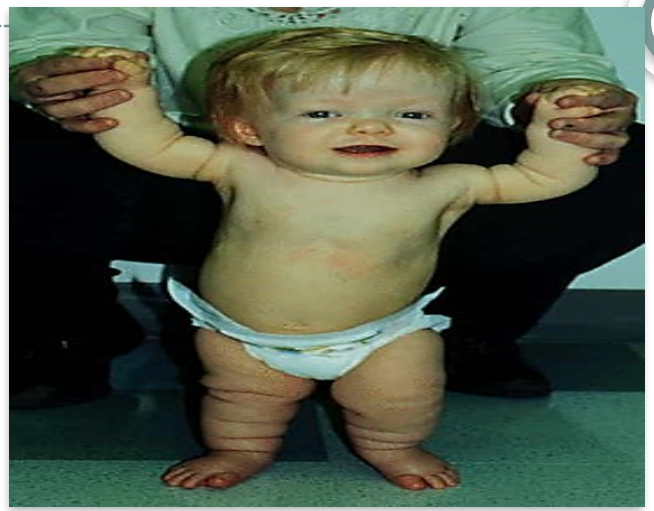
A PRESENTATION ON ACHONDROPLASIA AND OSTEOGENESIS IMPERFECTA



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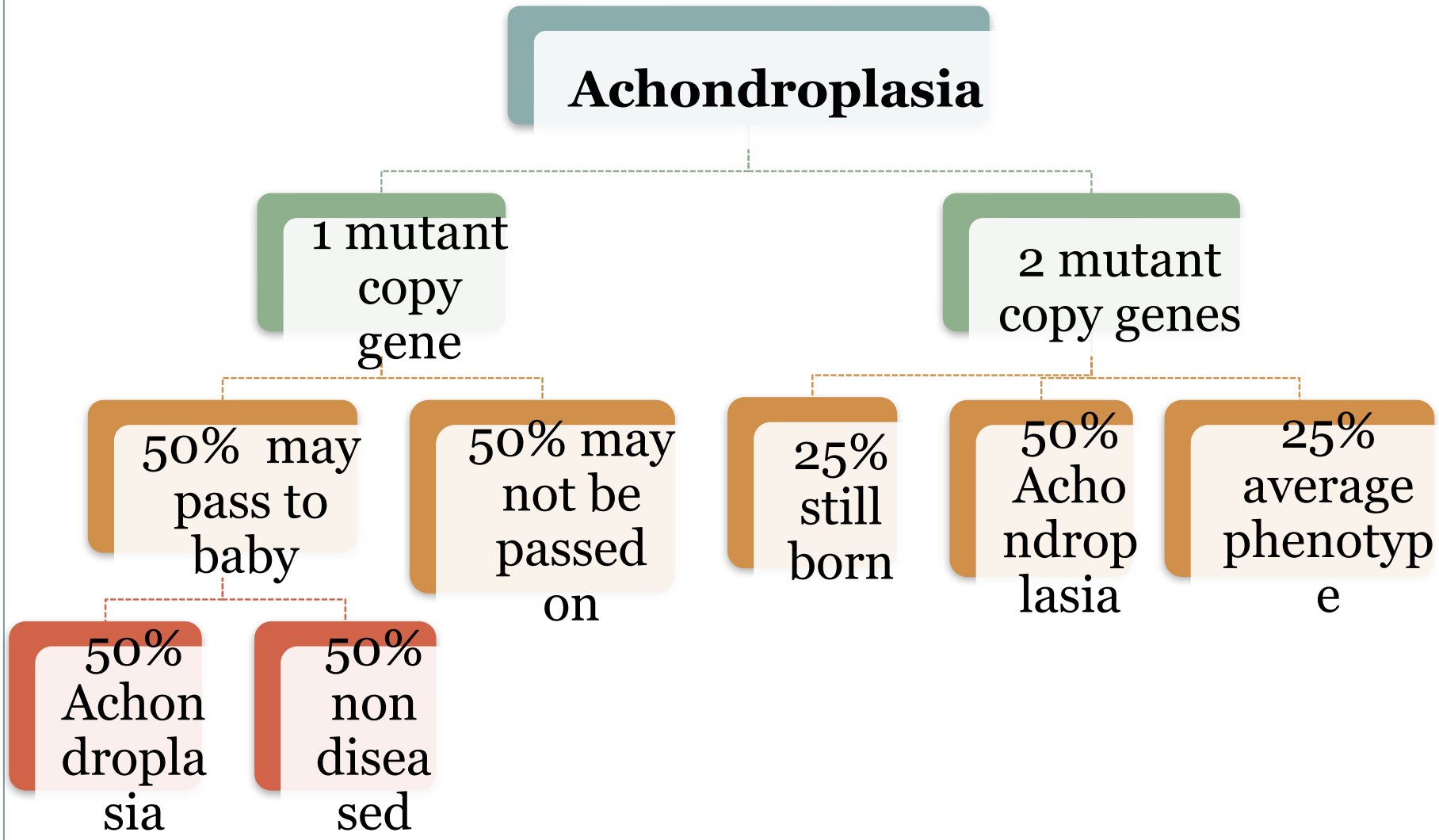
SKELETAL DYSPLASIA

- Are defined as intrinsic disturbances in the bone formation and modeling which results in short stature
- Ex: Achondroplasia and Osteogenesis Imperfecta

