach/investigations: (Approach is determined by the type of the ataxia).

- Start by doing a thorough neurological examination.
- **Symmetric ataxia**
    - Alcohol and toxicology screens; (vitamin B1, B12 and E levels)
    - Thyroid function test.
    - Antibody tests (syphilis and Lyme infection)
    - Antigliadin and anti-GAD antibodies.
    - Paraneoplastic antibodies.
    - CSF studies.
    - Genetic testing.

- **Unilateral or asymmetric ataxia:** brain MRI or CT scan is the initial test of choice.

Treatment:

Treat underlying causes; eg.supply vitamins B1and B12 and E for deficient patients, thyroxine for hypothyroidism,etc...

Tremors

Types:

- Resting: oscillation occurs at rest, eg: parkinsonian tremor.
- Active: oscillation occurs or increases during voluntary movement, eg: intention tremor.
- Postural: oscillation occurs while maintaining a fixed posture against gravity or during other fixed posture (clenched fist, standing), eg: essential tremor, Enhanced physiologic tremor.

DDx

- Primary → Essential tremor, parkinson's disease, cerebellar dysfunction, psychogenic
- Secondary → medications (eg:amphetamines, beta agonist, TCA, lithium, caffeine), fatigue, anxiety, fear

History of presenting illness:

- Site:
    - Unilateral or asymmetric? (Parkinson's).
    - Bilateral? (essential tremor, Enhanced physiologic tremor).
    - Hand head or voice? (essential tremor).
    - Jaw or face? (parkinson's)
- Onset:
    - Sudden? acute onset tremor (stroke, toxic, metabolic related, structural lesion, psychogenic).
    - Gradual? (essential,Enhanced physiologic tremor, parkinson's).
    - After a stressful event ? (psychogenic).
    - After new medication ? (medication related, metabolic related)
- Characteristic:
    - At rest ? (Parkinson's disease, parkinsonism)
    - With posture like holding something? (Essential tremor, Enhanced physiologic tremor, toxic, metabolic related)
    - With action like drinking, eating, writing, dressing? (Essential tremor)
    - With action when reaching the target? (Cerebellum or its connections)
- Alleviating factors:
    - Alcohol (essential tremor)
- Timing:
    - Gotten worse? (Essential tremor, Parkinson's disease/parkinsonism)
    - Has it changed ? (Enhanced physiologic tremor)
    - Was it unilateral and now bilateral? (Parkinson's disease)

- Exacerbating factors:
    - stress, anxiety, fatigue ? (may affect all tremor types)

- Severity: does it affect your daily life?

- Associated symptoms:
    - Stiffness, slowness, gait changes? (Parkinsonism)
    - Stress, anxiety ? (Enhanced physiologic tremor)
    - Weight loss, diaphoresis, heat intolerance, palpitation? (thyrotoxicosis)
    - Seizure, delirium, hallucination, tremulousness (alcohol withdrawal)
    - Diaphoresis, anxiety, palpitation, confusion, seizure ? (hypoglycemia)
    - Cognitive impairment ،visual hallucinations ? (Lewy body dementia)
- Constitutional symptoms?
- Risk Factors:
    - Medical history: DM? (hypoglycemia).
    - Medications?
    - Social history: hx of alcohol? (alcohol withdrawal). hx of smoking?
    - Family history: tremor ? (essential tremor)

Approach/investigations:

Start by doing a thorough examination.

- Alcohol and toxicology screening.
- Psychological evaluation.
- Brain MRI or CT
- Standard electrolyte panel.
- Thyroid function tests.
- Blood urea nitrogen (BUN).
- Creatinine.
- LFT

Treatment:

Treat underlying causes:

1. Essential tremor: Primidone, propranolol, thalamotomy.
2. Parkinson's diseases: Levodopa, dopamine agonist, MAO inhibitors, Anticholinergics and Surgical treatment (deep-brain stimulation)
3. Anxiety : SSRIs

Loss of Consciousness (LOC)

DDx:

- Cardiac syncope:
  - Arrhythmias e.g. → Ventricular arrhythmias, SA node or implanted device dysfunction, SVT, inherited syndromes (e.g. Long QT, Brugada).
  - Structural cardiopulmonary disease e.g. → Valvular, myocardial (e.g. HOCM, MI), cardiac tamponade, pulmonary embolism/HTN, acute aortic dissection.
- Non-cardiac syncope:
  - Reflex (neurally mediated) → Vasovagal syncope, situational syncope.
  - Orthostatic → Dysautonomia (e.g. Baroreflex failure, diabetic Dysautonomia), hypovolemia.
  - Neurogenic → Seizures, TIA/stroke, migraine.
- Metabolic → hypoglycemia
- Psychiatric (hyperventilation)
- Drug induced.

First you must distinguish Syncope from other causes of loss of consciousness (LOC) e.g. seizures, intoxications …etc

Questions to ask:

- Was there a loss of consciousness? if no → could be Vertigo, Presyncope, Lightheadedness, Disequilibrium…etc
- If the answer for Q1 was yes then ask; was it brief and self-limited ? If no → Coma, Intoxication, Sleep disorders, …etc
- If the answer for Q2 was yes then it could be syncope or seizure.

Clues help you differentiate syncope from seizures:

- Seizure: had seizures before? sense of déjà vu1 or jamais vu2 before episodes? anyone noted head turning, being unresponsive, jerking limbs, unusual posturing or being blue during an episode? Wake up with No memory of the episode, confused and drowsy ? woke up with a tongue cut after the episode
- Syncope: ever had lightheaded spells? Sweet or have SOB before spells? pallor?

REMEMBER: The onset is rapid, the duration is brief, and the recovery is spontaneous and complete, this is <u>what characterizes syncope</u>.

Taking History:
Personal Data: Age → above above 40, male (Common IHD)

History of presenting illness:

- Was it complete loss of consciousness or just a drop attack? If just a drop attack → TIA
- Was it brief and self-limited?
    - If no → Coma, Intoxication, Sleep disorders.. etc.
    - If Yes → Syncope or Seizure
- Have you had light headed spells? Syncope

Before the attack	
Was there any triggers?	• Changing position from sitting to standing: orthostatic hypotension • Sitting or lying down: cardiac problems, orthostatic hypotension • During heavy exercise: aortic stenosis • Syncope with arm exercise: subclavian steal • During urination, coughing, defecation, swallowing: situational syncope • Emotional response (fear, anxiety): vasovagal syncope • Migraine attack • Severe facial or throat pain: glossopharyngeal neuralgia.
Was there any warnings?	• Nausea, ringing in the ears: vasovagal syncope • Palpitation, chest pain and SOB: cardiac syncope. • Sweating, weakness and confusion: hypoglycemia • Olfactory (aura), sense of deja vu: seizure
Was there any color changes?	• Pallor → syncope • Cyanosis → Seizures

During the attack	
How long did the attack last ?	• Seconds: syncope • Minutes : seizures
Has anyone seen the episode noticed jerking movements (tonic-clonic movements) ?	If the answer is yes it is most likely seizure
Have you bitten your tongue ?	
Have you pass urine or faeces during the attack ?	
Have you injured yourself?	

After the attack	
Did you wake up feeling normal or drowsy? Or how long did it take for full recovery?	• Normal or immediate recovery → syncope • Drowsy or delayed recovery → seizures
Did you have confusion , headache and loss of memory after the attack, muscle pain?	Indication of seizure

Associated symptoms:

- Constitutional symptoms
- Cardiac and CNS system symptoms
- Vasovagal syncope: Episodes occur in hot crowded environments, with prolonged standing? After experiencing intense pain, fear, or emotion? Preceded by a prodrome of symptoms such as dizziness, nausea, and diaphoresis? Pale during or after the episodes?
- Aortic stenosis: angina, dyspnea on exertion? -Hypertrophic cardiomyopathy: family + young age + hx of sudden cardiac death + syncope after exertion?
- ACS: family hx of CAD, angina,..etc?
- Aortic dissection: abdominal and back pain?
- TIA: double vision, difficulty speaking, dysarthria or weakness or numbness on one side of the body?
- Vertigo: sensation that room spinning

Risk Factors:

- Medical hx:
    - History of Epilepsy, Stroke, TIA, Cardiac diseases, Parkinson's disease (autonomic neuropathy) any chronic disease as HTN (syncope due to antihypertensive drugs), diabetes and CKD (syncope due to hypoglycemia)
    - Autonomic insufficiency, Addison's disease, pheochromocytoma (orthostatic hypotension).
- Drugs:
    - Cardiovascular: B-blockers, Vasodilators (alpha-blockers, CCB, hydralazine, Nitrate, ACEI), Diuretics, centrally acting antihypertensives? clonidine, methyldopa,Cardiac antiarrhythmic.
    - CNS: Antidepressants (tricyclics, monoamine oxidase inhibitors), Antipsychotics (phenothiazines), Sedatives (barbiturates, ethanol), Antiparkinsonian agents, Anxiolytic agents (benzodiazepines), Antiepileptics
- Surgical hx:
    - Hx of cardiac surgery or head trauma.
- Social hx:

    - Smoking
- Family hx:
    - Same episode, Hx of tumors.
    - Cardiac disease or sudden death

Investigations:

- First perform a thorough examination.
- Electrolytes + blood glucose to rule out metabolic abnormalities.
- If the diagnosis is most likely cardio-related start with ECG and if abnormal order echocardiogram, 24 H holter monitor, and stress test.
- If you suspect seizure order EEG.

Management:

- Determined by underlying cause.
- Neurally mediated (ex: vasovagal) should be reassured and instructed to avoid stimuli that provoke attack, and increase plasma volume with fluids and salts.
- If the patient has orthostatic hypotension, first remove the vasoactive medication then consider non pharmacological approach including patient education regarding moving from supine to standing, increasing fluids and salt, and finally medications: fludrocortisone, vasoconstricting agents such as midodrine, L-dihydroxyphenylserine, and pseudoephedrine.
- Management of cardiac causes depends on underlying disorder and may include cardiac pacing or cardioverter-defibrillator.

Altered mental status (AMS)

DDx:

- Cerebrovascular (Stroke, TIA, Epidural hematoma, subdural hematoma, subarachnoid hemorrhage)
- Traumatic (head trauma, pelvic fracture)
- Neurologic (dementia, delirium, postictal)
- Cardiac (MI, arrhythmia, CHF)
- Pulmonary (PE, hypoxia, carbon monoxide poisoning)
- Metabolic (Hyperglycemia, Hypoglycemia, Hypernatremia, Hyponatremia, Dehydration -volume depletion-, Hypothermia, Hypercalcemia, Hypocalcemia, Hypercapnia, Hepatic encephalopathy, Uremia, Hyperthermia, DKA)
- External (Alcohol withdrawal, Alcohol toxicity, Drug toxicity, Drug withdrawal)

Associated symptoms:

- Constitutional symptoms.
- CNS symptoms: Seizures, syncope, dizziness, vertigo, confusion, lethargy, Facial, Headache neck, back pain, neck stiffness, Problem in the special senses: vision, smelling, tasting,hearing , speech and swallowing. Numbness, paraesthesia, loss or altered sensation,weakness, Involuntary movement
- Uremic symptoms: Oliguria, nocturia, or polyuria.Anorexia, metallic taste, vomiting, fatigue, hiccups, and insomnia. Edema, itch, bruising, pallor, pigmentation.

Risk Factors related to DDx:

- Medical history:
  - Previous history of Confusion
  - Have you been diagnosed with DM, HTN, HL
  - History of TIA and stroke
  - History of Renal failure
  - History of liver failure (liver cirrhosis + Hepatitis)
  - History of Cns Malignancy or mass
  - History of encephalitis
  - Have you been diagnosed with Alzheimer
- Medication: Morphine
- Allergy
- Any previous surgery
- History of blood transfusion
- History of head trauma
- Social history: drug abuse , alcohol
- Family history of confusion and stroke

Investigations:

1. First make sure the patient is stable by doing ABC's.
2. CBC, metabolic profile (electrolytes), blood glucose level.
3. Liver, kidney and thyroid function test.
4. Blood alcohol level and urine drug screen.
5. CXR + urinalysis (for elderly to look for infection).
6. Brain CT and lumbar puncture.
7. ECG.

Note that all these tests are to identify the cause and should be guided by the history.

Management:

1. Depends on the cause.
2. Correct and fluid or electrolyte deficit.
3. Give antibiotics if there is evidence of infection.
4. Admit to the stroke unit if the patient has a stroke.
5. if the patient is seizing or undergoing alcohol withdrawal give benzodiazepine and manage accordingly.

Cranial Nerves Examination

WIP3E: Wash your Hands, Introduce yourself, Permission/Privacy/Position, Exposure.

Cranial Nerve	The Examination Steps
1st-Olfactory (Sensory)	1. Inspect the nostrils (external appearance + vestibule) using a torch. 2. Ask the patient to smell: a) Ask to identify items with specific odors (e.g. soap, coffee, alcohol wipes) b) Each nostril is tested separately by asking the patient to close the other.
2nd-Optic (Sensory)	AFRO → with 3 steps in each. 1- Examine *visual acuity* A. Distant vision using ⇒ Snell's Chart; a) With the patient wearing his\her glasses, test each eye separately. b) If he couldn't recognize the largest letter on the chart → ask him to count your fingers → if fail; then perception of hand movement is tested → if this failed → test for light perception with a torch. B. Colour vision using ishihara plates. --- 2- Examine *Visual fields by* ⇒confrontation method A. Visual Inattention: with both eyes open; ask the patient to focus on you (ex: tell them to look at your forehead or nose), hold your fists out laterally to each side and ask them to point at the fist which is opening and closing. B. Visual Fields: 1. Remove the patients' glasses. 2. Patient's head should be at the level of your head, and the distance must be approximately 50cm. 3. Examine each eye separately using a white or red tipped pin or pen. 4. Close the patient's left eye and ask him\her to look at your right eye and vice versa. You should also close your opposite eye. 5. Hold the pin at arm's length, halfway between you and the patient, start just outside your peripheral vision then bring it medially until the patient can see it. 6. Check the 4 quadrants and the middle field and make sure the patient is looking at your eye and seeing the pin from his/he peripheral vision. C. Blind spot: 1. The blind spot can be mapped out by asking about the disappearance of the pin around the center of the field vision of each eye.

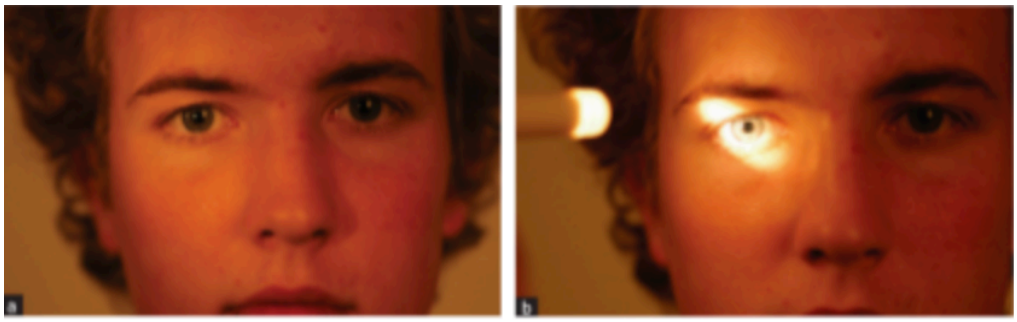
2. Enlarged blind-spot indicates papilledema.

3- Pupillary Reflex *(Optic is the afferent AND the efferent is the Oculomotor)*

d) *Direct:* the pupil constrict in the examined eye.

b) *Indirect (consensual):* the pupil constricts in the other eye.

