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Section 1 **Principles of surgery**

Chapter 1

# Principles of surgical practice

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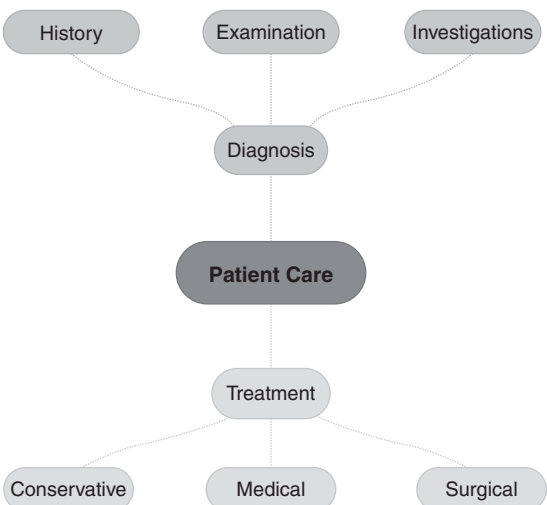
- The purpose of medicine in general is to improve physical, intellectual and emotional health.
- Surgery aims to achieve this through the scientific manipulation of human anatomy and physiology, aiming to restore form and function and alleviate pain, whilst reducing the number of complications that can arise during the process.
- The surgeon's role is twofold:
  1. to identify the problem (diagnosis)
  2. to provide a solution (design and implement a management plan)
- The surgeon needs to establish a relationship of trust with the patient, based on honesty, competence and good communication, in order to address complex aspects of diagnosis and treatment.
- The management of patients should be done in a professional, timely and efficient manner, with the goal of treatment being positive outcomes rather than good intentions.
- Surgical intervention should result in either an increase in the patient's length of life or an improvement of their quality of life in a timely, ethical and patient-centred manner.
- Ethics can be defined as the respect for human life and its autonomy.

*Physical Examination for Surgeons*, ed. Petrut Gogalniceanu, James Pegrum and William Lynn. Published by Cambridge University Press. 

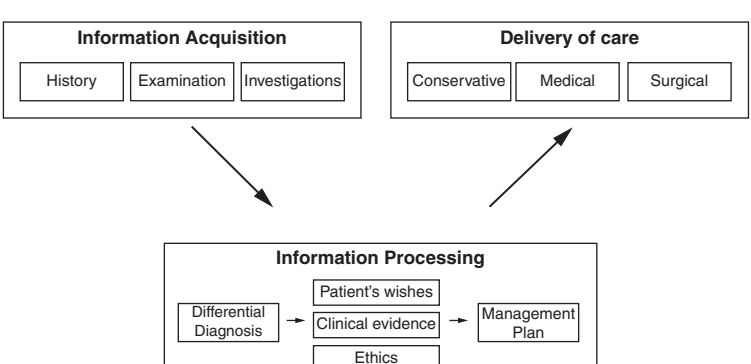



## Principles of diagnosis

### How is a diagnosis reached?

Three steps:

1. History taking
2. Physical examination
3. Investigations

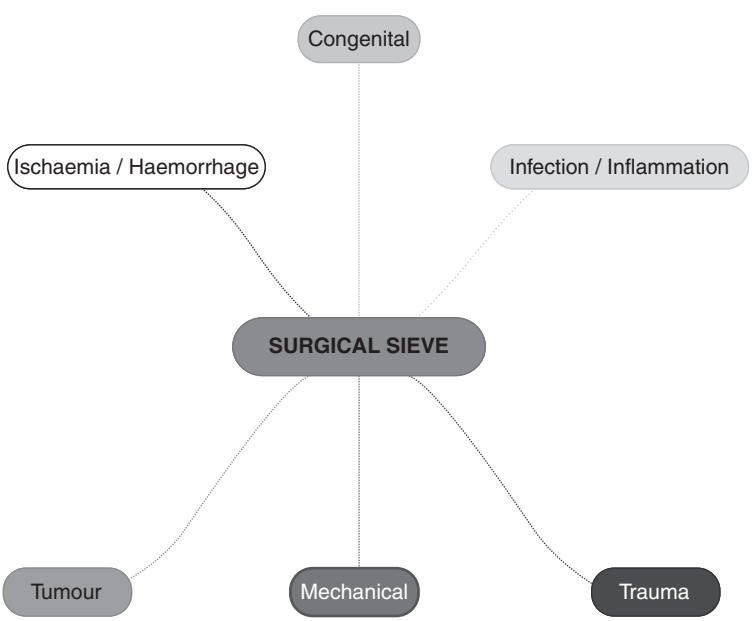


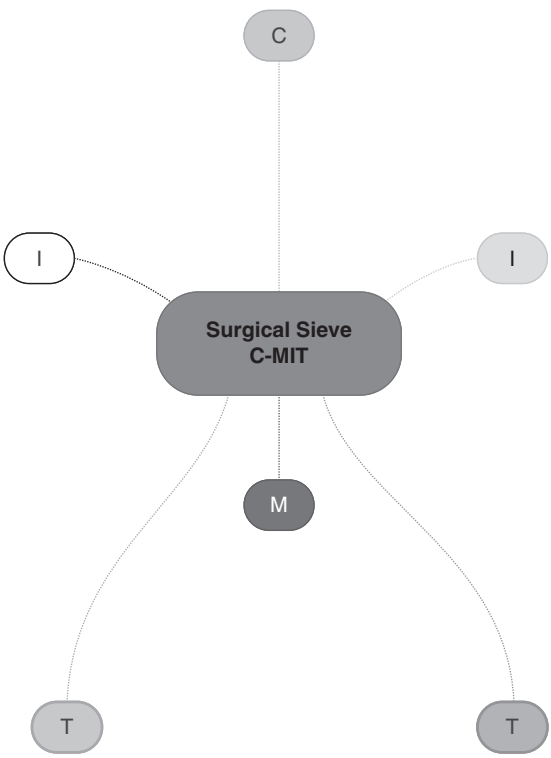
# Differential diagnoses

## How can a differential diagnosis be made?

A logical differential diagnosis can be formulated by applying a list of pathological processes to any organ in an anatomical area. The surgical sieve used in this book is **C-MIT**:

- **C**ongenital
- **M**echanical: extrinsic, mural, intraluminal
- **I**nfective or **I**nflammatory: autoimmune, bacterial, viral, fungal, protozoal
- **I**schaemic or haemorrhagic (vascular): stenosis, embolism, thrombosis, haemorrhage, dissection, aneurysmal change, vasospasm
- **T**umour: primary, secondary (metastases), lymphoproliferative
- **T**rauma: penetrating, blunt, chemical, electrical, thermal






All the differential diagnoses in the book are conveyed in the same diagrammatic manner, based on the pathological processes mentioned above.

## Principles of examination

### What checks must be made prior to beginning the physical examination?

- The surgeon must prepare for the examination.
- Check physiological parameters (vital signs) and fluid balance from the observations chart.
- Examine patient's bedside or environment.
- General examination of the patient from the end of the bed.

## How should the examining surgeon prepare before commencing an examination?

**Mnemonic**

**WIPER**

- **W**ash hands, remove all jewellery and watches and expose arms above elbows.
- **I**ntroduce yourself.
- **P**urpose and **P**ermission: explain purpose and gain verbal consent (permission) to proceed with the examination.
- **E**xpose the patient appropriately for the examination you are about to perform.
- **R**ecline: position the patient appropriately.

**Example**

*'Good morning, Mrs Taylor. My name is Mr Smith. I am a surgical registrar working for Mr Johnson. I understand you have pain in your calf. I would like to examine you to find out the cause. Would that be OK?'*

Find a chaperone.
Expose the patient's legs, removing shoes and socks. Cover the inguinal area and perineum with a sheet.
Place the patient flat with one pillow on an examination couch.