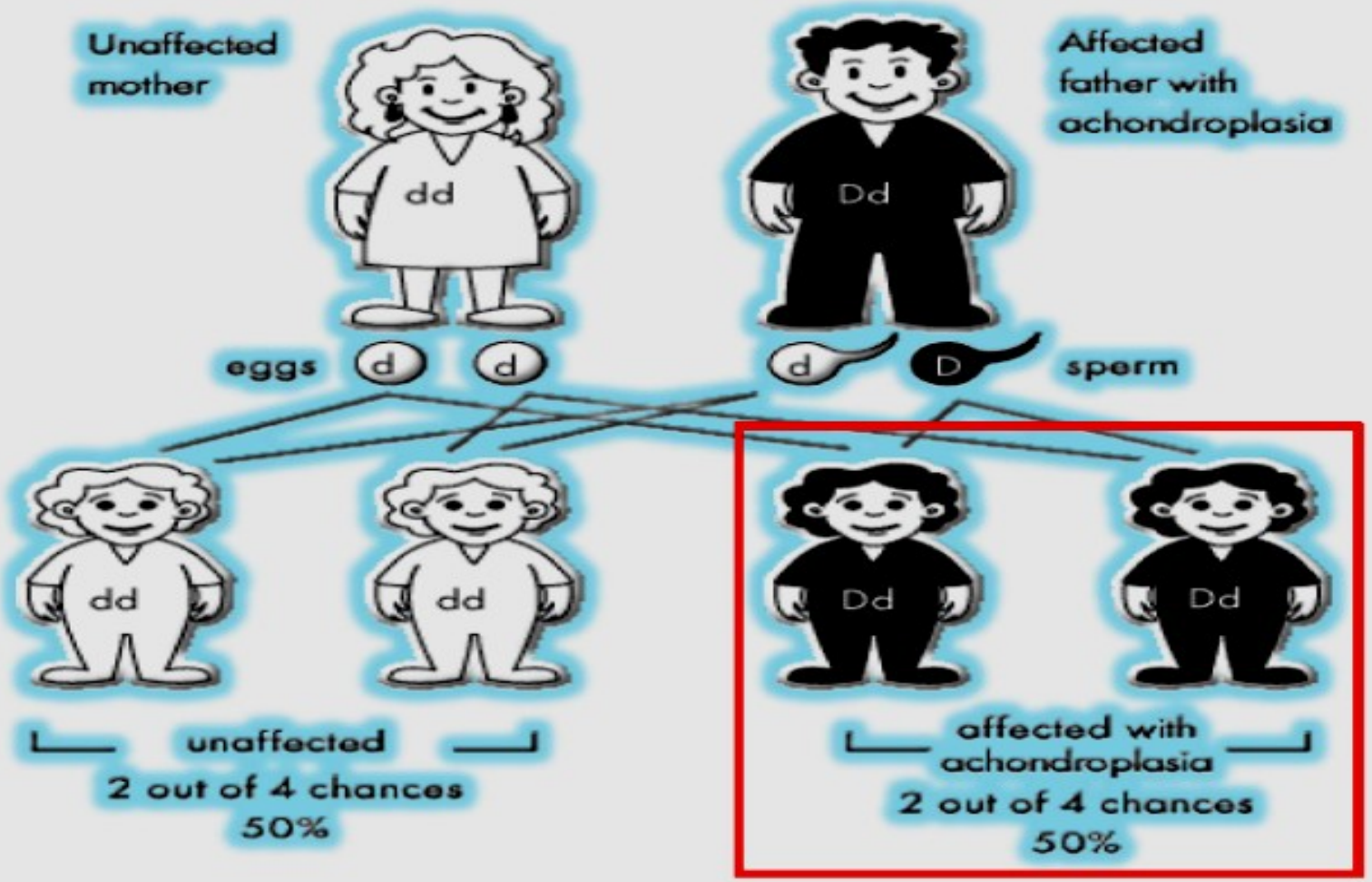
ACHONDROPLASIA

- Achondroplasia literally means “without cartilage”
- Occurs as a sporadic mutation in almost 85% of cases or
- Maybe inherited in as autosomal dominant disorder
- Abnormality in the fibroblast growth factor receptor 3 which causes an abnormality of cartilage formation.

- In normal development FGFR3 has a negative regulatory effect on bone growth.
- Achondroplasia is inherited in an autosomal dominant pattern, which means one copy of the altered gene in each cell is sufficient to cause the disorder
- The effect is genetically dominant, with one mutant copy of the FGFR3 gene being sufficient to cause Achondroplasia, while two copies of the mutant gene are invariably fatal before or shortly after birth


Achondroplasia
1 mutant copy gene
2 mutant copy genes
50% may pass to baby
50% may not be passed on
25% still born
50% Achondroplasia
25% average phenotype
50% Achondroplasia
50% non diseased