1. Ask the patient to look forward and bring the torch from the side, look for the direct and indirect response.
2. Make sure to test both eyes for direct and indirect.



(a) The pupils: inspect for size and symmetry

(b) Testing the pupillary reflex

c) *Swinging light test* or *Marcus Gunn papillary sign:*

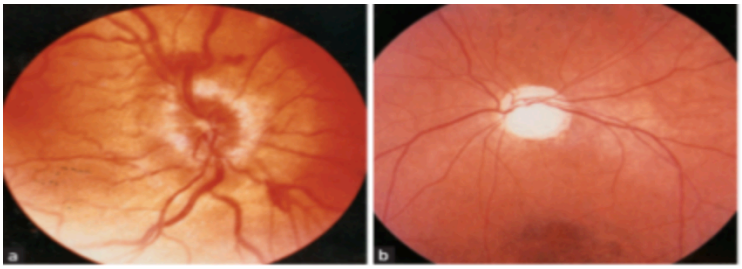
1. Move the torch in an arc from pupil to pupil.
2. If there is abnormality, the affected pupil will dilate paradoxically after a short time when the torch moved from the normal eye to the abnormal one. This is called afferent pupillary defect.

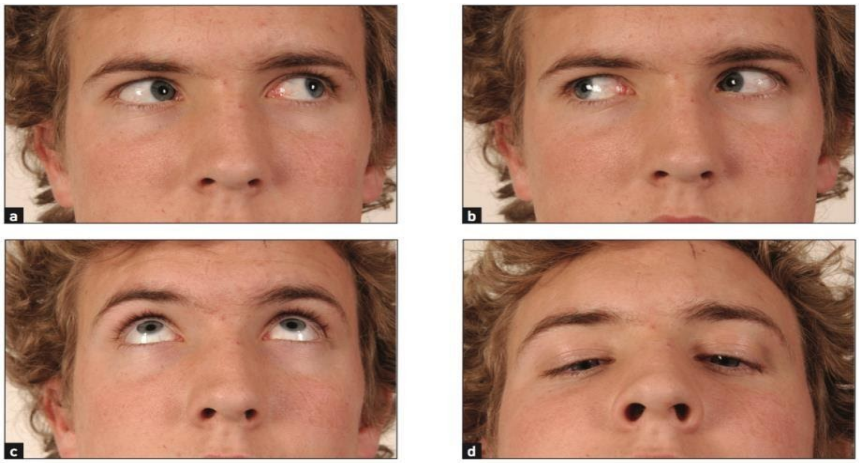
d) Accommodation reflex:

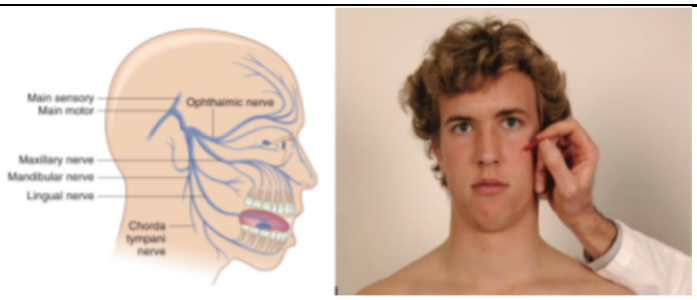
Ask the patient to look at a far object then put a pin in front of his\her eye (the distance approximately 30cm) and observe the pupil. Normally there is constriction of both pupils.

4- Optic disc: *examine the eye fundus using ophthalmoscope*

Assess optic disc (for any papilledema, atrophy), retinal vessels, macula, and retina (for any changes, ex: hemorrhages or exudates, especially diabetic and hypertnesive).

	 (a) Papilloedema (b) Optic atrophy

3rd-Oculomotor (Motor) 4th-Trochlear (Motor) 6th-Abducens (Motor)	1. Inspect for: a. Pupil size, shape, symmetry b. Ptosis c. Abnormal eye movement d. Eye deviation 2. Eye Movement a) Ask the patient to follow your finger without moving his/her head: test the 6 cardinal points in (H) pattern. b) Move your finger in (X) shape to check for superior and inferior oblique muscles. c) Asses if there is failure in eye movement, diplopia, or nystagmus in any direction.  Figure (2)
5th-Trigeminal (Mixed)	1. Inspect temporalis, masseter, and pterygoid for muscle wasting. 2. Sensory: Has three divisions: Ophthalmic, Maxillary and Mandibular. a) Ask the patient to close his/ her eyes. b) Examine it by using a piece of cotton to assess light touch, and pinhead to assess pain and compare each side with the other.

5th- Trigeminal (Mixed)	3. Motor: Muscle of mastication: temporalis, masseter, and pterygoid. a) Ask the patient to clench the teeth and palpate the masseter. You can assess the strength by asking the patient to bite forcefully on to a wooden tongue depressor with the molar teeth, and the depth on each side gives indication of relative strength of muscle. b) Ask the patient to open the mouth (pterygoid) and hold it open while the examiner attempts to force it shut, and note any deviation (toward the side of the lesion).  Figure (5): Clench your jaw'—feel the masseter muscles 4. Reflexes: 1. Corneal reflex: a) Lightly touch the cornea with a wisp of cotton brought to the eye from the side. b) The normal response is blinking of both eyes. c) Ask the patient whether he\she feels the touch or not. d) Afferent: ophthalmic division of trigeminal. e) Efferent: facial nerve. 2. Jaw reflex (masseter reflex): a) Ask the patient to let the mouth fall open slightly. b) Place your index on the tip of the jaw and tap it lightly with a hammer. c) Normally there will be a slight closure of the mouth or no reaction at all.  Figure (6)

<table>
<tr>
<td>7th-Facial (Mixed)</td>
<td>
1. Inspect for facial asymmetry by looking for drooping at the corner of the mouth, smoothing of the wrinkled forehead, and the nasolabial fold.
2. Test muscle power:
a) Ask the patient to look up so as to wrinkle the forehead.
b) Ask the patient to puff out the cheeks.
c) Ask the patient to shut eyes tightly and try to force open each eye.
d) Ask the patient to smile and show you their teeth.

Figure (5): Clench your jaw'—feel the masseter muscles
3. Examining the taste is not usually require but if necessary can be done by asking the patient to protrude the tongue and placing sugar, vinegar, slate, and quinine (sweet, sour, saline, and bitter) one at a time on each side of the tongue. The mouth is rinsed with water between each sample.
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<tr>
<td>8th-Vestibulo-cochlear (Sensory)</td>
<td>
1. Look to see if the patient is wearing a hearing aid; if so, remove it.
2. Examine the pinna and look for scars behind the ear.
3. Feel for nodes (pre- and post-auricular).
4. Inspect the external auditory meatus and pull the auricle up and backwards before inserting the otoscope to examine the tympanic membrane (eardrum) for inflammation or perforation and look for wax or other obstructions.
5. Test for hearing by covering one ear and whispering a number in the other ear; "68" for high tone and "100" for low tone.
6. Perform Rinnes and Weber's test:
<table>
<tr><th></th><th>Weber's test</th><th>Rinne's test</th></tr>
<tr><td>Technique</td><td>Hold the base of a vibrating tuning fork against the vertex.</td><td>Hold the base of a vibrating tuning fork against the mastoid process.</td></tr>
<tr><td>Conductive deafness</td><td>Sound is louder in the affected ear, since distraction from external sounds is reduced in that ear.</td><td>Bone conduction is better than air conduction.</td></tr>
<tr><td>Nerve deafness</td><td>Sound is louder in the normal ear.</td><td>Both bone and air conduction are impaired.</td></tr>
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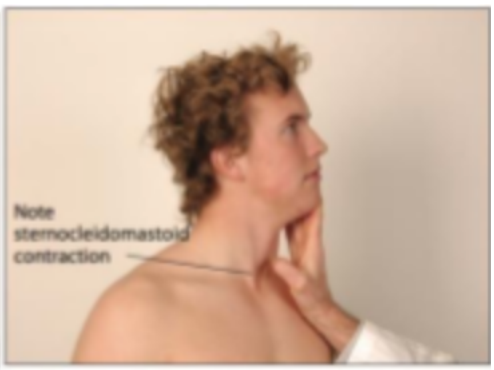
9th Glosso-pharyngeal (Mixed) 10th-Vagus (Mixed)	1. Inspection: a) Ask the patient to open his/her mouth to inspect the palate, then say "AAH" to observe the soft palate with a torch (should be symmetrical if there is a lesion the soft palate is pulled to the normal side). b) Ask the patient to cough, and look for any bovine cough. c) Ask the patient to speak to assess hoarseness. d) Ask the patient to take a sip of water and swallow it, and look for any coughing or regurgitation into the nose.  Figure (5): Clench your jaw'—feel the masseter muscles 2. Reflexes A. Gag reflex (ninth is the sensory component and tenth is the motor) a) By depressing the patient's tongue and touching his\her palate, pharynx or nostril. b) Compare with the other side.
11th-Accessory (Motor)	1. Muscle power: A. Sternocleidomastoid : a) Ask the patient to rotate his/her head to the side against resistance. b) Compare the power on each side. B. Trapezius: a) Ask the patient to shrug shoulders and hold them in position against resistance. b) Compare the power on each side.   Figure (12) Figure (13)

12th-Hypoglossal (Motor)	1. Inspection a) Ask the patient to open his/her mouth, and inspect the tongue for: • Atrophy: increase folds, or wasting. • Fibrillation: fine, irregular, non-rhythmic muscle fiber contractions) b) Ask the patient to protrude tongue, note any difficulty or deviation (the tongue deviates toward the weaker/affected side). c) Place your finger on the patient's cheek and ask to push their tongue against it.  Figure (14)

Cranial Nerves Lesions

Problems with smell:

- Damage to the olfactory pathway will cause diminished sense of smell (Anosmia):
  - Transient (non-neural): upper respiratory tract infection
  - Trauma i.e. basal skull fracture
  - Tumor (e.g. Olfactory groove meningiomas)

Problems with vision: Caused by damage to CN II, CN III, CN IV or CN VI.

Acuity:

Sudden blindness in one eye	Gradual onset bilateral blindness	Rapid onset bilateral blindness
2. retinal artery or vein occlusion 3. temporal arteritis 4. non-arteritic ischaemic optic neuropathy 5. optic neuritis or migraine	6. cataracts 7. acute glaucoma 8. macular degeneration 9. bilateral optic nerve or chiasmal compression	3. occipital lobe: bilateral infarction or trauma 4. optic nerve: bilateral damage with methyl alcohol poisoning 5. hysteria

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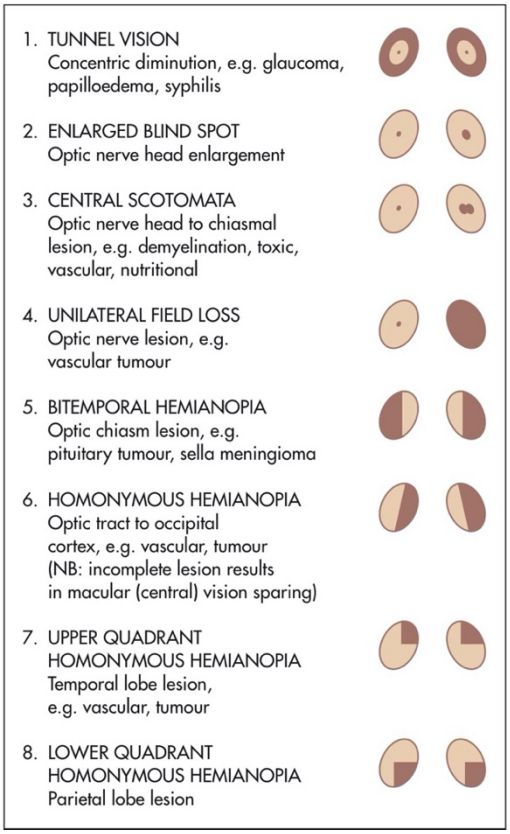
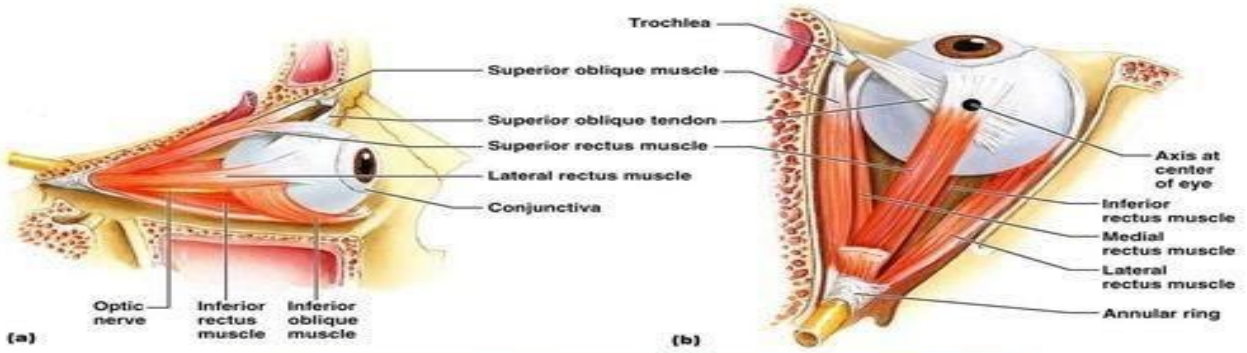


Reflexes:

1. *If afferent defect (i.e. Optic nerve lesion):* pupils are symmetrical but when the light is shined in affected eye => neither pupils constrict.
2. *If efferent defect (i.e. Oculomotor lesion):* affected pupil is persistently dilated, while the normal one is reactive to light being shined in either eye.

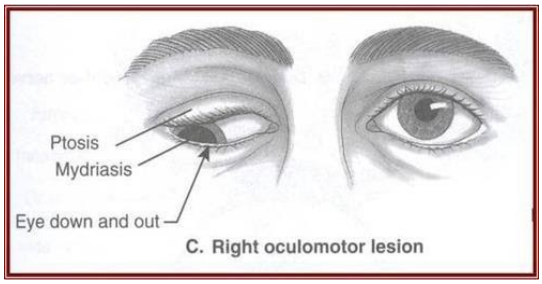
Movement:



(c)

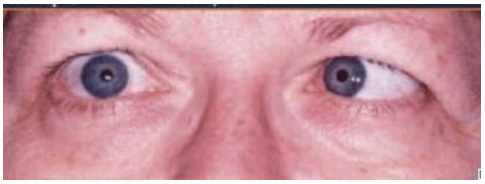
Name	Action	Controlling cranial nerve
Lateral rectus	Moves eye laterally	VI (abducens)
Medial rectus	Moves eye medially	III (oculomotor)
Superior rectus	Elevates eye and turns it medially	III (oculomotor)
Inferior rectus	Depresses eye and turns it medially	III (oculomotor)
Inferior oblique	Elevates eye and turns it laterally	III (oculomotor)
Superior oblique	Depresses eye and turns it laterally	IV (trochlear)

1. **Oculomotor lesion:**
   - No levator palpebrae superioris >> *ptosis*
   - No parasympathetic innervation >> *dilated, fixed pupil* (loss of light reflex) and *paralysis of accommodation.*
   - No extraocular muscles, except: lateral rectus is intact >> *eye goes lateral* + superior oblique is intact >> *eye down.*

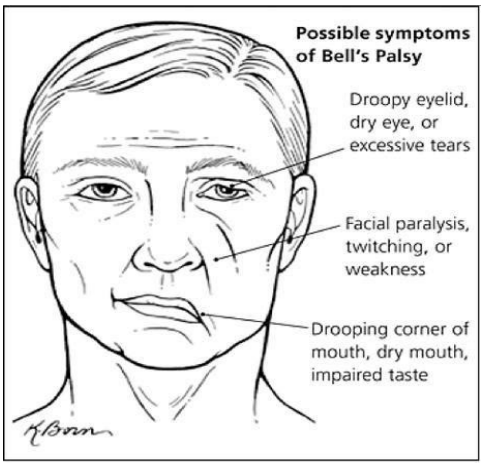


2. **Trochlear lesion:**
   - No superior oblique → eye deviate *upward and medially.*
   - Weakness of downward gaze → *double vision when looking down.*
   - A compensatory *contralateral head tilt* (head tilted away from lesion).

