

CSFP SURGICAL PEs SENIORS' WORKSHOP

BOOKLET ACCOMPANIMENT



SUGGESTED ANSWERS

(Updated 11 March 2017)

OVERVIEW & CONTENTS

This is a set of suggested answers to the introductory workshop on the clinical examination of common surgical complaints, for the Phase II Clinical Skills Foundation Programme (CSFP).

- Aims:**
1. To provide an overview of basic physical examination skills, for students who are encountering clinical skills for the first time.
 2. To briefly introduce the rationale & thought process behind each step of the physical examination.
 3. To practise clinical professionalism and communication skills.

Contents: Please refer to the workbook during the 3 sessions. The YLLSoM CEX templates have also been included for your reference.

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This suggested answer booklet was prepared with reference to Browse's Introduction to the Signs and Symptoms of Surgical Disease, YLLSoM MedBear Surgery Notes, and Nigel Fong's Approaches to Symptoms of Disease.

Suggested answers were first compiled by Wilbert Ho, Edwin Loh & Yii Zheng Wei (Class of 2017) in AY15/16.

To upper Ms peer-reviewing this booklet: Please contact Wilbert at wilhohh@gmail.com for suggestions, if you wish to review other sections, or if you know someone else interested in peer-reviewing. The team strongly welcomes peer-reviews as it will help to improve the programme 😊

*To the current M2s of AY15/16: this suggested answer booklet **has not been peer-reviewed** as of yet. We are in the midst of seeking upper Ms to peer review this booklet for use in AY16/17, hence the answers in this booklet may still fall short of perfect during your CSFP period. Please don't hesitate to contact us if you notice anything wrong 😊*

LUMPS & BUMPS

DOCTOR, I THINK I HAVE A LUMP!

Part 1 of 3: Generic lump exam

Lumps & Bumps are relatively common complaints that are relevant in both Surgery and Medicine. When you adopt a proper framework to describe every mass, you will be surprised at the amount of things that you can say! Your description should be good enough for a doctor to come up with differential diagnoses without seeing the patient. With experience, you may even be able to give an on-the-spot diagnosis.

Part 1 of 3: Generic lump exam

There are many descriptors used to characterize a lump. They can be summarized in the mnemonic **SECTOR**:

S	Size, Shape, Site, Surface
E	Edge, Expansibility/Pulsatility
C	Colour, Contour, Consistency, Compressibility
T	Temperature, Tenderness, Transillumination
O	-
R	Reducibility

Learn the basic technique in the examination of any lump, and the language you will use to communicate your findings. This is a skill you will fall back on for any lump anywhere in the body.

1. Look	How to describe?	Significance?
a) Site	<p>Be as precise as possible in describing the exact location of the lump.</p> <p>If someone who has never seen the patient before were to hear your description, he should be able to picture exactly where the lump is.</p>	<p>Sebaceous (epidermoid) cysts can appear just about anywhere.</p> <p>Lipomas can appear just about anywhere, but usually on the trunk and upper limbs.</p> <p>Abscesses may occur on the breast, anorectal region, back of the neck and buttocks, but any other region is possible.</p> <p>Congenital dermoid cysts tend to occur on the face, eyebrows and midline trunk, areas where the skin dermatomes fuse. Inclusion dermoid cysts are caused by traumatic implantation of skin into deeper layers of tissue, and so tend to occur where there has been previous trauma.</p> <p>Ganglion cysts form most commonly over the dorsal wrist, and second most commonly over the volar wrist. They may also occur in the fingers, and much less commonly in other joints.</p>
b) Size	<p>A three-dimensional measurement is best, but a two-dimensional measurement is usually sufficient.</p>	<p>Size may be an indicator of severity, or may be causing cosmetic issues for the patient. A description of size is also helpful for the listener to developing a mental picture of the lump.</p>
c) Shape	<p>Usually round, oval or irregularly shaped.</p>	<p>Most benign lumps are encapsulated and so appear round/oval. An irregularly shaped lump should prompt you to think of more sinister differentials.</p>
d) Skin Surface (+ colour, discharge)	<p>Is the overlying skin intact? Or are there other features like a punctum, erythema, discharge or ulceration?</p>	<p>Most common benign lumps and bumps don't cause significant changes to the skin surface above them. Sebaceous cysts tend to (but not always) have a central punctum.</p> <p>An erythematous or discharging lump should prompt you to consider an abscess as the diagnosis.</p> <p>Ulcerating lumps and everted edges are suspicious for a malignancy.</p>

2. Feel	How to describe?	Significance?
a) Lump Surface & Margin	<p>Comment on how distinct the margins of the lump feel, and whether it is well circumscribed/encapsulated or not.</p> <p>Feel for whether the lump is loculated or not.</p>	<p>An encapsulated, unilocular lump is more likely to be benign.</p>
b) Consistency	<p>A lump may be soft, firm or hard in consistency.</p>	<p>Sebaceous (epidermoid) cysts, dermoid cysts and ganglion cysts are usually firm.</p> <p>Lipomas are usually soft, which may make it difficult to clearly palpate their edges.</p> <p>Abscesses are usually soft, but may be tense and so feel firm when palpated.</p>
c) Tenderness, Temperature	<p>Press GENTLY while observing the patient's face to elicit tenderness.</p> <p>Warmth is best felt with the back of the fingers, and should be compared with surrounding skin.</p>	<p>Abscesses tend to be both warm and tender.</p> <p>Pain may also be related to underlying nerve involvement. In that case, the pain is usually lancinating, and may radiate along the nerve distribution.</p>
d) Fixation / Mobility	<p>Try to move the lump in relation to the structures overlying and underlying it.</p> <p>If you can move the skin independently over the lump, it is unlikely to be within the epidermis or tethered to it</p> <p>Next, try and move the lump in all directions. Lumps attached to underlying muscles or nerves will only be moveable in a direction perpendicular to the structure.</p> <p>Lastly, ask the patient to tense the muscles around the lump. A lump superficial to the muscle becomes more prominent, while one deep to it becomes less so. Tensing the muscle also restricts movement of a lump that is fixed to it.</p>	<p>Sebaceous (epidermoid) cysts are found in the epidermis, and so cannot be moved independently of the skin.</p> <p>Lipomas are tumors of superficial subcutaneous fat. The skin over them is thus mobile.</p> <p>Abscesses may occur at varying depths, so fixity and mobility are useful in suggesting how deep the abscess may be.</p> <p>Dermoid cysts are deeper in the dermis. The skin over them is thus mobile.</p> <p>Ganglion cysts are deep to the epidermis but often fixed to underlying structures. They are thus relatively immobile.</p> <p>Fixity and immobility may also (in the right clinical context) suggest a malignancy</p>

3. Eliciting special characteristics	How to describe?	Significance?
a) Fluctuance	Yes or No	A fluctuant mass contains fluid. This can be anything from a cyst to an abscess , but do note that a tense fluid-filled mass may not feel fluctuant
b) Trans-illumination	Yes or No	A transilluminable mass usually consists of clear fluid . This is usually a simple cyst or a ganglion cyst .
c) Expansibility, Bruit	Yes or No	An expansile impulse is usually best felt on an abdominal aortic aneurysm . Bruits may indicate that a mass is hypervascular , or may indicate that the mass is vascular in origin.
d) Pulsatility	Yes or No Distinguish this from expansile impulse. An expansile mass pushes the fingers apart . A pulsatile mass merely makes the fingers bob up and down.	Pulsatility indicates that the mass sits above an arterial vasculature.
e) Other special signs	A slip sign is suggestive of a lipoma . Some lipomas will “slip” away when you attempt to press them with 1 finger Ganglion cysts can usually be compressed away, but they will refill if given enough time.	Special signs help to narrow down differential diagnoses and help you to make a more confident diagnosis.
f) Regional tissues (e.g. lymph nodes)	Invasion into surrounding structures or regional lymph node enlargement should be reported	Painless, hard and fixed lymph nodes are suspicious for metastatic malignancy.

Question: What are the 3 commonest skin lumps and their characteristics?

