Common Neonatal Problems

Part I

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Objectives

By the end of this presentation the student should be able to:

- Recognize the uniqueness of neonatal pathophysiology affecting illness presentation
- Mention some of the most common neonatal problems encountered in well-baby nursery and their management.

How The Newborn Infant Differs

Developmental considerations:

- Varying degree of immaturity in multiple systems
- Lower glomerular filtration rate (GFR) in the first few days
- Higher basal metabolic rate (BMR)
- Larger body surface area

Their kidney function 1\3 of adult normal kidney so you should adjust the dose of medication(Abx).

Increase insensible loss and BMR,that's why they need more calories\kg

Neonates Are NOT Just Small Children

Maternal Factors

You should ask about these in evaluating an infant:

Examples of ***maternal health issues*** and its effects on the newborn:

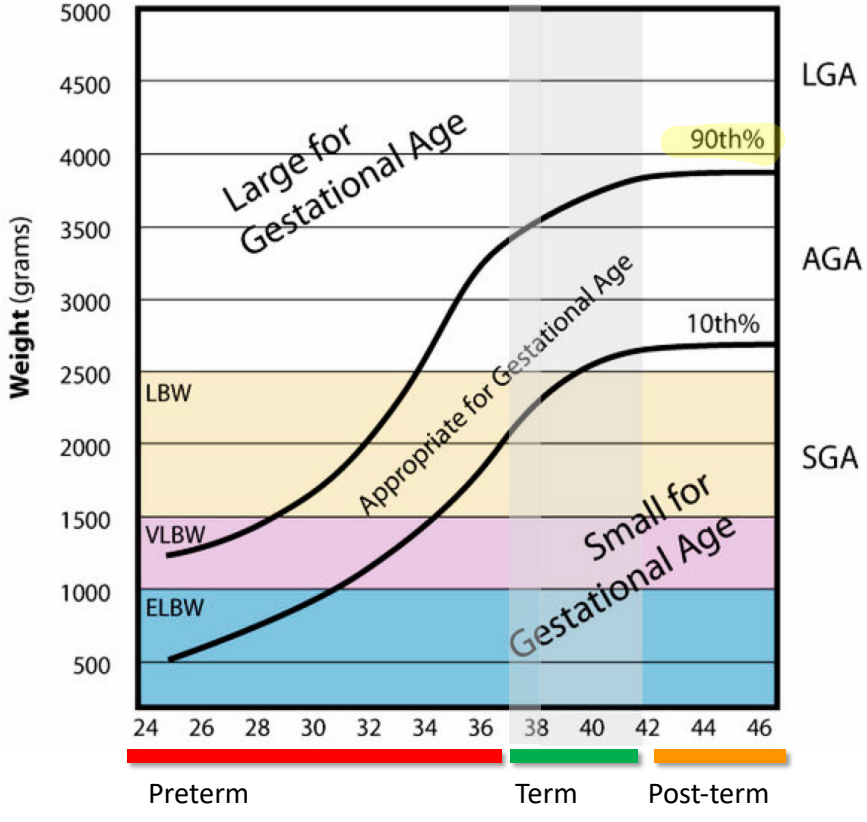
- Hypertension and small for gestational age (SGA) infants And Preeclampsia
- Myasthenia Gravis and neonatal hypotonia The antibodies can be transmitted to the fetus.
- DM and macrosomic infants
- SLE and neonatal lupus Will cause complete heart block.

Birth Weight (BW) & Gestational age (GA)

Term:37-42
Preterm:before 37
Post term:after 42

The appropriate weight for term baby is 2500-3700
Less will be small of gestational age
Above will be large for gestational age.

Low BW (LBW)	<2500 g
Very low BW (VLBW)	<1500 g
Extremely low BW (ELBW)	<1000 g



Signs ~~and symptoms~~

No symptoms cause infants can't talk

Thermal regulation
- Hypothermia
- Fever

Color changes
- Cyanosis
- Pallor
- Jaundice

Breathing pattern
- Apnea
- Tachypnea

Movement
- Convulsions
- Jitteriness
- Pseudo-paralysis

Sensorium
- Irritability
- Lethargy

GI tract changes
- Poor feeding
- Vomiting
- Abdominal distension

Thermal regulation abnormalities

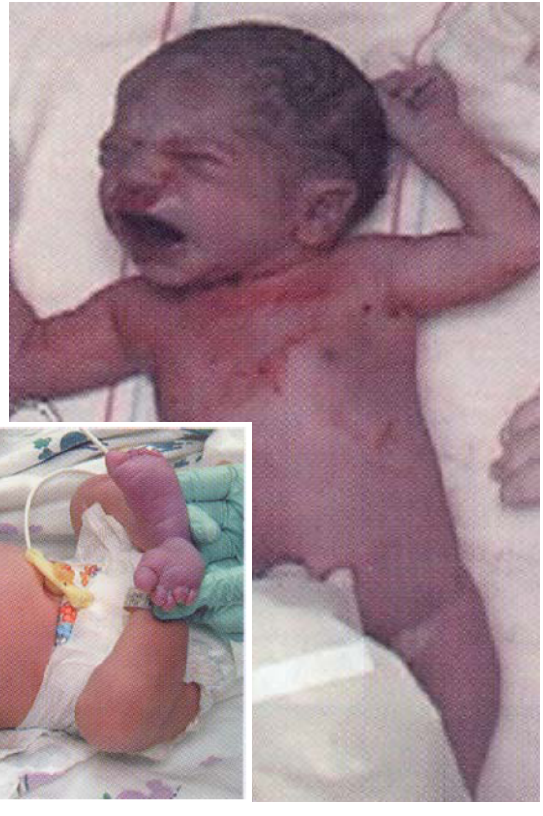
Hypothermia: Temperature of less then 36,common with preterm baby

- Sepsis
- Environmental

Hyperthermia: More then 37.5, more common with term baby.

- Environmental
- Over clothing
- Dehydration
- Infection

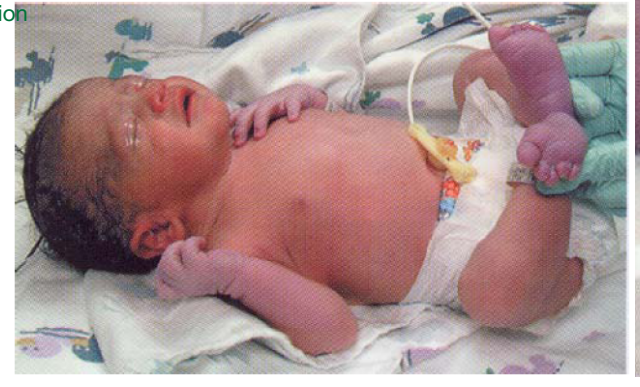
Cyanosis



Central cyanosis :

Lips and tongue are blueish in color and it's always pathological and should investigate.

- Respiratory insufficiency
- Cyanotic heart disease
- PPHN Persistent pulmonary hypertension
- CNS depression
- Hypoglycemia
- Sepsis



Peripheral cyanosis

Commonly seen in newborns and it does not require any investigation
Peripheral limbs>blue
Central body and tongue >pink

Pallor

- Anemia
  - Hemorrhage and hemolysis and less likely aplastic
  - Acute vs. chronic; prenatal vs. postnatal
- Shock The baby Is on distress,unresponsive+pale
  - Adrenal failure
  - Cardiogenic
  - Sepsis

Convulsions

Any abnormal,unexplained movement that you can't stop
If you can stop it>jitteriness

Distinguish it from jitteriness and apnea

Focal, generalized or subtle

Causes:

Most commonly these 2 causes:

- Electrolyte abnormalities: Ca, Na.
- Hypoglycemia
- Inborn error of metabolism
- Drug withdrawal
- Pyridoxine deficiency
- Cerebral anomalies
- Cerebral Infarction
- Intracranial hemorrhage
- Birth Asphyxia
- Meningitis If there is any risk like maternal infection.
- Familial

Lethargy

Being excessively sleepy and inability to arouse the baby by pinging...etc

- Sepsis
- Asphyxia
- Sedation
- Hypoglycemia
- CNS anomalies
- Inborn error of metabolism

Irritability

You have to differentiate between normal crying and irritability(high pitched crying without abvious reason)

- Sepsis
- Drug withdrawal
- Meningeal irritation
- Congenital glaucoma
- Intra-abdominal conditions Valvulus

Poor Feeding

Always abnormal

- Prematurity
- Sick newborn infants (*especially sepsis*)

Vomiting

Possibly twice a day,if excessive vomiting you have to rule out:

- Sepsis
- Over-feeding
- GI obstruction
- Pyloric stenosis
- Increased intracranial pressure
- Milk allergy

Abdominal Distention

Normally babies have mild distension but if it was like ballon this is abnormal.