3. **Abducens lesion:**
    1. No lateral rectus → eye goes *medially*.



Facial palsy:



- **Causes of facial palsy:**
    - Bell's palsy (idiopathic or HSV1 infection)
    - Ramsay Hunt syndrome.
    - Trauma
    - Tumor e.g. acoustic neuroma

- **Key points in hx:**
    - Difficulty with *speaking*?
    - Abnormal *hearing*? Hyperacusis
    - Change of the *taste*? Anterior 2/3 of the tongue.
    - *Dryness* of the eye and mouth?
    - Painful vesicular rash of the pinna and the ear canal? Ramsay hunt syndrome
    - Any *trauma (esp temporal bone), brain tumor, surgery*?
    - Hx of *otitis media*.

Motor System Examination

WIP3E: Wash your Hands, Introduce yourself, Permission/Privacy/Position, Exposure **Position:** Sitting (UL exam), laying down (LL exam).

1.Inspection

- Ask the patient to stand and assess the posture (abnormal ex: hemiplegia).
- Look for muscle wasting, fasciculations, deformities, abnormal movements (ex: tremor).
- Ask the patient to close his/her eyes and hold out both hands with palms facing upwards then look for pronator drift.
- Inspect the skin for scars, striae or evidence of neurofibromatosis, herpes zoster.

2. Tone

The resistance felt by the examiner when moving a joint passively through its range of movement.

1. Ask the patient to relax to allow you to move his\her joint freely (choose the big joints).
2. Start from the distal then proximal or vice versa.
3. Note the group of muscle affected.
   - Normally, there is smooth minimal passive resistance.
   - Hypotonia occur with LMN lesions.
   - Whenever there is resistance to movement (hypertonia), think of the two most common issues: spasticity and rigidity.
     - ✓ Spasticity: More resistance in one direction than the other, velocity dependent (i.e. more noticeable with fast movements).
     - ✓ Rigidity: Same resistance in all directions, not velocity dependent.

3. Power

The ability to make a resistance.

1. Tested by measuring the examiner's ability to overcome the patient's full voluntary muscle resistance and always compare right to left.
2. For every joint, you have to move it in all its directions of movement.

○ If there is weakness then → Decide if it is symmetrical or asymmetrical + group of muscles or general + with pain or not?

○ Use **MRC scale** to grade the power:

- Grade 0: No movement.
- Grade 1: Flicker of contraction.
- Grade 2: Active movement possible with gravity.
- Grade 3: Active movement possible against gravity.
- Grade 4: Active movement against gravity and resistance.
- Grade 5: Normal power.

Raise the patient's hand up and leave it. If it falls, the power is less than 3, but if not, apply resistance on it.

Lower Limbs	Upper Limbs
1. Hip: a. Flexion (L2&3) by psoas and iliacus. b. Extension (L5,S1&2) by gluteus maximus c. Abduction (L4,5&S1) by gluteus medius, minimus, sartorius and tensor fasciae latae. d. Adduction (L2,3&4) by abductor longus, brevis, and magnus. 2. Knee: a. Flexion (L5&S1) by hamstrings. b. Extension (L3&4) by quadriceps. 3. Ankle: a. Plantar flexion (S1&2) b. Dorsiflexion (L4) 4. Tarsal joint: a. Big toe extension (L5) b. Eversion and inversion (L5&S1) Quick tests: • Stand on toes (S1). • Stand on heels (L4 &5). • Squat and stand again (L3&4).	1. Shoulder: a. adduction (C6, 7and 8) mostly by pectoralis major and latissimus dorsi. b. Abduction (C5and 6) mostly by deltoid and supraspinatus. 2. Elbow: a. Flexion (C5&6) by the biceps and brachialis. b. Extension (C7&8) by the triceps. 3.Wrist: a. Flexion (C6&7) by flexor carpi ulnaris and radialis. b. Extension (C7&8) by extensor carpi group. 4. Fingers: a. Flexion and extension (C7&8) b. Abduction and adduction (C8&T1). c. Thumb opposition

4. Reflexes

Sudden stretching of a muscle usually evokes brisk contraction of that muscle or muscle group.

- The patient must be relaxed and properly positioned.
- Make sure that you expose the targeted muscle "If a gross movement can't be noticed, focus on muscle contraction".
- If the reflex did not appear properly, apply reinforcement maneuvers:
  - Ask patient to close his eyes or teeth firmly.
  - Ask patient to pull one hand against the other.

✓ Grades of muscle reflex:

- 0 absent
- +1 reduced (hyporeflexia)
- +2 normal
- +3 exaggerated (hyperreflexia)
- +4 exaggerated with clonus (brisk)

Lower Limbs reflexes	Upper Limbs reflexes

1. Knee reflex (patellar reflex L3&4):
   a. Hold the knee by your forearm.
   b. Tap on the patellar ligament (between patella and tibial tuberosity).
   c. Normally the quadriceps will contract, resulting in knee extension.

2.Ankle reflex (S1&2):
   a. Both the knee and ankle are flexed 90° and the thigh is externally rotated.
   b. Tap on the Achilles tendon.
   c. Normally there will be contraction of gastrocnemius muscle causing plantar flexion.

3.Plantar reflex(Babinski sign):
   a. Tell the patient what you will do.
   b. Stroke up the lateral side of the sole with a sharp instrument such as a key.
   c. Curve medially before reaching the toes (i.e. toward the big toe)
   d. Normally there will be a plantar flexion of the big toe (downwards).
   e. Abnormal response (i.e.positive test) if there is dorsiflexion (extension or upward flexion) of the big toe, and fanning of other toes. Seen in UMN lesion (pyramidal) and in infants.
   f. Bilateral up going toes occurs after generalized seizure, and with a patient in coma.

4.Test for clonus:
   a. Done if any of the reflexes appeared hyperactive.
   b. Hold the relaxed lower leg in your hand, and sharply dorsiflex the foot and hold it dorsiflexed → Normally nothing is felt.
   c. Positive if you felt oscillations between flexion and extension of the foot.

1. Biceps jerk (C5&6):
   a. Angle of the elbow: 120°.
   b. Place your thumb on the biceps tendon and tap your thumb with the hammer.
   c. Normally:
   - Brisk contraction of the biceps.
   - Flexion of the forearm at the elbow, followed by prompt relaxation.

2.Triceps jerk (C7&8):
   a. Angle of the elbow 90°.
   b. Triceps jerk with one arm flexed.
   c. Support the elbow with one hand and tap over the triceps tendon (do not place your finger).
   d. Normally there will be triceps contraction that results in forearm extension.

3.Brachioradialis (supinator) jerk (C5&6):
   a. Strike the lower end of the radius just above the wrist.
   b. Normally there will be contraction of brachioradialis, and flexion of the elbow.

4.Finger jerk (C5):
   a. The patient rests the hand with the palm upwards and fingers slightly flexed.
   b. Place you hand over the patients and strike the hammer over your fingers.
   c. Normally a slight flexion of all the patient's fingers occurs.

3.Hoffman response:
   a. Place your right index finger under the distal interphalangeal joint of the patient's middle finger.
   b. Use your right thumb to flick the patient's finger downwards.
   c. Look for any reflex flexion of the patient's thumb.

Difference between upper and lower motor neuron lesion:

	Upper motor Neuron	Lower motor Neuron
Type of paralysis	Spastic paralysis	Flaccid paralysis
Location	Opposite to the side of the lesion	Same side of the lesion
Deep tendon reflexes	Exaggerated	Diminished or Absent
Muscle wasting	Not marked (disuse atrophy)	Marked
Fasciculations	Absent	Present
Colonus	Present	Absent
Babinski sign	Present	Absent

Sensory System Examination

- Always start distally and go proximally.
- Compare left to right.
- The patient's eyes should be closed throughout the sensory examination and the stimuli should routinely be applied lightly so that minor abnormalities can be detected.
- Always use a control point “i.e. a normal area, such as the anterior chest wall” before you start testing for each sensory type.

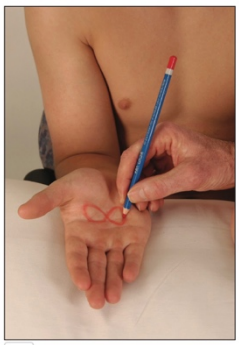
1. **Pain**
    - Using a new pen, a sterile needle or broken tongue depressor.
    - First: Demonstrate to the patient that this induces a relatively sharp sensation by touching lightly a normal area, such as the anterior chest wall (sternum).
    - Then ask the patient to close his eyes and say whether the pinprick is sharp or dull.

2. **Temperature**
    - This test performed only in special circumstances, e.g. syringomyelia(a chronic progressive disease of the spinal cord associated with sensory disturbances, muscle atrophy, and spasticity).
    - Use a cold tuning fork.
    - Ask the patient to close his eyes. Touch the patient with it and ask if he/she perceives the vibration fork as cold.

3. **Vibration**
    - Using a tuning fork (128-Hz) strike it on your palm. Place the vibrating fork on the patient sternum, so the patient can appreciate the vibration.
    - Ask the patient to close the eyes, and place the vibrating tuning fork on bony prominence starting from distal and moving to proximal if vibration is not felt (big toe->medial malleolus->patella, distal interphalangeal joint of the fore finger->metacarpophalangeal-> wrist...)
    - The patient should be able to describe a feeling of vibration.
    - Ask the patient to report whether they feel vibration sense and then to report when it stops (to assess the minimal threshold) and compare with your own.
    - Golden base: do not go to proximal sites unless distal sites are abnormal.

4. **Proprioception** (Joints)
    - Use the distal interphalangeal joint of the little finger or the big toe.
    - Demonstrate to the patient initially with eyes open that you will be moving their digit up (towards their head) or down (towards their feet).
    - Ask the patient to close his eyes → then make minimal movements upwards or downwards and ask the patient to report after each movement the direction of movement.

5. **Light touch**
    - Use a wisp of cotton and apply a gentle touch (do not drag the stimulus). while the patient's eyes are closed, and let him tell you when he feels the touch



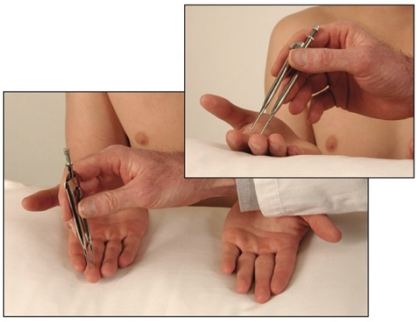
6. **Graphesthesia**
    - Ask the patient to close their eyes.
    - With a pencil draw a number or a letter on the patient's palm and ask him to identify the figure.

7. **Stereognosis**
    - Ask the patient to close their eyes.
    - Place an object (e.g coin or key) in the patient's hand and ask him to identify it.

8. **Sensory attention**
    - Ask the patient to shut their eyes.
    - Touch each side of the lower and upper limbs in turn and ask them to tell you which side was touched (right or left?).
    - Then touch both sides at the same time and ask them to tell whether they felt the touch in the left or right side or both?

9. **Two point discrimination:**
    - Ask the patient to close their eyes.
    - Using a compass (فرجار) seperate the two points (the minimal separation that can be distinguished on hands and feet is 3 cm while on fingertips it is 0.6 cm) and touch the patient's hand and ask them if he/she feels one point or two.

- Alternate between one point and two and note the narrowest tip width at which the patient can distinguish two points from one.



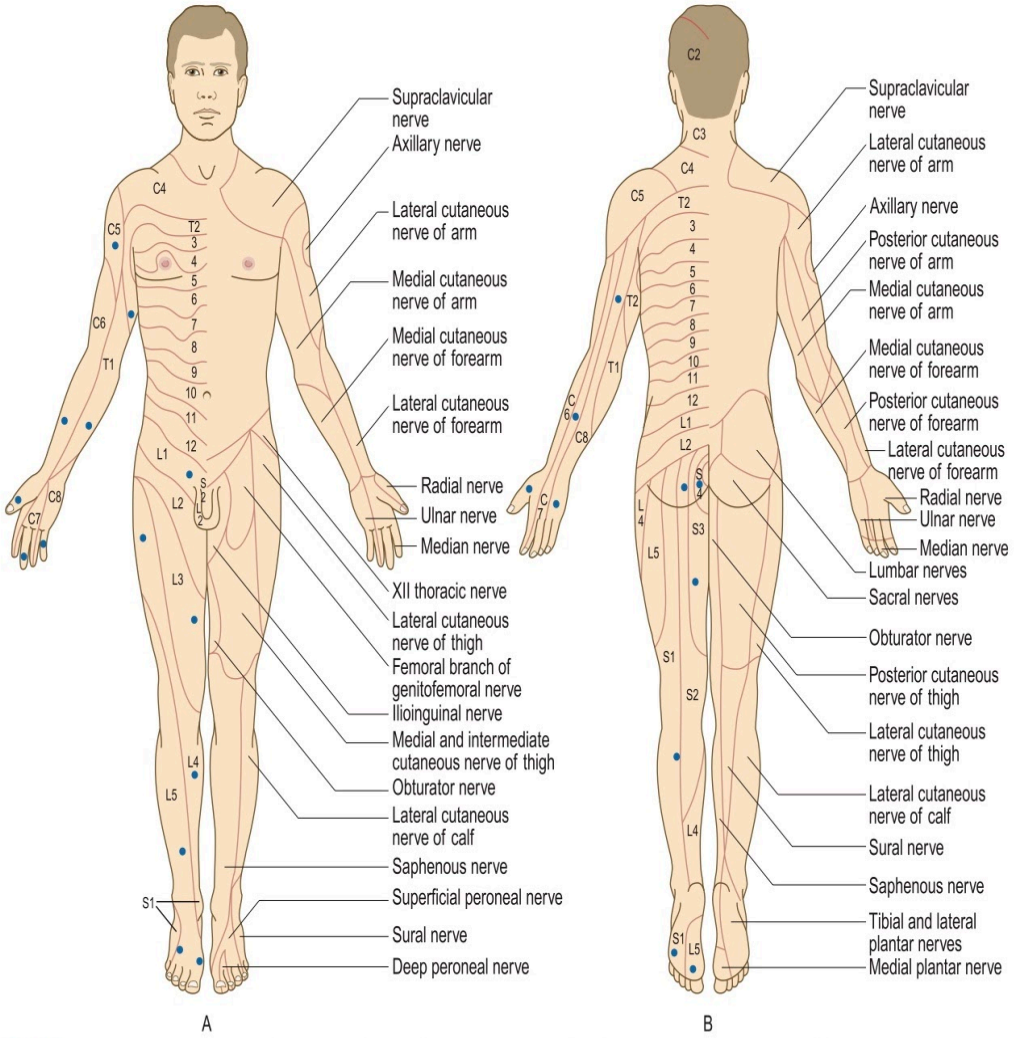


Fig. 7.26 **Dermatomal and sensory peripheral map innervation.** Points (shown in blue) for testing cutaneous sensation of the limbs. By applying stimuli at the points marked, both the dermatomal and main peripheral nerve distributions are tested simultaneously. A Anterior view. B Posterior view.