One parent affected

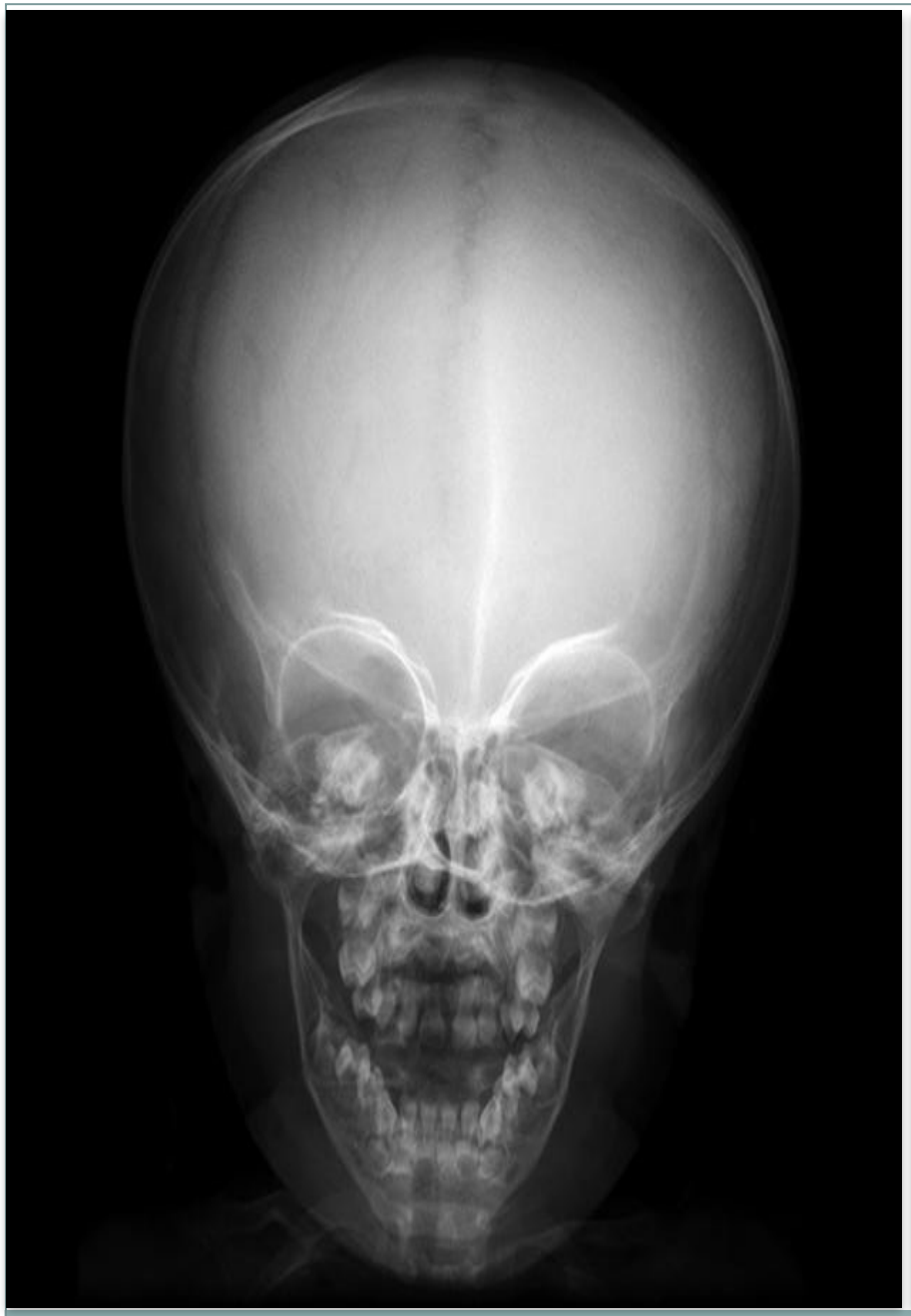


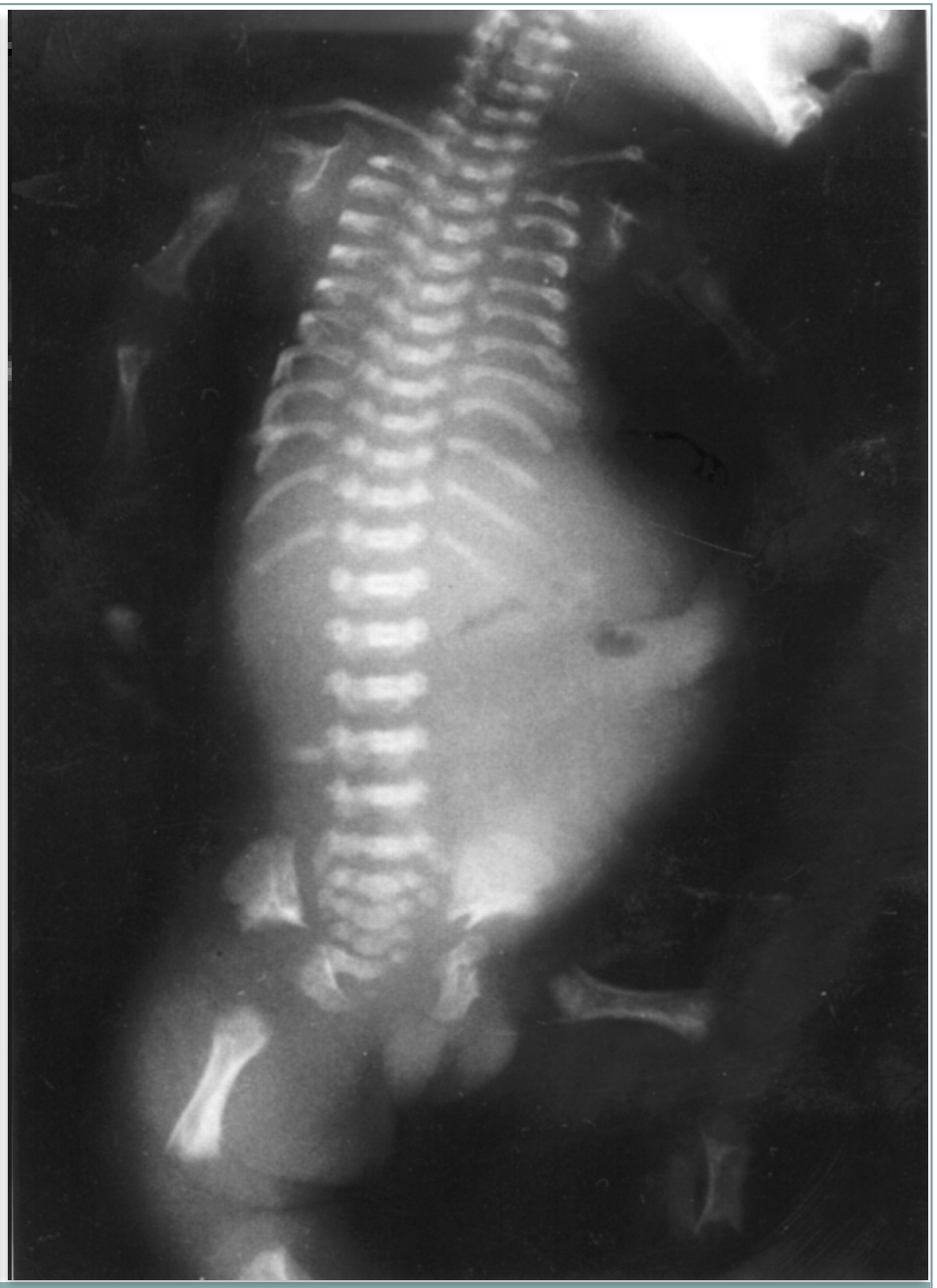
Prenatal -diagnosis

- Before birth- prenatal USG

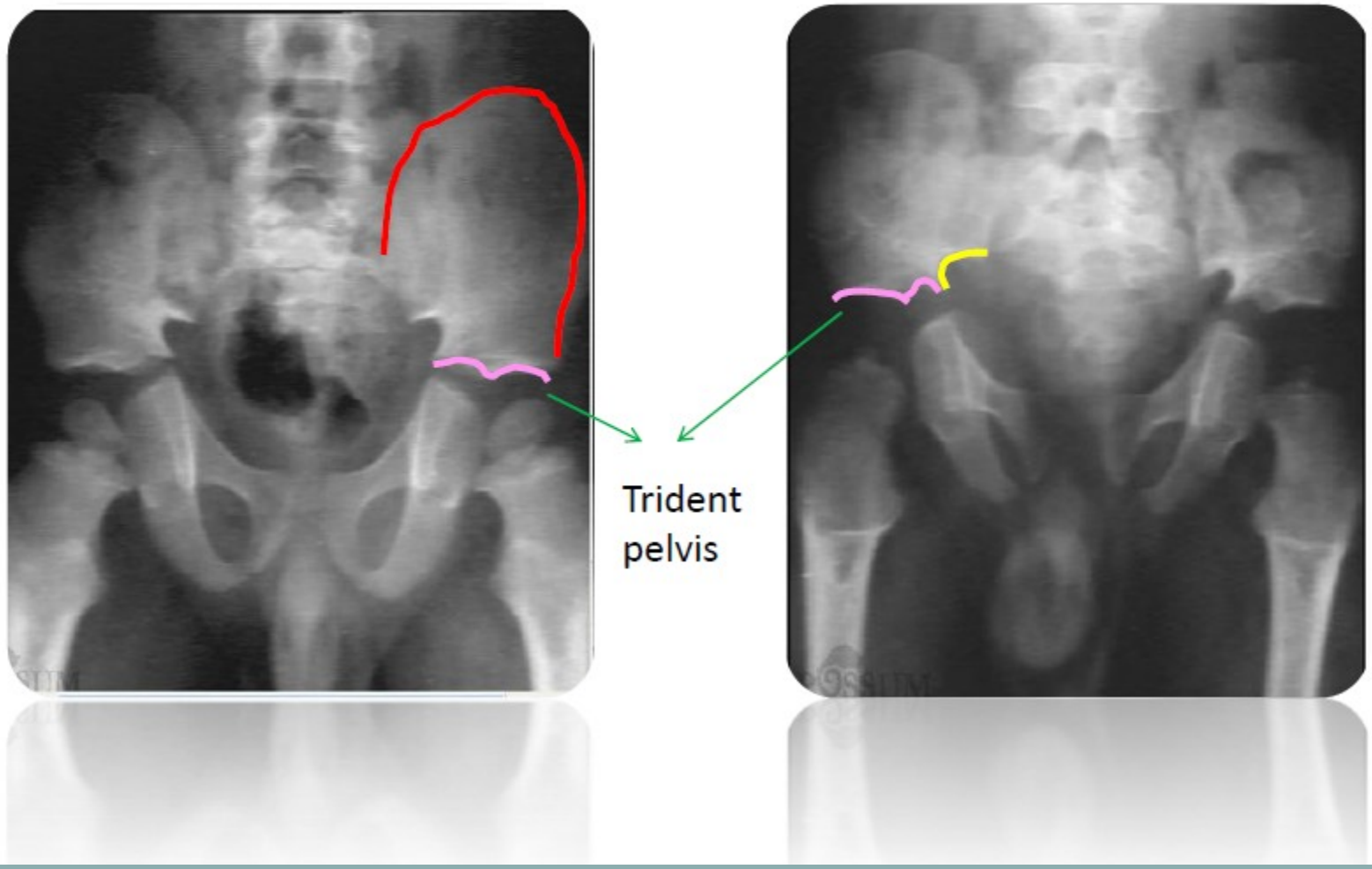
Radiological findings

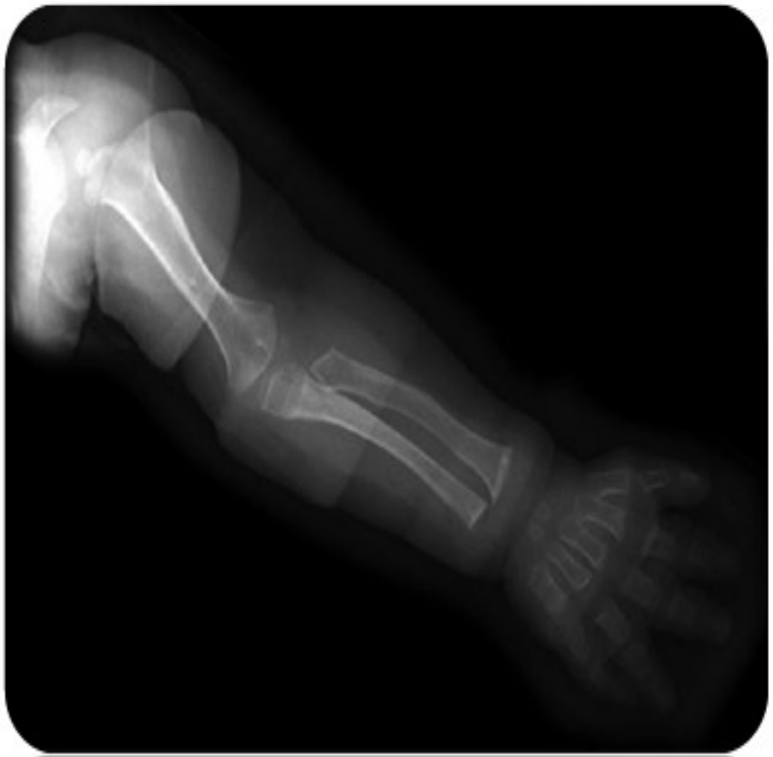
- The skull is large, with a narrow foramen magnum, and relatively small skull base
- The vertebral bodies are short and flattened with relatively large intervertebral disk height, and there is congenitally narrowed spinal canal
- Thoracolumbar gibbus is distinct feature
- The iliac wings are small and squared,[4] with a narrow sciatic notch and horizontal acetabular roof
- The hand is broad with short metacarpals and phalanges, and a trident configuration
- The ribs are short with cupped anterior ends