- GI obstruction
- Abdominal mass
- Necrotizing Enterocolitis (NEC)
- Ileus
  - Hypokalemia
  - Sepsis

Pseudo-paralysis

Not being able to move the extremity

- Fracture
- Dislocation
- Nerve injury
- Osteomyelitis

Selected Issues

JAUNDICE

Hyperbilirubinemia

Jaundice

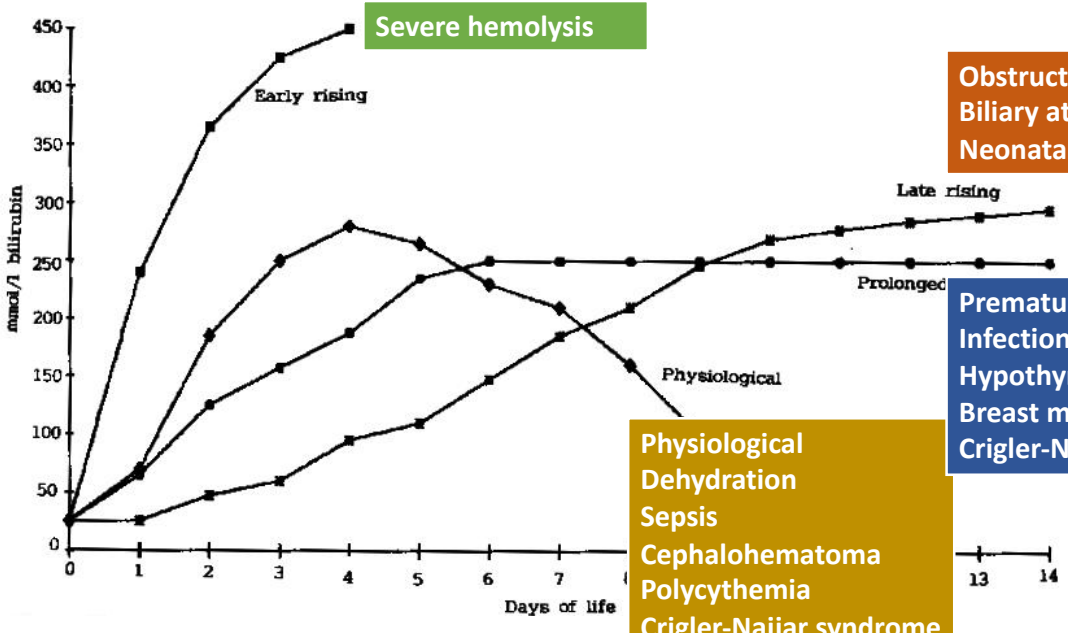
Skipped

- *In the first 24 hours*:
  (*almost always pathologic*)
  - Erythroblastosis fetalis
  - Hemolysis
  - Sepsis
  - TORCH

- *After 24 hours*:
  - Physiologic
  - Sepsis
  - Hepatitis
  - Hemolytic anemia
  - Congenital infections
  - Inborn Errors of Metabolism (*e.g.* Galactosemia)

Patterns of neonatal jaundice

Skipped

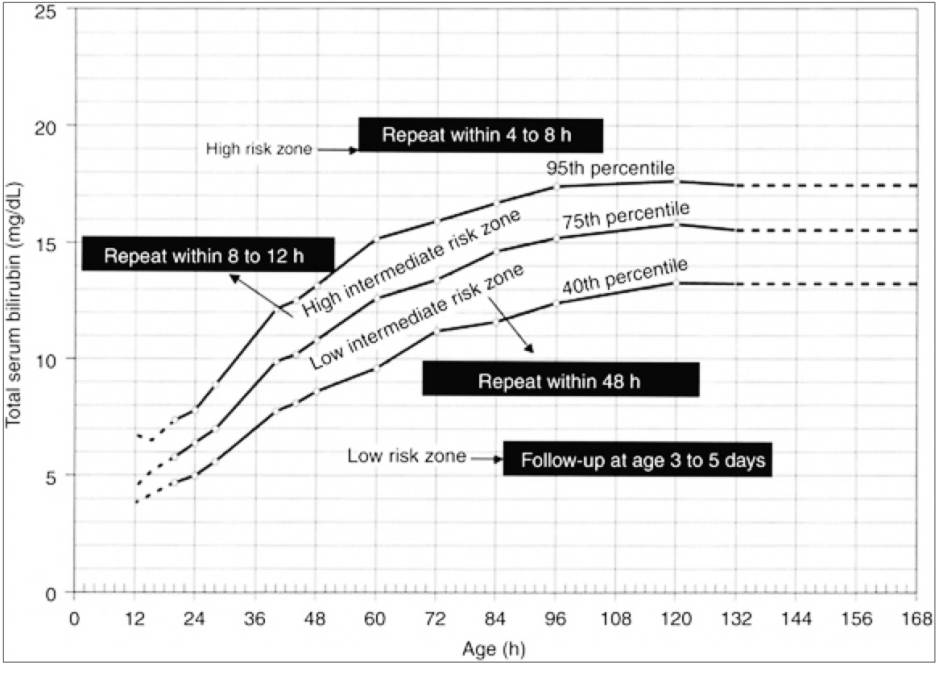


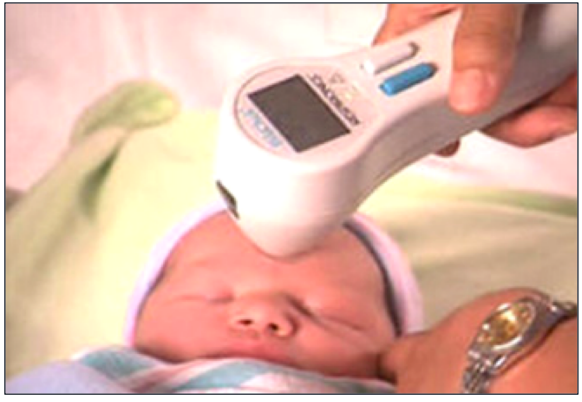
Physiological vs. Pathological Skipped

	Physiological	Pathological
Onset	2nd-3rd day of life	At any time
Level of Bilirubin	Usually lower	Usually higher
Type of Bilirubin	Unconjugated	Any
Rate of increase	Slow increase *(usually <85μmol/L/24h)*	May be faster *(usually >85μmol/L/24h)*
Duration	Shorter *(7-10 days in the term &* *14 days in the Preterm)*	May be longer
Physical Exam and Lab. tests	Normal, healthy infant	Abnormal

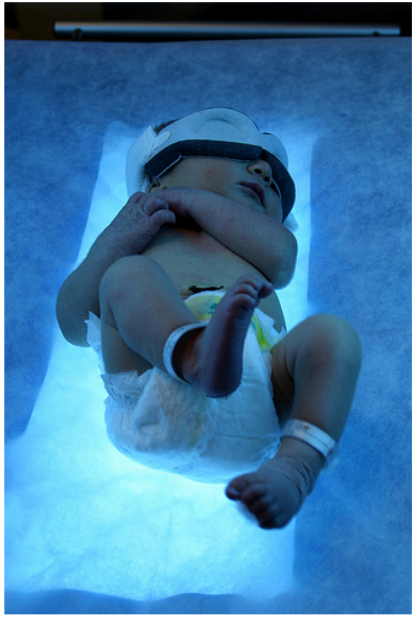
Management

Skipped





Phototherapy Skipped



Breast MILK Jaundice

Skipped

- Unconjugated hyperbilirubineamia beyond 2nd week of life
  - Disappears within 2 days of breast feeding discontinuation
  - May take up to 3 months to resolve completely
  - Due to (?) a substance in human milk that inhibits the activity of glucoronyl transferase

Treatment

- Reassurance after exclusion of other pathologies
- Stoppage of breast feeding is NOT recommended

Breast FEEDING Jaundice

Skipped

- May be related to decreased amount of milk consumed by the infant (breast-feeding failure)
- More effective nursing may prevent early “starvation” in breastfed newborns and reduce the incidence of this type of jaundice

Intrauterine growth restriction (IUGR)

IUGR vs. SGA

IUGR vs. SGA

Not every SGA is IUGR and vice versa

IUGR Malnutrition in utero but they can have normal body weight.

Failure of normal fetal growth caused by multiple adverse effects

SGA Could be familial or IUGR

When infant birth-weight is:

- <10th percentile for gestational age ***or*** Growing normally in utero at 10th percentile.
- >2 standard deviations below the mean for gestational age

Why IUGR matters

- Increased risk of perinatal complications
  - Perinatal asphyxia
  - Cold stress Less adipose tissue
  - Hyper-viscosity (due to polycythemia)
  - Hypoglycemia

Outcomes of IUGR infants

- Depends on: The earlier it detected>worse outcome cause it might be caused by chromosomal abnormalities...etc
  - The ***cause*** (the most important determinant of outcome)
  - The ***time*** detected
  - The presence of ***fetal compromise*** Presence of Asphyxia
- Infants with chromosomal disorders or congenital infections (*e.g.* CMV) experience early IUGR, and commonly have a disability

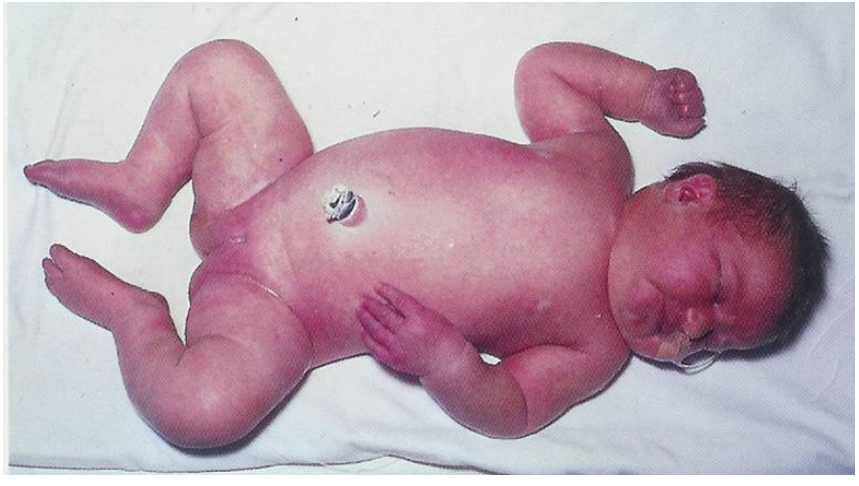
Macrosomia

Infant of diabetic mother (IDM)

Macrosomia

- Defined as:
  - Birthweight > 90th percentile for gestational age ***or***
  - Greater than 4,000 g
- More in IDMs (15% - 45%) vs. normal infants (8% to 14%)

More common in diabetics mothers but can be familial.



Macrosomia

High blood glucose in mother is delivered to the baby>high insulin in fetus blood>anabolic effect on adipose tissue.