Cerebellar and gait Examination

Exam	Technique
1. General inspection:	
a. Patient posture	Looking for Truncal ataxia. Ask the patient to fold his/her arms and set up.
b. Eyes looking for any Nystagmus	Ask the patient to keep their head still and follow your finger with their eyes, then move your finger right, left, up and down and look for any nystagmus (H shapes).
c. Speech	Speak with the patient to assess dysarthria.
2. Upper Limbs:	
a. Inspection	• Resting tremor: place a piece of paper on the patient's outstretched hand, then inspect for tremors. • Pronator drift: ask the patient to place arms outstretched forwards with palms upwards and close their eyes, then observe the arm for pronation movement. • Rebound phenomenon: with their eyes closed, ask the patient to resist your pulling of their arm, then suddenly remove your hand. Make sure you protect the patient's face as they might hit it.
b.Coordination	• Finger to nose test: Ask the patient to touch their nose with the tip of their index finger, then touch your finger tip as fast as they can and move your finger just before the patient leaves their nose. Looking for Dysmetria or intention tremor. • Rapid alternating movement: Ask the patient to clap by alternating the palmar and dorsal surfaces of the hand, ask them to do this as fast as possible and repeat the test with the other hand, demonstrate this to the patient first. looking for Dysdiadochokinesia.
c. Tone	• Try to shake patients hands with pronating and supinating the hand slightly then suddenly supinate or pronate the hand strongly (Assessing for spastic catch/clonus, hypotonia). • Perform the ranges of motion fully of the joints. start proximal to distal or opposite: Shoulder, elbow and wrist.

3. Lower Limbs:	
a.Coordination	• Heel to shin test: Ask the patient to run the heel of one foot down the shin of the other leg and repeat the test with the other leg. • Toe to finger test: Ask the patient to lift the big toe up to touch your finger. Looking for Dysmetria or intention tremors. • Foot tapping test (Rapid alternating movements of the feet): Ask the patient to tap the sole of foot quickly on your hand or tap the heel on the opposite shin.
b. Tone	• Pull the leg up then down at the knee joint (while the patient is sitting over the edge of the bed) to assess knee/leg tone.
c. Reflexes	• With the help of a hammer, tap the knee to induce knee reflex. Looking for Pendular knee reflex due to hypotonia.
4. Gait Examination:	
a. Inspect walking	Ask the patient to walk normally a few meters, then turn around quickly & walk back. Pay attention to arms swings, stride length, limping and steadiness. (gait abnormalities in the image below)
b.Tandem (Heel to toe) walking	Ask the patient to walk in a straight line with their heels to their toes (it will be difficult for pt with cerebellar dz).
c. Romberg Test	It's done to differentiate cerebellar ataxia from sensory ataxia. It's positive only in sensory ataxia. Ask the patient to stand still with their heels together, then to remain still and close their eyes. If the patient loses their balance, the test is positive.

5. Coordination	
Lower Limbs	Upper Limbs

Heel –shin test:
• Ask the patient to run the heel of one foot up and down the opposite shin at moderate pace and as accurately as possible, then repeat it with closed eyes.
• Inability to perform this is a sign of cerebellar disease, or posterior column loss.
	Finger-nose test:
	• Ask the patient to touch his nose, then rotate his finger and touch your finger (you should move his finger from one position to another, backward and forward as well as from side to side).
	• Note any:
	  ○ Intentional tremor.
	  ○ Past pointing (dysmetria).
	  ○ Both.

Toe-finger test: Ask the patient to lift the foot and touch your finger by his big toe. **Foot-tapping test:** • It tests rapid alternating movement of the lower limb. • Ask the patient to tape the sole of the foot quickly on your hand or tap the heel on the opposite shin. • Look for loss of rhythmicity.	**Rapid alternating movement**: a) Ask the patient to pronate and supinate his\her hand on the dorsum of the other hand as rapid as possible. b) Inability to perform this movement smoothly is called dysdiadochokinesis (slow and clumsy movement). **Rebound phenomenon**: c) Ask the patient to flex the arm at the elbow joint against your resistance. c) When you suddenly let go, violent flexion may occur and, unless prevented, the patient may strike him\herself in the face. a. Hypotonia due to cerebellar disease causes delay in stopping the arm.

Signs of cerebellar disease (SIN 3Ds 2As):

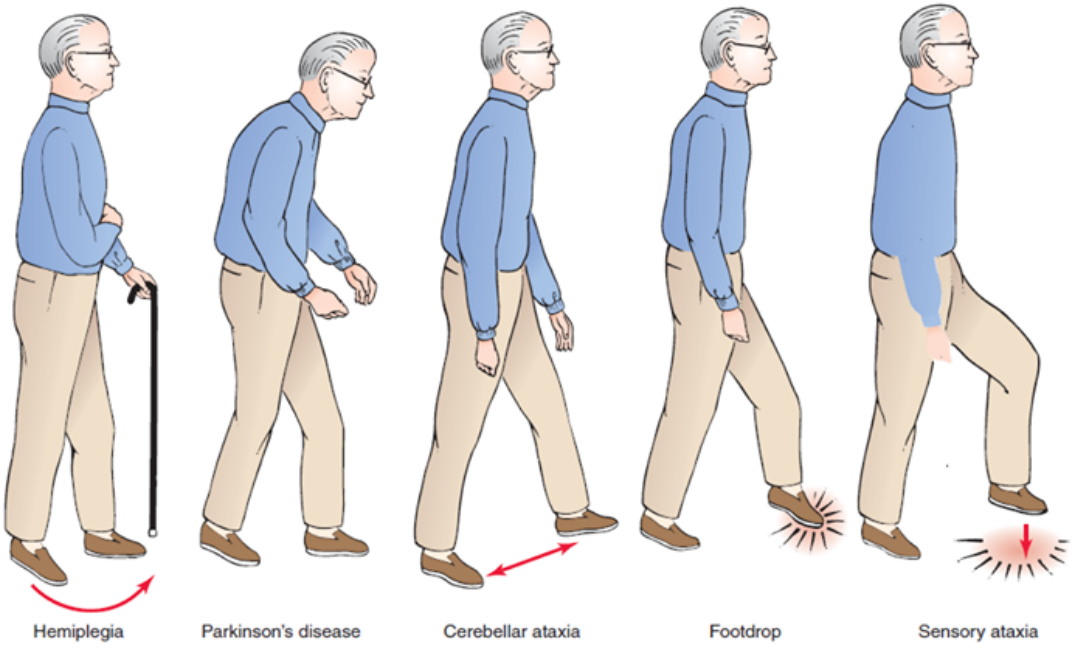
1. Scanning speech.
2. Intention tremor
3. Nystagmus.
4. Dysdiadochokinesia
5. Dysmetria
6. Drunken gait
7. truncal Ataxia
8. Atonia/hypotonia

Causes of cerebellar disease:

- Vascular (Stroke)

1. Inflammatory (encephalitis)
2. Traumatic
3. Tumor (posterior fossa tumors)
4. Autoimmune (Multiple sclerosis)
5. Degenerative
6. Intoxication (alcohol, drugs
7. congenital (Dandy-Walker)
8. Inherited (friedreich's ataxia)

Gait abnormalities:



1- Hemiplegic Gait:
The patient drags his or her affected leg in a semicircle (circumduction) with the arm flexed, adducted and internally rotated.

2- Parkinsonian Gait:
Small shuffling (festinating) gait and a general slowness of movement (hypokinesia), reduced stride length and walking speed with the trunk flexed forward + Both upper limbs are also flexed.

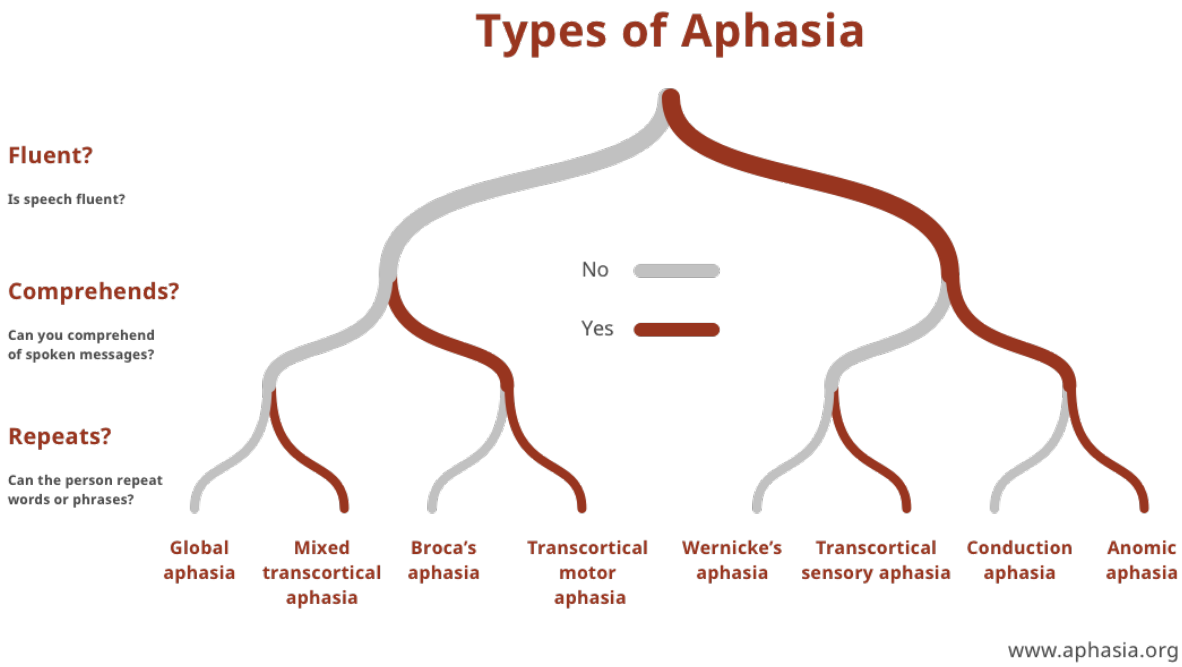
3- Ataxia (cerebellar) gait:
A wide base stand with staggering uncoordinated walk. the patient will not be able to walk from heel to toe or in a straight line. Patients tend to fall to the side of the lesion.

4- Steppage (Foot drop) Gait:
The patient lifts the leg high enough during walking so that the foot does not drag on the floor.

5- Sensory ataxic gait:
There is a loss of proprioceptive input. Sometimes referred to as a stomping gait since the patient may lift his leg very high to hit the ground hard in order to sense it. This is exacerbated when the patient cannot see his feet (i.e. in the dark) and is associated with a positive Romberg's test.

Speech Disturbances:

- Dysarthria: a *motor speech disorder*. It results from *impaired movement of the muscles* used *for speech production*. It is characterized by slurred or slow speech that can be difficult to understand.
- Aphasia: an inability to comprehend and formulate *language* because of *damage to specific brain regions*.



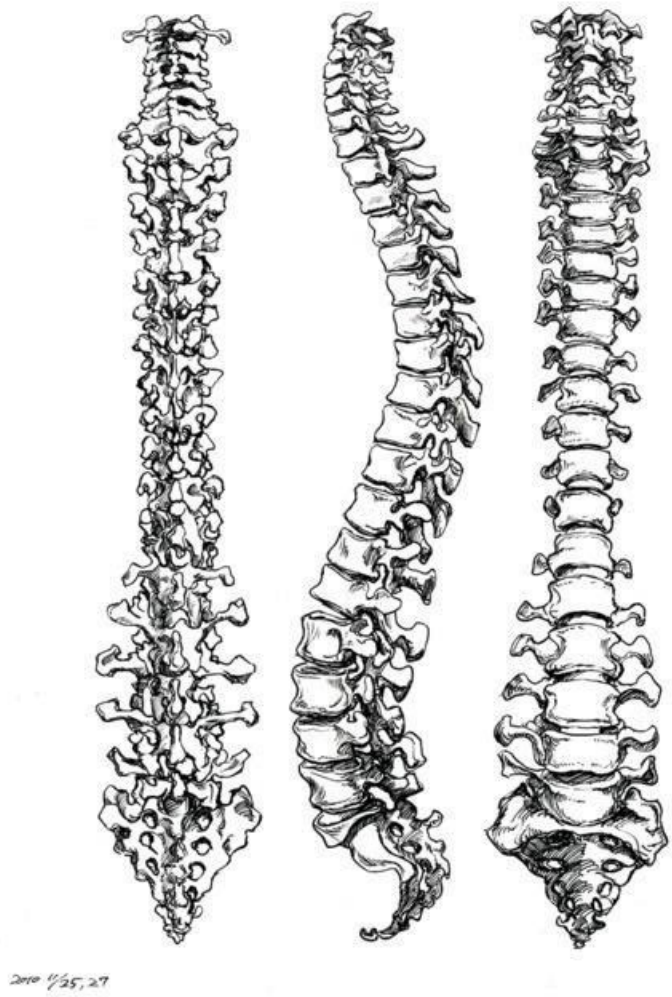
1.Fluent: Person is able to produce connected speech. Sentence structure is relatively intact but lacks meaning, Exs:

1. Anomic Aphasia: *word finding difficulties*, repetition of words/phrases good.
2. Conduction Aphasia: damage to the arcuate fasciculus, the person will have *difficulty repeating phrases*.
3. Receptive (Wernicke's) aphasia: has *great difficulty understanding the speech* of both themselves and others, So they are often *unaware of their mistakes. repetition is poor*.

2.Non-fluent: Speech production is halting and effortful, Exs:

1. .Expressive (Broca's) aphasia: person knows what he or she wants to say but they *can't express* it. They speak *short, meaningful phrases* that are *produced with great effort. repetition is poor*.

- Global Aphasia: *severe expressive and receptive language impairment, may be totally nonverbal, and/or use only facial expressions and gestures to communicate*.



Rheumatological system

★ Joint pain:

DDx:

	Monoarthritis	Polyarthritis
Acute inflammation	• Septic arthritis • Haematogenous (e.g. staphylococcal or gonococcal) • Secondary to penetrating injury • Traumatic • Gout, pseudogout or hydroxyapatite arthritis • Haemarthrosis (e.g. haemophilia) • Seronegative spondyloarthritis	1. Infection 2. Onset of chronic polyarthritis
Chronic inflammation	1. Chronic infection (e.g. atypical mycobacterial infection) 2. Seronegative spondyloarthritis	1. Rheumatoid arthritis 2. Seronegative spondyloarthritis 3. Osteoarthritis 4. Gout, pseudogout or hydroxyapatite arthritis 5. Connective tissue disease (e.g. SLE) 6. Infection (rare)
Painful joint with no inflammation	Osteoarthritis	-

Personal Data:

- Age (elderly → Osteoarthritis).

History of presenting illness: (SOCRATES)

- **Site**

Mono- Arthritis	Oligo-Arthritis	Poly- Arthritis
One Joint	Equal or less than 4	More than 4
Infection (TB, Brucella), Osteoarthritis, Chronic malignancy, Gout	ankylosing spondylitis, reactive arthritis	Rheumatoid arthritis (RA), SLE

- **Onset:**
    - Sudden? → Gout
    - Gradual? → Osteoarthritis
    - Continuous or in separate attacks? → Reactive arthritis
- **Character:**
- Additive: affects one joint then affects another one in addition to the formal one → Reactive arthritis
- Intermittent: affects the same joint, but comes and goes → osteoarthritis
- Migratory: affects one joint, and then leaves it to another one → Rheumatic fever
- Time of the day which is worst
    - Worse in the morning? (large joint → Osteoarthritis) (small joint → spondyloarthritis)
- **Exacerbating\ relieving factors**
- **Associated symptoms:**
    - Constitutional symptoms
    - system involved (MSS) e.g. Deformity, Instability, Morning stiffness, Joint swelling, skin rash, dry eyes/mouth , nail changes , raynaud phenomena?
    - GIT (for reactive arthritis): change in bowel habit, abdominal pain, bloody diarrhea
- **severity:** score the pain, ask if it is affecting his daily activity?

