



Inguinoscrotal Conditions

In Infants and Children

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Inguinoscrotal Pathology

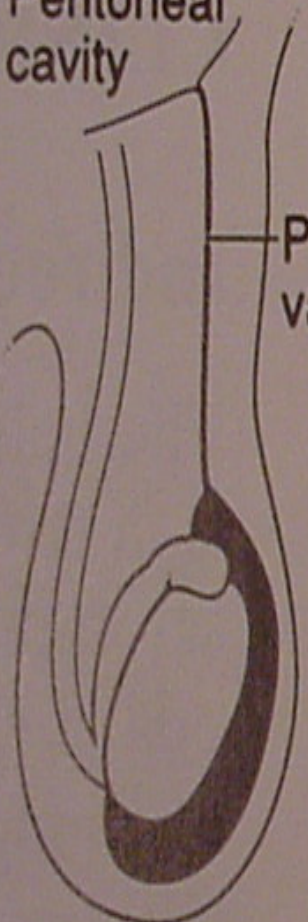
- **Inguinal Hernia**
- **Hydrocele**
- **Undescended Testis**
- **Acute Scrotum**

Groin Hernias – Embryology & Anatomy

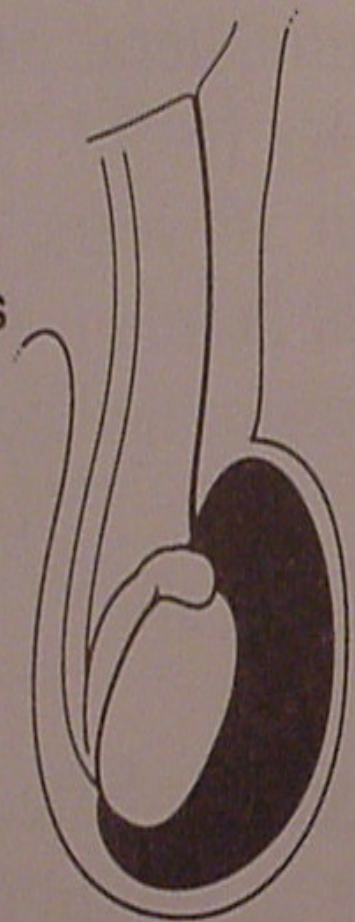
- **The processus vaginalis is present in the developing fetus at 12 weeks in utero**
- **The processus is a peritoneal diverticulum that extends through the external inguinal ring**
- **As the testis descends at the 7th to 8th month, a portion of the processus attaches to the testis, as it exits the abdomen and is dragged into the scrotum with the testis**