Refer to the above descriptions in the tables for:

- Sebaceous cysts
- Lipomas
- Abscesses

Part 2 of 3: Breast lump exam

Everything you have learnt thus far applies, plus some special considerations. The largest fear of a patient who presents with a breast lump is **cancer**.

Your #1 job in the evaluation of a breast lump, therefore, is to rule this out.

Q1. In a patient with breast cancer, what might you find in a breast exam?

- **Look for** nipple changes (e.g. retraction, deviation, eczema) & skin changes (e.g. peau d'orange, inflammatory changes), on top of the above generic 'malignant lump' features.
- **Feel for** the above 'malignant lump' features.
- **Elicit special characteristic of** nipple discharge.
- **Also look for regional changes of** lymphadenopathy in the axilla and cervical lymph node groups.

Q2. How would you demonstrate professionalism when doing a breast exam?

Seek consent confidently; awkwardness on your part makes it harder for the patient too. Practise the exam so that it becomes routine for you, and you can do it smoothly. This helps patients to trust you and makes them feel more at ease.

Also for males, **seek a chaperone**.

Q3. Hence, consider the significance behind each step of the breast exam:

✓ You will need: Ruler, (Chaperone)	
Step	Significance/Practical Tips
WIPE (Wash, Introduce, Position - 90° first, Expose)	
Look for scars/tethering of skin/asymmetry/nipple changes/skin changes and any visible mass as patient is sitting up	 Recall: What signs of breast cancer should you look for?
Inspect bilateral breasts and axilla from the end of the bed, asking the patient to lift her hands and also to push down on hips	These manoeuvres accentuate areas of dimpling, tethering or fixation
Position patient at 45° and put her hand behind her head	This makes palpation of the lateral aspect of the breast easier Examine the normal side first, cover up the other side meanwhile
Examine breast in circular motion, starting from nipple and moving outward, fully examining all 4 quadrants	
Comment fully on any lumps felt (shape, size, surface, site, consistency, mobility, signs of inflammation, etc.)	There are a few ways you can describe the lump, based on <ul style="list-style-type: none"> • Quadrant of the breast • Clock face • Distance from the nipple
Assess for any nipple discharge, which duct it came from and the character of the discharge	As this is a sensitive area, ask the patient to express the discharge herself.
Support patient's elbow on examiner's ipsilateral hand to start examining the axillary tail and axillary content	
Comment on any lymph nodes or abnormalities palpable in the axilla	Palpable draining lymph nodes: spread from a malignant breast lump.
Feel the contralateral breast and axilla	

Feel the supraclavicular fossa for lymphadenopathy	
Offer to examine the lungs and abdomen	Looking for metastases <ul style="list-style-type: none"> • Lungs – pleural effusion • Abdomen – hepatomegaly
Thank patient, cover up and wash your hands	

Q4. Fill in the blanks – what are some other important differentials for a breast lump?

Differential	Patient profile	Physical exam characteristics
Fibroadenoma	Young, complaining of a lump that varies in size with the menstrual cycle.	Encapsulated, hard, mobile “breast mouse”.
Fibrocystic change	Perimenopausal, though can happen at younger ages. Breast pain worsens mid-cycle.	Diffuse, tender nodular swellings. A “lumpy breast” as opposed to a mass in and of itself.
Breast abscess	Breastfeeding lady.	Red, warm, tender, sometimes with purulent breast discharge. May be fluctuant.

Q5. What are the key points of history to take for a patient with a breast lump?

<p>Biodata</p> <ul style="list-style-type: none"> - Patient's age - Menstrual status 	<p>Spectrum of Concerns</p> <p>History of recent circumstances (breastfeeding, galactorrhea, trauma etc.)</p>	<p>History of Presenting Complaint</p> <ul style="list-style-type: none"> - Time course - How it was noticed - Changes with the menstrual cycle - Pain - Discharge - Other lumps elsewhere
<p>Drug History</p> <ul style="list-style-type: none"> - Hormonal replacement - Contraceptives 	<p>Past Medical History</p> <p>Past medical, surgical hx</p> <ul style="list-style-type: none"> - Personal history of breast cancer - Previous mastectomy on the other side <p>Obstetric hx</p> <ul style="list-style-type: none"> - Number of children - Age of first child - Breastfed children for how long 	<p>Family History</p> <ul style="list-style-type: none"> - Family history of breast cancer
<p>Social History</p>	<p>Systemic Review</p> <ul style="list-style-type: none"> - Constitutional symptoms (fever, loss of weight, loss of appetite) 	<p>Concerns and Expectations</p>

Part 3 of 3: Neck lump exam

Q1. How would you classify a neck lump? Therefore, what are the differentials?

Neck lumps can be classified according to their anatomic location in the neck. Recall that the neck is divided into the **anterior triangle** and the **posterior triangle**. The structures in each triangle enable us to formulate differential diagnoses.

The following are a limited number of structures, from which lumps can arise. You will learn a more complete list of differentials in M3.

Midline:

1. Lymph node
2. Thyroid isthmus
3. Thyroglossal cyst
4. Generic skin lump (e.g. sebaceous cyst, lipoma)

Anterior triangle:

1. Lymph node
2. Thyroid
3. Salivary gland
4. Carotid artery
5. Branchial cleft remnants
6. Generic skin lump (e.g. sebaceous cyst, lipoma)

Posterior triangle:

1. Lymph node
2. Cystic hygroma
3. Cervical rib
4. Brachial plexus
5. Generic skin lump (e.g. sebaceous cyst, lipoma)

Q2. What are some potential causes of cervical lymphadenopathy?

Tender lymphadenopathy is usually the result of an ongoing **infection**. Look out for upper respiratory tract infection features such as tonsillitis (bacterial and infectious mononucleosis).

Non-tender lymphadenopathy may still be infectious in origin. However, other sources must be considered. **Infections** are still possible, e.g. TB lymph nodes. **Malignancies** of the head and neck must also be considered; look for a thyroid lump, any visible lesions in the mouth, nasopharyngeal carcinoma (which requires a scope), esophagus and larynx. Breast and lung cancer can also involve neck nodes!

Rare causes include **inflammatory** lymphadenopathies such as sarcoidosis and Kikuchi disease, but these should only come up very late in your differential list.

Among the various neck lumps, the thyroid lump deserves special mention. This organ is of interest to both physicians and surgeons, as thyroid disease may require medical or surgical treatment or both. A thyroid is a functional organ – therefore, in addition to examining as for a lump, you need to elicit thyroid status.

Q3. The thyroid exam can be seen as two distinct but equally important parts – thyroid STRUCTURE and FUNCTION. Hence, make sense of and attempt the thyroid exam:

✓ You will need: Ruler, Stethoscope, (Tendon tapper)	
Step	Significance
WIPE (Wash, Introduce, Position – seated comfortably, Expose)	
General appearance of patient (gender, age, body build, voice quality). Look for clues suggestive of the level of thyroid function.	 Recall: Hyperthyroidism: thin, sweaty, anxious +/- thyroid eye disease Hypothyroidism: obese, lethargic
Inspection from front: location of nodule, previous scars	 Recall: The lump's location is an important clue for DDx
Demonstration of movement of nodule with swallowing	The thyroid gland is invested in a sheath derived from the pretracheal fascia - this holds the thyroid onto the larynx and the trachea. Both the thyroid and thyroglossal cyst will ascend with swallowing.
Check for movement of nodule on protrusion of tongue in two steps <ul style="list-style-type: none"> • Ask the patient to open his mouth • Then stick out his tongue 	Only thyroglossal cysts will ascend with tongue protrusion.
Palpation of nodule: consistency, mobility, tenderness	 Part 1 of 3: How to describe lumps
Palpation for cervical lymph nodes	Cervical lymphadenopathy increases the suspicion of a malignant nodule
Assess thyroid eye signs: exophthalmos, lid retraction, lid lag, chemosis, ophthalmoplegia	These are seen in Grave's disease.
Auscultate for thyroid bruit	This is rare but often considered to be pathognomonic of Graves' disease
Percussion to assess for retrosternal extension of the goiter	

Assessment of mass effect: tracheal deviation, Pemberton's sign	Pemberton's sign – raising the arms narrows the thoracic inlet, compressing the SVC. Patients develop facial congestion and cyanosis.
Assess for thyroid status: tremors and heart rate	
Assess for features of Grave's disease: acropachy, pretibial myxedema	Thyroid acropachy looks like clubbing. No one knows what causes it. Pretibial myxedema appears as firm, orange/brown/skin-coloured nodules and plaques on the shins due to mucopolysaccharide deposition.
Request to assess reflexes, perform TFT	Hypothyroidism: delayed relaxation phase Hyperthyroidism: brisk reflexes
Thank patient, cover up and wash your hands	

Q3. What are some differentials for your findings on the thyroid exam?