Risk factors related to DX

- Past Medical history:
    - Childhood arthritis.
    - RA, SLE, scleroderma, vasculitis
    - Recent infection
    - IBD (can result in arthritis).
    - Psoriasis (psoriatic arthropathy)

- **Dugs history:**
    - Antiarthritics, e.g. aspirin, NSAID, gold, methotrexate (MTX), penicillamine, chloroquine, steroid.
    - Side effects: gastric ulcer or hemorrhage from aspirin
    - allergies
- **Surgery\ trauma:**
    - History of joint trauma/surgery? or Arthroscopy (examination of a joint with an arthroscope which is an endoscope that is inserted through an incision near a joint).
- **Social History :**
    - Alcohol → can cause trauma
    - IV drug abuse (septic arthritis)
- **Family History:**
    - RA and OA
    - Hemochromatosis: can result in arthritis due to calcium pyrophosphate deposition

- Seronegative spondyloarthropathies (e,g: Ankylosing Spondylitis, Reiter's Syndrome, Psoriatic Arthritis, Arthritis of Inflammatory Bowel Disease)
- Bleeding disorders: Hemophilia may lead to swollen tender joints

investigation:

- CBC , ESR, CRP
- LFT
- Renal profile
- Arthrocentesis : for septic arthritis, gout, pseudogout.
- **RA:** serology (RF (sensitive), anti-CCP (specific)), x-ray (shows bony erosion), biopsy of nodules (shows cholesterol deposit)
- **OA:** x- ray (diagnostic)
- **Ankylosing spondylitis:** initial test (x-ray) , most accurate test (MRI)
- **Reactive arthritis:** clinical diagnosis.
- **Psoriatic arthritis:** x-ray shows esosive pitting (pencil in cup)

Treatment:

- **RA**

NSAIDS + methotrexate, if no response give biologics (anti-TNF eg. infliximab) , steroids (for flare up only)

- **OA**

1. nonpharmacological: lifestyle modification, reduce weight, physical therapy
2. pharmacological: paracetamol, NSAIDS, intra articular steroids injection
3. surgical: joint replacement (for severe cases)

- **Ankylosing spondylitis:**

NSAIDS (first line) , if no response give biologics (anti-TNF eg. infliximab)

- **Reactive arthritis**

NSAIDS for arthritis , treat chlamydia infection with doxycycline

- **Psoriatic arthritis**

NSAIDS (for mild arthritis), methotrexate (if there is severe skin findings) , if no response give biologics (anti-TNF eg. infliximab)

- **Enteropathic arthritis**

by treating IBD it will make it better.

- **Septic arthritis**

start empirically then alter them after culture and sensitivity, it gram -ve give double coverage (ceftriaxone vancomycin)

- **Gout**
- Acute: NSAIDS or Colchicine.
- Chronic: Allopurinol or Probenecid.
- **SLE**

1. acute flare: steroids
2. chronic mild symptoms (skin+ joint): hydroxychloroquine.
3. lupus nephritis: steroids, IV cyclopmide

★ Skin Rash:

DDx: SLE, vasculitis, dermatomyositis, Sjögren syndrome, Psoriatic arthritis, RA, infectious disease

Personal:
Name? age?

HPI:

- **Site:**
  - Unilateral or bilateral?
  - On the cheeks? (malar rash in SLE)
  - On the lower legs? (vasculitis or Sjogren syndrome, RA)
  - Around eyes (heliotrope rash) or on the back of the hand (gottron papule)? (dermatomyositis)
- **Onset:**
  - Sudden?
  - Gradual?
- **Duration?**
- **Course:**
  - Progressive or constant?
  - Continuous or intermittent?
- **Character:**
  - Morphology (shape of lesion): Butterfly? annular? Papular? discoid?
  - Painful or painless?
  - Itchy?
- **Aggravating factors:** Sun exposure? (SLE)
- **Relieving factors?**
- **Timing:** Worse at certain times of the day?
- **Severity?**
- **Associated symptoms:**
  - Joint pain? Joint stiffness? Joint deformity or instability? Ryanaud's phenomenon? Back pain? Dry eye and mouth? mouth ulcers? proximal muscle weakness? (dermatomyositis), Nail changes? (psoriatic arthritis)
- **Constitutional symptoms:** fever, fatigue, loss of weight/ appetite, night sweat, N\V?
- **Other systems related to the CC (systems related to SLE or vasculitis):**
  - Cardio\Respiratory: chest pain, dyspnea, PND, orthopnea, LL edema cough, hemoptysis, wheezing,
  - Renal: frothy urine, hematuria
  - CNS: psychosis, headache, numbness, seizures
  - Hematology: hemolytic anemia? bleeding?
  - GIT (for vasculitis, dermatomyositis): dysphagia, odynophagia, GERD, abdominal pain, change in bowel habit

Past medical history:

- Chronic disease?
- Any rheumatological or autoimmune disease? (SLE, RA, vasculitis, dermatomyositis… ect)
- Resent infection?
- Dermatological disease
- Hematological disease?
- Malignancy?

Drugs history:

- Ask about taking any medication? (for drug induced lupus e.g: hydralazine, procainamide, a-methyldopa, INH)
- Allergy?

Social history:

- ask about STD (for rash caused by infection)
- IV drugs abuse/ smoking alcohol

Family history:

- Family history of the same problem?
- Chronic disease?
- Rheumatological or hematological disease?
- Malignancy?

Investigations:

- CBC, ESR, CRP
- Liver function test
- Renal profile
- complement level (decrease complement in SLE)

serology:

- **SLE:** ANA (sensitive, nonspecific), anti-DsDNA and anti-smith (specific for SLE), anti-histone (for drug induced lupus)
- **Dermatomyositis:** anti- Mi, Anti-jo + (CK-MP, EMG and muscle biopsy)
- **Psoriatic arthritis:** negative serology
- **Sjögren syndrome:** Anti-SSA (Anti-ro), Anti-SSB (anti-LA)
- **RA:** RF (sensitive but nonspecific), anti-CCP, (specific)

Treatment:

SLE:

- acute flare: steroids
- chronic mild symptoms (skin+ joint): hydroxychloroquine.
- lupus nephritis: steroids, IV cyclophosphamide

Dermatomyositis: steroids + screen for malignancy
Vasculitis: steroids
Psoriatic arthritis: NSAIDS, methotrexate, TNFa,
Sjögren syndrome: artificial tears, screen for other C.T diseases.
RA: NSAIDS + methotrexate, if no response give biologics (anti-TNF eg. infliximab), steroids (for flare up only)

Back pain

Personal Data: Age (<40 ankylosing spondylitis, >50 malignancy, >65 AAA in a male smoker, >70 compression fracture) , Occupation, Residence.

DDx:

Mechanical	Systemic	Referred pain
1. Herniated disk 2. degenerative disk or facet 3. spondylolisthesis or spondylolysis 4. spinal stenosis 5. compression fracture	• Malignancy (1ry or 2ry) • Infections (osteomyelitis of spine, discitis, Spinal epidural abscess (fever, back or neck pain, and neurological deficits) • Inflammatory spondyloarthropathy (ankylosing spondylitis, psoriatic spondylitis, Reiter's syndrome, IBD) • Metabolic: Paget's disease of bone, osteoporosis, osteomalacia, hyperparathyroidism)	• Acute aneurysm (AAA) • Pelvic disease (prostatitis, endometriosis, pelvic inflammatory disease) • Renal disease (stones, pyelonephritis, perinephric abscess) • Gastrointestinal disease (pancreatitis, cholecystitis, penetrating ulcer)

History of presenting Illness:

Site: where?

- Upper (Muscle strain, injury)
- Middle/Central (Abdominal aortic aneurysm)
- Lower (mechanical, systemic)?

Onset: When?

- Sudden?(fracture/injury)
- Gradual?
- Continuous or in separate attacks?
- Cyclical? (Endometriosis)

Character: (What is the pain like?)

- Electrical or shock like? > disc herniation
- Colicky? > visceral pain
- Tearing? > aortic dissection
- Constant and nocturnal? > Malignancy when worse with rest, mechanical when improved with rest

Radiation: (Does it Radiate anywhere?)

- Pain with lumbosacral radiculopathy travels from the buttock down to the posterior or posterolateral leg to the ankle or foot.

Alleviating factors/Exacerbating factors

- Lumbar Flexion (e.g.bending forward): relieve spinal stenosis, and aggravates herniated disk (disc prolapse (plus neurological signs) and annular tear)

- Lumbar extension/rotation: worsens Lumbar extension/rotation: worsens pain of facet joint disorder, Spondylolysis, Localised buttock pain, Sacroiliac disorder
- Sitting straight : Aggravates spinal stenosis
- Activity: relieves Ankylosing spondylitis
- Improve with exercise: Ankylosing spondylitis
- Sitting, coughing, or sneezing: exacerbate the pain with lumbosacral radiculopathy.
- change in pain intensity when eating: improvement (peptic ulcer), worsening (pancreatitis, gallbladder disease…)

Time of the day which is worse:
- Worse in the morning? (inflammatory back pain, fibromyalgia)
- Stiffness after inactivity, pain worse in the morning and associated with morning stiffness? (ankylosing spondylitis)

Severity:
- How bad is the pain from 1 to 10?
- Does the pain wake the patient from sleep?
- Affect daily activity?

- Evidence of neurological compression?
- Urinary retention? (Pyelonephritis, renal stones)
- Sciatic (with or without weakness)?
- Weakness? (Compression)
- Paresthesia? loss of sensation?

Associated symptoms

Alarm symptoms:
- pain onset at age of <20, or >55
- Cancer Hx
- Unexplained weight loss
- Constant or progressive pain
- Cluadication symptoms, signs of peripheral ischaemia or abdominal mass
- pain on waking from sleep (morning stiffness)
- Pain during/awakening from sleep
- Current or recent infection
- Pain for longer than 1 month
- Fever (Infection, malignancy)
- Hx of drug use by injection? to exclude osteomyelitis and paraspinal abscess
- Osteoporosis Hx
- Bowel or bladder dysfunction, saddle anesthesia

- Hx of trauma or abrasion/contusion over spine

Constitutional symptoms

- Fever (most important) and then.. (N/V/W loss/Night sweats**)**

The systems related

- If the back pain associated with..
- Abdominal pain? > visceral etiology
- Nausea and vomiting> pancreatitis, peptic ulcer, appendicitis

Risk Factors related to DDx:

Medical history:

- Trauma Hx, Cancer Hx, Immunodeficiency (HIV)

Medications Hx:

- drugs (infection causing osteomyelitis), Steroids, allergies

Surgical Hx

- Trauma, Blood transfusion, Rehabilitation

Social Hx:

- Alcohol, smoking, occupation, sports

Family Hx:

- Bleeding disorders or inherited diseases, malignancy?

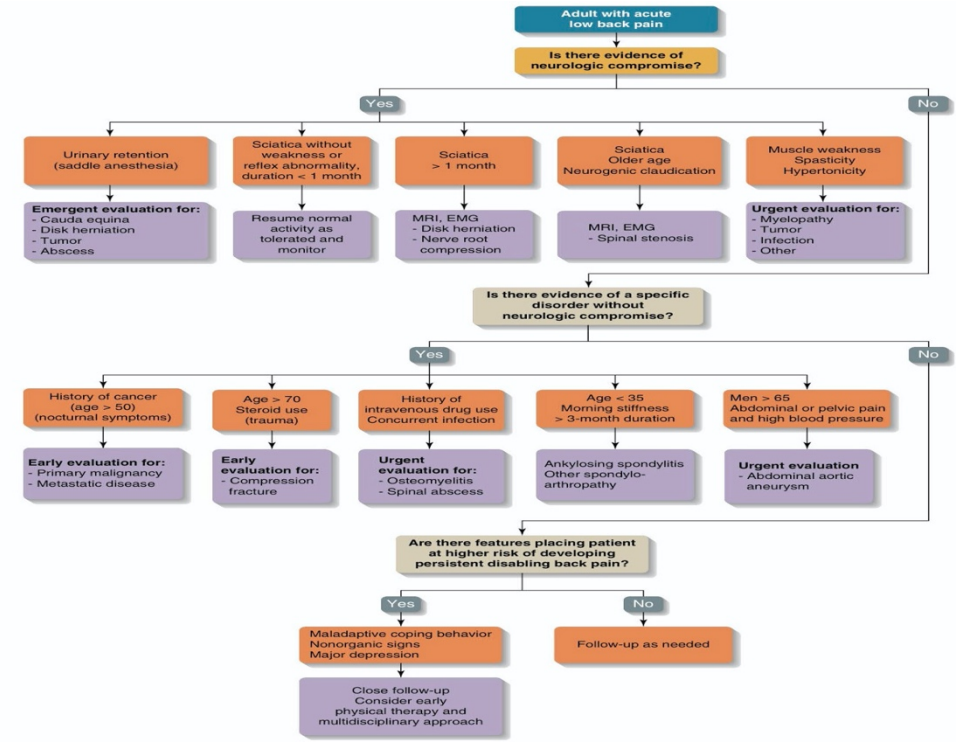
investigations

Labs:

- CBC, ESR, CRP, blood cultures (for non-mechanical back pain w/t constitutional Sx)
- Urinalysis and urine culture (if suspecting pyelonephritis or renal colic)

Imaging:

- **No red flags and low risk patients** > reassurance that symptoms will respond to conservative treatment. If



symptoms persist longer than 6 to 8 weeks then do plain X-ray

- **Red flags present <u>or</u> high risk patient (immunocompromised or IV drug abuse Hx.)** > do imaging:
- **X-ray:**
- Non-improving back pain on conservative treatment
- **Pelvis, neck and spine AP and lateral:** for trauma Hx without radiculopathy
- **Pelvis AP, angled posterior and oblique** for spondyloarthropathy
- **CT:** for bony anatomy and facet degeneration and spinal stenosis, also trauma if associated with neurological compromise, gross spinal deformities, or manual step-off on spinal palpation
- **MRI:** for soft tissue structures, such as the discs and nerve roots > if neurological compromise is present, or if infection or tumour is considered.
- **Nuclear/Isotope bone scanning:** specific situations, such as suspected sacroiliitis or malignancy

Management:

- **General measures and if serious pathology is absent:**
- Pain control so that rehabilitation can started
- 1-2 dose of diazepam in acute severe muscle spasm
- facet joint injections (diagnostic and therapeutic)
- short-term pain management (simple analgesics, NSAIDs, mild/moderate opiates (may add laxatives), TCA...)
- Rehabilitation and mobilization to strengthen supporting structures to the spine
- **Spondyloarthropathies:** Management depends on the condition but includes exercise and anti-inflammatory drugs
- **Spondylosis and spondylolisthesis:**
- Relative rest to allow the bone to heal
- Bracing
- Surgery if: persistent pain, progression of the slip, neurological signs, or sphincter disturbance
- **Disc herniation:**
- Analgesics
- Physical therapy
- Spinal injections
- Microdiscectomy/Laminectomy/foraminotomy for cauda equina or people who do not respond to conservative treatment and experience progressive neurologic decline
- **Sacroiliac joint:** depends on the cause. Relative rest, anti-inflammatories, or rarely a fluoroscopic guided steroid injection