Peritoneal cavity

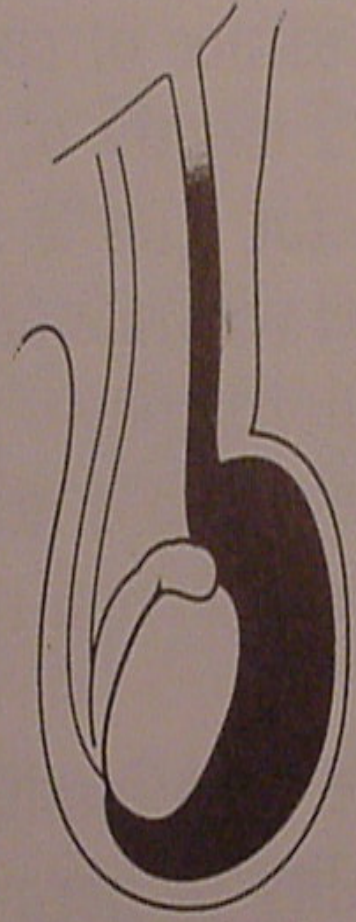
Process vaginalis



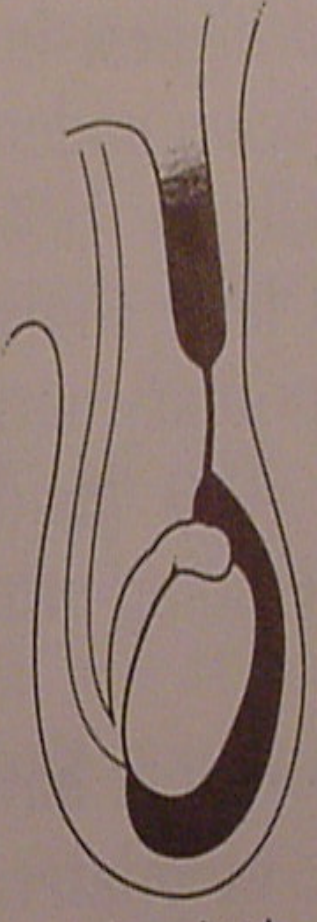
Normal



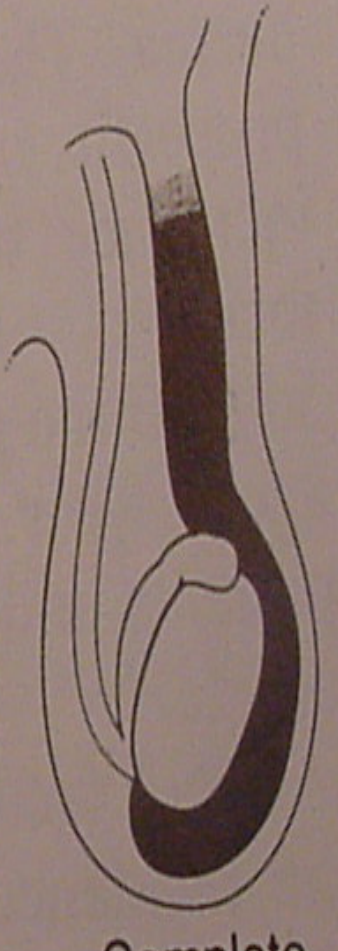
Hydrocele



Communicating hydrocele

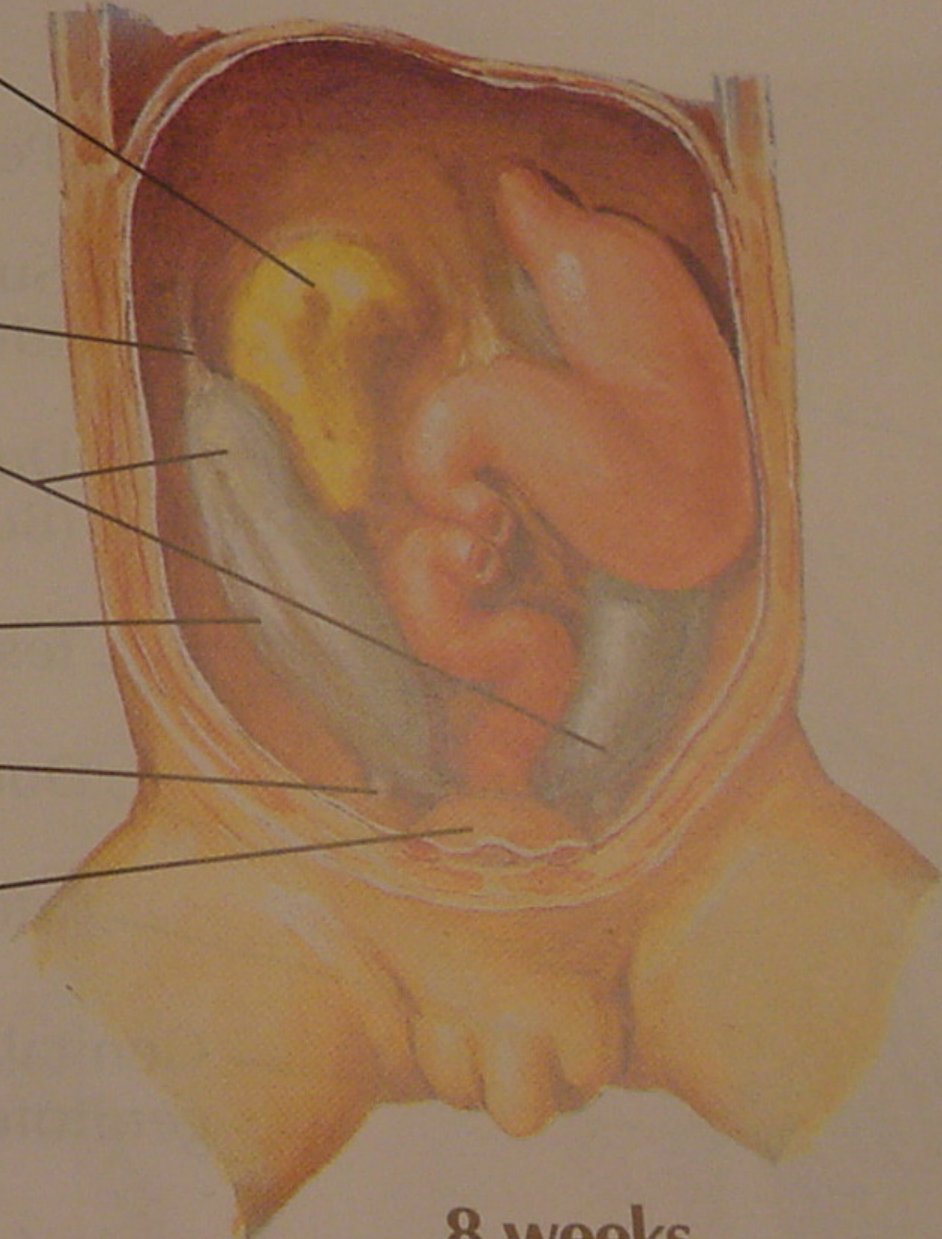


Inguinal hernia

