A- Body Habitus & Nutrition

1- WEIGHT

- Important indicator of **general health** and **nutrition**, and serial weight measurements can be useful in **monitoring both acute and chronic disease.**
- The **Body Mass Index (BMI)** is more useful **than weight alone**, as it allows for differing height.
- Normal values for different ethnicities are available.

$$BMI = \frac{Weight\ (kg)}{[Height(m)]^2}$$

3.7 The relationship between body mass index (BMI), nutritional status and ethnic group

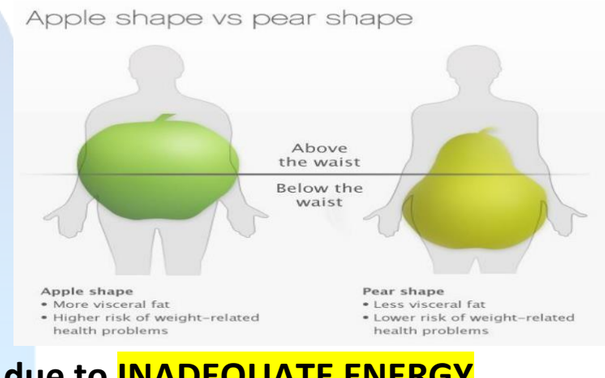
Nutritional status	BMI non-Asian	BMI Asian
Underweight	<18.5	<18.5
Normal	18.5–24.9	18.5–22.9
Overweight	25–29.9	23–24.9
Obese	30–39.9	25–29.9
Morbidly obese	≥40	≥30

a. Obesity

- **Associated with :**
  - ✓ increased risk of malignancy, particularly **oesophageal** and **renal cancer** in both sexes, thyroid and colon cancer in men, and endometrial and gallbladder cancer in women, as well as hypertension, hyperlipidaemia, type 2 diabetes mellitus, GERD, gallbladder disease, osteoarthritis and sleep apnoea.
- **Usually is the result of**:
  - ✓ **Excessive calorie intake** relative to calories expended, it can rarely be secondary to **hypothyroidism**, **Cushing's syndrome**, **hypothalamic disease** or **drugs** such **as oral hypoglycaemic agents**, **insulin** and **antipsychotics**.

Distribution Of Fat

- **Central obesity** (as judged by the waist circumference: the maximum abdominal girth at the midpoint between the lower costal margin and the iliac crest) .
- **Waist-to-hip ratio** can also be a useful assessment of adipose distribution:
  - ✓ **'Pear Shape' or** Gluteal–femoral obesity **(waist:hip ratio of ≤0.8 in females or or <0.9 in males) has a better prognosis.**
  - ✓ **'Apple-shaped' patients** with **a greater waist:hip ratio have an increased risk of coronary artery disease** association with **htn, type 2 DM and CAD** and the **'metabolic syndrome'.**



b. Weight loss

- Weight loss or **Malnutrition** may be **due to INADEQUATE ENERGY CONSUMPTION** or **utilization** (such as **malabsorption, anorexia, glycosuria**) or to **conditions** in which **NUTRITIONAL DEMAND IS INCREASED** (such as **fever, infection, thyrotoxicosis, malignancy, surgery**).
- **Psychiatric disease** and **alcohol** or **drug dependency** may also result in **weight loss**.
- **Markers of malnutrition** : **Arm Muscle Circumference** & **Grip Strength**.
- Malnutrition may **associated with biochemical** & **physical evidence of hypoproteinemia and/or vitamin deficiencies .**
- **It lengthens recovery time** from illness and surgery, and **delays wound healing**.