## What physiological parameters should be checked in every examination?

The first part of the physical examination is to inspect the patient's observation chart for physiological parameters (vital signs). If the observation chart contains inaccurate, incomplete or old vital signs it is the examiner's responsibility to assess and measure these at the time of examination.

The vital signs or physiological parameters are grouped in the following manner and must always be documented:

- Cardiac: heart rate and rhythm (HR) and blood pressure (BP)
- Respiratory: respiratory rate (RR) and oxygen saturation (Sats)
- Temperature (degrees Celsius)
- Glasgow Coma Scale (GCS) score
- Blood sugar levels (if available)
- Fluid balance (positive or negative), including urine output (ml/h in the last 3 hours), drain, NG and stoma output, as well as oral intake

**Example**

| | | | |
|---|---|---|---|
| HR 95 SR[1] | RR 18 | T 37.2 °C | Glucose 3.9 |
| BP 135/82 | Sats 98% RA[2] | GCS 15/15 | |

Urine: 20 – 32 – 35 ml/hour
Drain: 50 ml in 24 hours
Fluid balance 340 ml +ve in 24 hours

## What 'bedside' observations should be made?

Look for any signs in the patient's immediate environment that would hint at the patient's health:

- Evidence of acute illness: attachment to cardiac monitors, defibrillators or infusion pumps
- Floor: purulent discharge, bleeding, incontinence, vomitus
- Surgical appliances: drains, catheters, vacuum suction devices, blood transfusions, parenteral feeding bags
- Orthopaedic appliances: prostheses, walking aids, external fixation devices

**Tip**

Inspect the bedside for clues, **'MD'**:

**3 Ms**: monitors, mobility aids, medical equipment (e.g. ventilators, dialysis machines)
**3 Ds**: drips, drains, drug infusions

## How is the general examination performed from the end of the bed?

The surgeon stands at the end of the bed keeping her/his hands in a neutral position (e.g. behind the back) so as to emphasise the lack of patient

[1] SR describes a sinus rhythm pulse. Other pulse rhythms notations may include AF (atrial fibrillation), irreg irreg (irregularly irregular), VF (ventricular fibrillation) or VT (ventricular tachycardia). The last two can only be assessed if the patient is attached to a cardiac monitor.

[2] RA or 21% $O_2$ signifies normal 'room air' concentration of oxygen. Saturations should always be reported with the concentration of oxygen that the patient is breathing.

contact and focus on the global observation of the patient. Only once this is completed can the examiner move to the right-hand side of the patient's bed (for right-handed examiners) and proceed with the organ-system-based assessment. Also assess the patient's general appearance and behaviour:

- Pain
- Lethargy, confusion or agitation
- Malnutrition, obesity

## How can the peripheral stigmata of disease be remembered?

**A**irway – stridor, anaphylaxis
**B**reathing – dyspnoea, cyanosis, use of accessory muscles, patient position to facilitate breathing
**C**irculation – external bleeding
**D**eficit of neurology – consciousness, comfort (pain), cognition (**3Cs**)
**D**ermatology – jaundice, rashes, pallor
**E**maciation – cachexia, malnourishment, evidence of catabolism
**F**luid status – dehydrated, overloaded/oedematous
**F**acies – syndromes
**F**oul smell – foetor, melaena, urine/faecal incontinence, infected tissue/pus, alcohol

**Mnemonic**

**JACCOL** is a quick method of remembering the peripheral stigmata of systemic disease from the end of the bed:

**J**aundice, **A**naemia, **C**lubbing, **C**yanosis, **O**edema, **L**ymphadenopathy

**Tips**

Always terminate the examination if the patient is in discomfort or in danger, or if there is a sudden deterioration in the patient's status. Resuscitate the patient as described in the ALS or CCrISP guidelines.
Inspection: always ask patient to show where the problem is found.
Palpation: always ask the patient if he/she has any pain before palpating or asking them to move a body part.