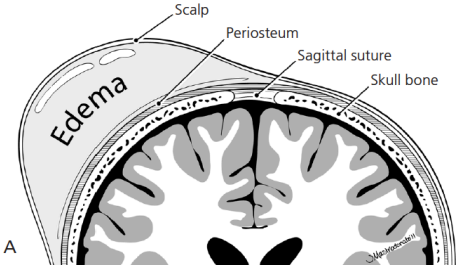
- Fetal hyperglycemia and hyperinsulinemia affect primarily insulin sensitive tissues such as fat
- The risk of macrosomia is similar for all classes of diabetes (type 1, type 2, and gestational)
- Glycemic control in the 2nd and 3rd trimesters may reduce the macrosomia rate to near baseline
- Macrosomia is a risk factor for intrapartum injury (shoulder dystocia and asphyxia) and for cesarean delivery

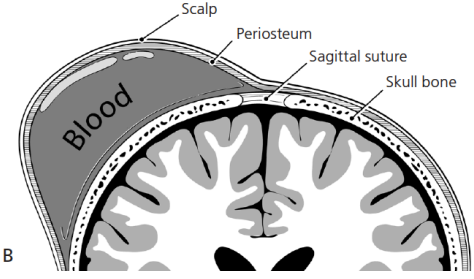
The big baby will stuck in birth canal causing more complication.

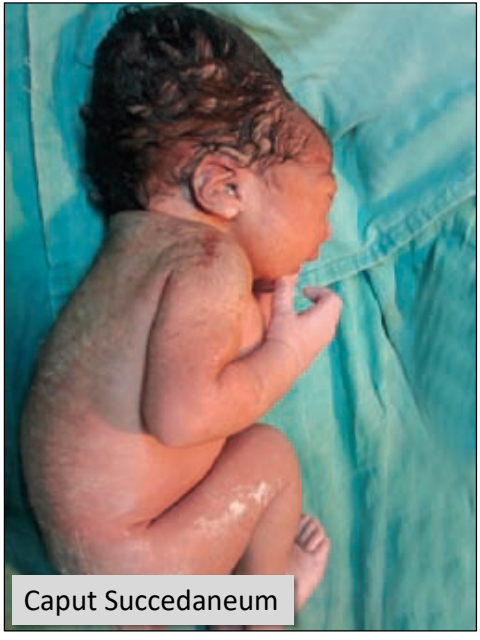
Birth injuries

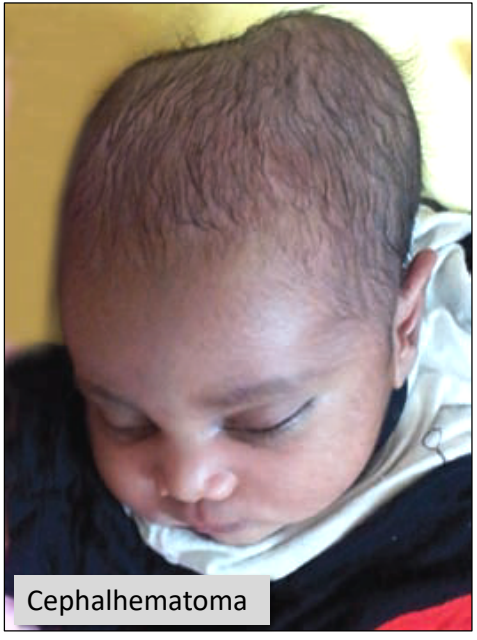
Birth trauma

It's important to differentiate between
Caput succedaneum:edema in scalp maybe mixed with blood due to prolonged engagement of head at the birth canal,and it overlies sutures can cross the midline ,hard on examination
Cephalhematoma:blood between the bone and periosteum not crossing midline can lead to significant bleeding,fluctuating in examination.



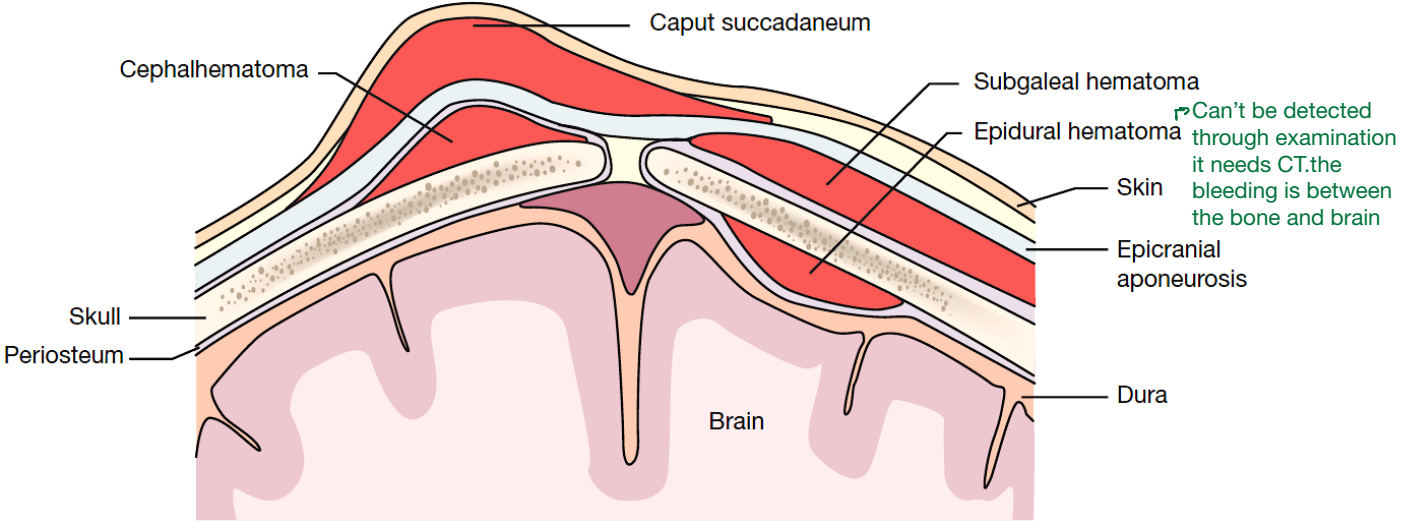



Caput Succedaneum


Cephalhematoma

Other Scalp Hemorrhages

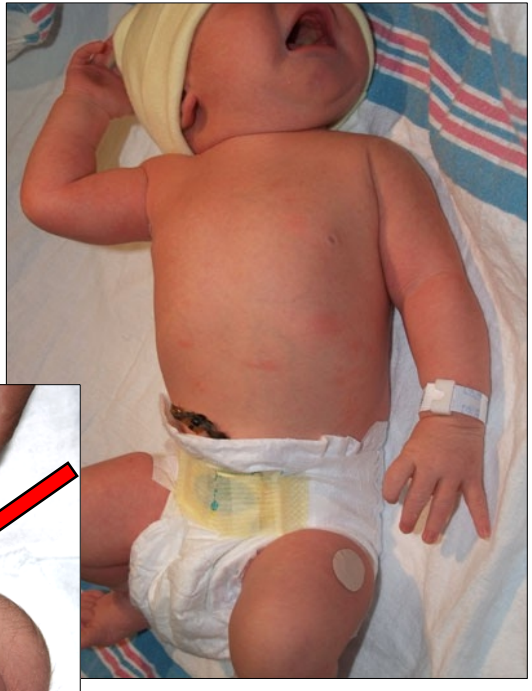
Subgleal hematoma:bleeding between glea and periosteum, usually it's localized to one bone but can involve the entire head,baby can be in shock it should be treated immediately(emergency)



Can't be detected through examination it needs CT.the bleeding is between the bone and brain

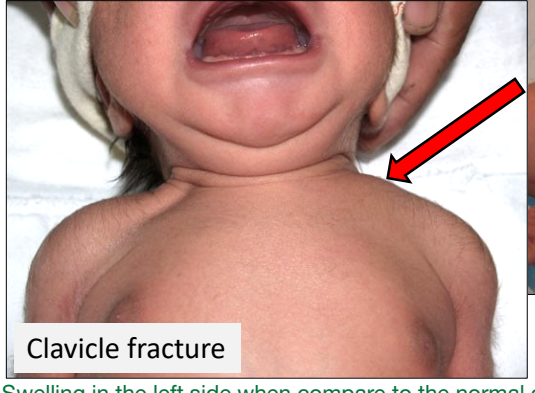
Erb's Palsy

Loss of Moro reflex on the affected side
Moro reflex:In response to the sound, the baby throws back his or her head, extends out his or her arms and legs, cries, then pulls the arms and legs back in.



- C5-C6 Injury
- ***Paralysis*** of deltoid, supraspinitus, biceps and teres major.
- ***Loss of sensation*** over deltoid, lateral forearm and hand.
- ***Porter's Tip Position:*** Adduction and internal rotation of the arm and extension of elbow joint.

Management:observe for two weeks most of the infant will recover if not>physiotherapist for 2 weeks then referral to neurosurgeon.



Swelling in the left side when compare to the normal dipping on the other side
Clavicle fracture management:observe,family instruction.