2- STATURE

a. Short stature

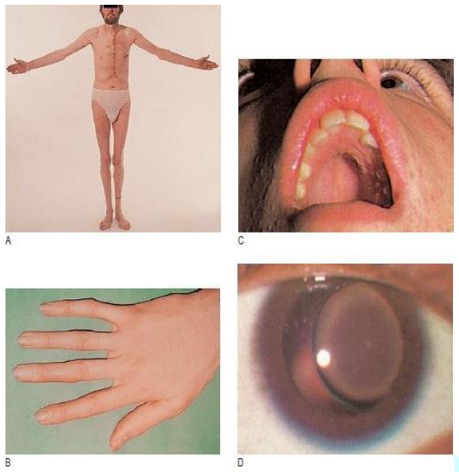
- **Short stature** may reflect **general nutritional state** or **significant illness during childhood**, although it may be **familial** (ask about siblings).
- **Loss of height** is Part of **normal ageing** but is accentuated by compression fractures of the spine due to **osteoporosis**, particularly In **Postmenopausal Women**, **loss of >5 cm height** is an indication to investigate for osteoporosis.

b. Tall stature

- **less common** than short stature and is usually **familial.**
- **Most** individuals with heights **above the 95th centile are not abnormal** so ask about the height of close relatives.
- **Abnormal Causes** of increased height include:

1. **Marfan's syndrome**

- **limbs are long** in relation to the length of the trunk, and the **arm span exceeds height**.
- **Additional features: long slender fingers (arachnodactyly)**, **narrow feet**, **a high-arched palate** , upward **dislocation of the lenses** of the eyes , **cardiovascular abnormalities** such as **mitral valve prolapse**, and **dilatation of the aortic root with aortic regurgitation**.



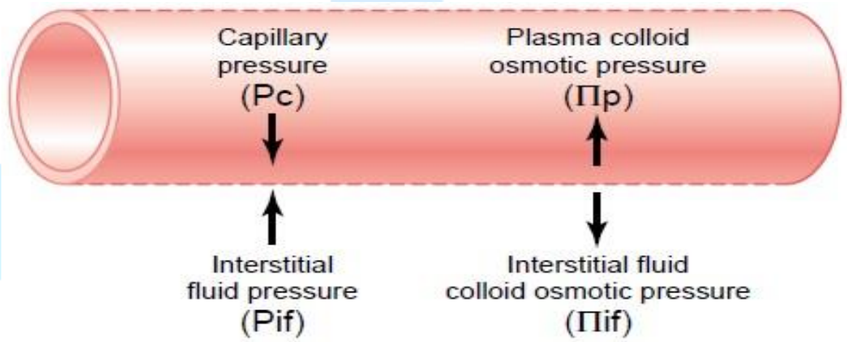
2. **Hypogonadism :** During puberty, the **epiphyses close in response to stimulation from the sex hormones**, so in some patients with **Hypogonadism** the limbs **continue to grow** for longer than usual.
3. **Pituitary Gigantism** is a **very rare cause of tall stature** due to excessive **growth hormone secretion BEFORE** epiphyseal fusion has occurred.

3- HYDRATION

- Assessment of a patient's hydration is **particularly important, especially in the acutely unwell patient.**
- Look for evidence of **Dehydration** or **Generalized** and **Localized oedema** , Ask about:
  • **Weight loss.** • **Ankle swelling (pitting edema).** • **Breathlessness (pleural effusions).** • **Abdominal swelling (ascites).**

Oedema

- Oedema : is **tissue swelling due to an increase in interstitial fluid**.
- **Capillary wall** separates the **interstitial fluid & plasma compartments**.
- Distribution of water between the vascular and interstitial spaces is determined by **the balance between hydrostatic pressure forcing water out of the capillary, & colloid osmotic (oncotic) pressure.**
- Oncotic pressure depends **largely on circulating protein concentration, particularly serum albumin.**



- **Localized Edema** This may be caused by :

1- Venous.
2- Lymphatic.
3- Inflammatory.
4- Allergic disorders.