Exam Finding	Differentials
No goiter	Hypothyroid: central, radioiodine, carbimazole/PTU, thyroid surgery, lithium Euthyroid: normal Hyperthyroid: exogenous, thyroxine, Grave's disease, drug induced e.g. amiodarone
Diffuse goiter	Hypothyroid: Hashimoto's, Thyroiditis, Carbimazole/PTU Euthyroid: Endemic goiter, cold MNG which feels diffuse Hyperthyroid: Grave's disease, thyroiditis e.g. Hashitoxicosis
Multinodular goiter	Euthyroid: cold MNG Hyperthyroid: toxic MNG
Solitary nodule	Euthyroid thyroid cyst, dominant nodule of a MNG, thyroid adenoma, thyroid carcinoma Hyperthyroid: toxic nodule



ABDOMEN & HERNIA

DOCTOR, MY TUMMY DOESN'T FEEL RIGHT!

The abdominal examination is not always easy because findings can be subtle and easily missed, and differentials are broad. Abdominal pain, for instance, may well be an acute abdomen requiring emergent surgery, a gynaecological surprise, or a medical cause arising from anywhere but the abdomen. Therefore, the abdominal examination is a key skill in both medicine and surgery. The emphasis varies slightly but the general principle and approach is essentially similar. Master the basics and build up your knowledge arsenal throughout M3, and you'll be set! 😊

Part 1 of 2: Abdominal exam

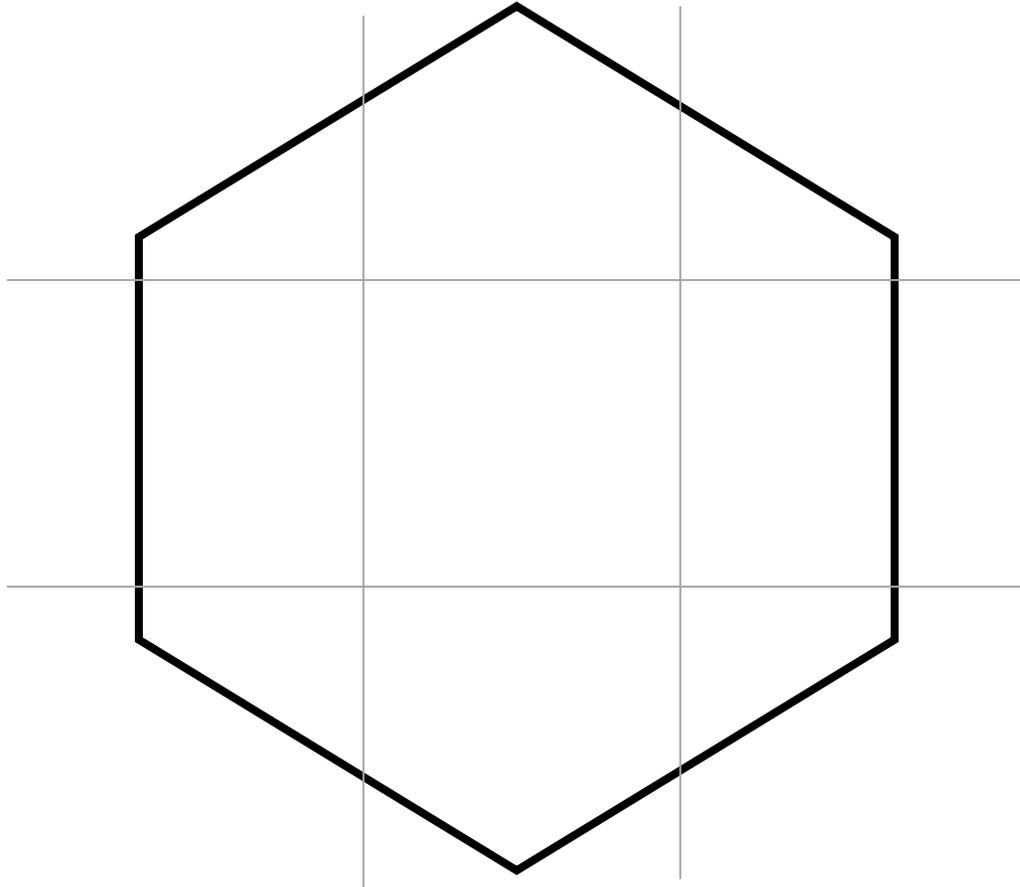
Q1. What is the general flow of the abdominal examination?

**Note* these principles can be generalized to other physical examinations too!*

I	Inspect
P	Palpate
P	Percuss
A	Auscultate

Q2. On examination of the abdomen, I have found a mass!

- a) What are the 9 areas of the abdomen and their anatomical landmarks? Fill in below.
- b) What could masses in each of the 9 areas be? Fill in below.



Q2. How is the abdominal examination performed?

✓ You will need: Stethoscope, Ruler, Pen torch	
Step	Significance/Practical Tips
WIPE (Wash, introduce, position - supine, expose – nipple to mid-thigh)	
General inspection: Squat to patient’s level to inspect the abdomen. Ask patient to take slow deep breaths.	Slow deep breaths help to accentuate masses, if present.
Look for surgical scars.	 Appendix 1: Common surgical scars
Look for swelling at hernia orifices. Ask patient to cough.	
Ask for any pain. Squat to patient’s level.	Patients may not tell you they are in pain. Having your arm parallel to the patient’s abdomen allows you to exert even pressure.
Superficial palpation - 9 areas. Remember to look at the patient’s face for any grimacing.	Look for tenderness.  Q5: Tenderness
Deep palpation – 4 quadrants.	Look for masses. Remember to characterize each mass.
Palpate the liver. Percuss for the lower border and the upper border. Use a ruler to measure liver span.	It is important to measure the accurate liver span in the case of liver ptosis (e.g. COPD).
Palpate the spleen. Attempt to splint the spleen. Percuss the lower border and measure the lower edge of the spleen to the costal margin.	 Recall: The spleen enlarges infero-medially.
Ballot kidneys.	
Percuss for ascites. Attempt to elicit shifting dullness and fluid thrill if appropriate.	Fluid settles to the dependent position. Remember to wait for the fluid to settle!
Auscultate:	Different bowel sounds can indicate different pathologies (e.g. tinkling

(1) RIF for bowel sounds (2) 1cm above and 1cm lateral to umbilicus for renal artery (3) Over the liver (venous hum, arterial bruit, friction rub) (4) Over the spleen (splenic rub)	bowel sounds and their association with obstruction!) A renal bruit indicates turbulent flow as in renal artery stenosis. A liver bruit suggests a hyperdynamic flow, such as that found in HCC.
Examine the hands front and back.	Things to look out for in the hands: Clubbing, leukonychia, palmar erythema – signs associated with chronic liver disease! Also glance at the arms for scratch marks and bruising (Bile salt deposition in skin causes itch and chronic liver disease results in reduced clotting factors).
Ask the patient to lift his hands up and extend at the wrist.	In hepatic encephalopathy , the motor centres in the brain which are involved in maintaining posture are affected. This causes asterixis , jerking movements of the outstretched hands when the patient tries to hold a fixed position.
Examine the patient's eyes.	Look for scleral icterus and conjunctival pallor.
Examine for parotidomegaly.	Enlarged in inflammation in chronic alcoholism, mumps.
Examine oral cavity.	The mucous membranes can tell you about the patient's hydration status. If there is oral thrush, the patient might be immunocompromised or use oral steroids. Oral ulcers may indicate Crohn's or Celiac disease.
Examine cervical lymph nodes (look for Virchow's node).	One of the first visible spots where GI malignancies metastasize is the left supraclavicular lymph node.
Examine chest and back for: Spider naevi (at least 5); Loss of axillary hair; Gynaecomastia; Caput medusa.	 Spider naevi, loss of axillary hair, gynaecomastia all arise due to hyperestrinism.
Examine for pedal oedema	Decreased albumin production and hence oncotic pressure
Offer hernia examination and digital rectal examination. Request for urine dipstick, temperature chart.	DRE: haemorrhoids, melena, fecal impaction Urine dipstick: albuminuria; hematuria; Temperature chart: pyrexia.