Congenital Anomalies

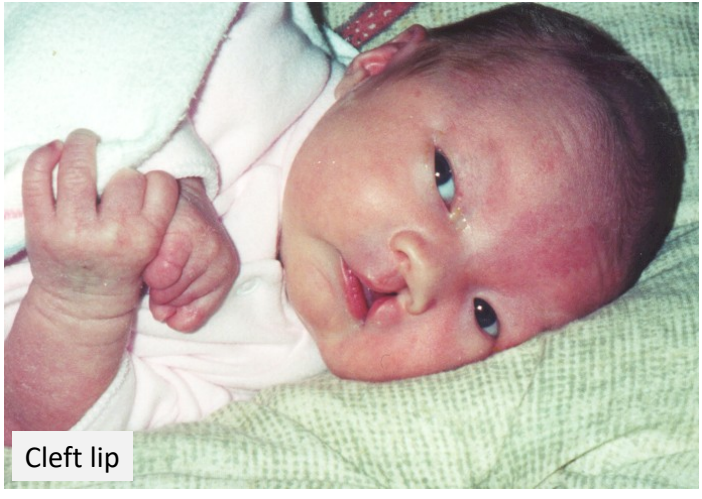
Malformations, deformations and disruptions

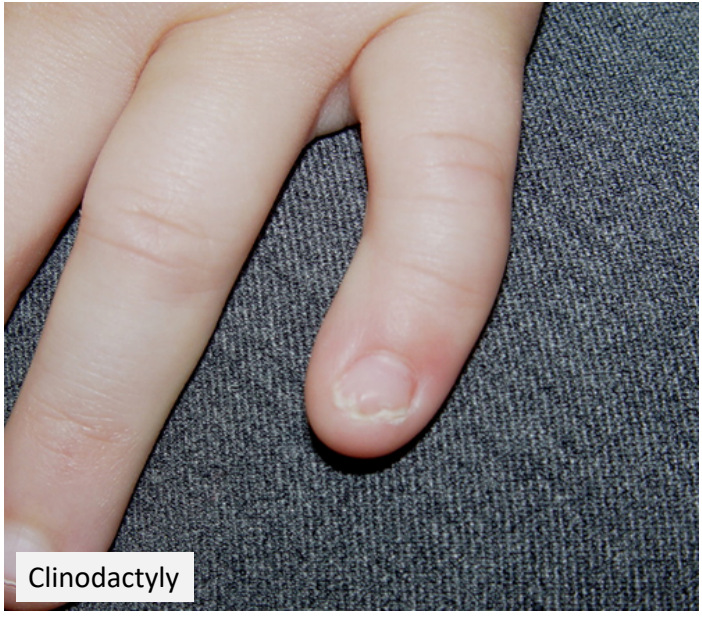
Congenital Anomalies

Can be non inherited

- "Congenital"__ the defect is present at birth
- *Major* (2% to 3% of live born infants) Less common but it effect the function.
    - Medical and social consequences (*e.g.* cleft palate and neural tube defects)
- *Minor* (Up to 15%)
    - No significant health or social burden (*e.g.* a single palmar crease)
- *Normal phenotypic variants* Like the differences in eye shape
    - Physical differences occurring in 4% or more of a general population

Major vs. minor





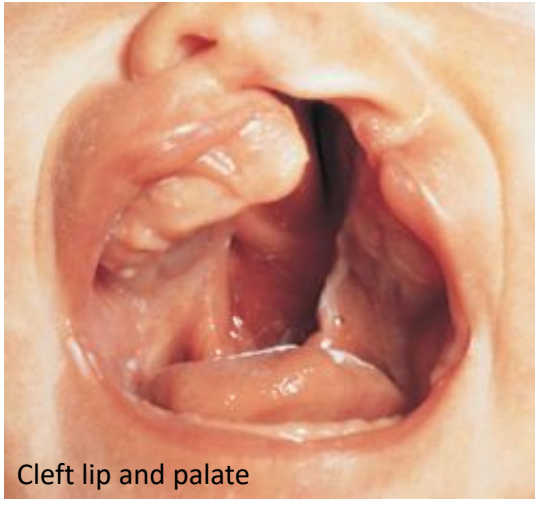
Minor

Normal variant

Can be in normal individual or with Down syndrome

Malformations

- Abnormal processes ***during*** the initial formation of a structure
- May result in:
  - Faulty configuration (*e.g.* TGA) Trans position of great arch
  - Incomplete formation (*e.g.* cleft palate)
  - Agenesis (*e.g.* absence of radius)

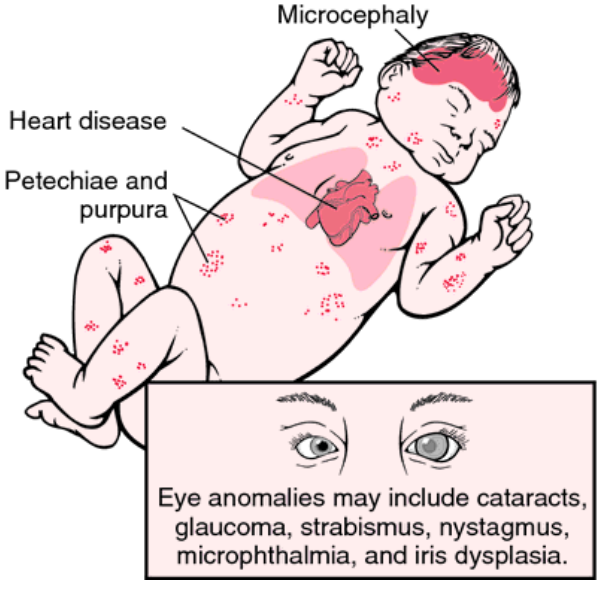


Cleft lip and palate

Malformations

Causes

- Genetic - chromosomal (10%), ***or***
  - single gene (4%)
- Environmental insults (teratogens)
  - Drugs – thalidomide
  - Congenitally acquired viruses – Rubella
- Multifactorial (25%)
- Unknown (40%-45%)



Disruptions

- Breakdown of normal tissue ***after*** formation

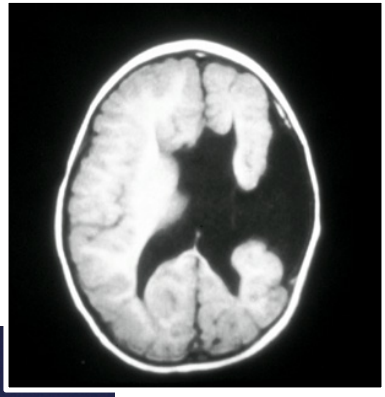
Causes

- Mechanical compressive forces, hemorrhage, thrombosis, and other vascular impairments

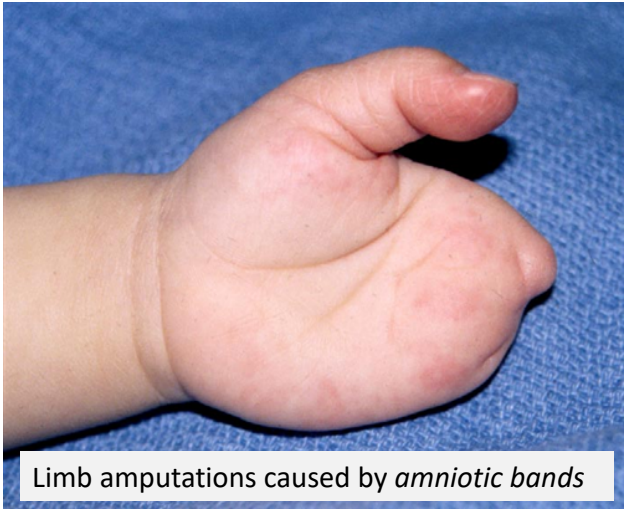
Manifestations

- Alterations of configuration, division of parts not usually divided, fusion of parts not usually fused, and the loss of previously present parts

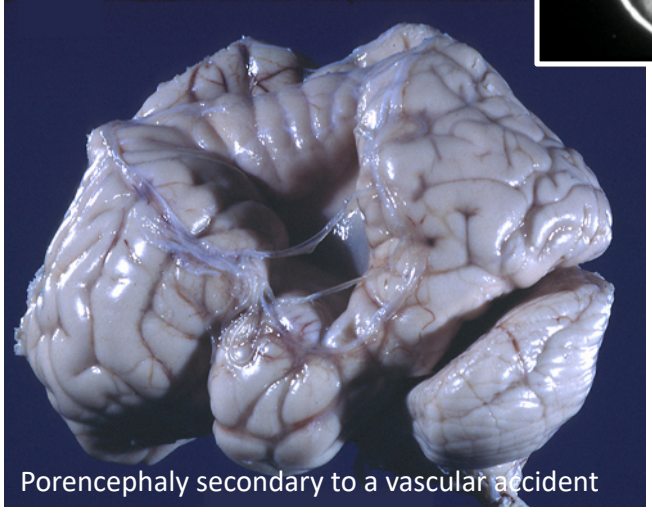
Disruptions



The limb Was normally formed previously



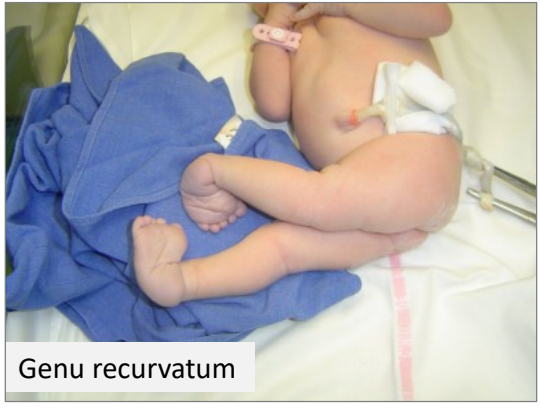
Limb amputations caused by *amniotic bands*

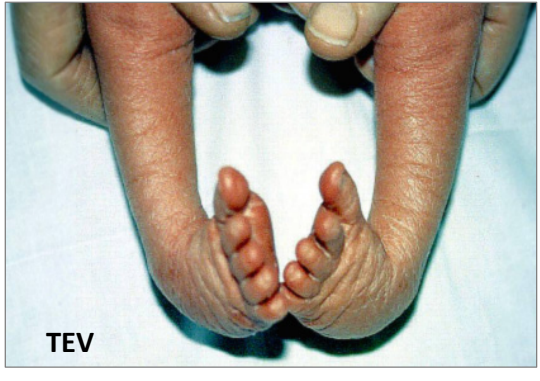


Porencephaly secondary to a vascular accident

Deformations

- Unusual and ***prolonged mechanical forces*** acting on normal tissue
- External (uterine constraint) vs. intrinsic (edema)
- Mostly Musculoskeletal tissues
  - Tibial bowing and hip dislocation associated with breech presentation
  - Webbing of the neck upon the involution of a giant cystic hygroma)