Localized Edema

1.Venous causes

- **Increased venous pressure** → increases **hydrostatic pressure** within capillaries → oedema in the area drained by that vein.
- **Venous causes :**
  Deep vein thrombosis, **external pressure** from a tumour or pregnancy, or **venous valvular incompetence** from previous thrombosis or surgery.
- Conditions which impair the normal muscle pumping action, e.g. **hemiparesis** and **forced immobility**, increase venous pressure by impairing venous return.
- may occur in **immobile, bed-ridden patients, in a paralysed limb**, or in **a healthy person sitting for long periods, e.g. during travel .**

2.Lymphatic causes

- Normally, **interstitial fluid returns to the central circulation via the lymphatic system.**
- Any cause of **impaired lymphatic flow**, e.g. **intraluminal** or **extraluminal obstruction** → localized edema **(lymphoedema).**
- If the condition persists → fibrous tissues proliferate in the interstitial space and the affected area → **hard** and **NO LONGER PITS on pressure.**
- In the UK, the commonest cause of **leg lymphoedema is congenital hypoplasia of leg lymphatics (Milroy's disease),** and in **the arm after radical mastectomy and/or irradiation for breast cancer**.
- Ccommon in some tropical countries because of **lymphatic obstruction by filarial worms (elephantiasis).**

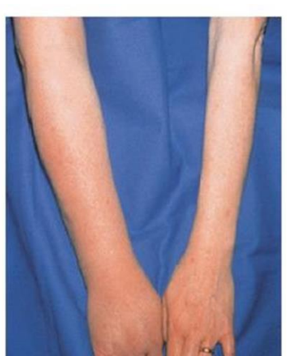


Fig. 3.31 Lymphoedema of the right arm following right-sided mastectomy and radiotherapy.

3.Inflammatory causes

- **Any cause of tissue inflammation,** including **infection** or **injury**, liberates mediators, e.g. **histamine, bradykinin** and **cytokines** → **vasodilatation** & **increase capillary permeability**.
- Inflammatory edema is accompanied by the other features of inflammation **(redness,tenderness and warmth)** and is therefore **PAINFUL.**

4.Allergic causes

- Increased capillary permeability occurs in acute allergic conditions.
- The affected area is usually **red** and **pruritic (itchy)** because of local release of **histamine** and other inflammatory mediators ,but in contrast to inflammation, **IS NOT PAINFUL.**
- **Angio-oedema** is a severe form of allergic oedema affecting **the face, lips** and **mouth**, most commonly caused by **insect bites**, **food allergy** or **drug reactions.**
- Swelling may **develop rapidly** and may **be life-threatening** if the upper airway is involved.

Fig. 3.32 Angio-oedema following a wasp sting.

B- Lump & Lymph Nodes

- Patients often **PRESENT** with **a lump** or **enlarged lymph nodes (lymphadenopathy)**, which, while usually **benign**, can herald a **serious underlying infective** or **malignant** process.
- Alternatively, when examining a patient **YOU MAY FIND A LUMP** of which they were **unaware**.

➔ Lumps

- Ask about **any changes** since they noticed.
- Ask about **the rapidity of onset of the lump** and the presence of any associated **pain**, **tenderness** or **colour** changes .

3.8 Features to note in any lump or swelling (SPACESPIT)

- Size
- Position
- Attachments
- Consistency
- Edge
- Surface and shape
- Pulsation, thrills and bruits
- Inflammation:
  - Redness
  - Tenderness
  - Warmth
- Transillumination

A. Size

Measure the **size of any lump** (preferably using callipers).

B. Positions

- The **origin** of some lumps may be obvious, e.g. in the **breast**, **thyroid** or **parotid gland**; in other sites, e.g. the **abdomen**, this is **less clear.**
- **Multiple lumps** may occur in **neurofibromatosis** ,**skin metastases**, **lipomatosis** and **lymphomas**.

C. Attachments

- **Malignant** masses commonly **infiltrate** adjacent tissues, causing them to feel **fixed** and **immobile**.
- **Lymphatic obstruction** causes **fixation of the skin** with fine **dimpling at the opening of hair follicles** that resembles orange peel (peau d'orange).