★ Raynaud's phenomenon

DDx:

- **Primary Raynaud's**: Raynaud's disease (a female with familial raynaud's and have it when experience cold because of idiopathic digital artery vasospasm)
- **Secondary Raynaud's** (here we will focus only on rheumatological and arterial causes, you can find more click here):
- Rheumatic/autoimmune/connective tissue disease:
- Systemic sclerosis (diffuse or limited type i.e. CREST)
- Mixed connective tissue disease
- Systemic lupus erythematosus
- Polyarteritis nodosa
- Rheumatoid arthritis
- Dermatomyositis
- Sjögren syndrome
- Systemic sclerosis
- Vasculitis
- Primary pulmonary hypertension
- Arterial disease: embolism or thrombosis (Atherosclerosis), Buerger's disease (thromboangiitis obliterans) - smokers, trauma
- others: carpal tunnel syndrome

Hx. of Raynaud's:
History of presenting illness: (SOCRATES)

- **Site:** fingers and toes
- **Onset**: when did it start and how did it start ?
- **Character:** change in color (white, blue, red), cold fingers?, painful? numb? tight? Swollen painful areas when re-warmed? ulceration?
- **Exacerbating and relieving factors:** cold temperatures or emotional stress, relieved with rewarming
- **Time**: persistent (ischemia) or intermittent symptoms?
- **Severity**: how painful is it out of ten?/ does it affect your daily life?
- **Associated symptoms:**
- **Systemic sclerosis**: hair loss, lumps under the skin, dilated blood vessels under the skin's surface, joint pain, SOB, dry cough, diarrhea/constipation, difficulty swallowing, esophageal reflux, abdominal bloating after meals
- **CREST syndrome** (Calcium skin deposits, Esophageal dysmotility, Sclerodactyly and Telangiectasia)
- **SLE**: fatigue, fever,joint pain, stiffness and swelling, butterfly-shaped rash on the face or rashes elsewhere on the body, skin lesions that appear or worsen with sun exposure (photosensitivity), chest pain, SOB, dry eyes, headaches, confusion and memory loss
- **Rheumatoid arthritis:** Tender/ warm/swollen joints, joint stiffness worse in the mornings and after inactivity
- **Dermatomyositis:** Red/purple rash on sun-exposed areas, red/purple swelling of the upper eyelids (heliotrope), spots on the knuckles, elbows, knees, and toes (Gottron's papules), proximal muscle weakness (difficulty getting up of standing)

- **Sjögren syndrome:** dry sand feeling burning eyes (Xerophthalmia), dry mouth (Xerostomia) and difficulty speaking, swollen salivary glands, dry vagina, joint pain, dry cough
- **Mixed connective tissue disease:** Swollen fingers, Muscle pain, joint pain/deformity, reddish brown patches over the knuckles
- **Vasculitis**: Rash, numbness or weakness, constitutional Sx.

- **Past Medical history:** Hx. of same problem before, Hx of autoimmune or connective tissue disease (thyroid, SLE, systemic sclerosis/CREST…), diabetes, HTN (blurry vision, headache), atherosclerosis
- **Medication**: beta-blockers, ergots, OCP, bromocriptine, Cyclosporine, Alfa-interferon
- **Surgical history:** Surgeries related to autoimmune or vascular/atherosclerotic disease
- **Trauma history:** Injuries to the hands or feet, such as fracture, surgery, or frostbite
- **Family history**: Hx. of same problem before, Hx of autoimmune or connective tissue disease, diabetes, atherosclerosis
- **Obstetric history:** Hx. of miscarriage (vasculitis,…)
- **Social history:** SMOKING, alcohol, living in cold area, occupations with use of vibrating tools, Industrial exposure to solvents (xylene, toluene, acetone, or chlorinated solvents)
- **review of systems:**
    - GIT: heartburn or dysphagia, Diarrhea or constipation, Nausea or vomiting.
    - Cardiopulmonary: SOB, cough, Syncope, palpitation
    - Renal: Urinary symptoms volume, color, dysuria, nocturia, frequency, urgency
    - MSK: muscle weakness/pain, joint pain
    - Neuro: memory loss

Investigation

- **Labs:**

CBC, ESR, CRP, renal function,CK-MB

- **systemic sclerosis:** anti-SCL-70 (anti-topoisomerase), RNA polymerase III
- **CREST:** Anticentromere,
- **SLE:** ANA (sensitive, nonspecific), anti-DsDNA and anti-smith (specific for SLE), anti-histone (for drug induced lupus)
- **Dermatomyositis:** anti-Mi, Anti-jo + CK-MP
- **Vasculitis:** ANA
- **Sjögren syndrome:** Anti-SSA (Anti-ro), Anti-SSB (anti-LA)
- **RA:** RF (sensitive but nonspecific), anti-CCP, (specific)
- **Imaging:** high resolution CT, MRI (dermatomyositis), echo, imaging of joints, spines, chest, angiography (vasculitis)
- **others:** EMG and muscle biopsy (Dermatomyositis), PFTs, biopsy (vasculitis)

Management:

- **General measures (1ry and 2ry raynaud's):**
- education, warming of the affected body part (wearing gloves), and cessation of vasoconstricting agents such as nicotine. **medication:** calcium channel blocker (nifedipine), topical nitroglycerin, Iloprost injection, SSRIs, sildenafil, reducing emotional stress,bosentan
- **Secondary Raynaud:** General measures + treating underlying cause:
- Avoiding medications causing it, avoiding occupational or toxic exposure(e.g. smoking cessation)
- **Systemic sclerosis:** steroids, antacids (reflux), antibiotics for ulcers to prevent infection, antibiotics to GI reduce bloating and diarrhea, anticoagulation NOT indicated in patients with systemic sclerosis and digital ulcers except in rare cases of rapidly advancing digital ischemia.
- **SLE:**
- acute flare: steroids
- chronic mild symptoms (skin+ joint): hydroxychloroquine.
- lupus nephritis: steroids, IV cyclophosphamide
- **Dermatomyositis:** steroids + screen for malignancy
- **Vasculitis:** steroids
- **Sjögren syndrome:** artificial tears, screen for other C.T diseases.
- **RA:** NSAIDS + methotrexate, if no response give biologics (anti-TNF eg. infliximab), steroids (for flare up only)
- release carpal tunnel surgically

Osteoarthritis

The patient may come with one of the following or more: joint pain that increases with movement, difficulty moving a joint.

Key points to ask suspected Osteoarthritis patient:

- Site (which joint) → osteoarthritis commonly affect the weight bearing joints (e.g. Hip, Knee or spine) + Primary Osteoarthritis is unlikely to involve the MCPs, Wrists, Elbows, Shoulders, Ankles.
- Onset, duration, relieving factors (e.g. rest), aggravating factors (movement), frequency?

Rule out other DDx of joint pain:

- Symmetrical small joints involvement, prolonged morning stiffness → RA
- Systemic symptoms; fatigue?→ RA, fever?→ septic arthritis
- Other systems involved e.g. respiratory, cardiac→ RA
- Acute onset joint pain in few hours → gout
- Joint is red, hot and acutely tender → gout, septic arthritis, traumatic injury.

Ask about Associated symptoms:

- functional difficulties? change in gait?
- bony deformities? Bouchard or heberden deformity
- Crepitus/ Clicking or cracking sound?
- Spinal stenosis? back/leg pain, paresthesia or numbness in the lower limb.

Risk Factors:

- Old age >50 years (the strongest)
- Occupation e.g. manual workers, repeated traumas to the joint.

Gout

The patient may come with one of the following or more: a sudden onset joint pain and swelling, difficulty moving a joint.

Key points to ask suspected Gout patient:

- Site which joint → commonly involved joints are 1st metatarsophalangeal, tarso-metatarsal or ankle joint.
- Onset (acute and sudden), duration, relieving factors (e.g: painkillers), aggravating factors (movement), frequency (usually he had previous self-limiting attacks before), Severity (the most severe he ever had)?

Rule out other DDx of joint pain:

- Symmetrical small joints involvement, prolonged morning stiffness → RA
- Systemic symptoms; fatigue?→RA, fever? → septic arthritis

- Other systems involved e.g. respiratory, cardiac → RA, recent chlamydia or GI infection Infection, conjunctivitis/urethritis → Reactive arthritis
- Pain is not sudden → osteoarthritis
- Joint is not red, hot and acutely tender → osteoarthritis, traumatic injury.

Ask about Associated symptoms:

- ✓ functional difficulties? change in gait?
- ✓ Renal disease (stones/insufficiency)?
- ✓ Gout tophi? noticed on the extensor surfaces e.g. elbows, knees and achilles tendon.

Risk Factors:

- Medical: Previous attack of gout or diagnosis of pseudogout. Use of gout-inducing medications e.g. aspirin, cyclosporine, diuretics (thiazide or loop diuretics). hx of conditions that cause high cell turnover e.g. myeloproliferative disorders, chemotherapy-induced cell death.
- Social: consumption of meat, seafood, alcohol.
- Family hx: family hx of gout.

Rheumatological Examination

WIP3E: Wash your Hands, Introduce yourself, Permission/Privacy/Position, Exposure

- Vital signs: temperature (fever?), respiratory rate, O2 sat., pulse rate, rhythm and quality and difference with raising hand
- General appearance look for: ABC2DE
  - Appearance: Well or ill, age, edema? mood (depression?), rashes upon photosensitive areas
  - Body built: normal, cachectic, cushingoid
  - Color: pale, hyperpigmentation, cyanosis or jaundice
  - Connections: medications or equipments or walking aid
  - Distress: pain, signs of difficult breathing
  - Else: consciousness, mental status
  -

Posture and gait:

- **ask** patient to stand from setting or squat (muscle power), ask patient to walk to inspect gait (antalgic? trendelenburg?...)
- **Head**
  - **scalp:** lesions, alopecia
  - **face:**
    - ✓ **shape:** moonlike facies > steroids
    - ✓ **eyes:** dry, watering, corneal opacification, uveitis, scleral injection, periorbital heliotrope/edema
    - ✓ **nose:** appearance (peaking in scleroderma)
    - ✓ **facial skin:** rash (butterfly, discoid), skin tightening, darkening, steroid use acne
    - ✓ **mouth:** buccal mucosa (ulcers? dry?), teeth (caries), small tight mouth opening?
    - ✓ **ask** patient to open and close and move lower jaw from side to side to assess TMJ
    - ✓ **ear lobe**: inspect for rashes, tophi (in gout, *also found on achilles tendon*)
- **Neck:** thyroid (autoimmune disease), using extra muscle for breathing difficulty, **ask** patient to bring right ear to right shoulder then left ear to left shoulder (lateral flexion is sensitive for cervical spine abnormality), palpate lymph nodes
- **Axilla:** palpate lymph nodes
- **Shoulder:**
  - **look:** inspect for deltoid wasting, inspect back of shoulders for buffalo hump (steroid use) and shawl sign (dermatomyositis), use of trapezius in breathing difficulty
  - **feel:** compare shoulder temperature, and palpate bony prominences, apply pressure to the midpoint of each supraspinatus and undertake skin-fold rolling of the overlying skin looking for increased tenderness > fibromyalgia

- **move:** check range of movement and limitation, ask for 'Hands behind head' (to assess glenohumeral joint). You can test the shoulder by asking patient to do compound movements actively and passively, if patient has pain or limitation then proceed to more specific tests (click here for explanation): external/internal rotation, active flexion/extension, active abduction/adduction, then do them to the patient passively.
  special tests (empty can, The painful arc (impingement syndrome) test, internal and external rotation with resistance,...)

- **Chest:** inspect for V-sign (dermatomyositis rash on chest), listen for heart sound, murmurs, pericardial rub (pericarditis), auscultate for lung sounds (may find bilateral decreased breath and Crackles)
- **Abdomen:** palpate for hepatosplenomegaly, auscultate for bowel sounds
- **Arms:** inspect arms for muscle wasting and rashes, inspect elbow joint for subcutaneous calcinosis, lupus extensor surface rash, resist patient in flexion and extension to check muscle power

Rheumatological Hand examination

Position: sitting, patient's hands on a pillow
Exposure: above the elbow

i. **Look :**

- **Nails:** Pitting nails, onycholysis, hyperkeratosis, psoriasis, Discoloration (Raynaud's phenomenon), digital infarction, splinter hemorrhage
- **Skin:** Atrophy, tightness, Erythema, rashes (psoriasis), guttorn papules, Discoloration and scars (fasciotomy, rheumatoid nodule scars)
- **Muscle:** Wasting
- **Bone:** Subluxation / dislocation

- **Joint:**
  - Swelling
  - Joint deformity:
    - ✓ Ulnar deviation
    - ✓ Radial deviation
    - ✓ Swan Neck: Hyperextension of the PIP joint and Fixed flexion of the DIP joint
    - ✓ Boutonniere: Fixed flexion of the PIP joint and Extension of the DIP joint
    - ✓ Jaccoud's arthropathy: reversible flexion of the PIP joint and Extension of the DIP joint
    - ✓ Z-deformity of the thumb: Hyperextension of the IP joint with fixed flexion and subluxation of the MCP joint
    - ✓ Sausage shape fingers: due to IP arthritis and flexor tendon sheath edema
    - ✓ Telescoping finger: shorting of the fingers

- ✓ Resolution of finger tips (tapering fingers)

ii. Feel:

- Temperature
- Tenderness: Gently squeeze across the (MCP)
- Bimanually palpate the joints of the hand (MCP / PIP / DIP / CMC)
- Bimanually palpate the patient's wrists

- Swelling
  - ✓ Bony swelling: Heberden's node (at DIP joint) , Bouchard's nodes (at the PIP joint)

iii. **Move:**

Assess each of the following movements actively first (patient does the movements independently). Then assess movements passively, feeling for crepitus and noting any pain.

- Finger extension : "open your fist and splay your fingers"
- Finger flexion : "make a fist"
- Wrist extension : "put palms of your hands together and extend wrists fully" – ROM 90º
- Wrist flexion : "put backs of your hands together and flex wrists fully" – ROM 90º

iv. **Function:**

- Power grip: ask the patient to squeeze your fingers with his/her hands
- Pincer grip: Ask the patient to place His/her thumb and index finger together and don't let you separate them
- Practical test: ask the patient to Pick up small object or undo a shirt button

v. **Special tests**

Phalen's wrist flexion test

- Ask the patient to hold their wrist in complete and forced flexion (pushing the dorsal surfaces of both hands together) for 60 seconds
- If the patient's symptoms of carpal tunnel syndrome are reproduced then the test is positive (*e.g burning, tingling or numb sensation over the thumb, index, middle and ring fingers).*

Tinel's test:

- Tap over the carpal tunnel If the patient develops tingling in the thumb and radial two and a half fingers this is suggestive of median nerve irritation and compression.

➽ ***End your examination with:***

Perform a full neurovascular examination of the upper limbs
Examine the elbow joint.

Back examination

Position: standing then laying down
Exposure: in underwear only

A. Look:

- from behind: Posture, scoliosis, scars , hairy patch or lipoma.
- from side: normal cervical lordosis, thoracic Kyphosis and lumbar lordosis.
- Ask the patient to walk and inspect the gate and lower extremities.

B. Feel

- Palpate the spinous processes and paraspinal tissues note the overall alignment and tenderness.
- The paravertebral muscles for tenderness and increased tone.