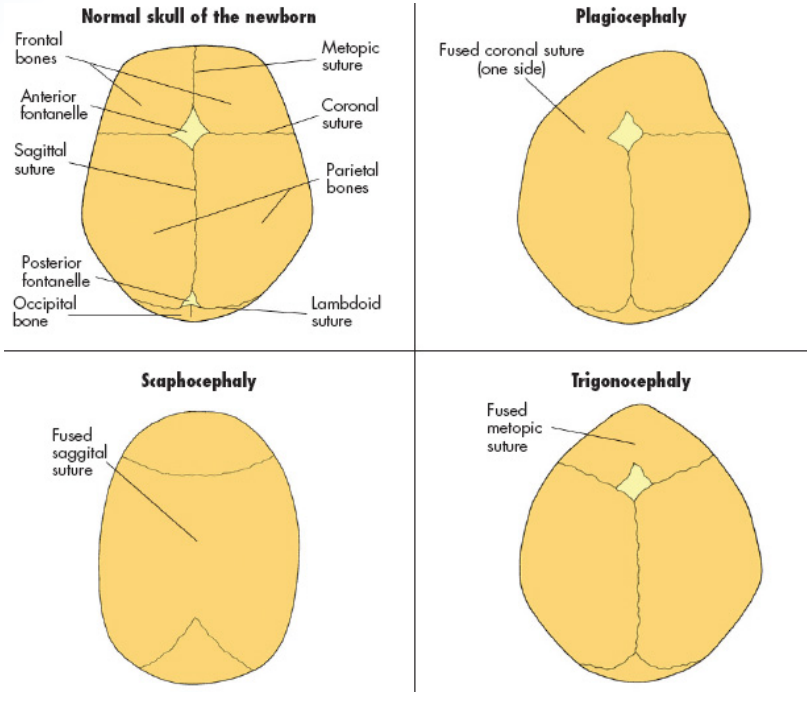

Genu recurvatum



Deformations

- Typically, deformations improve postnatally
- Their resolution depends on the duration of the abnormal forces and the extent of subsequent growth

Early closure of the sutures can lead to abnormal skull shape



Cranio-stenosis resulting from in-utero constraint

Dysplasia

- Abnormal cellular organization or function
- Typically, affects a single tissue type

Examples

- Ectodermal dysplasia, Skeletal dysplasia and hamartoma

Ectodermal dysplasia

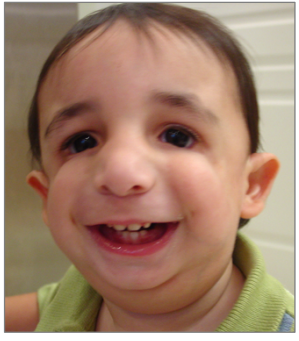
Multiple Anomalies!

Syndrome

Multiple defects that are **NOT** explained on the basis of a single initiating defect, but share a cause (*e.g.* chromosome or single gene disorders, or environmental teratogens)

Examples:

- Trisomies 13,18,21
- Tracher collins



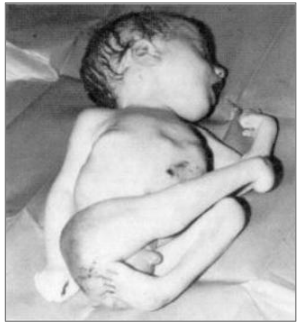
Sequence

All of the anomalies can be explained on the basis of a single problem

Examples

- Pierre Robin sequence
- Oligohydramnios

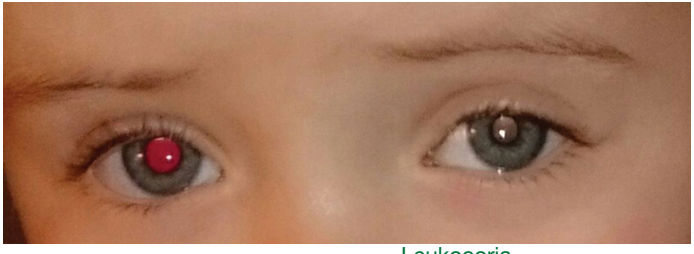
Less fluid>less space>bones are growing incorrectly
And it also effect lung development so they might have pulmonary hypoplasia



Common encounters!

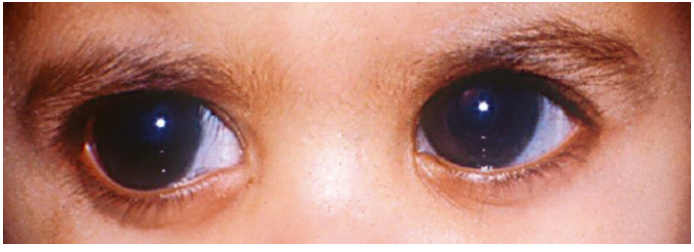
Head to Toe

The eyes



Normal red reflex

Leukocoria
Can be retinoblastoma or cataract interrupting light

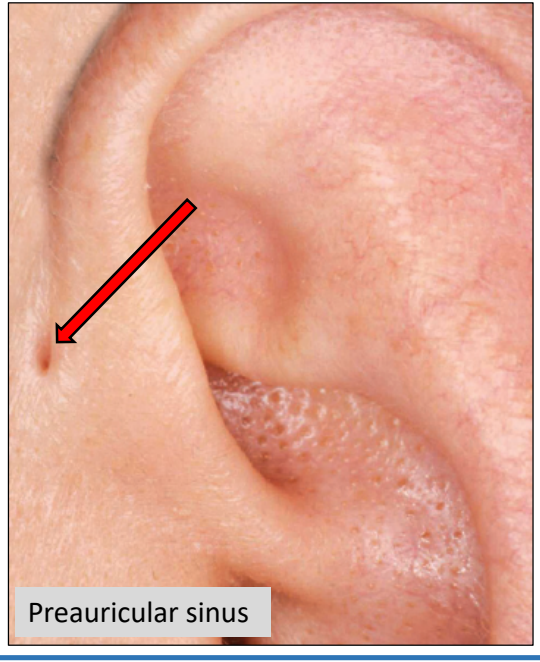


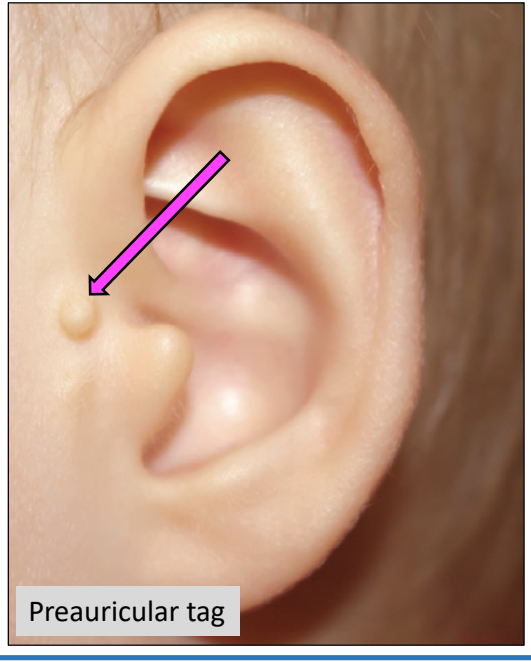
Bilateral Large iris and hazy eyes>congenital glaucoma

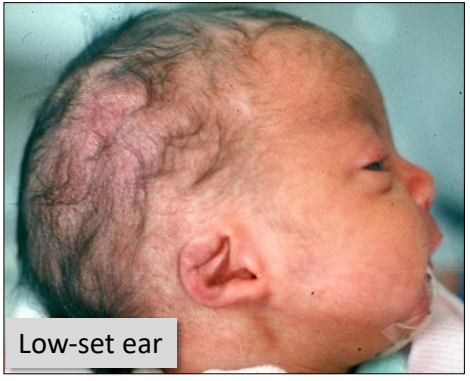
The ears

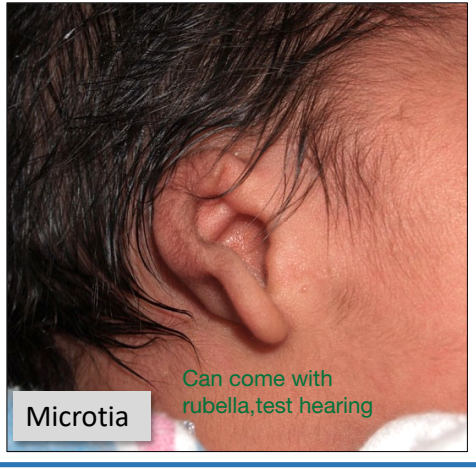
Low set ear:more then 1/3 of ear is below an imaginary line between eye and occipit.
Can be associated with trisomy 21 or 18...