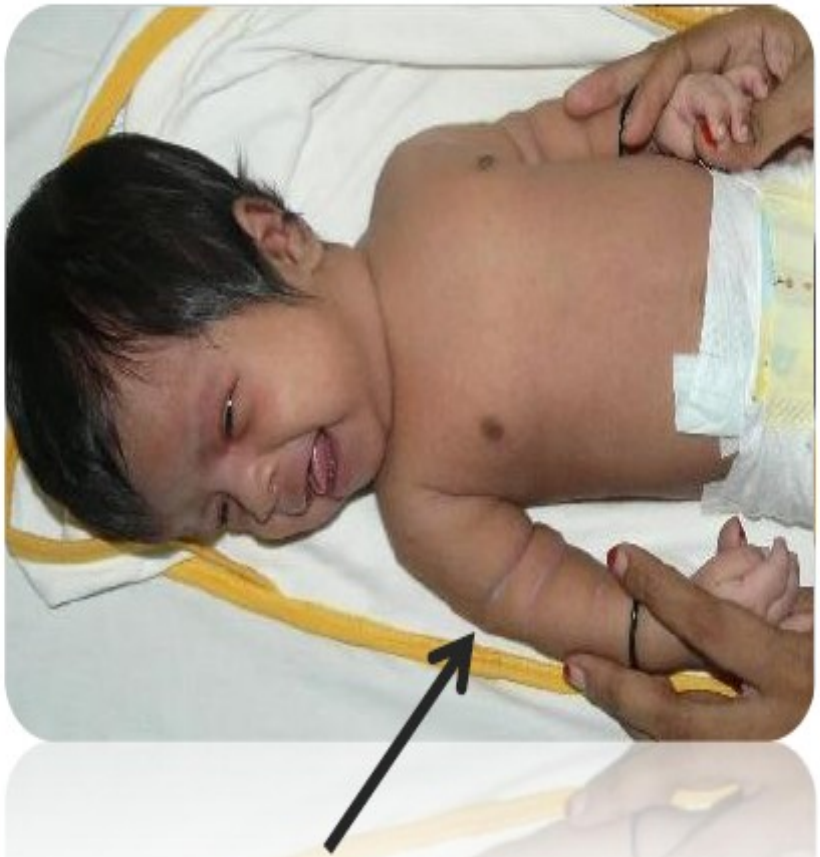


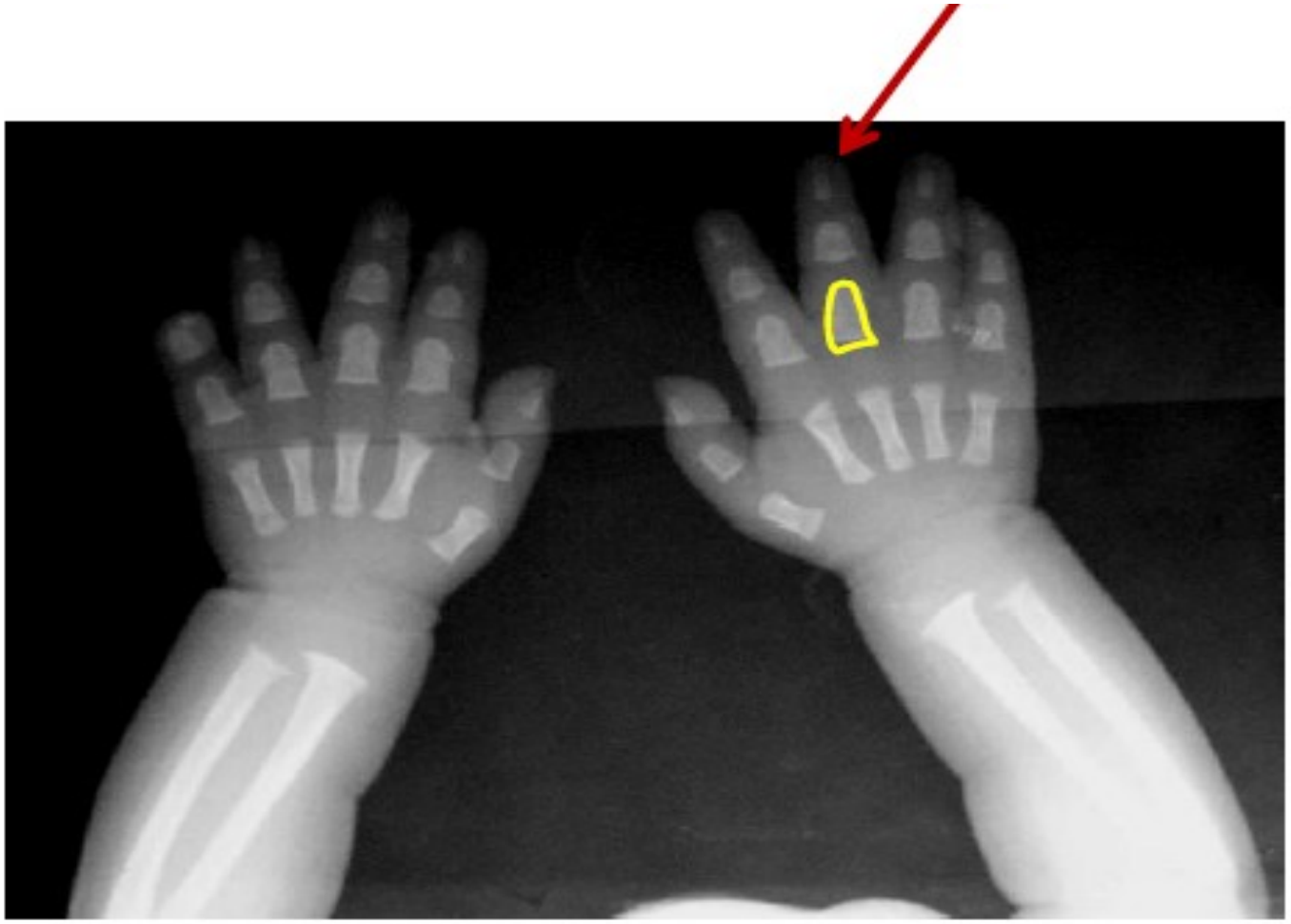


PELVIS



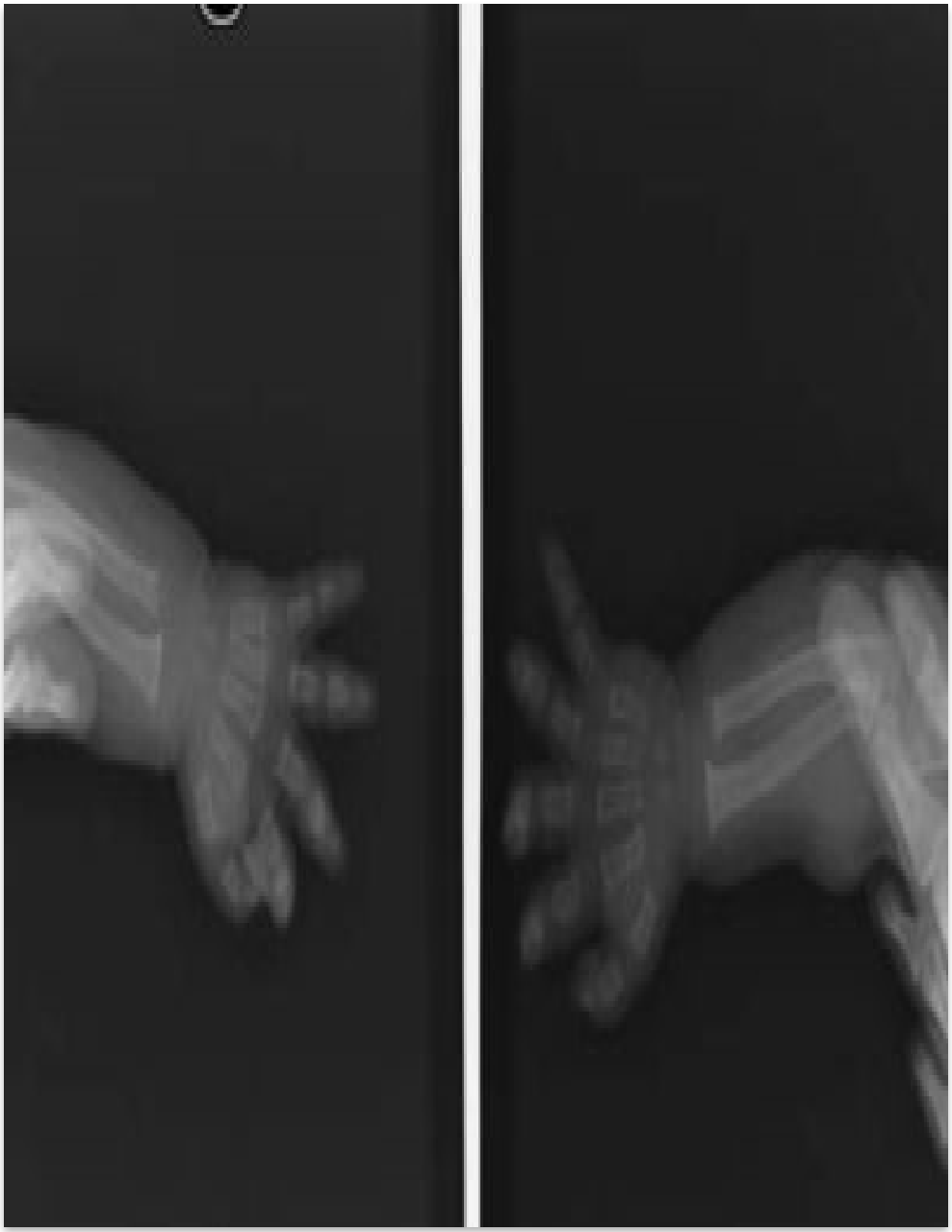


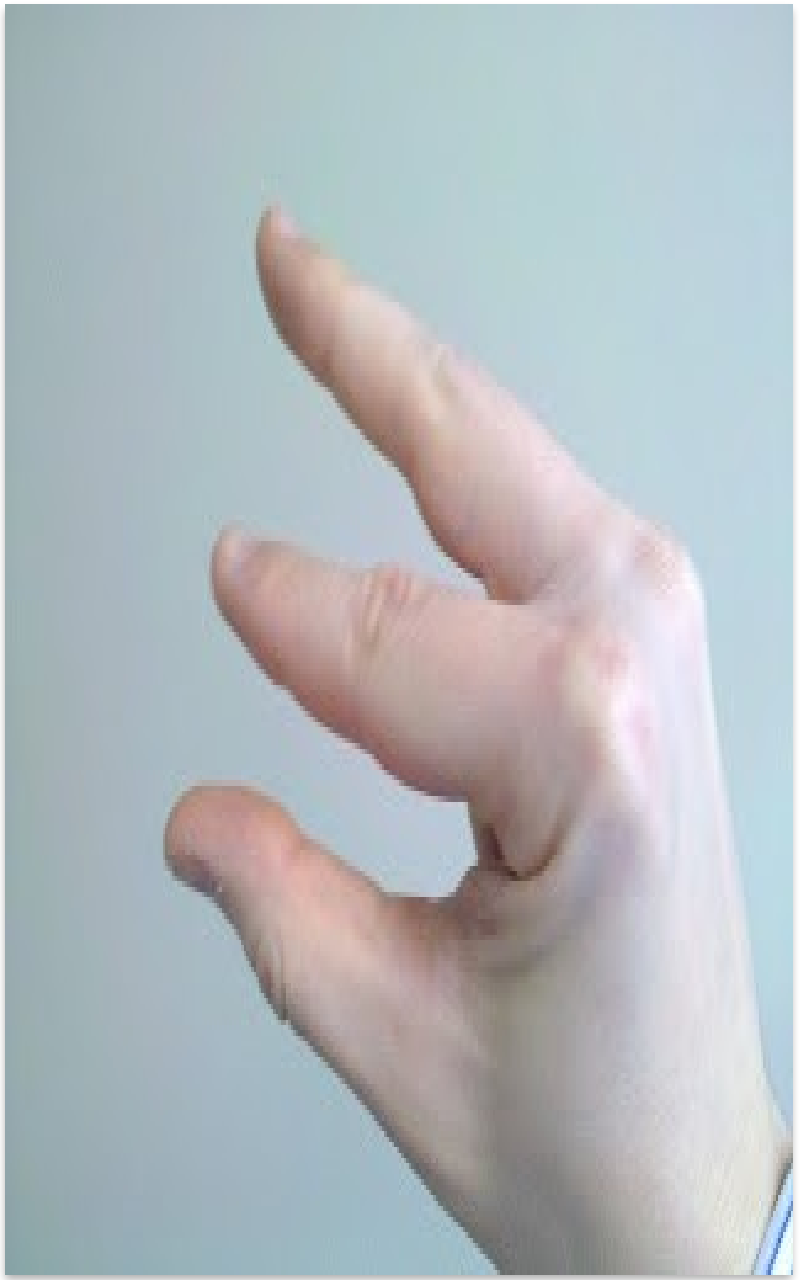


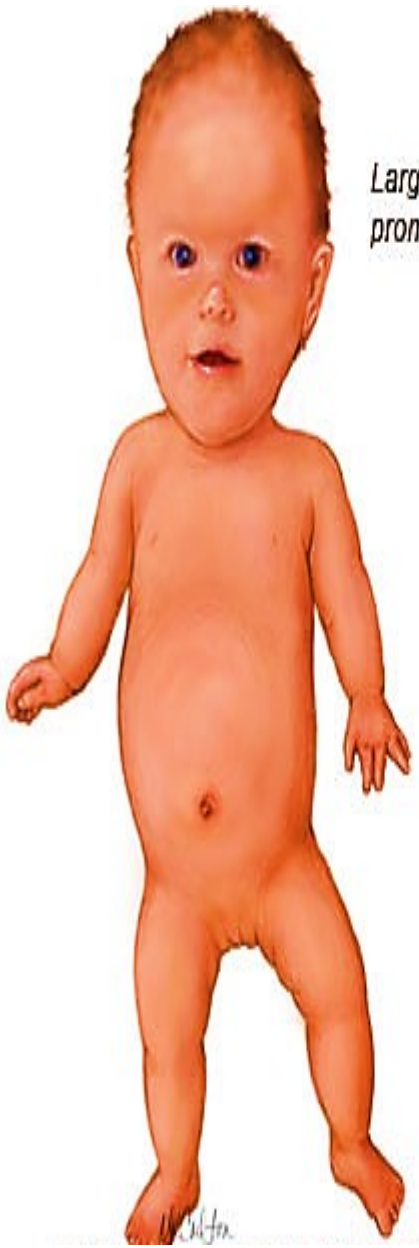


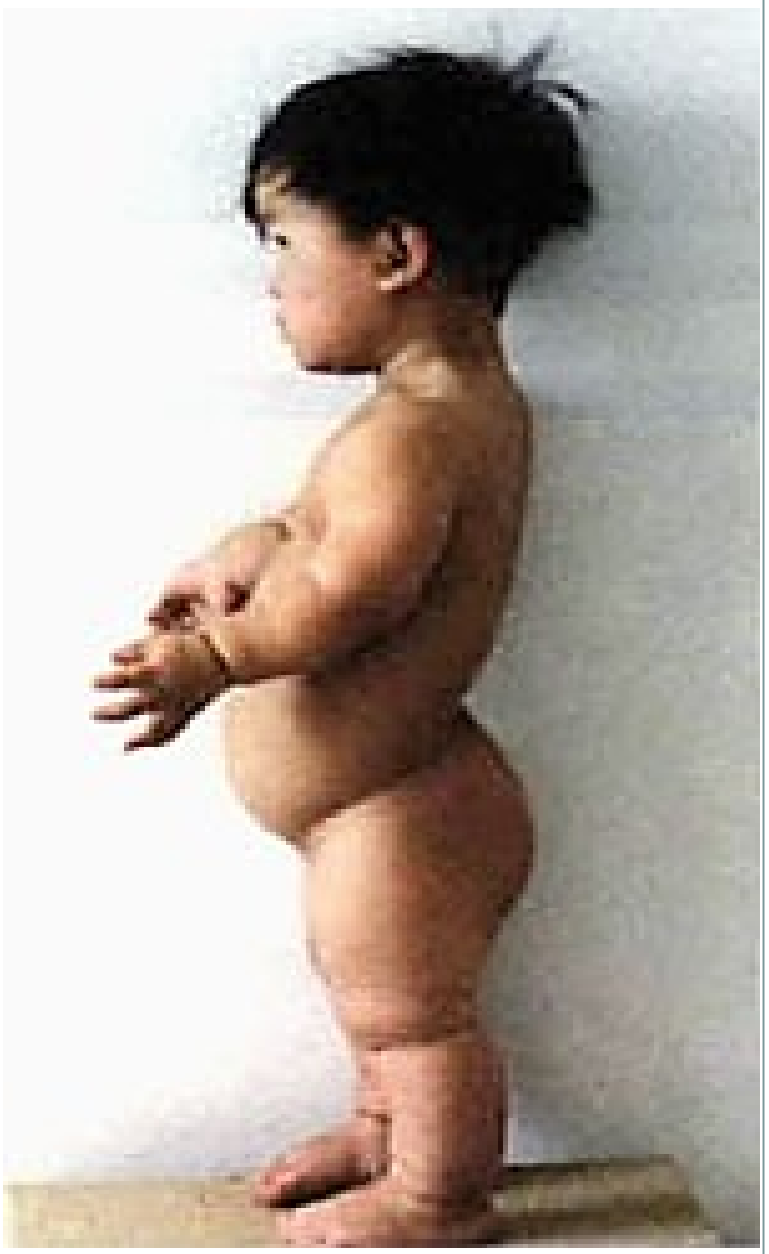
Clinical features

- Disproportionately large head.
- Prominent forehead, depressed nasal bridge & relatively prominent jaw.
- Disproportionate short stature , rhizomelic limb shortening, proximal segments of limbs are relatively short, trident hand.
- Lumbar lordosis, Thoraco lumbar kyphosis