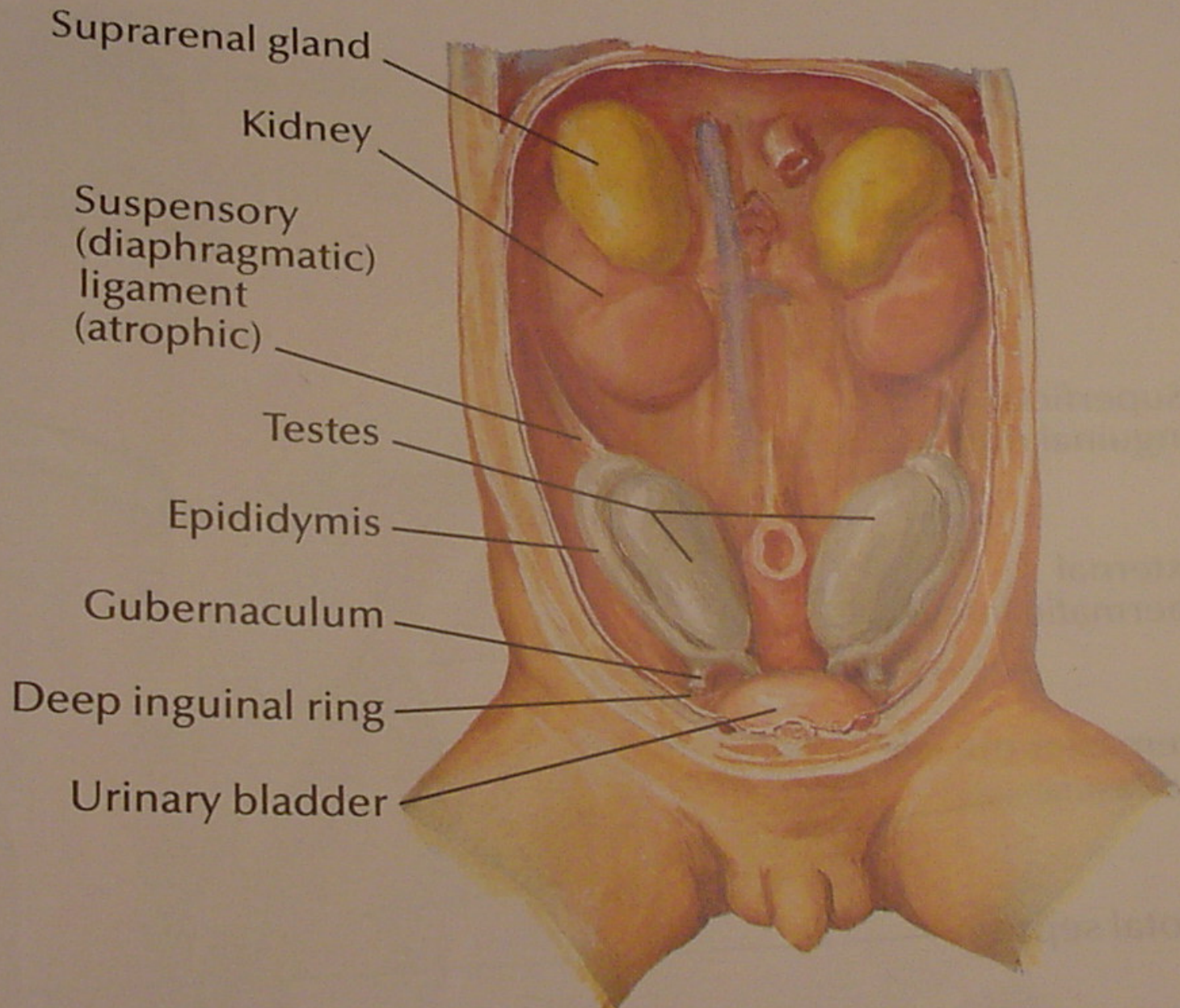


Complete inguinal hernia

Suprarenal gland
Suspensory
(diaphragmatic)
ligament
Gonads
Mesonephric
(Wolffian) duct
Gubernaculum
Urinary bladder



8 weeks



Suprarenal gland

Kidney

Suspensory
(diaphragmatic)
ligament
(atrophic)