Preauricular sinus and tag can be associated with renal anomalies


Preauricular sinus

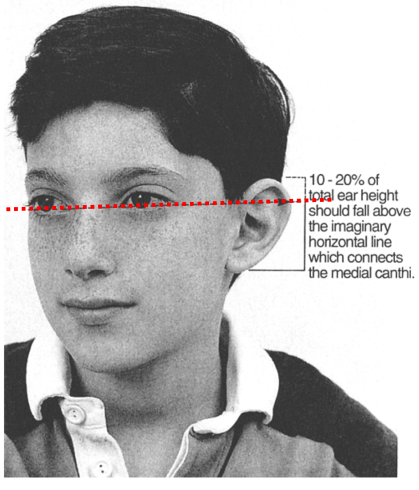

Preauricular tag


Low-set ear

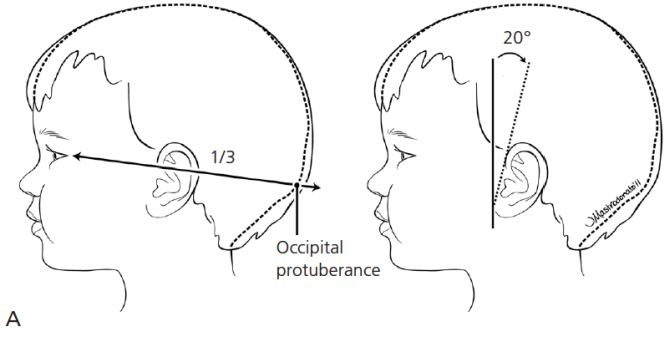

Microtia

Can come with rubella,test hearing

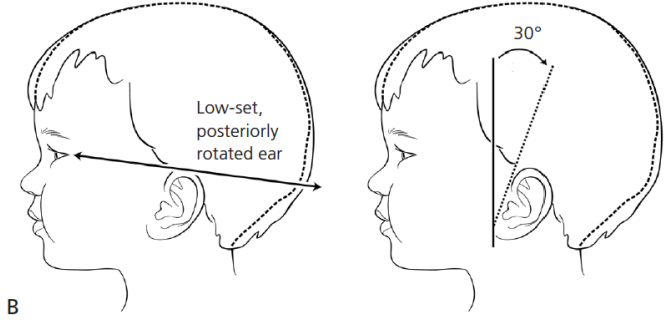
The ears



Normal ear



Low-set,
posteriorly rotated



The nose

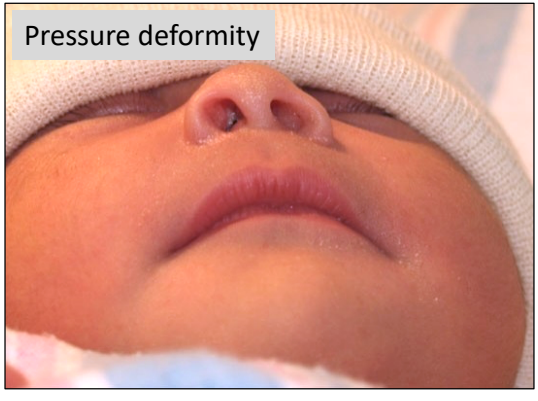
Here the base I'd widened and deviated.
High risk of perforation(emergency)call ENT.

Shape and size
- Race and family determined

Patency
- Infant is an "obligate nasal breather"
- Shut infant's mouth to look for choanal atresia

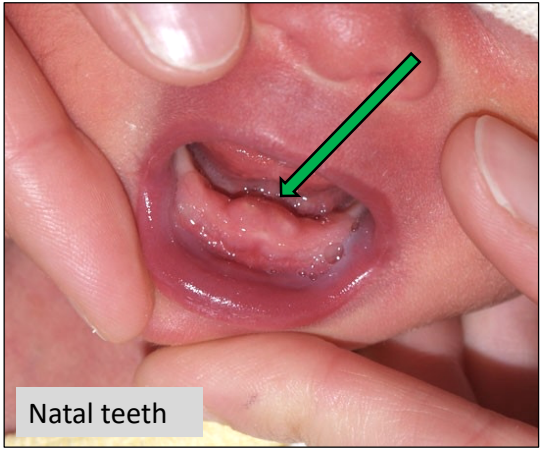
Deformities
- Trauma or syndromic

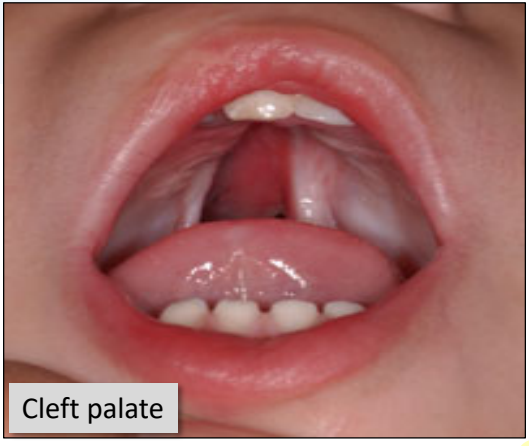
The base is in the mid but the septum is deviated only.
Can be secondary to oligohydraminise.
It will be corrected with time but make sure that baby is breathing and feeding properly.

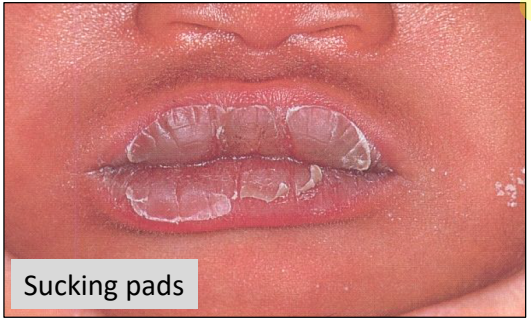


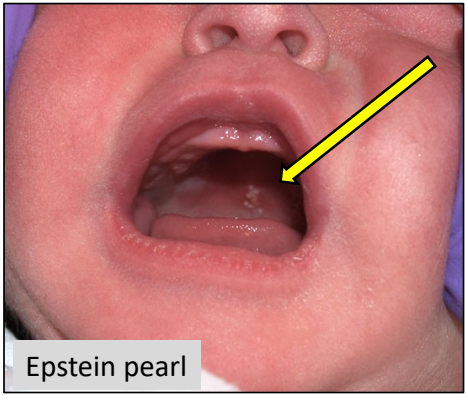
The mouth

Present at birth.
Here we should call dentist to remove it because it's interfere with feeding ,it can fall and cause aspiration.


Natal teeth


Cleft palate


Sucking pads

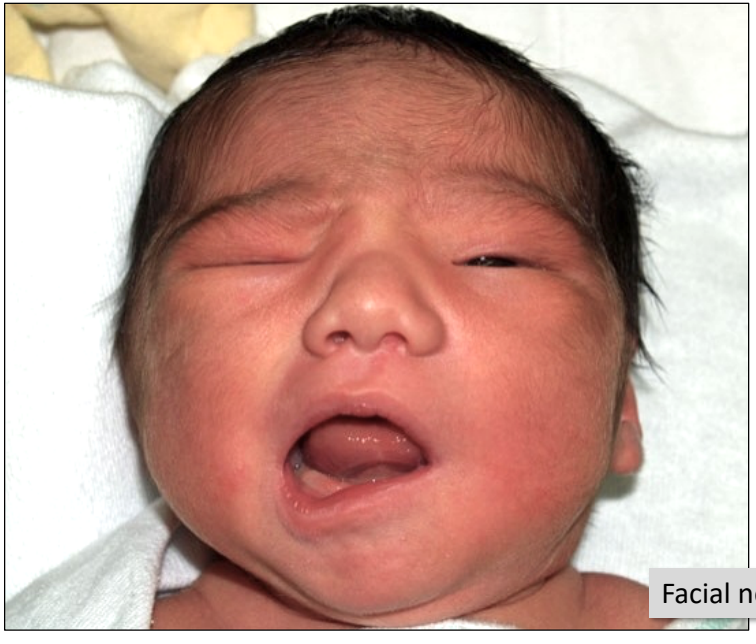

Epstein pearl

Tongue tie
Delay the treatment unless it's interfere with feeding or breathing.


Ankyloglossia

The mouth

In the affected side usability to completely close the eyes and the mouth is deviated to the other side.
Management is observation and supportive like artificial tears for dryness... unless it's interfere with feeding



Facial nerve palsy

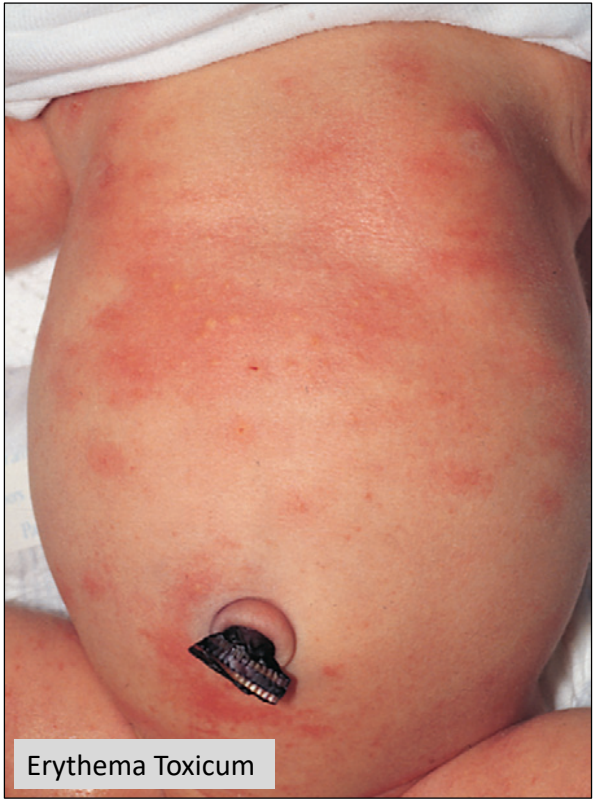
Skin Lesions

Erythema Toxicum

Erythematous flares with central pin point vesicles or papules.