Thank patient, cover up and wash your hands.	
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Q3. Many organs in the abdomen can be enlarged and detected on physical examination.

	How do I know if a mass is this organ?	Causes of enlargement
Liver	<ul style="list-style-type: none"> - Cannot get above organ - Moves with respiration (inferiorly) - Not ballotable - Dullness to percussion 	<ul style="list-style-type: none"> - Congestion (e.g. CHF) - Infections (e.g. HBV) - Neoplastic (e.g. HCC) - Autoimmune (e.g. PBC) - Infiltrative (e.g. sarcoid) - Metabolic (e.g. alcohol) <p>etc.</p>
Spleen	<ul style="list-style-type: none"> - Splenic notch present - Cannot get above organ - Moves with respiration (towards RIF) - Not ballotable - Dullness to percussion 	<ul style="list-style-type: none"> - Congestion (eg. portal HTN) - Infection (e.g. mono) - Neoplastic (e.g. leukemia, myeloproliferative neoplasm) - Infiltrative (e.g. lysosomal storage disease) - Work hypertrophy (e.g. thalassemia) <p>etc.</p>
Kidney	<ul style="list-style-type: none"> - Moves with respiration (inferiorly) - Can get above organ - Ballotable - Resonant to percussion, due to overlying bowel 	<p>Unilateral:</p> <ul style="list-style-type: none"> - Cancer - Renal vein thrombosis - Cyst - Hydronephrosis - Hypertrophy <p>Bilateral:</p> <ul style="list-style-type: none"> - ADPKD - Acromegaly - Angiomyolipomata <p>etc.</p>
Pelvic organ	<ul style="list-style-type: none"> - Cannot get under organ - If gynecologic organ: will be bimanually palpable on pelvic exam 	<ul style="list-style-type: none"> - Bladder (e.g. ARU) - Uterus (e.g. fibroids) - Uterine adnexa (e.g. ovarian cyst) <p>etc.</p>

**Q4. The patient complains of abdominal pain. What are some classical pain patterns? Do you know of any special signs associated with the condition?
(Not limited to the abdomen!)**

Condition	Pain Pattern (SOCRATES is a good framework if you're stuck)
Acute Appendicitis (early, late)	Central abdominal pain, later localises to right iliac fossa (McBurney's point)
Cholecystitis	Right hypochondriac pain, radiates to tip of right scapula
Pancreatitis	Epigastric pain which radiates to the back
Urolithiasis	Loin to groin pain
Acute Myocardial Infarction	Epigastric pain

**Q5. What is the difference between:
Pain and tenderness?**

Pain is a symptom (i.e. the patient complains of pain on the history). **Tenderness** is a sign (i.e. you elicit tenderness on physical exam by pressing)

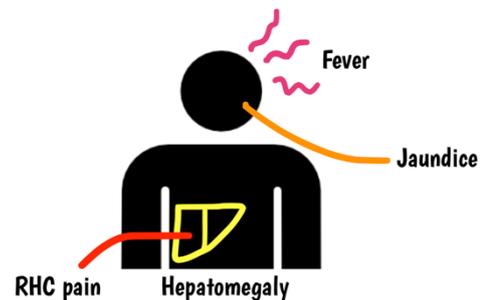
Rebound tenderness and guarding?

Abdominal guarding. Tensing of the abdominal wall muscles, for the same reason as the above rigidity.

Rebound tenderness. Increased pain upon removal of pressure rather than application of pressure to the abdomen, since sudden removal of pressure stretches the parietal peritoneum.

Q6. In a given disease, characteristic groups of symptoms often occur together. This is known as a symptom complex. What condition does each of these patients likely have?

(a) Mr Hum is 40-year-old Chinese male. He comes into your GP clinic with abdominal pain, fever, malaise and vomiting of six days. Today he notices that his eyes were yellow and his urine is darker in colour. He loves raw oysters and recently travelled to Indonesia for an oyster buffet. He has no history of gallstone disease.



On examination, he had a diffusely enlarged liver with a firm, sharp, smooth edge. RHC was tender to palpation.

What does he have?

Acute Hepatitis

(b) Mr Bier is a 57-year-old Caucasian male. In the last few months, he has been noticing that his trousers and shoes don't seem to fit as well as before. His belly and feet are swelling up. He feels itchy all over even though he doesn't have a rash. His wife complains that he has been getting more and more agitated these days, and tells her that he is being visited by "little people like in Gulliver's Travels" but she doesn't see them.

When you examine him, you find bruises and scratch marks all over his arms. He smells of alcohol and there is gynecomastia.

What does he have?

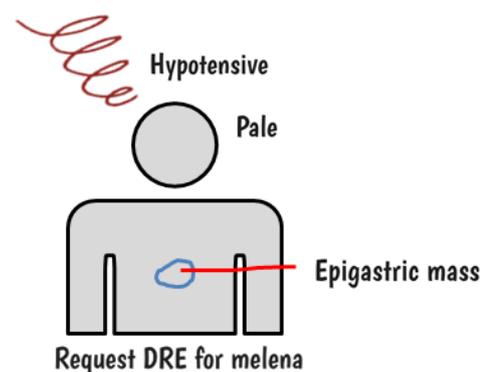


- Look for:**
- Jaundice
 - Hands: Clubbing, asterixis, palmar erythema
 - Arms: Loss of axillary hair, scratch marks, easy bruising
 - Body: Spider naevi, gynecomastia, caput medusae

- Check for:**
- Hepatosplenomegaly
 - Ascites

Alcoholic cirrhosis

(c) Ms Fe is a 69 year-old Chinese female. Her son has brought her into your clinic because she has been experiencing increasing dizziness over the last 3 months and nearly fainted yesterday. These days, she feels very breathless and can feel her heart beating very fast. She can barely leave the house. She unintentionally lost 10kg in the last 4 months (50kg→40kg) and has lost her appetite. She reports passing "black, sticky stools".



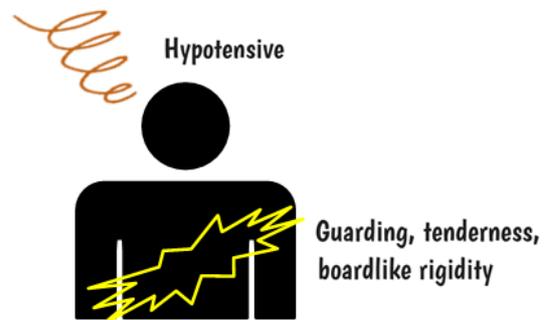
On examination, she is tachycardic, pale and cachexic. You note conjunctival pallor. There is a palpable mass in

the epigastrium.

What could she have in this scenario?

Gastric cancer

(d) Mr Lim is a 54 year-old male who presents to the Emergency Department with severe abdominal pain and vomiting. He says it began 2 days ago but has been getting progressively worse, now 10/10 in severity. He has not passed motion or flatus for the past 2 days. The journey to the hospital was especially painful. He does not have any significant past medical history except for an episode of appendicitis 20 years ago.



On examination, he is febrile, lying still in bed and there is "board-like" rigidity and distension of his abdomen. He is not jaundiced or cachexic, but you notice a well-healed appendicectomy scar. His abdomen is tender to light palpation throughout, with rebound tenderness and guarding also present. Upon auscultation, you do not hear any bowel sounds.

What could he have in this scenario?