Testes

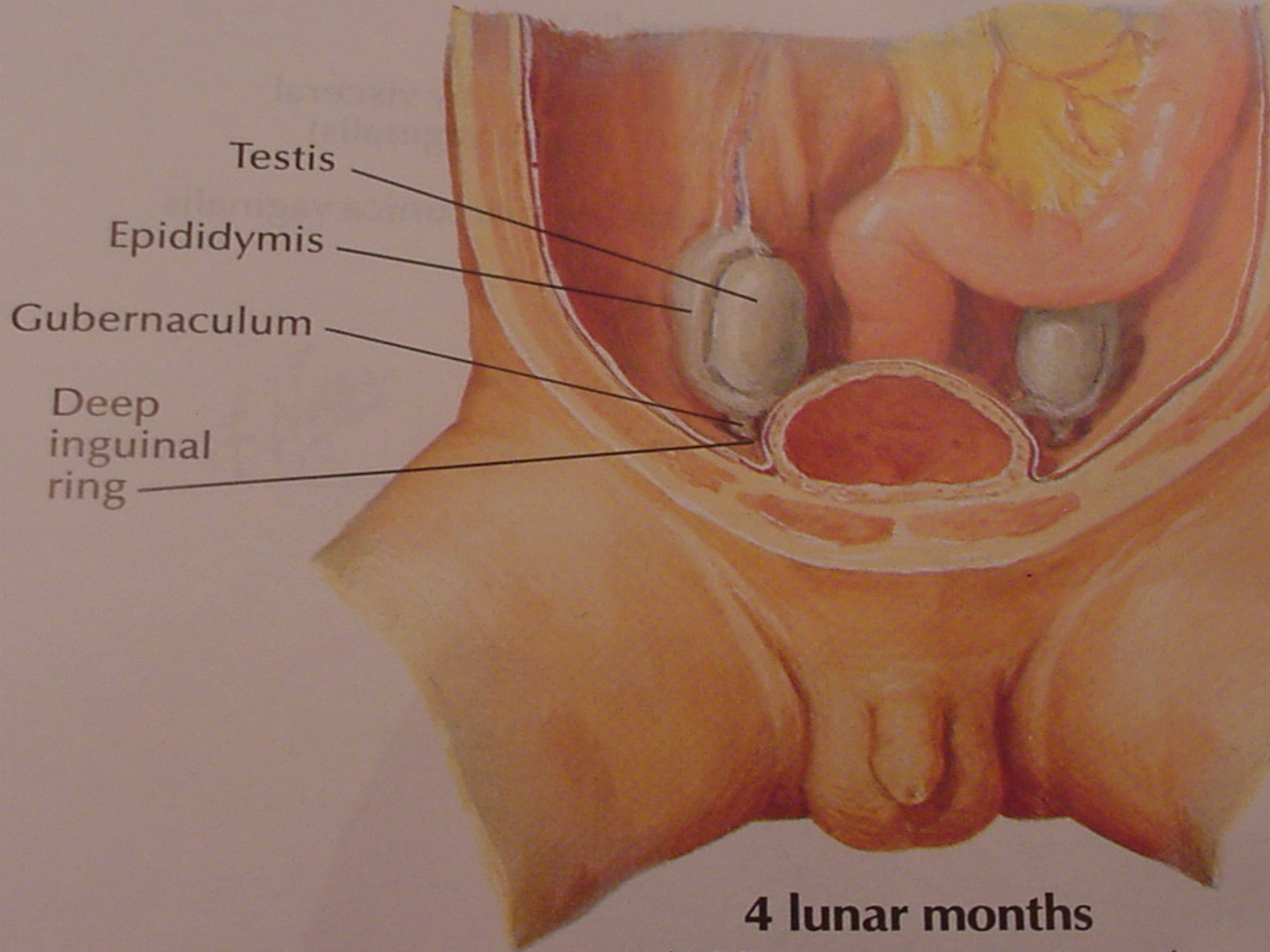
Epididymis

Gubernaculum

Deep inguinal ring

Urinary bladder