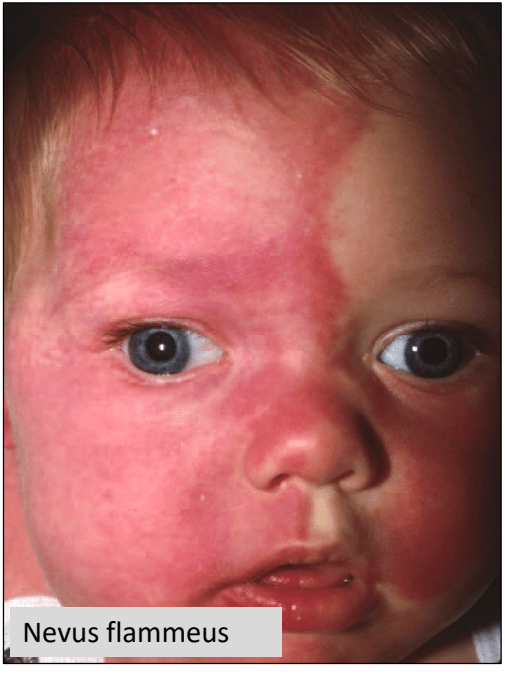
May appear and disappear over several hours to days during the first week of life

It contains fluid and eosinophils under microscope
No treatment

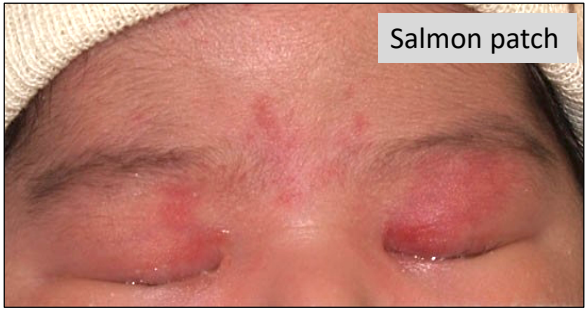


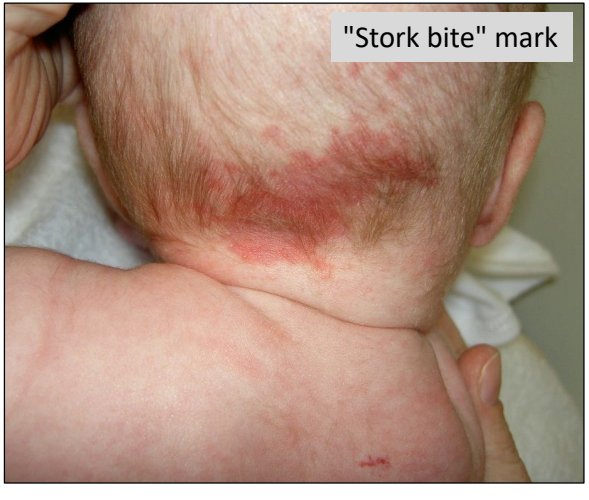
Erythema Toxicum

Hemangiomas


Nevus flammeus

Nevus flammeus doesn't regress with time and should be evaluated thoroughly.

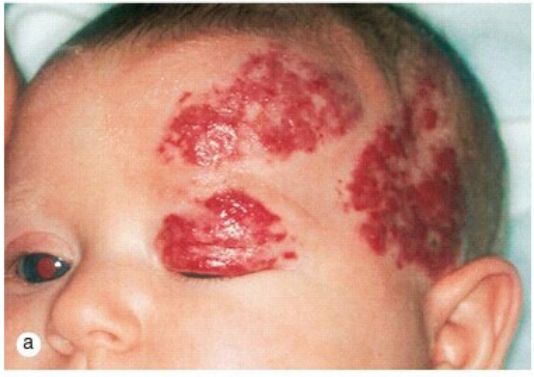

Salmon patch

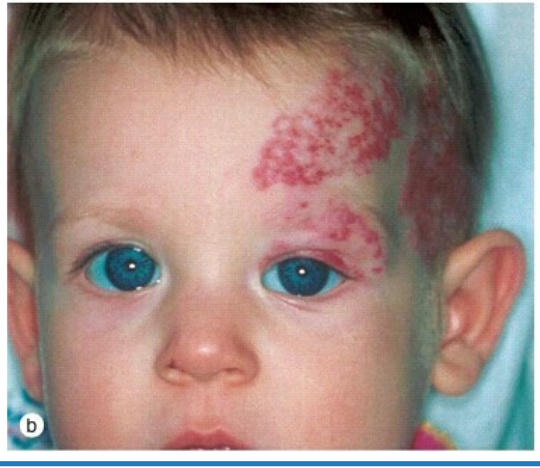

"Stork bite" mark

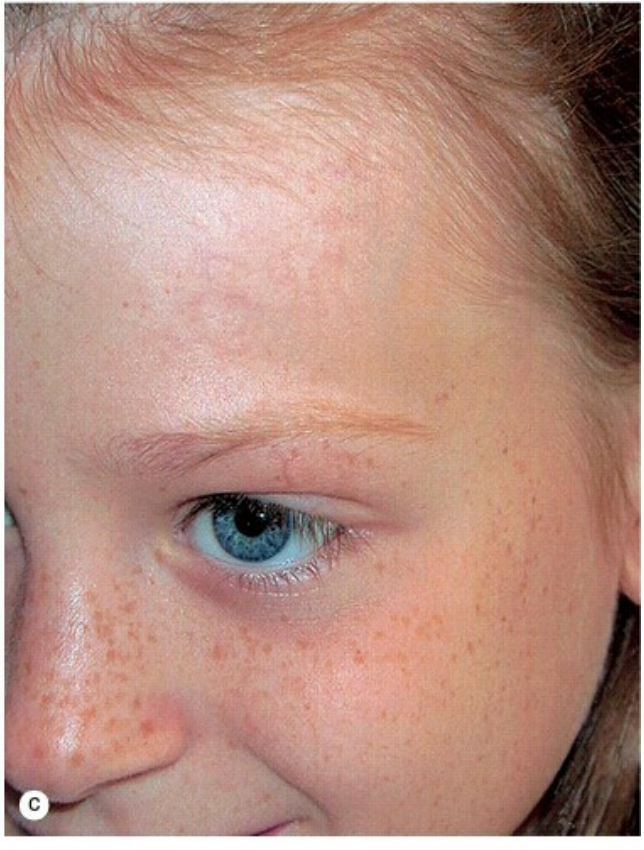
Hemangioma Natural History

A. At 1 month
B. At 2 years
C. At 7 years

If no contraindication like heart anomalies you can use propranolol

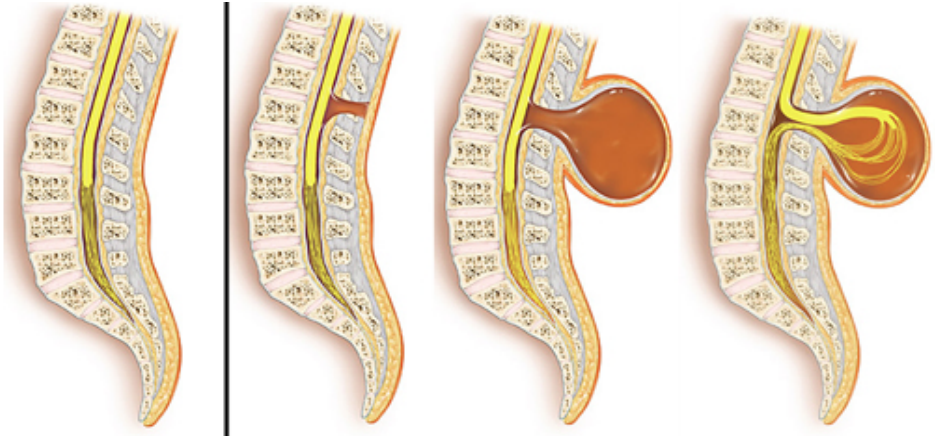


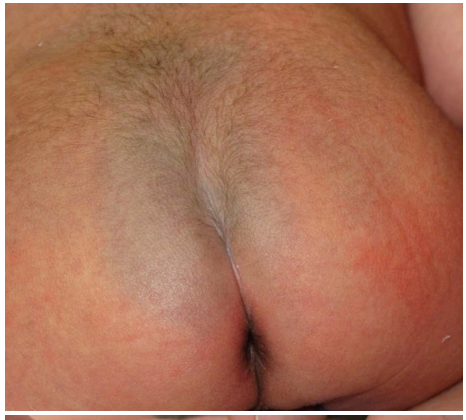


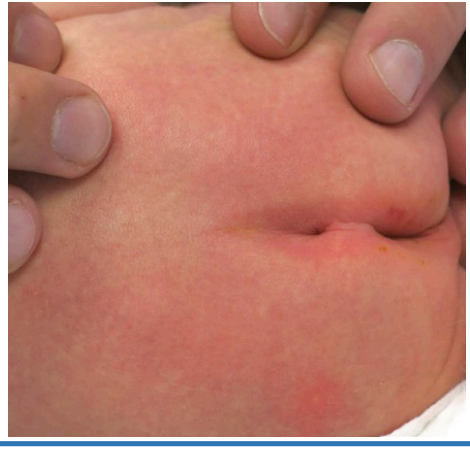


Sacral dimples

Hypertrichosis and pigmentation>investigate







Which sacral dimple to investigate?