Intestinal obstruction (perforated) with peritonitis

Part 2 of 2: Groin lump exam

The fundamentals of “Look, Feel, Elicit special characteristics” which we learnt in [Chapter 1: Lumps & Bumps](#) can also be applied to groin lumps. However, the examination has to be modified to reflect our understanding of the anatomy and pathophysiology of hernias.

Q1. Define ‘hernia’.

A hernia is defined as the abnormal protrusion of a viscus through a defect in the wall of its containing cavity.

There are multiple places where hernias can occur; you will be more familiar with them in M3. Some common places to know (at this point) are at surgical sites and over the umbilicus. Hernias can be checked for at these places with a cough impulse.

Q2. How do I differentiate the common hernias?

Differential	Characteristics	Significance
1. Direct inguinal hernia	Superior and medial to pubic tubercle. Will be reducible and have expansile cough impulse unless complicated. Cannot be controlled by pressure over deep inguinal ring.	Neck lies medial to inferior epigastric artery, within Hesselbach’s triangle. More common in elderly men.
2. Indirect inguinal hernia	Superior and medial to pubic tubercle. Will be reducible and have expansile cough impulse unless complicated. Can be controlled by pressure over deep inguinal ring.	Neck lies lateral to inferior epigastric artery, outside of Hesselbach’s triangle. More common in young adults due to congenital etiology of patent processus vaginalis.
3. Femoral hernia	Inferior and lateral to pubic tubercle. Typically irreducible, and has no expansile cough impulse.	Neck lies at femoral ring which is small, therefore high risk of strangulation. Usually operated on quickly to prevent complications.

Q3. The following are some patients who apparently present with inguinal hernias. What are your thoughts? How does knowledge of these situations inform your physical exam of an inguinal lump?

Scenario	Thoughts	Lessons learnt
1. This man's longstanding hernia can't "go back in" anymore, and it is getting a little uncomfortable	Could this hernia be incarcerated?	An attempt to reduce the hernia should always be made on physical exam.
2. The patient in (2) comes to A&E. He screams in pain when you try to palpate his hernia.	Could this hernia be strangulated?	Ask for pain first before palpating. Might need urgent surgical treatment.
3. This man with a longstanding hernia presents with abdominal pain, abdominal distension, nausea & constipation	Could this hernia be causing intestinal obstruction?	Consider intestinal obstruction as a complication. Check for bowel sounds on physical exam.

When examining a groin lump that turns out to be an inguinal hernia, consider:

1. Is this a hernia?
2. Is this an inguinal or femoral hernia?
3. Is it a direct or indirect hernia?
4. Have I ruled out a scrotal mass?
5. Are there any complications?
6. Why is this patient getting hernias?

Sometimes, the steps you're performing may not be apparent to the examiner. You can give a running commentary as you go along.

✓ You will need: Stethoscope, Ruler/Measuring Tape

Step	Significance
WIPE (Wash, Introduce, Position - stand, Expose – abdo to mid-thigh).	
General inspection: Look for swelling at both sides of the groin and surgical scars (recurrent hernia).	
Ask patient to cough to demonstrate expansile cough impulse.	This helps you detect hernias that are not apparent.
Define the anatomy by palpating the pubic tubercle and anterior superior iliac spine; inguinal ligament runs between the two.	 Recall: This is different from the mid inguinal point which is between the ASIS and pubic SYMPHYSIS.
Check whether the hernia is above or below this line.	 Q2: Distinguishing the different types of hernias.
Describe the hernia: site, size, shape, surface, edges, whether you can get above it.	You can get above most other scrotal lumps but not hernias.
Describe the hernia: consistency, fluctuance, pulsatility, overlying skin	 Lumps and bumps: Section 1 of 3
Examine the scrotum: whether the hernia descends into the scrotum or examine for incidental scrotal lumps.	Hernias that descend into the scrotum are most likely indirect hernias.
Lay the patient supine then ask him to reduce the hernia.	The patient knows his hernia best – if he is unable to reduce the hernia, you should try to reduce it.
Palpate and press over the deep inguinal ring (1cm above midpoint of inguinal ligament). Then, ask patient to stand up/cough.	If the hernia cannot be controlled by pressure over the deep inguinal ring, it is direct.
Offer to <ol style="list-style-type: none"> 1) Auscultate for bowel sounds 2) Respiratory, Abdominal and Digital Rectal Examination 	 Q3: If they are absent, suspect an incarcerated hernia. These examinations help you to determine the cause of the hernia – usually secondary to raised intra-abdominal pressure <ul style="list-style-type: none"> • Respiratory – COPD

- | | |
|--|--|
| | <ul style="list-style-type: none">• Abdomen – Intra-abdominal masses, ascites• DRE – BPH (straining on passing urine) |
|--|--|

SESSION 3: PERIPHERAL VASCULAR

DOCTOR, THERE'S AN ULCER ON MY LEG!

Part 1 of 3: Arterial system exam

- Objectives:**
1. Examine the arterial system in a systematic manner with good examination technique, especially the pulses.
 2. Examine the arterial system in a thoughtful manner to make a broad diagnostic classification of acute vs. chronic limb ischemia, and use the physical examination to elicit etiologies.

Peripheral vascular disease may be unfamiliar to you at this point, but the concept is not any different from what you know!

Q1. Let us go back to General Pathology. What can cause arterial supply to an organ to be blocked?

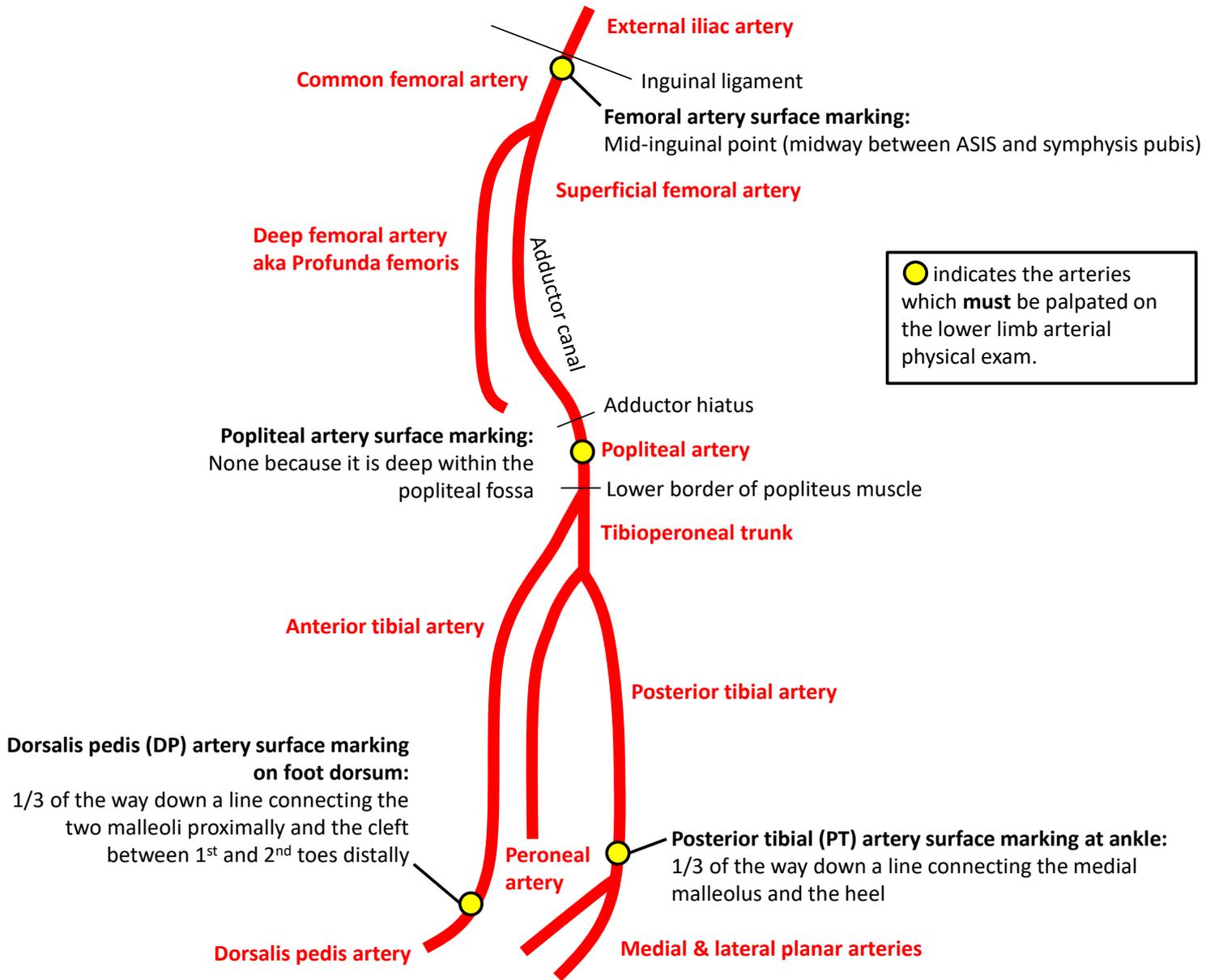
In the chronic setting, **atherosclerosis** is the most common culprit, with its associated modifiable risk factors of DM, HTN, HLD and smoking.