11 weeks



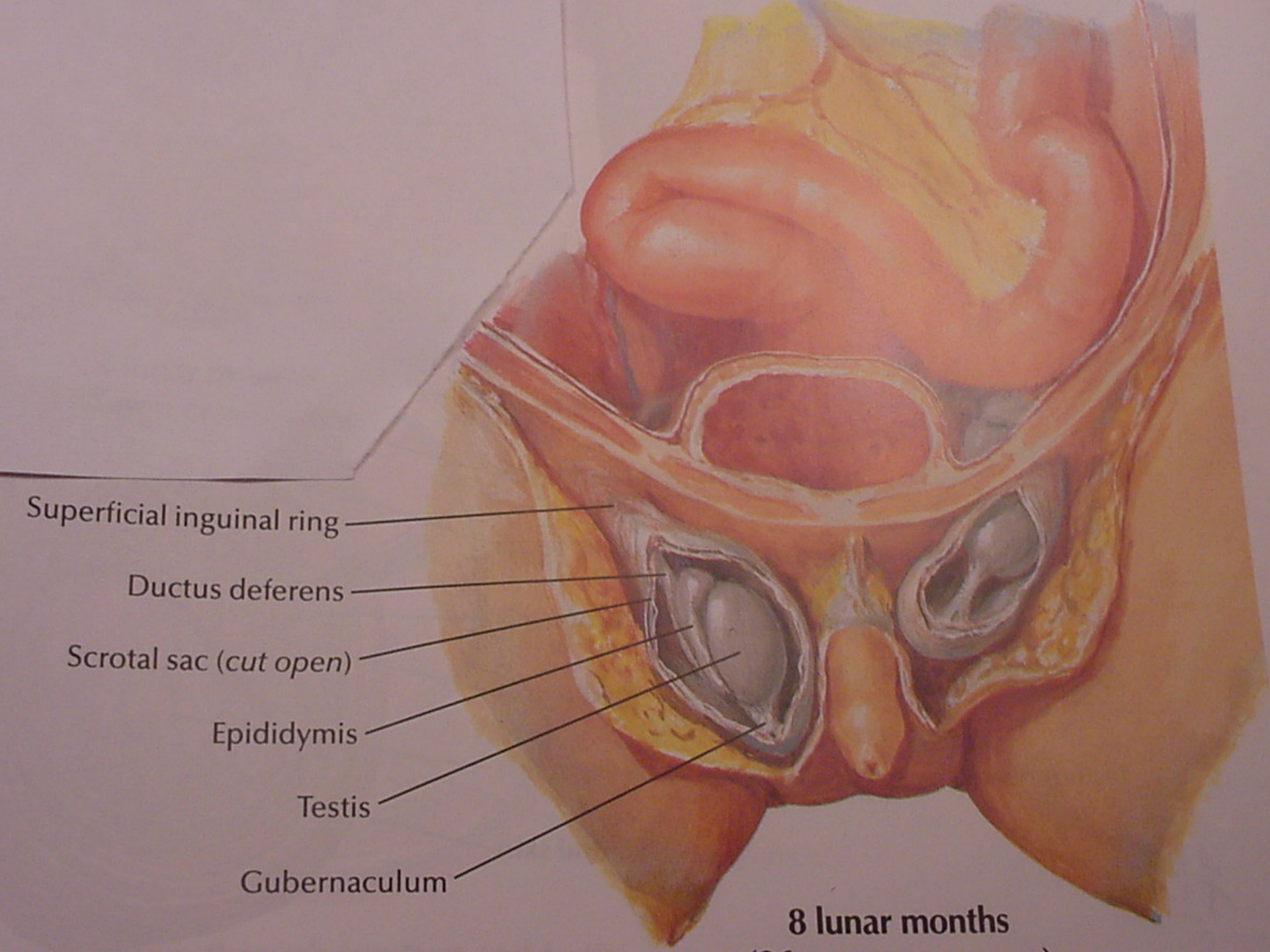
Testis

Epididymis

Gubernaculum

Deep
inguinal
ring

4 lunar months