D. Consistency

- can vary from **soft to 'stony' hard**.
- Very **hard** swellings are **malignant**, **calcified** or **dense fibrous tissue.**
- **Fluctuation** indicates the **presence of fluid**, e.g. **abscess, cyst, blister** or **soft encapsulated tumours, e.g. lipoma.**

E. Edge or margin

- The edge or margin may be **well delineated** or **ill defined, regular** or **irregular**, **sharp** or **rounded**.
- The margins of enlarged organs, e.g. thyroid gland, liver, spleen or kidney, can usually be **defined more clearly** than those of **inflammatory** or **malignant** masses.
- An **indefinite margin** suggests **infiltrating malignancy**, in contrast to the **clearly defined** edge of a **benign tumour.**

F. Surface and shape

- can be **CHARACTERISTIC**.
- In the abdomen examples include an enlarged spleen or liver, a distended bladder or the fundus of the uterus in pregnancy.
- The surface may be **smooth** or **irregular**, e.g. the **surface of the liver** is **smooth** in acute hepatitis but is often **nodular** in **metastatic disease.**

G. Pulsations, thrills and bruits

- Arterial swellings (aneurysms) & highly vascular tumours are **pulsatile** (they move in time with the arterial pulse).
- Other swelling may **transmit pulsation** "lie over a major blood vessel"
- If the blood flow through a lump is **increased**, a systolic murmur (bruit) may be **auscultated** and, if **loud enough**, a **thrill may be palpable.**
- Bruits are also heard over **arterial aneurysms** and **AVM**.

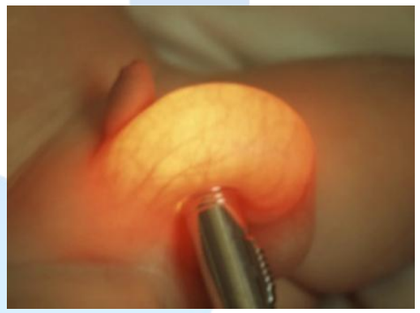
H. Inflammation

Redness, tenderness and warmth suggest inflammation :

- ✓ **Redness (erythema):** the skin over acute inflammatory lesions is usually red due to **vasodilatation**. In **haematomas** the pigment from **extravasated blood** may produce the range of colours in a bruise (ecchymosis).
- ✓ **Tenderness:** inflammatory lumps, e.g. **boil** or **abscess**, are usually **tender** or **painful**, while non-inflamed swellings are **NOT**: **lipomas**, **skin metastases** and **neurofibromas** are characteristically **Painless**.
- ✓ **Warmth:** inflammatory lumps and some tumours, especially if **rapidly growing**, may feel warm due to **increased blood flow.**

I. Transillumination

In a darkened room, press **the lighted end of a pen torch** on to one side of the swelling. A **CYSTIC SWELLING**, e.g. testicular hydrocoele, will light up if the **fluid is translucent**, providing the **covering tissues are not too thick**.



➔ Lymph Node Examination

- Lymph nodes may be **palpable** in **normal people**, especially in the **submandibular, axilla** and **groin regions**.
- Distinguish between **normal** and **pathological** nodes.
- **Pathological lymphadenopathy** may be **local** or **generalized**, and is of **diagnostic** and **prognostic** significance in **the staging of lymphoproliferative** and **other malignancies**.

Lymph node Examination

- As with any lump, note the **SIZE** and **POSITION** of the nodes (normal nodes in adults **are <0.5 cm in diameter**) .
- Assess **FIXATION** to deeper structures (lymph nodes fixed to deep structures or skin suggest **malignancy**).
- Assess **CONSISTENCY**: **normal nodes** feel **soft**. In **Hodgkin's lymphoma**, they are characteristically **'rubbery'**, in **tuberculosis** they may be **'matted'**, and in **metastatic** cancer they feel **hard.**

N.B. : Acute viral or bacterial infection, including infectious mononucleosis, dental sepsis and tonsillitis, causes **tender**, variably **enlarged lymph nodes**.