# Principles of investigation

## How are surgical investigations classified?

- Laboratory-based
- Physiological tests
- Imaging
- Invasive diagnostic tests

## What laboratory tests can be performed?

- Blood tests: full blood count, urea and creatinine, electrolytes, liver function tests, C-reactive protein, immunology assays
- Blood bank: group, save and crossmatch blood and blood products
- Microbiology: microscopy, culture and sensitivity (any fluid or tissues)
- Histopathology: microscopic analysis of tissues

## What basic physiological tests can be performed at the bedside?

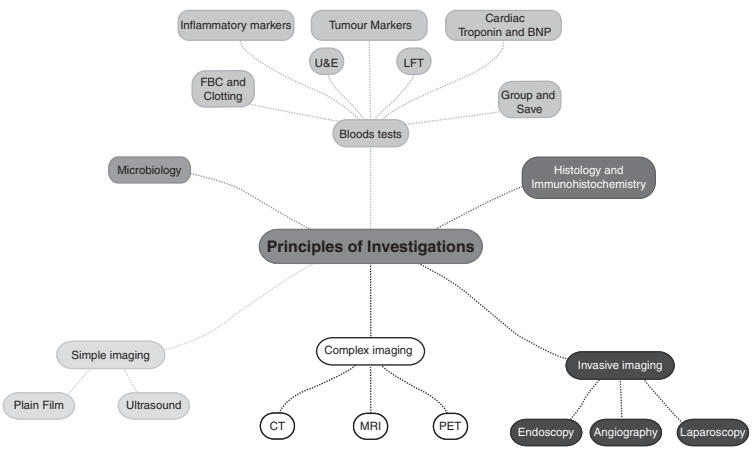
- ECG
- Spirometry/peak flow
- ABPI

## What imaging tests can be performed?

- Simple imaging: plain x-rays (abdomen, chest or limbs) and ultrasonography
- Complex imaging: computed tomography (CT) scanning or magnetic resonance imaging (MRI)

## What are the invasive diagnostic tests available?

- Endoscopy: OGD, colonoscopy, ERCP, endoscopic ultrasound, cystoscopy
- Biopsy: fine-needle aspiration (FNA), true-cut biopsy, excision biopsy
- Percutaneous angiography




## How to examine anything…

**Tip**

**What are the features of surgical disease in any organ?**

| | | |
|---|---|---|
| 1. | Abnormal anatomy: increase or decrease in size | e.g. palpable gallbladder |
| 2. | Abnormal physiology: loss of function | e.g. jaundice |
| 3. | Pain | e.g. positive Murphy's sign |

### General examination

- Bedside
- JACCOL
- WIPER
- Physiological parameters

### Inspection

Skin:

- Skin lesions: masses, ulcers, fistulas
- Scars: well healed, tethering, hypertrophic, keloid
- Lacerations: clean, irregular, flaps, contamination

- Colour changes: rashes, erythema, jaundice, pallor, ecchymosis, cyanosis, necrosis or gangrene[3]

Soft tissues:[4]

- Swellings: hypertrophy, abscesses, tumours, aneurysms, haematomas, fractures, hernias.
- Tissue loss: excision, atrophy, aplasia, necrosis

Bone:

- Deformities
- Amputations

### Palpation

Skin:

- Temperature: cold or hot
- Hydration: normal, dry, moist
- Sensitivity: pain-free, tender, anaesthesia, paraesthesia

Soft tissues:

- Swelling or fluctuance
- Tissue loss
- Crepitus (surgical emphysema or infection)

Viscera:

- Tenderness
- Organomegaly/distension
- Atrophy
- Pulsations or movement

Vascular:

- Presence or absence of pulses
- Capillary refill time
- Evidence of haemorrhage

Neurology:

- Sensation
- Movement
- (Reflexes)

[3] Mnemonic for skin colour changes: **REJPECT**: **R**ashes, **E**rythema, **J**aundice, **P**allor, **E**cchymoses, **C**yanosis, **T**errifying changes (necrosis and gangrene).
[4] Remember there can be only two types of soft tissue changes: too much or too little.