Superficial inguinal ring

Ductus deferens

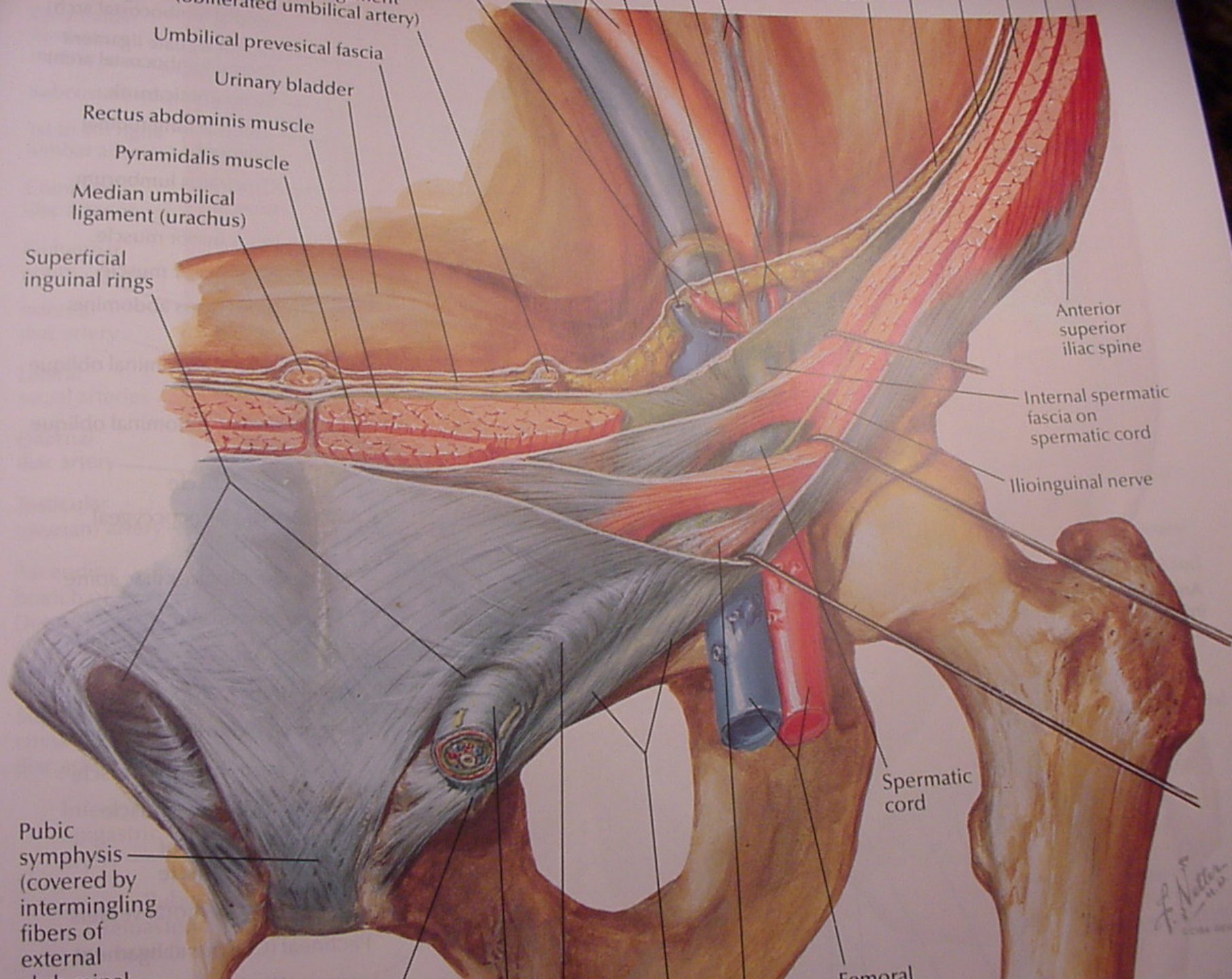
Scrotal sac (*cut open*)