Cervical nodes

1. Examine the cervical with the **patient sitting.**
2. From **behind**, examine the **submental**, **submandibular**, **preauricular**, **tonsillar**, **supraclavicular** and **deep cervical nodes** in the anterior triangle of the neck.
3. **Palpate** for the scalene nodes by placing your index finger between the **sternocleidomastoid** muscle and **clavicle**. Ask the patient to **tilt his head to the same side** and **press firmly** down towards the first rib.
4. From the **front of the patient**, palpate the **posterior triangles,** up the back of the neck and the **posterior auricular** and **occipital nodes.**

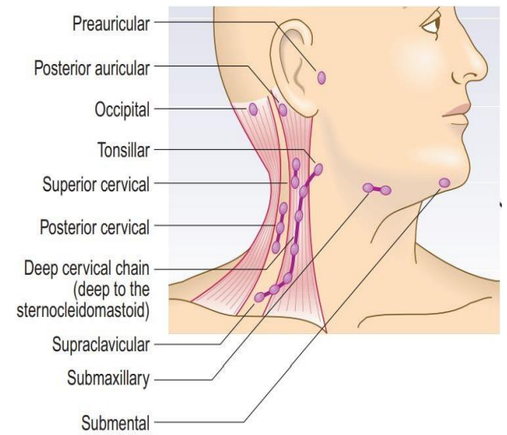


Fig. 3.22 Palpation of the cervical glands. (A) Examine the glands of the anterior triangle from behind, using both hands. **(B)** Examine for the scalene nodes from behind with your index finger in the angle between the sternocleidomastoid muscle and the clavicle. **(C)** Examine glands in the posterior triangle from the front.

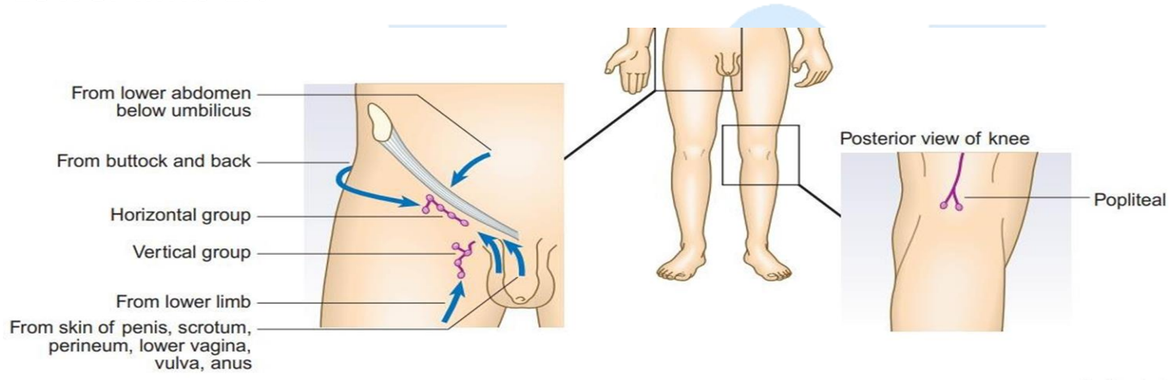
Axillary nodes

1. Examine axillary nodes with the patient **sitting.**
2. From the patient's **front** or **side**, palpate the **right axilla with your left hand** and vice versa .
3. Gently place your fingertips into the **apex of the axilla** and **then draw them downwards**, feeling the **medial**, **anterior** and **posterior** axillary walls in turn.

Epitrochlear nodes

- Support the patient's **Left wrist with your right hand**, hold his **partially flexed elbow** with **your left hand** and use your **thumb** to feel for the **epitrochlear node.**
- Examine the **RIGHT** epitrochlear node with your **LEFT** thumb node with your right thumb.

Lower limb LN



Inguinal nodes

1. Examine for the inguinal and popliteal nodes with the patient **lying down.**
2. Palpate over the **horizontal chain**, which lies **just below the inguinal ligament.**
3. Then over the **vertical chain** along the line of the saphenous vein.

Abnormal Findings

- If you find **localized lymphadenopathy**, examine the areas which drain to that site.
  - ✓ **Infection** commonly causes **lymphadenitis (localized tender lymphadenopathy);** e.g. in acute tonsillitis the submandibular node are involved.
  - ✓ If the lymphadenopathy is **non-tender**, look for a **Malignant** cause, **tuberculosis** or features of **HIV infection**.
- **Generalized lymphadenopathy** occurs in a number of conditions.
  - ✓ Examine for enlargement of the **liver** and **spleen**, and for other **haematological features**, such as **purpura (bruising under the skin)**,which can be large (**ecchymoses**) or pinpoint (**petechiae**).