C. Move

- It is assessed actively by bending movement at lumbar spine and rotational movement at thoracic spine.
- Range of movement is checked by observing and by using Schober's test
- Flexion: is tested by asking the patient to touch the toes with knees straight and look at the spine:
  - Normally there is a gentle curve
  - Patients with advanced ankylosing spondylitis have a flat ankylosed spine and all binding occurs at the hips.

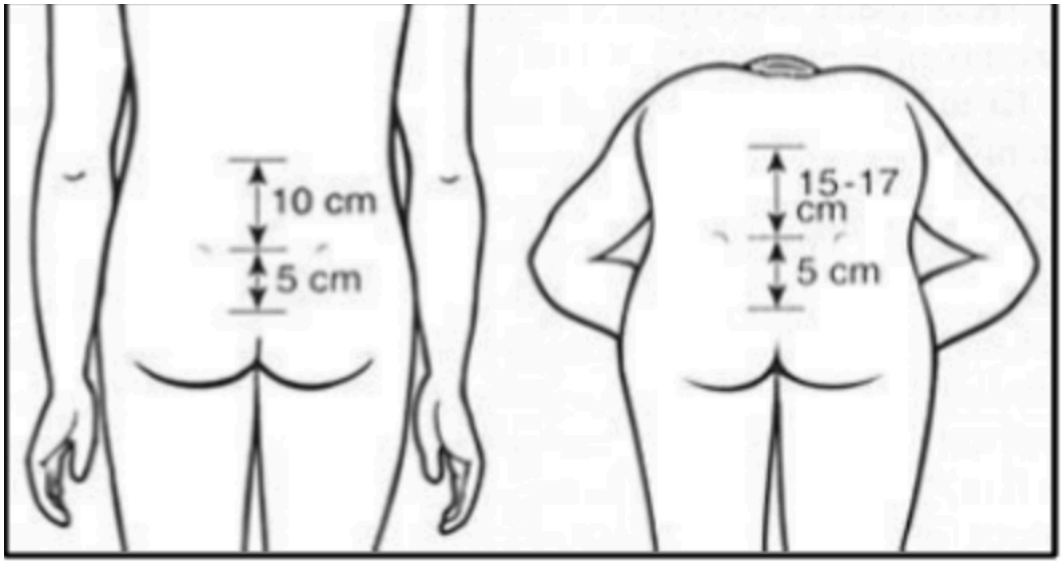
- Extension: ask the patient to straighten up and lean back as far as possible (normal 10– 20° from neutral erect posture).
- patients with back pain will find this less uncomfortable than bending forward
- Lateral flexion: ask him to reach down to each side, touching the outside of the leg as down as possible while keeping the legs straight.
- Rotation is tested by asking the patient to rotate the head and shoulders as far as possible to each side (this is best viewed from above).

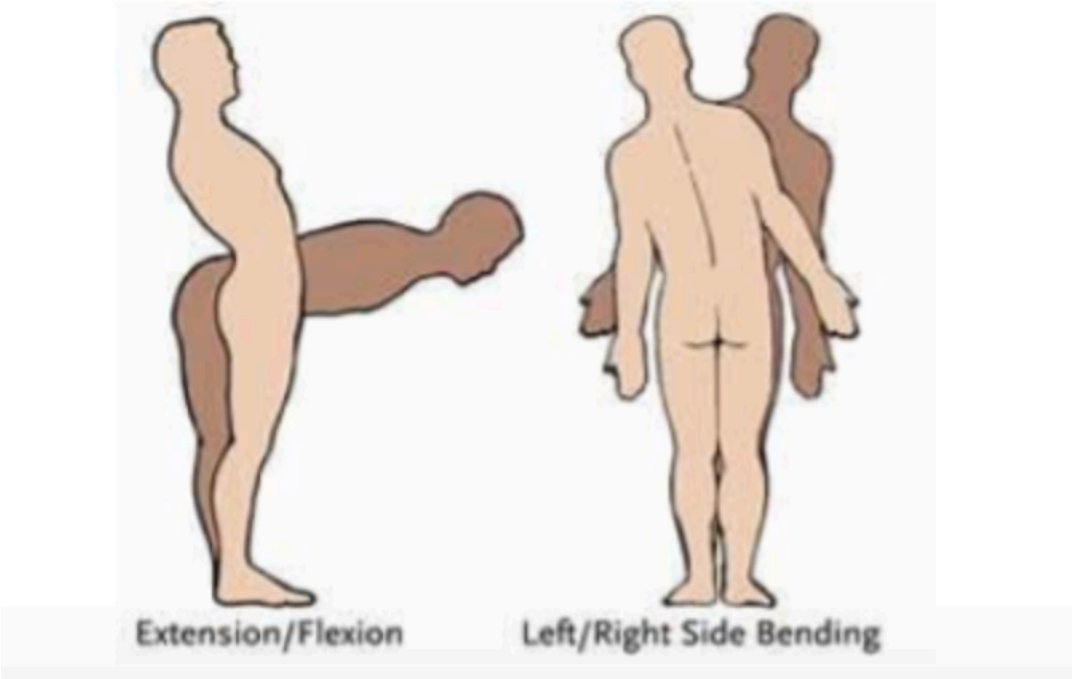
D. Special Tests:

Straight leg raising:
-Ask patient to lie down. Lift up a straight leg and dorsiflex the foot.
This may exacerbate pain from a nerve root entrapment or irritation e.g. Sciatica.

Schober's test: (to assess the amount of lumbar flexion)
-while the patient is in a standing position make a mark approximately at the level of L5.
-Two points are then marked: 5 cm below and 10 cm above this point (for a total of 15 cm distance).
Then the patient is then instructed to touch his toes while keeping the knees straight.
-The distance of the two points should increase by at least 5 cm (with the total distance greater than 20 cm). <20cm is a sign of restriction in the lumbar flexion.
Adams forward bending test: (The examiner stands behind the patient to assess)
-Full forward flexion until back is horizontal to the floor. (with complete knee extension and hands in the air not touching the knee).
-If thoracic Scoliosis is present, then rib hump will become visible

➽ ***End your examination with:*** Neurological examination of the lower limbs





Knee examination

Position: lying down
Exposure: both knees and thighs are fully exposed

A. Look:

- Gait : ask the patient to walk a few steps and asses for asymmetry/deformities or pain during walking.

then inspect Nails → Skin → muscles → Joints → bone.

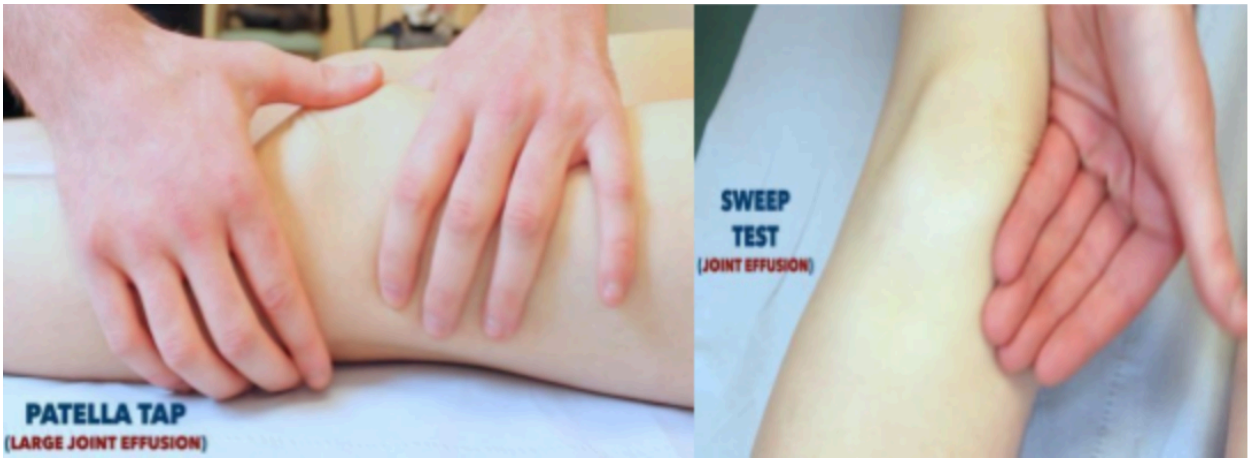
- Nails: any changes of the toes' nails
- Skin: Scars, discoloration, Rashes, atrophy or tightness.
- Muscle: quadriceps wasting

- Joint: swelling (Loss of the peripatellar grooves; an early sign of effusion) or deformities (valgus; deviation away from the midline occur in RA <=> Varus; toward the midline occur OA)
- Bone: Subluxation or dislocation

B. Feel:

- Temperature; with the backs of the fingers
- Tenderness
- Palpate:
  - Patella – palpate the borders for tenderness / effusion
  - Tibial tuberosity – tenderness may suggest Osgood Schlatter disease
  - Head of the fibula
  - Collateral ligaments – both medial and lateral
  - Popliteal fossa – for swelling e.g. Baker's cyst or an aneurysm.
- **Effusions:**

1. Patellar tap test: for huge effusion:
   - ✓ Empty the suprapatellar pouch by sliding your left hand down the thigh to the patella.
   - ✓ Keep your left hand there and use the fingertips of your right hand to press down briskly and firmly over the patella see if it flows (indicate the presence of fluid)
2. Fluctuation (sweep)test: for moderate effusion
3. Milking sign: for mild effusion
   - ✓ Empty the suprapatellar pouch with one hand whilst also emptying the medial side of the joint using an upwards wiping motion by the other.
   - ✓ Now release your hands and do a similar wiping motion downwards on the lateral side of the joint.
   - ✓ Watch for a bulge or ripple on the medial side of the joint the appearance of a bulge or ripple suggests the presence of an effusion



C. Move:

- Passive movement: (doctor performing the movement)

- ✓ flex and extend the knee using your both hands (one is resting on the knee cap while the other moves the leg up and down).
- ✓ flexion is normally possible to 140° and extension to 10° (above 10 is abnormal; hyper-extension).
- ✓ left the knee between your arm and chest → move it medially then laterally (more than 5 is considered abnormal).

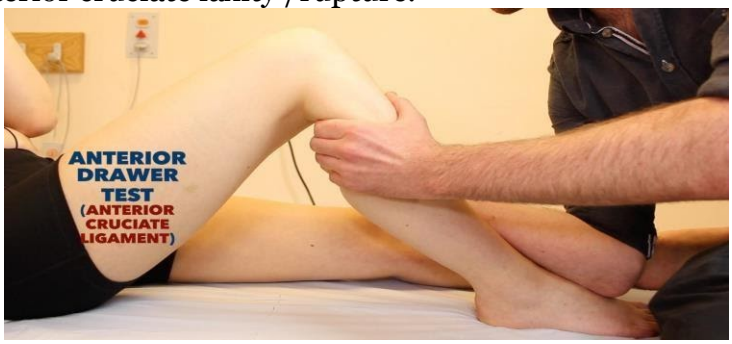
- Active movement: This involves the patient performing the movements
  - ✓ Knee flexion: "Move your heel as close to your bottom as you can manage"
  - ✓ Knee extension: "Straighten your leg out as best as you are able to".

D.Measure:

Measure quadriceps circumference and compare (20cm above tibial tuberosity)

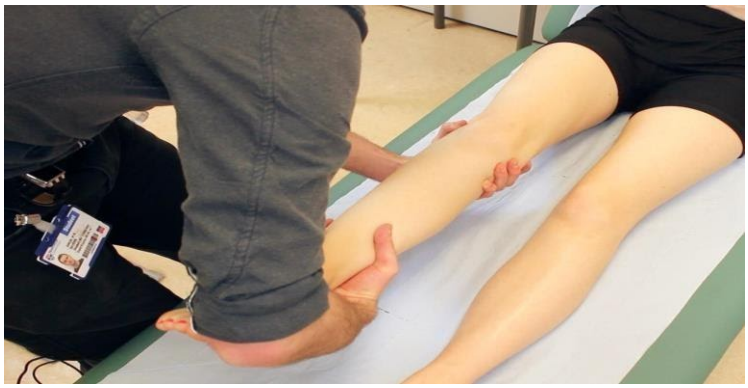
E. Special tests:

1. Anterior/Posterior drawer test:
   - Flex the patient's knee to 90°.
   - Wrap your hands around the proximal tibia with your fingers around the back of the knee.
   - Rest your forearm down the patient's lower leg to fix its position.
   - Position your thumbs over the tibial tuberosity.
   - Ask the patient to keep their legs as relaxed as possible
   - Pull the tibia anteriorly: significant movement suggests anterior cruciate laxity /rupture
   - Push the tibia posteriorly: significant movement suggests posterior cruciate laxity /rupture.



2. Collateral ligament (CL)
   - Extend the patient's knee fully.
   - Hold the patient's ankle between your elbow and side.
   - Place your right hand along the medial aspect of the knee.
   - Place your left hand on the lower limb (e.g. calf or ankle).
   - Push steadily outward with your right hand whilst applying an opposite force with the left.
   - Push steadily inward with your right hand whilst applying an opposite force with the left.

- If after this assessment the knee appears stable you can further assess the collateral ligaments by repeating this test with the knee flexed.



3. patellar apprehension test:
   - When recurrent dislocation or subluxation of the patella is suspected.
   - Pushing the patella laterally while flexing the knee slowly.
4. McMurray test:
   - To evaluate for tears in the meniscus.
   - Flex the knee and hip to 45 → the knee is brought from flexion to extension with **either** internal or external rotation using the ankle.
5. Apley's test:
   - Performed with the patient prone and the knee flex at 90.
   - Try to stabilise the thigh by kneeling lightly on it.
   - While pushing the foot downward → rotate the leg laterally and medially.

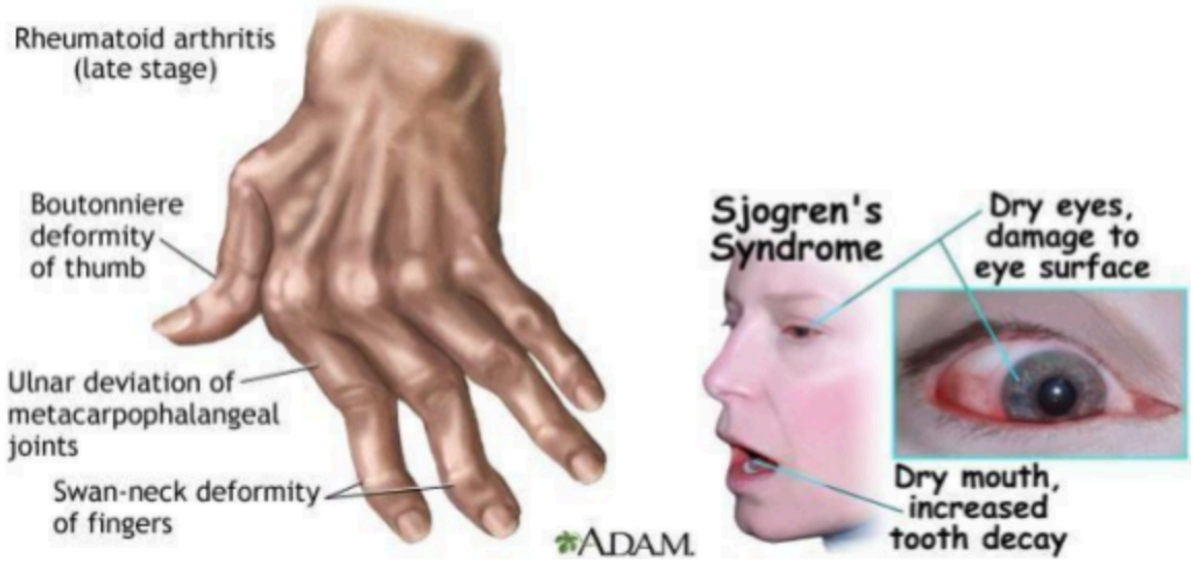
➽ ***End your examination with:***

- Neurovascular examination of both lower limbs
- Ankle & hip Examination (the joints above and below) Inspect soles.