Large head with
prominent forehead
Normal-sized torso
with short arms
and legs



- Protuberant abdomen.
- Bowed legs and waddling gait.
- No mental retardation but the mean IQ of the affected children is somewhat below average
- The larger the head, the lower is the likely IQ.

Treatment and prognosis

- At present, there is no known treatment for Achondroplasia
- Genetic counselling
- Treatment with human growth hormone has been used for over a decade and effectively increases bone growth rate, at least in the first year of life.
- There have been few studies looking at whether children treated with growth hormone achieve greater (or normal) adult heights

Surgery

- Surgery is sometimes needed to correct specific skeletal deformities.
- Spinal fusion -a surgery to permanently connect otherwise separate vertebrae. Surgery performed for patient with significant spinal kyphosis

- Osteotomy-the bones of the leg are cut and allowed to heal in the correct anatomical position. Procedure is for patients with severe knock-knee or bowed legs.

Outlook (Prognosis)

- People with Achondroplasia seldom reach 5 feet in height.
- Intelligence is in the normal range.
- Infants who receives the abnormal gene from both parents do not often live beyond a few months

Osteogenesis Imperfecta

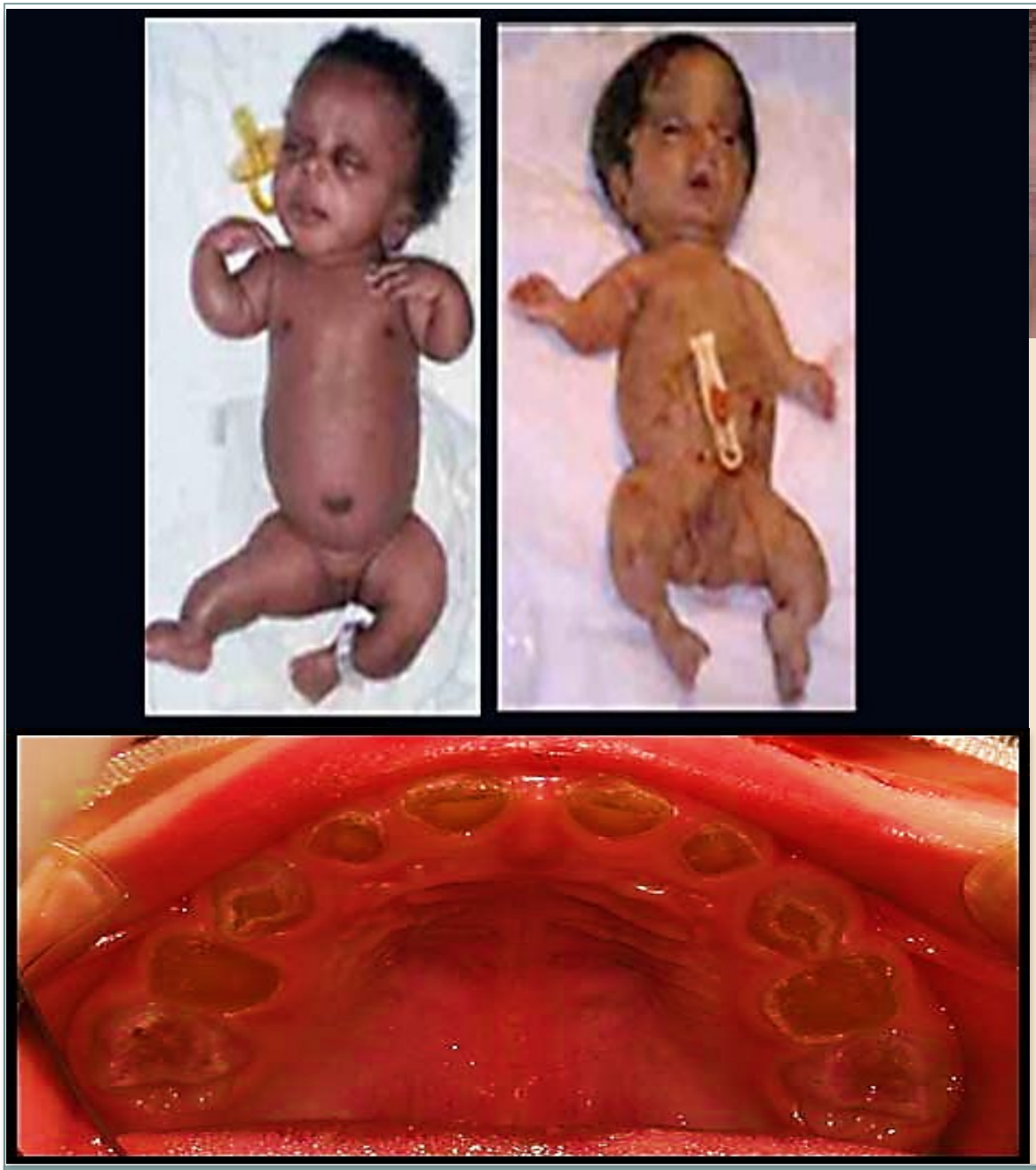
- OI is a genetic disorder the affects the gene that produces collagen in body
- **Brittle bone disease**, or "Lobstein syndrome
- Classically 2 basic forms are recognized:
- 1 Congenital 2 Tarda
- There are eight different types of OI, Type I being the most common
- The symptoms vary from person to person

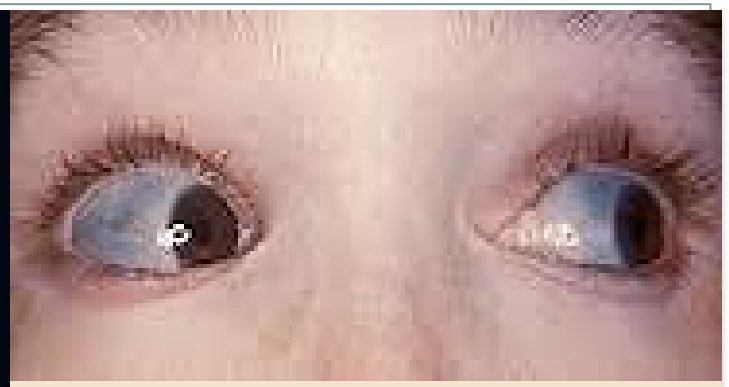
- Congenital form : numerous fractures from birth
  : poor prognosis
  : high mortality
- Tarda : manifests several years later
  : fractures may be delayed until the first decade
- Irrespective of type the fractures heal with residual deformity