Fig. 3.29 Petechiae.

Examination sequence

- **Inspect** the lump, noting any change in the colour or texture of the overlying skin.
- Define the **site** and **shape** of the lump.
- Measure its **size** and record the findings diagrammatically.
- Gently palpate for **tenderness** or change in skin **temperature**.
- Feel the lump for a few seconds to determine if it is **pulsatile**.
- Assess the **consistency**, surface texture and margins of the lump.
- Try to pick up an overlying fold of skin to assess whether the lump is fixed to the skin.
- Try to move the lump in different planes relative to the surrounding tissues to see if it is fixed to deeper structures.
- Compress the lump on one side; see and feel if a bulge occurs on the opposite side **(fluctuation).** Confirm the fluctuation in two planes. Fluctuation usually indicates that the lump contains fluid, although some soft lipomas can feel fluctuant.
- **Auscultate** for vascular bruits.
- **Transilluminate**

C. Spot Diagnoses

1. Characteristic facial features

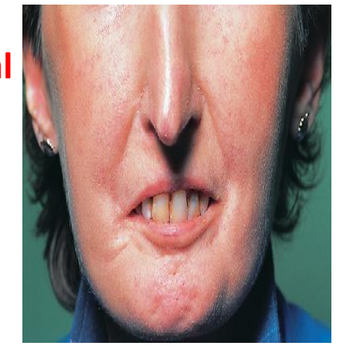
- Several disorders have **characteristic physical or facial features**, that allow a **diagnosis to be made by observation alone**.
- These **conditions**, together with those that have a more **generalized distinctive physical phenotype**, are often over-represented in candidate assessments, where they are referred to **As 'Spot Diagnoses'.**

3.9 Conditions with characteristic facial appearances

Diagnosis	Facial features
Hypothyroidism (see Fig. 10.5)	Sparse, coarse hair and eyebrows, periorbital puffiness, dry, waxy skin, apathetic expression, macroglossia
Graves' disease (autoimmune thyrotoxicosis) (see Fig. 10.2A)	Staring appearance due to lid retraction, proptosis, evidence of weight loss
Hypopituitarism (see Fig. 10.10A)	Pale, often unwrinkled skin with loss of hair
Acromegaly (see Fig. 10.9A)	Thickened, coarse skin with enlarged nose and frontal bones, prognathism (lower jaw protrusion), widely spaced teeth, macroglossia
Cushing's syndrome (see Fig. 10.11A)	Moon-shaped plethoric facies
Osteogenesis imperfecta (see Fig. 3.30A)	Blue sclerae
Hereditary haemorrhagic telangiectasia (see Fig. 3.30B)	Telangiectasia on and around lips
Systemic sclerosis (see Fig. 3.30C)	Tight skin constricting mouth, 'beaking' of nose, loss of nasolabial folds
Myotonic dystrophy (see Fig. 3.30D)	Frontal balding, paucity of expression, bilateral ptosis
Down's syndrome (see Fig. 3.31)	Flat facial profile, up-slanting palpebral fissures, small, low-set ears, macroglossia, Brushfield spots in iris
Systemic lupus erythematosus	'Butterfly' erythematous rash on cheeks

Systemic Sclerosis

the **skin** is **thickened** and **tight**, → **loss of the normal wrinkles** and **skin folds**,**'beaking'** of the nose, and **narrowing** of the mouth .

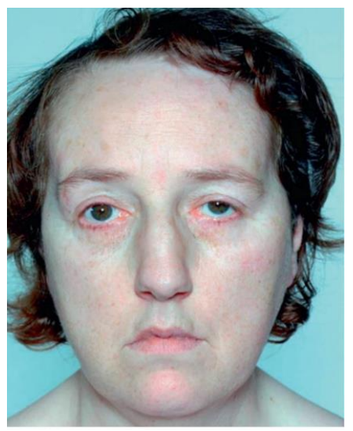


Hereditary hemorrhagic telangiectasia

is an **autosomal dominant** condition associated with **small dilated capillaries** or **terminal arteries (telangiectasia)** on the **lips** and **tongue**.