Physical Signs of Rheumatological System

Rheumatoid Arthritis	
1. General inspection	• Cushingoid appearance (due to steroid treatment) • weight loss (active disease) • thin and easily bruised skin
2. Hands	• Perform hand examination looking for: symmetrical small joint synovitis, vasculitis. • Wrist: Radial deviation, Entrapment neuropathy (e.g. carpal tunnel) - perform Phalen's sign • MCPs: ulnar deviation. • PIPs: swan neck and boutonnière deformity. • Thumbs: Z deformity.
3. Arms and shoulder	• Elbow joint (examine for Subcutaneous nodules) • Shoulder joint (Examine for tenderness and limitation of movement) • Axillary nodes (enlarged nodes may indicate active disease of joints in the area that they drain)
4. Face	• Eyes—Red dry eyes (Sjögren's), scleritis/episcleritis, Conjunctival pallor (anaemia), cataracts (steroids, chloroquine), scleromalacia (scleral thinning). • Face—parotids (Sjögren's) • Mouth—dryness and dental caries (Sjögren's). ● Temporo-mandibular joint (crepitus)
5. Neck	• Cervical spine (examine the cervical spine for tenderness, muscle spasm and reduction of rotational movement) ● Cervical nodes
6. Chest	• Signs of pleural effusion, pulmonary fibrosis, pericarditis, valvular disease (esp aortic), (if present)
7. Abdomen	• Splenomegaly (e.g. Felty's syndrome) • Inguinal nodes
8. Hips & knees	• Movements limitations. • quadriceps wasting (sign of knee joint involvement) ● Baker's cysts in popliteal fossae.
9. Lower limbs	• Ulceration (vasculitis) • Calf swelling (ruptured synovial cyst) • Peripheral neuropathy • Mononeuritis multiplex in lower limb nerves ● signs of Cord compression.

11. Feet	• Metatarsophalangeal joints swelling and subluxation • Lateral deviation and clawing of the toes • Achilles tendon nodules
12. Other	• Urine: protein, blood (drugs, vasculitis, amyloidosis) • Rectal examination (blood)

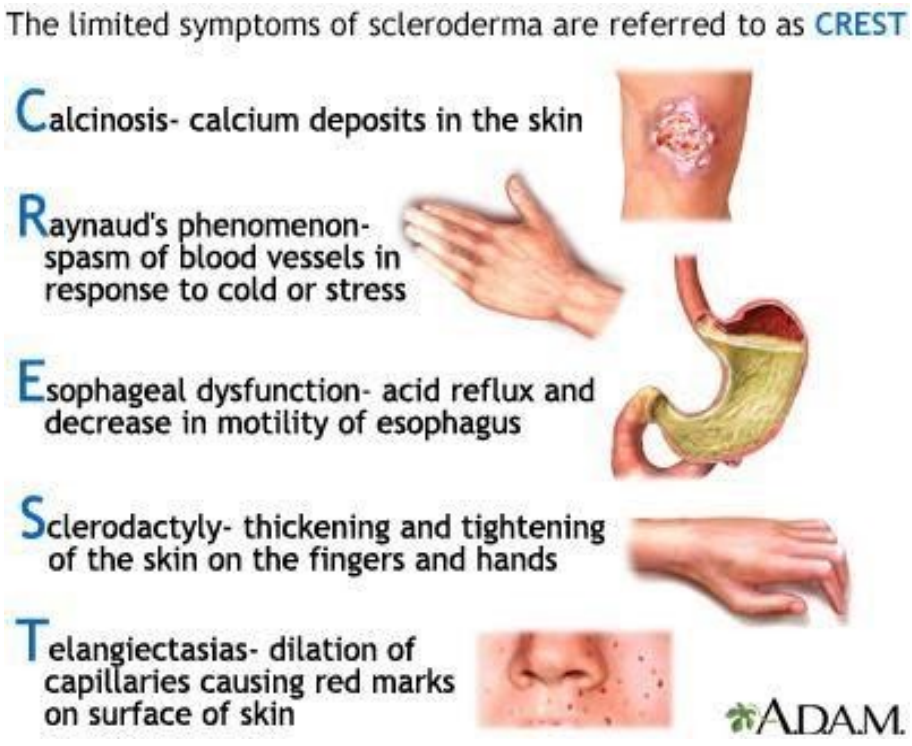


SLE	
1. General inspection	• Cushingoid appearance (due to steroid use) • Weight loss (due to chronic inflammation) • abnormal mental state - psychosis.
2. Hands	• Telangiectasia and erythema • Rash over the phalanges (photosensitivity) • Raynaud's phenomenon (may occur if the weather is cold) • arthritis
3. forearm and Arms	• Livedo reticularis • Purpura (vasculitis) • Proximal myopathy (active disease or steroids)

4. Head	• Alopecia with/without scarring • lupus hairs: short,broken hairs above the forehead. • Eyes—scleritis, red and dry (Sjögren's syndrome), pallor of conjunctiva (anemia of chronic disease) • Mouth—ulcers • Face: ○ butterfly rash: over the cheeks and bridge of the nose; sparing nasolabial folds). ○ Discoid rash: red plaques with a central area of hyperkeratosis.
5. Chest	• Cardiovascular system—Pericardial rub (pericarditis) • Respiratory system—Pleural rub (pleuritic) or signs of pleural effusion, pulmonary fibrosis, collapse or pulmonary HTN.
6. Abdomen	• Hepatosplenomegaly
7. Hips	• pain on movement due to aseptic necrosis (due to ischemia of femoral head)
8. Legs	• Feet—red soles, small-joint synovitis • livedo reticularis & Rash • Ulcers over the malleoli (due to vasculitis or anti-phospholipid syndrome) • ankle edema (nephrotic syndrome) • Proximal myopathy and Neuropathy (sensory)
9. Other	• Urine analysis (proteinuria) • Blood pressure (hypertension) • Temperature chart/fever

Scleroderma	
1. General inspection	• 'Bird-like' facies (pinched and expressionless) • cachexia/Weight-loss (due to dysphagia or malabsorption) • Hair loss
2. Hands	• calcinosis, atrophy distal tissue pulp (ischemia from Raynaud's), telangiectasia. • sclerodactyly: Fixed flexion deformity (due to thickening of skin of fingers); i.e.Hand function must be assessed. • Dilated capillary loops (nail folds) • Tendon friction rubs (palpable or audible) • Small-joint arthritis and tendon crepitus

3. Arms	• edema (early) or skin thickening and tightening • Pigmentation • Proximal myopathy (myositis) • Blood pressure (hypertension with renal involvement)
4. Head	• loss of wrinkles and skin fold. • Alopecia • Eyes—difficulty closing the eyes, loss of eyebrows, pale conjunctiva. • Mouth—puckered ('purse string mouth'), reduced opening • salt and pepper pigmentation • telangiectasia • Neck muscles—wasting and weakness
5. Chest	• Tight and thickened skin ('Roman breastplate') • Heart—signs of pulmonary hypertension, pericarditis, cor pulmonale (secondary to pulmonary fibrosis),left ventricular failure. • Lungs—signs of fibrosis, reflux pneumonitis, pleural effusion.
6. Legs	• Skin lesions, ulcers • signs of vasculitis
7. Other	• Urinalysis (proteinuria) • Temperature chart/fever (infection) • Stool examination (steatorrhoea)



Miscellaneous

★ Fever

Personal data:

- Age, Female, Residency and occupation.

HPI:

- Site: locus of infection or newly noticed mass (malignancy).
- Onset: sudden or gradual
- Character:
  - Continuous ?(fluctuation <0.5 F) Suggests CNS infection or gram positive rod
  - Dirunal (a regular rise and fall in temperature , occurring between 4 pm and midnight). Absence of diurnal variation has been associated , but doesn't establish a non infectious cause.
  - Tertian(periodicity og 48 hrs) like in malaria due to plasmodium vivax or ovale
  - quartan? (periodicity of 48 hrs) malaria due to plasmodium malariae
  - Cyclical: on and off (hodgkin)

DDX	Causes	Signs & symptoms	Risk Factor
Malignancy	lymphomas, leukemia, Renal cell carcinoma, hepatocellular carcinoma	-Low grade, constant fever. -constitutional symptoms e.g. N/V, weight loss, fatigue. -recurrent bleeding or infections, pallor, petechiae/ecchymoses (hematological malignancies) - ask about the symptoms of the common malignancies	-Familial -Occupation -Smoking -Alcohol or Diet -Radiation, chemo or sunlight. - Infections (e.g. hepatitis, H.pylori, HPV, AIDs). -toxins e.g. Aflatoxin - Drugs e.g. OCP. -Diseases e.g. IBD, Barrett esophagus.
Infection	(bacterial, viral, fungal, parasitic)	-Specific locus of infection. -Other symptoms related to the system involved. -Continuous or intermittent fever. - Headache, weakness ,profuse sweats, chills, joint pains, aches, weight loss, vomitting	-Recent surgeries/procedure or visit to hospital. -Contact with sick person. -Unpasteurized dairy products. -exposure to pets or cattle. -Consumption of camel milk. -travel to endemic countries.

			-Blood transfusion, stick needle, unprotected sex, were in prison. -Immune compromised, prolonged steroid or antibiotic use.
Inflammatory-y/ autoimmune	(SLE, Rheumatic fever, giant cell arteritis, Rheumatoid arthritis, IBD)	-Rash, Joint or bone pain, bone deformities. -Constitutional symptoms e.g. N/V, weight loss, fatigue.	-Female gender -Family hx -Autoimmune diseases
Others	(Pulmonary Embolism, drug, hyperthyroidism)	-Agitated, anxious, palpitations, heat intolerance, weight loss, exophthalmos. -Leg pain, redness,itching.	-Started a new medication. -DVT, hypercoagulable state, bedridden.

Associated symptoms:

Cardiorespiratory:

- Do you have a dry cough, nasal congestion,sinus pain,or sore throat?
  - Acute pharyngitis(viral or bacterial),sinusitis,URTI.
- Do you have productive cough or SOB?
  - Pneumonia(viral,bacterialfungal),bronchitisTB?
- Do you have any blood in your sputum?
  - Pneumonia,bronchitis,TB,PE,lung cancer
- Do you have chest pain?
  - PE,pneumonia,pericarditisbacterial endocarditis

Uinary:

- Do you have Blood with urination?
  - UTI,Pyelonephritis,renal cell carcinoma wegners granulomatosis,SLE and other vasculitis disease of the kidney.
- Do you have burning with urination?
  - UTI,pyelonephritis,renal cell carcinoma,urethritis,prostatitis.

Gastrointestinal:

- Have you ever had nausea and vomiting?
  - Gastroenteritis, cholecystitis ,cholangitis,hepatitis,pancreatitis.
- Do you have diarrhea?
  - Gastroenteritis, infectious colitis,parasitic infections,IBD
- Do you have abdominal pain?
  - Gastroentritis,cholecystitis,cholangitis,hepatitis,pancreatic CA , pancreatitis, liver mets,polyarteritis nodosa, IBD
- Have you noticed yellowing of your skin?

- Cholecystitis,hepatitis,lives abscess, malignancy and involvement of the liver

Constitutional symptoms

Neurological:

- Do you have headache?
  - Giant cell arteritis, meningitis,encephalitis,sinusitis
- Difficulty with your speech, double vision, arm or leg weakness, seizure?
  - Meningitis, encephalitis, intracerebral hemorrhage,endocarditis with CNS emboli.
- Have you been confused?
  - Meningitis,encephalitis,bacterial infection with septic shock

Others:

- Any redness of your skin.
  - Cellulitis ,phlebitis, fungal infection , drug reaction
- Have you had any stiffness or pain in you joints?
  - Septic arthritis , SLE , rheumatic fever,GCA,wegners granulamatosis,RA,polyarteritis nodosa
- Have you had jaw claudication?
  - GCA
- Do you have easy bruising or gum bleeding?
  - Leukemia, lymphoma

PMH and surgical:

- Recent procedures(dental work) bacterial endocarditis
- Started new medications? Drug fever
- Started a psychiatric medication? Neuroleptic malignant syndrome

If you were recently hospitalized ,did you have:

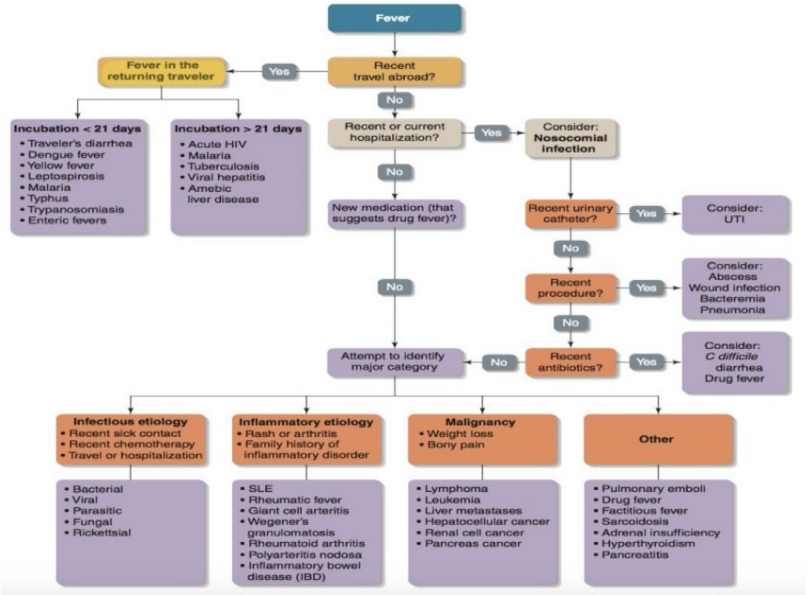
- Surgery? Abscess , wound infection, malignant hyperthermia
- Catheter (urinary or IV)
- New antibiotics? Colitis , drug fever

If you traveled abroad?

- Did traveling require you to remain immobile for extended periods of time?
  - PE,DVT
- Did you consume untreated water or milk products?
  - Brucellosis/salmonella/shegilla,hepatitis
- Did you eat raw or uncooked meat?
  - Enteric infection
- Were you exposed to mosquitos?
  - Malaria/dengue fever
- Were you exposed to tics?
  - Lyme disease

- Have you recently had unprotected sexual intercourse or used intravenous drugs?
  - Acute HIV, hepatitis B/C, syphilis , gonorreah,endocarditis.
- Have you ever lived in a homeless shelter or a prison?
  - TB
- Have you had recent exertion in the heat?
  - Heat stroke
- Have you ever had heart valve surgery?
  - endocarditis

Differential Diagnosis:



Investigation:

- CBC with differentials
  - High neutrophils suggests bacterial infection
  - High lymphocytes suggests viral infection or brucellosis
- Inflammatory markers:ESR,CRP,ferritin
  - High levels indicate inflammation/infection
- Urea and cr.: high in sepsis
- Liver function test
- CXR:Tb/pneumonia/malignancy/pleural effusion
- Blood, sputum, stool culture

Management:

- Up to 38.9: rest and drink plenty of fluids . medications isn't needed.
- More than 38.9 : acetaminophen (Tylenol/others), Ibuprofen(Advil, Motrin IB, others) or Asprin.
- Treat the cause of fever