In an acute setting, the most common causes are embolism and thrombosis. **Emboli** are commonly derived from the heart. These include thrombotic emboli (atrial fibrillation, mural thrombi post-MI, valve disease) and septic emboli (endocarditis). Non-cardiac sources include peripheral vessel atherosclerotic emboli. **Thrombosis** is usually superimposed on pre-existing atherosclerotic plaques that rupture.

Q2. Let us look at a familiar organ, the heart. What happens in each case?

	Heart	Lower limb
Acute ischemia	Acute myocardial infarction classically results from plaque rupture with thrombus formation, acutely occluding the lumen of coronary vessels.	Acute limb ischemia most commonly results from embolisation , and less commonly thrombosis of a pre-existing ruptured plaque.
Chronic ischemia	Stable angina results from chronic stenosis of coronary arteries from atherosclerotic plaques , which causes supply-demand mismatch. Rupture can induce acute ischemia.	Chronic limb ischemia results from atherosclerotic plaque formation in peripheral arteries, again resulting in supply-demand mismatch. Rupture can induce acute ischemia.

Q3. Draw and label the arterial supply of the lower limb. Label the major limb pulses and their anatomical landmarks



Q4. What are the signs & symptoms of insufficient blood supply to a limb?

Symptoms include pain (initially only when walking, i.e. intermittent claudication, which progresses to rest pain), paresthesia and paralysis. **Signs on inspection** include limb pallor, skin changes (shiny, smooth, dry hairless skin), venous guttering and ulceration & gangrene. **Signs on palpation** include decreased temperature, diminished limb pulses, prolonged capillary refill and positive Buerger's test.

A commonly used mnemonic for the features of acute limb ischemia are the **6 P's** (3 symptoms of pain, paresthesia, paralysis and 3 signs of pallor, perishingly cold, pulseless).

The goals of the arterial examination are:

1. Describe features and complications: skin changes, ulcer, gangrene
2. Estimate perfusion and arterial flow in the limb
3. Demonstrate insufficiency: Buerger's test.
4. Examine for any other arterial pathology especially in the abdomen.

Q5. Make sense of and attempt the arterial examination:

This is an abbreviated version of the arterial examination that is commonly used in clinical practice. Often, you will be asked to assess the vascular status of the lower limbs.

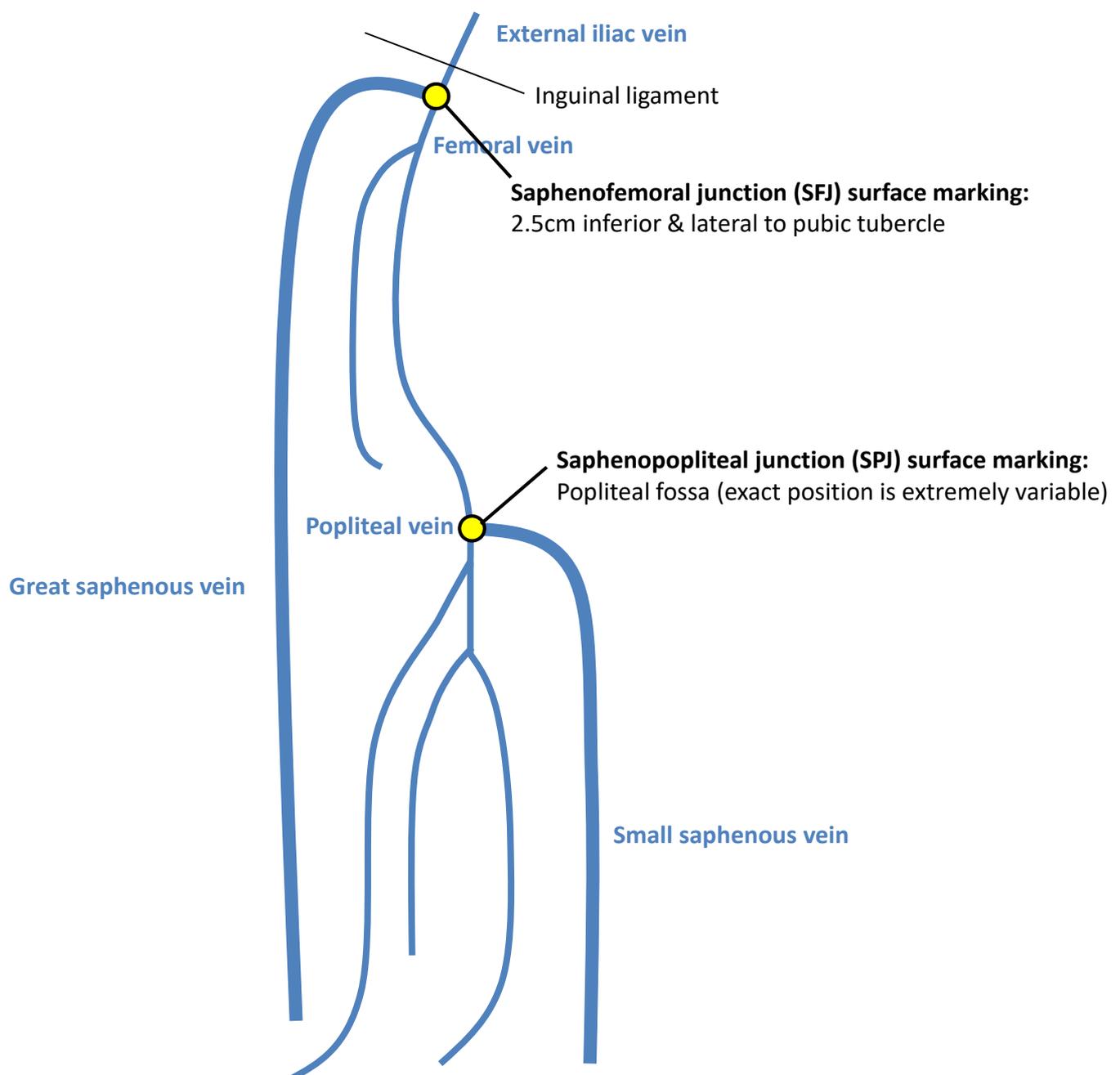
✓ You will need: Stethoscope, Ruler/Measuring Tape	
Step	Significance/Practical Tips
WIPE (Wash, Introduce, Position – lying flat, Expose – from groin down to legs; keep underwear on for modesty).	
General inspection: Look at soles, heels, in between the toes.	 : Q4 (see above). Broadly, they are <ol style="list-style-type: none"> 1) Colour changes: pallor 2) Trophic changes: hair loss, non-healing sores, gangrene 3) Ulcers
Palpate feet for difference in skin temperature.	
Assess capillary refill time of big toe.	The toe's colour should return within 2s .
Palpate the ulcer, if any.	For pain and pus.
Elevate limb, check for elevation pallor and dependent rubor.	Buerger's test has 2 parts. <ol style="list-style-type: none"> 1) Lift the leg until it becomes white as the perfusion drops. The angle between the horizontal and the leg when it becomes white is Buerger's angle. When Buerger's angle <20°, this indicates severe