When to suspect other issues and you should investigate:

- >5 mm in size. Depth
- >25 mm cephalad to the anal orifice.
- Associated with overlying cutaneous markers:
  - True hypertrichosis, or hairs within the dimple
  - Skin tags.
  - Telangiectasia or hemangioma
  - Subcutaneous mass or lump.
  - Abnormal pigmentation.
  - Bifurcation (fork) or asymmetry of the superior gluteal crease

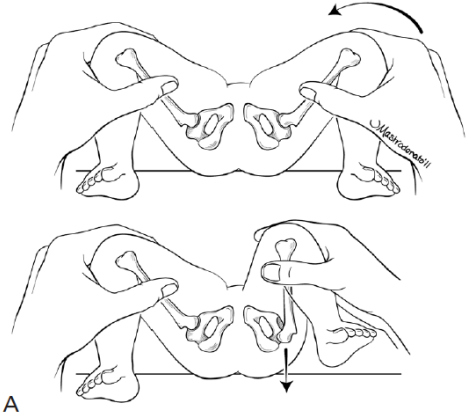
Ultrasonography is the screening modality of choice

The hips

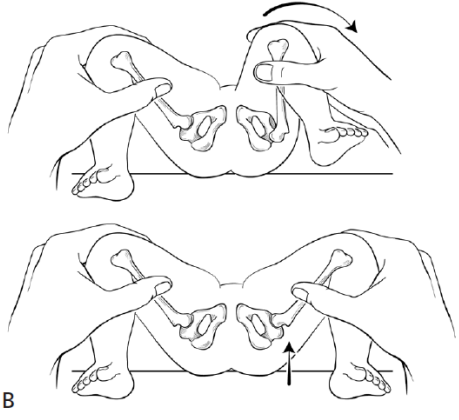
Barlow:guiding the hips into mild adduction and applying a slight downward pressure with the thumb.
If the hip is unstable,will produce a palpable sensation of subluxation or dislocation.
Means you are trying to dislocate the hip but the ortolani is the opposite you are trying to reduce it.
Doctor recommended to watch a video
https://m.youtube.com/watch?v=imhI6PLtGLc

It's not dislocation cause it's not caused by trauma.

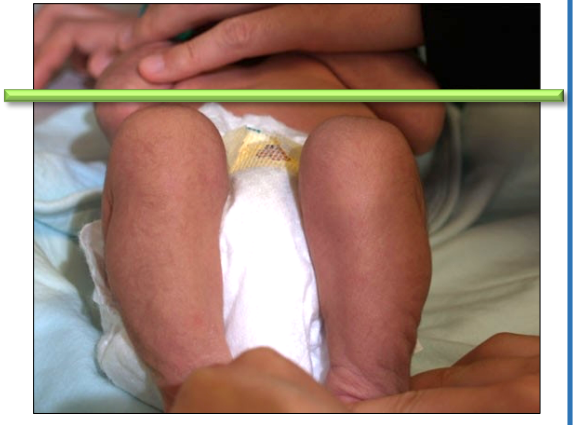
Barlow



Ortolani



Developmental Dysplasia of the Hip (DDH)

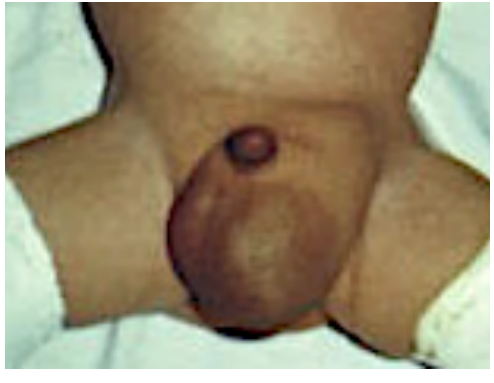


The left is shorter

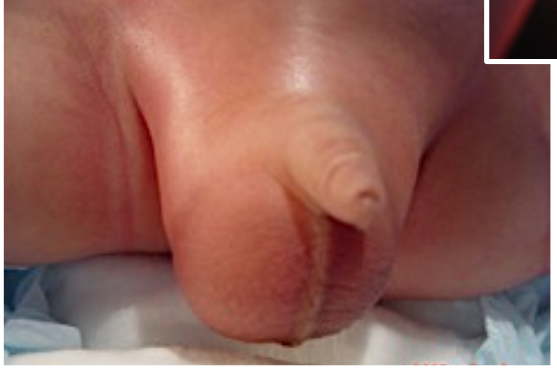
The genitals

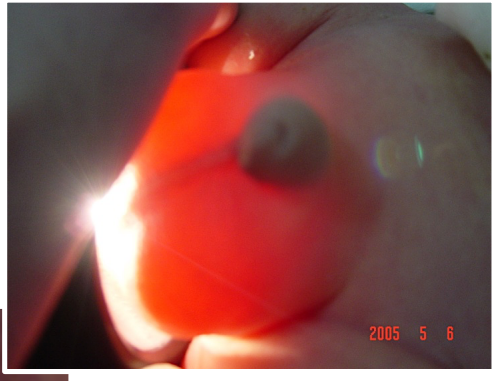
Inguinal hernia vs. Hydrocele

Inguinoscrotal swelling with negative transluminalion test
Evaluate and it should be treated.



Scrotal swelling with a positive translumination test
Reassure the family and follow up.

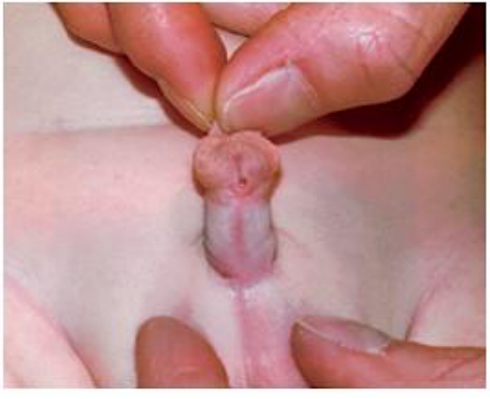


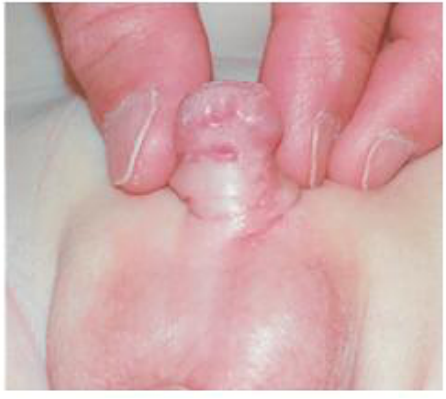


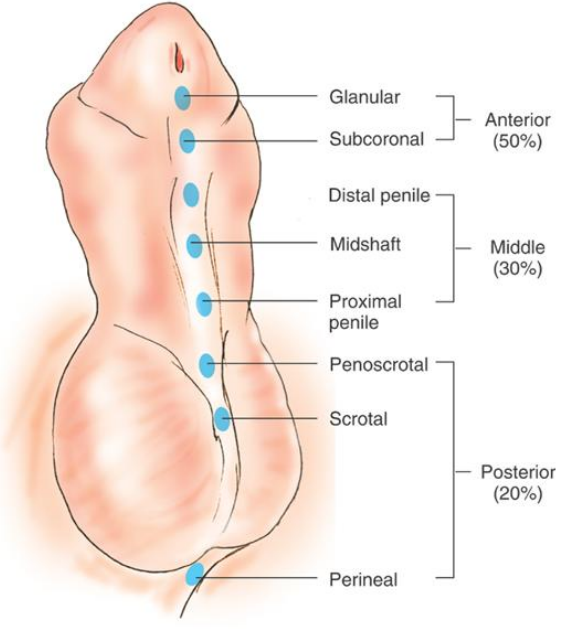
The genitals

No circumcision before referring to urologists.

Hypospadias

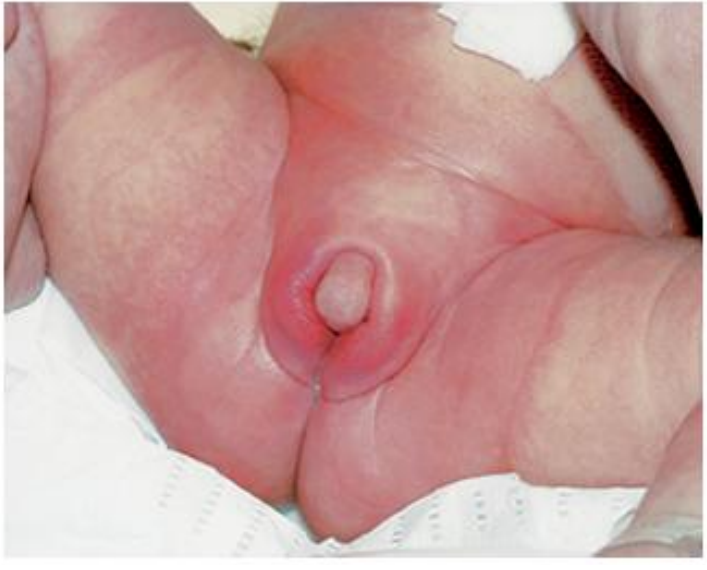


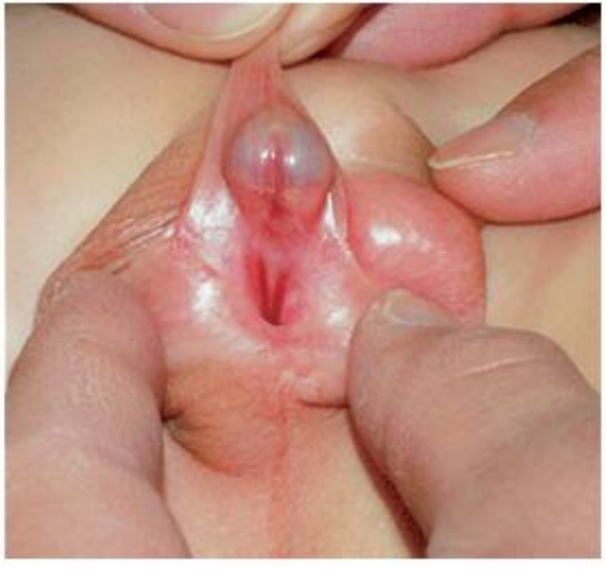




Ambiguous genitalia

Most important thing is to identify the cause then to determine the gender of baby,investigate thoroughly.





Common Neonatal Problems

Comments? …

Please email them to:

kaltirkawi@ksu.edu.sa