Dystrophia myotonica

is an **autosomal dominant** condition with characteristic features of **frontal balding**, **bilateral ptosis** and **delayed relaxation of grip** after a handshake.



Osteogenesis imperfecta

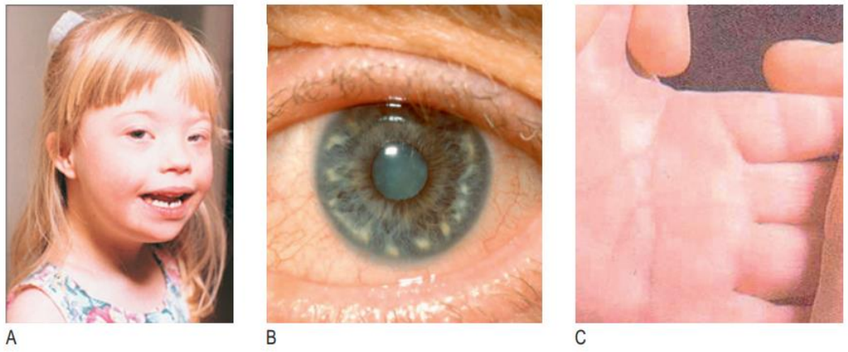
is an **autosomal dominant** condition causing **fragile** and **brittle bones** in which the **sclerae** are **blue due to abnormal collagen formation.**

2. Major chromosomal abnormalities

- Several **genetic** or **chromosomal** syndromes that you should **easily recognize on first contact** with the patient.

1- Down's syndrome (trisomy 21 – 47XX/XY + 21)

- characterized by typical physical features, including : **Short stature**, a **Small Head** With Flat Occiput, **up slanting palpebral fissures**, **epicanthic folds**, a **small nose** with a poorly developed bridge and **small ears** .
- Greywhite areas of **depigmentation** are seen in the **iris (Brush field's spots).**
- The hands are **broad** with a **single palmar crease** ,the fingers are **short** and the **little finger** is curved.



A B C

Fig. 3.31 Down's syndrome. A Typical facial appearance. B Brushfield spots: grey–white areas of depigmentation in the iris. C Single palmar crease. A *From Kerryn Phelps, Craig Hassed; Genetic conditions. In General Practice: The Integrative Approach, 1e, Churchill Livingstone; 2011.*

2- Turner's syndrome (45XO)

- due to **loss of a sex chromosome.**
- It occurs in **1 : 2500** live female births and is a cause of **delayed puberty in girls.**
- Typical features include **short stature**, **webbing of the neck**, **small chin**, **low set ears**, **low hairline**, **short fourth finger**, increased **carrying angle** at the elbows and widely spaced nipples ('shieldlike chest').

Fig. 3.32 Turner's syndrome. *From Henry M. Seidel, Jane Ball, Joyce Dain, G. William Benedict. Growth and measurement. In: Mosby's Guide to Physical Examination, 6e; 2006.*

3- Achondroplasia

- This is an **autosomal dominant** disease of **cartilage** caused by mutation of the **fibroblast growth factor gene.**
- Although the **trunk is of normal length**, the **limbs are very short and broad.**
- The **vault of the skull is enlarged**, the **face is small** and the **bridge of the nose is flat.**

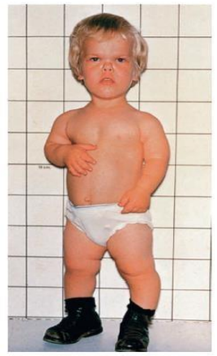


Fig. 3.33 Child with achondroplasia. *From Keith L. Moore, T. V. N. Persaud. Congenital Anatomic Anomalies or Human Birth Defects. In the Developing Human: Clinically Oriented Embryology, 8e; 2008.*

4- Klinefelter's syndrome (47XXY)

- This chromosomal abnormality results **in tall stature**, **gynaecomastia**, reduced **pubic hair** and **small testes .**
- **MCC of primary hypogonadism in men.**