	<p>ischemia.</p> <p>2) Gently lower the leg over the side of the bed and look for reactive hyperaemia. In patients with chronic ischemia, their vessels lose sympathetic tone and take a while to constrict.</p>
<p>Palpate for bilateral femoral, popliteal, posterior tibial and dorsalis pedis pulses. Report them as present, reduced, or absent.</p>	<p> How can I locate these pulses (surface anatomy)?</p> <ul style="list-style-type: none"> • Femoral: mid-inguinal point • Popliteal: between the heads of the gastrocnemius • Posterior tibial: 1/3 way down a line joining the medial malleolus to the heel • Dorsalis pedis: 1/3 way down a line joining the midpoint of the two malleoli to the 1st webspace
<p>Auscultate femoral, popliteal arteries for bruits.</p>	<p>Blood flow through stenosed vessels will be turbulent.</p>
<p>Request to</p> <ol style="list-style-type: none"> 1) Examine the rest of the peripheral pulses 2) Examine the abdomen for abdominal aortic aneurysm 3) Assess neurological status of lower limbs 4) Using Doppler to check for pulses and ABI 	<p>Atherosclerosis is a systemic process.</p> <p> What is the ankle-brachial pressure index?</p> <ul style="list-style-type: none"> • Ankle pressure divided by the brachial pressure • Normally, it is 1 (i.e. ankle pressure = brachial pressure). However, in peripheral vascular disease of the lower limbs, atherosclerotic plaques reduce blood flow and hence blood pressure. • An ABPI of <0.9 is abnormal.
<p>Thank patient and cover up.</p>	

Part 2 of 3: Venous system exam

- Objectives:**
1. Examine the venous system systematically.
 2. Be able to name and identify signs of chronic venous insufficiency and its complications.
 3. Perform tourniquet tests competently to localize the source of venous incompetency.

Q1. Draw and annotate the pathway by which blood flows from the great and small saphenous veins of the lower limb back to the right atrium.



Q2. You may have heard of deep vein thrombosis and that it can present with calf pain. Where are these “deep veins”, and what is their course?

These deep veins are located **deep to the deep fascia** of the lower limb. In contrast, superficial veins are located superficial to the deep fascia.

The course of the deep veins roughly parallels the lower limb’s arterial supply (refer above). The blood flows in the direction of distal to proximal, to return to the right atrium.

Q3. What prevents venous blood from flowing backwards, from deep veins to superficial veins?

The presence of **valves in the perforating veins** (“perforators”) aka communicating veins connecting the superficial to deep veins allows only a unidirectional flow of blood, from superficial to deep.

Q4. Hence, why might blood be unable to effectively drain from the superficial to the deep venous system? (i.e. chronic venous insufficiency)

Two pathologies are described in the CEAP classification for chronic venous insufficiency: reflux and obstruction.

Reflux occurs when there is incompetence of these valves. This may be primary (idiopathic), or secondary to a prior insult like a DVT that directly damages valves.

Obstruction occurs when downstream flow of venous blood is obstructed. Possible causes include pregnancy (gravid uterus), gynecologic masses (fibroids, ovarian cysts), intra-abdominal tumours with or without lymph node involvement.

Other rarer causes like an arteriovenous fistula (e.g. secondary to prior trauma) increase the pressure of the venous system and secondarily “force open” the valves, rendering them incompetent.

The typical patient on whom you may be asked to perform a venous examination is the elderly lady who complains of ugly varicose veins and a sensation of heaviness in the legs after standing the whole day.

The goals of the venous examination are to:

1. Describe the features and complications of venous insufficiency
2. Demonstrate varicose vein incompetence
3. Identify the site of incompetence
4. Identify contributory factors

Q5. [Goal 1] Describe the features and complications of venous insufficiency.

What are the signs of venous insufficiency?

The signs are described in order of increasing severity by the CEAP classification. It is unnecessary to remember this at M2, but you'll be required to know it in M3.

C1: telangiectasias, reticular veins

C2: varicose veins

C3: edema

C4: hyperpigmentation, venous eczema, lipodermatosclerosis, atrophie blanche

C5: healed venous ulcer

C6: active venous ulcer

Q6. [Goal 2] Demonstrate varicose vein incompetence.

How do you demonstrate venous incompetence?

Sign/test	How to examine	How to interpret
Tap test	Place two fingers on opposite ends of a vein. Use one finger to tap vein, to elicit a percussion wave felt by other finger. Repeat with opposite fingers.	The tap impulse is transmitted distal to proximal indicating vein patency. However, proximal to distal transmission indicates incompetence of the superficial vein valves.
SFJ cough impulse	Palpate for the SFJ. Ask patient to cough, feeling for a cough impulse.	Presence of a cough impulse indicates reflux of venous blood from femoral vein to great saphenous vein, showing that the SFJ is incompetent.

[Goal 3] Identify the site of incompetence.

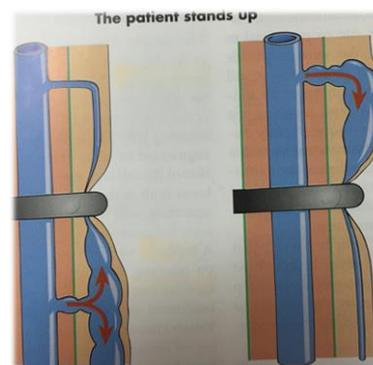
The tourniquet test is an antiquated way of localizing the site of venous insufficiency. It has largely been superseded by Doppler studies; however you may still be asked to perform these tests on physical exam.

Q7. What are the landmarks of the SFJ, SPJ, and perforator veins?

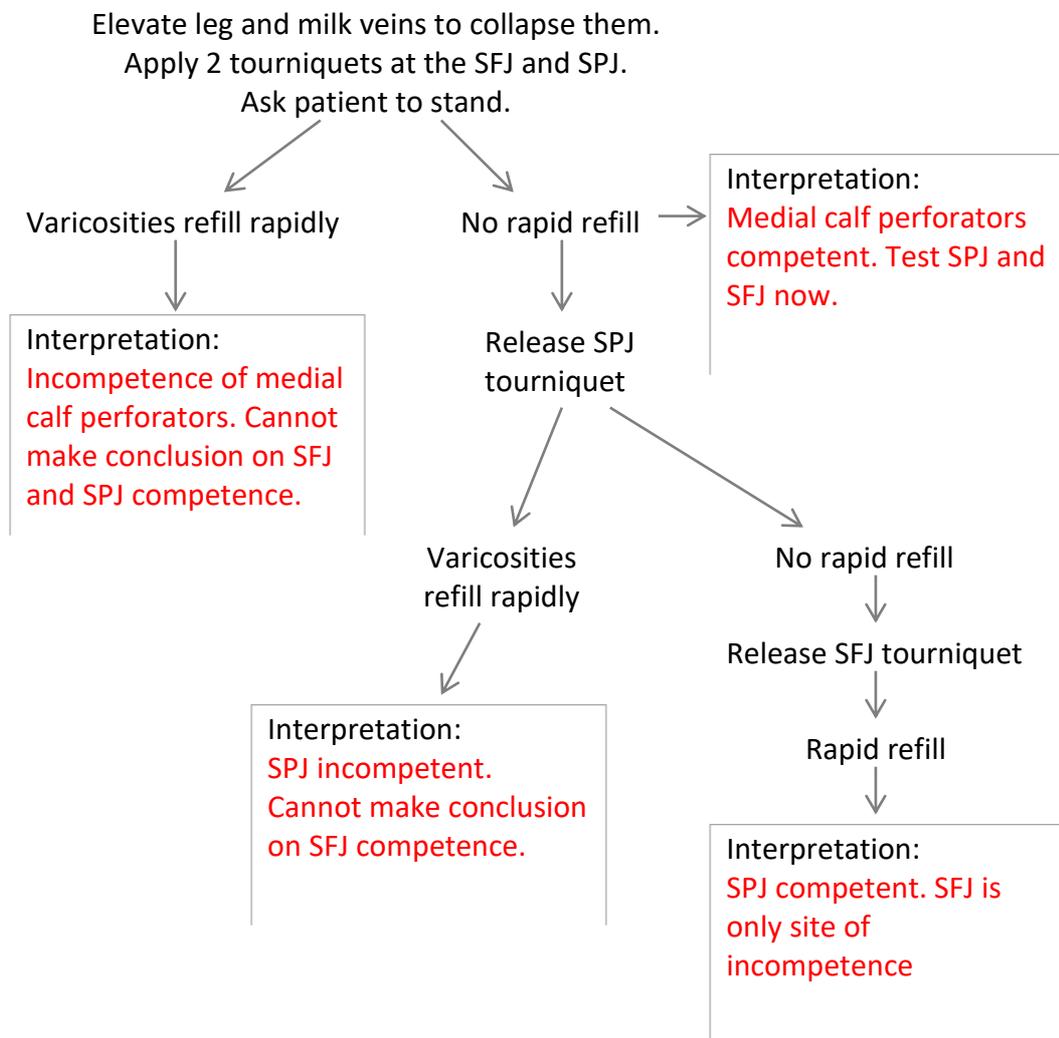
SFJ: 2.5cm inferior and lateral to the pubic tubercle