Clinical features

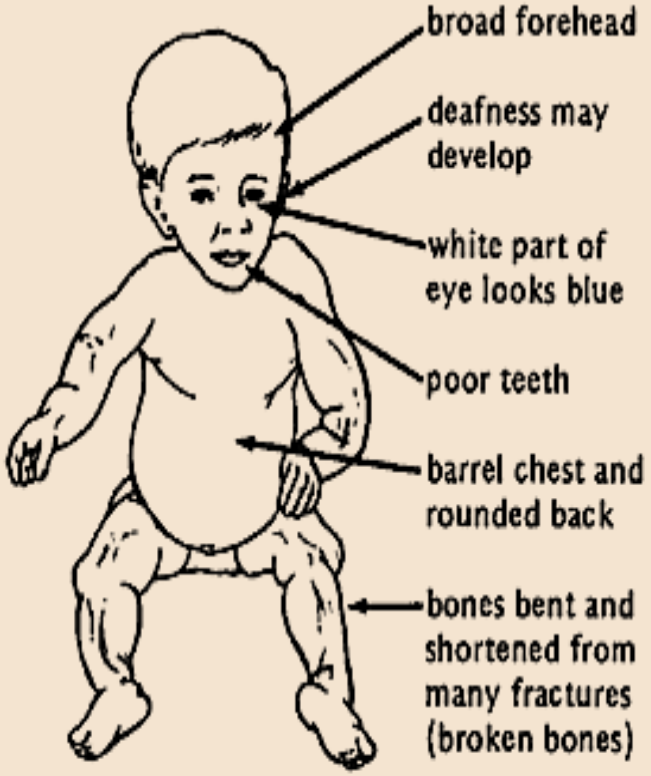
- Bone fragility identified in the form of pathological fractures is the hallmark
- **Type I:**
- Collagen is of normal quality but is produced in insufficient quantities:
- Bones fracture easily
- Slight spinal curvature
- Loose joints
- Poor muscle tone

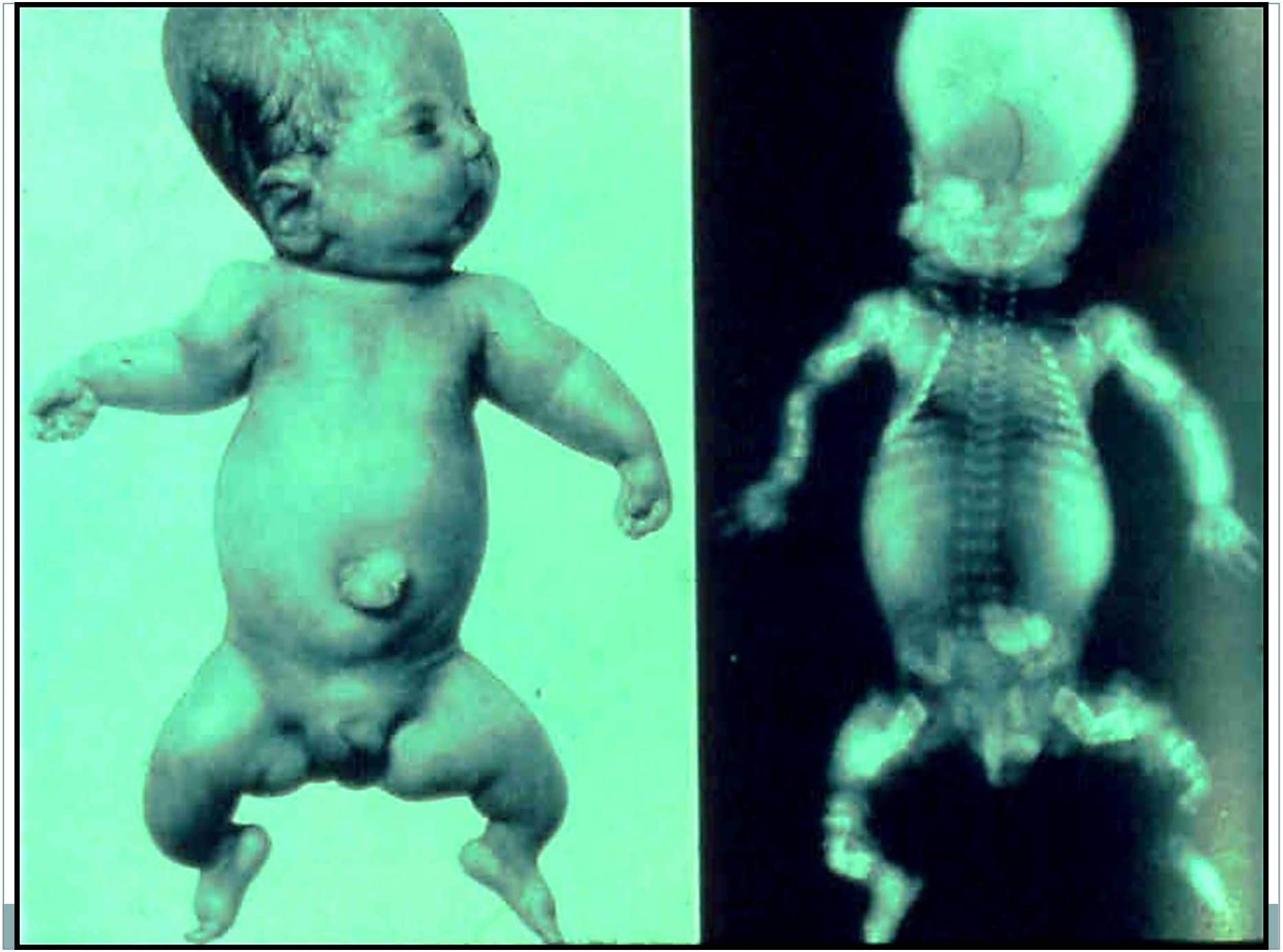
- Discoloration of the sclera (whites of the eyes), usually giving them a blue-grey colour.
- Early loss of hearing in some children
- Slight protrusion of the eyes





SIGNS OF BRITTLE BONE DISEASE





Methods of testing include:

- X-Rays
- ⑥ DNA sequencing using a collagen sample from blood
- ⑥ Biochemical tests using a collagen sample from the skin
- ⑥ Tests during pregnancy can be done through ultrasound and amniocentesis

Treatment

- At present there is no cure for OI. Treatment is aimed at increasing overall bone strength to prevent fracture and maintain mobility.
- There have been many clinical trials performed with Fosamax (Alendronate), a drug used to treat those experiencing brittleness of bones due to osteoporosis

THANK YOU ALL……..