SPJ: within the popliteal fossa, although the exact location is very variable

Perforators: within the calf – 5cm, 10cm and 15cm superior to the medial malleolus



Q8. In a patient with varicosities in the calf, how do you perform and interpret the tourniquet tests? Complete the chart:



Note: there are many variations of how to perform tourniquet tests, this is just one suggestion

Q9. [Goal 4] Identify contributory factors.

Varicose veins are commonly due to idiopathic superficial venous incompetence; however it is important to look out for potential contributory factors that may have clinical significance. Fill in the table:

Contributory factor	How to examine	Clinical significance
Incompetent or obstructed deep veins	<p><i>Perthes' test:</i> Apply tourniquet below knee, and ask patient to repeatedly tiptoe up and down. Worsening of the varicosities or pain indicates obstructed or incompetent deep venous system.</p>	<p>This is a contraindication to surgical removal of superficial veins, since it will leave patient without competent veins!</p>
Arteriovenous fistula	<p>Auscultate over varicose veins, especially those in large clusters. A continuous machine-like murmur suggests</p> <p>Presence of a scar over femoral artery may suggest a past cardiac catheterization procedure (e.g. PCI for STEMI) which lends greater reason to suspect an AV fistula!</p>	<p>To treat the venous insufficiency, the underlying AV fistula should be excised.</p>
Raised intra-abdominal pressure	<ul style="list-style-type: none"> - Abdominal exam for masses, and look for enlarged inguinal nodes - Examine the external genitalia for hernia - Digital rectal exam for enlarged prostate causing straining 	<p>If a mass is present it warrants further investigation, as it may be sinister!</p>

Q10. Hence, make sense of and practice the venous examination:

This is an abbreviated version of the venous examination that is commonly used in clinical practice. Often, you will be asked to perform the venous examination of the lower limbs.

✓ You will need: Stethoscope, Ruler/Measuring Tape	
Step	Significance/Practical Tips
WIPE (Wash, Introduce, Position – Standing up, Expose – from groin down to legs; keep underwear on for modesty).	The patient should be standing up. Gravity causes blood to pool in the veins, making them distended.
General inspection: Look for any scars, swelling, venous ulcers, pigmentation and varicose veins (signs of chronic venous insufficiency)	<p>✎ : Q5 (see above). Broadly, they are</p> <ol style="list-style-type: none"> 1) Trophic changes: lipodermatosclerosis (darkening of the skin when subcutaneous fat becomes inflamed), eczema 2) Ulcers 3) Varicosities: site and size of varicosities (remember to look at the backs of the legs for the distribution of the short saphenous vein) 4) Swelling: imbalances in Starling forces lead to lower limb edema
Palpate the skin for presence of pitting edema	
Palpate along the course of the long and short saphenous veins	
Palpate for tenderness, temperature and fascial defects at the site of perforator veins	The calf fascia envelopes the calf muscles and veins. Fascial defects reduce compression of calf veins, causing them to bulge.
Palpate the SFJ for the smooth swelling and palpable thrill of a saphena varix	<p>✎ : Q6 (see above). Saphena varix is a dilatation at the SFJ. It is a compressible lump that refills when pressure over it is released.</p>
Test for positive cough impulse of saphena varix at the saphenofemoral junction.	The saphenofemoral junction is located 2.5cm below and lateral to the pubic tubercle.

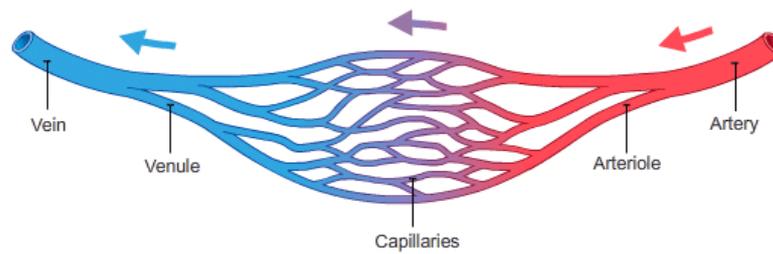
Tap test	 : Q6 (see above). If the pressure wave travels downwards, the valves are incompetent.
Trendelenburg test	This is another test you can perform to assess if the SFJ is incompetent. 1) Lie patient down. Lift one leg up and empty the varicose veins. Occlude the SFJ. 2) Get patient to stand up while keeping SFJ occluded. 3) If varicosities do not fill up, the SFJ is the site of incompetence; if they fill up, there are other sites of perforator valve incompetence (the SFJ may or may not be incompetent).
Tourniquet test	 : Q8 (see above). The tourniquet test assesses the patency of the SFJ and perforators .
Perthes test	 : Q9 (see above). Perthes test assesses the competency of the deep veins .
Auscultate over veins for bruits.	To assess for presence of arteriovenous fistula
Request to 1) Examine the abdomen for masses 2) Examine the external genitalia 3) Use Doppler to check SFJ and SPJ	1) Increased intra-abdominal pressure e.g. abdominal masses are a risk factor for varicose veins. 2) Look for hernias. They are also caused by increased intra-abdominal pressure. 3) The Doppler tests whether venous valves are incompetent. Blood should only be able to flow through the veins in one direction if the valves are functional.
Thank patient and cover up.	

Part 3 of 3: Integration of arteriovenous pathology

Arterial, venous, or neurological pathology may present with lower limb ulcers. It is important to be able to describe an ulcer; recognizing it takes time and experience.

Q11. Please complete the table

	Arterial	Venous	Neuropathic
Site	Distal toes and pressure points	Gaiter region, i.e. lower third of medial leg	Pressure points (e.g. heel, metatarsal heads)
Base	No granulation, underlying deep structures may be visible	Pink granulation tissue	Underlying deep structures may be visible
Edge	Punched out	Sloping	Punched out
Depth	Deep	Superficial	Deep
Discharge	Little exudate; serous, non-bloody	Copious exudate; serous, sometimes bloody	
Pain	Painful	May be painful	Painless
Pulses	Absent	Present	Present
Skin changes	Signs of peripheral vascular disease present	Signs of chronic venous insufficiency present	Signs of peripheral neuropathy present
Other signs	Signs of atherosclerotic disease elsewhere, e.g. heart failure	Check for malignant change by observing for everted margins and lymph nodes	Glove and stocking neuropathy



Q12. In both arterial and venous pathology, a vessel is blocked. Can you use the diagram above to explain why their signs and symptoms differ?

In arterial disease, blood inflow into capillaries (and therefore surrounding structures like muscles) is reduced. Hence symptoms and signs are primarily concerned with ischemia; an ulcer, if present, will appear “dry” since there is little transudate according to Starling’s forces.

In venous disease, backpressure buildup in the venous system increases capillary hydrostatic pressure. Varicose veins (dilated superficial veins) are directly attributed to this pressure buildup. The rise in hydrostatic pressure and resulting Starling’s forces alterations results in other findings like edema and a “wet” ulcer.