Epididymis

Testis

Gubernaculum

8 lunar months



Inguinal Hernia

Inguinal hernia? Or Hydrocele?



- Congenital (PPV)
- Prevalence (1-5% boys)
- Premature (30%)
- Male/Female (4-8:1)
- Indirect (99%)
- $R > L$

Associated Conditions – Inguinal Hernia

- **Cystic Fibrosis**
- **Connective tissue disorders**
 - **Ehlers-Danlos syndrome**
 - **Hunter-Hurler syndrome**
- **Developmental dysplasia of the hip (DDH)**
- **Chronic peritoneal dialysis**
- **Preterm infants with intraventricular hemorrhage**
- **Myelomeningocele with VP-shunt**
- **Undescended testis**

Inguinal Hernia



History

- Intermittent groin swelling
- Asymptomatic until get complicated
- In girls, lump in upper part of labia majora

Examination

- Examine the testes
- Reducibility
- Thickened spermatic cord*

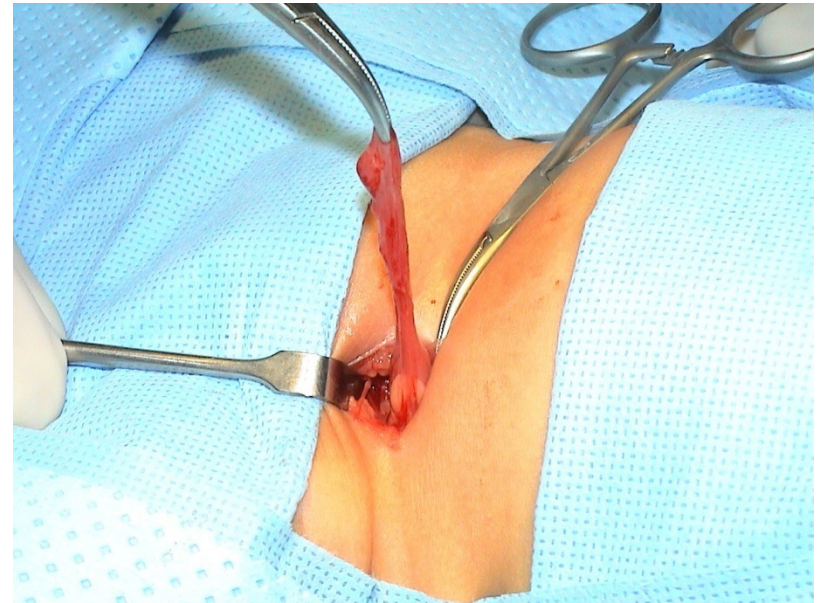
Complicated Inguinal Hernia

- Incarcerated hernia:
 - Irreducible swelling
 - No evidence of bowel obstruction or strangulation
- Obstructed hernia:
 - Irreducible swelling
 - Symptoms and signs of bowel obstruction (bilious vomiting, abdominal distention, constipation)
- Strangulated hernia:
 - Irreducible swelling
 - Symptoms and signs of strangulation (severe groin pain, fever, tachycardia, skin discoloration of the groin)

Inguinal Hernia

Management:

- Herniotomy (as soon as it is feasible)
- Incarcerated hernia
 - +/- Sedation and analgesia
 - Manual Reduction
 - Urgent herniotomy
- Strangulated hernia
 - Emergent herniotomy
 - +/- bowel resection



Inguinal Hernia and Hydrocele



Hydrocele

History:

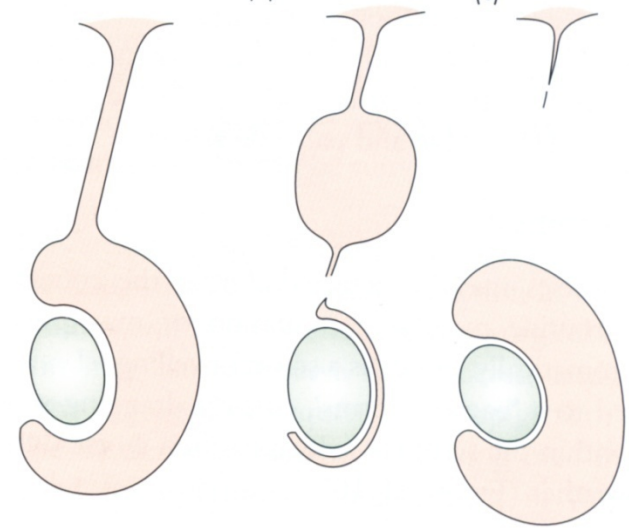
- Scrotal swelling
- Asymptomatic
- 1% over one year of age

Examination:

- Get above the swelling
- Not reducible (most accurate)
- Transillumination ++

Management:

- Surgery not advised < 2 years of age
- Ligation of PPV



Descent of Testis – 2 Phases

- 10-15th week: the gubernaculum enlarges to anchor the testis near the inguinal region as the embryo enlarges
- 28-35th week: the gubernaculum migrates out of the inguinal canal across the pubic region and into the scrotum
- The processus vaginalis develops as a peritoneal diverticulum within the elongating gubernaculum, creating an intraperitoneal space into which the testis can descend

Undescended Testis

Definitions:

- True undescended testis
- Ectopic
- Retractable

Incidence:

- At birth: 3-4%
- At one year: 1%
- Pre-term: 30%

Palpable 80%



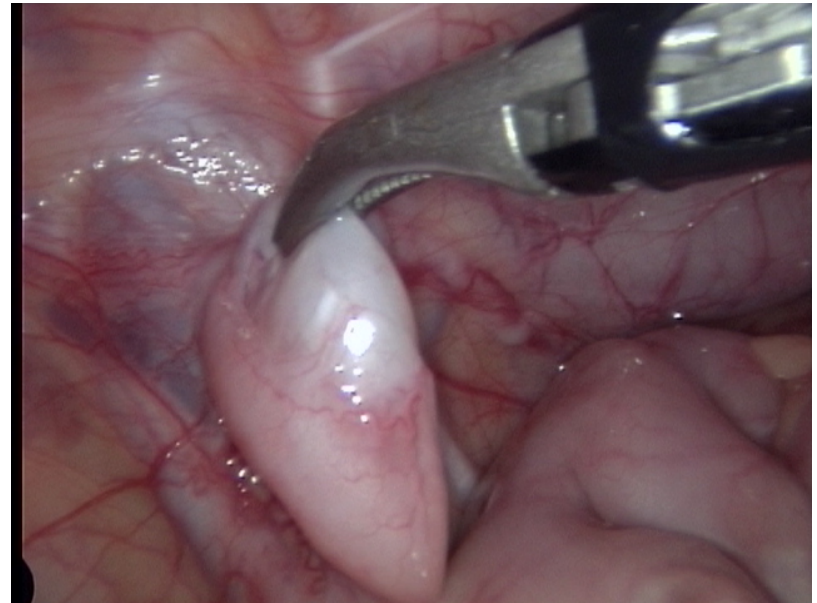
Non palpable 20%



Undescended Testis

Diagnosis:

- Parents/Doctors
- Clinical features
 - Empty scrotum
 - Palpable or not
 - Milk it down to scrotum
- Imaging? (limited role)
- Laparoscopy
 - Diagnostic
 - Therapeutic



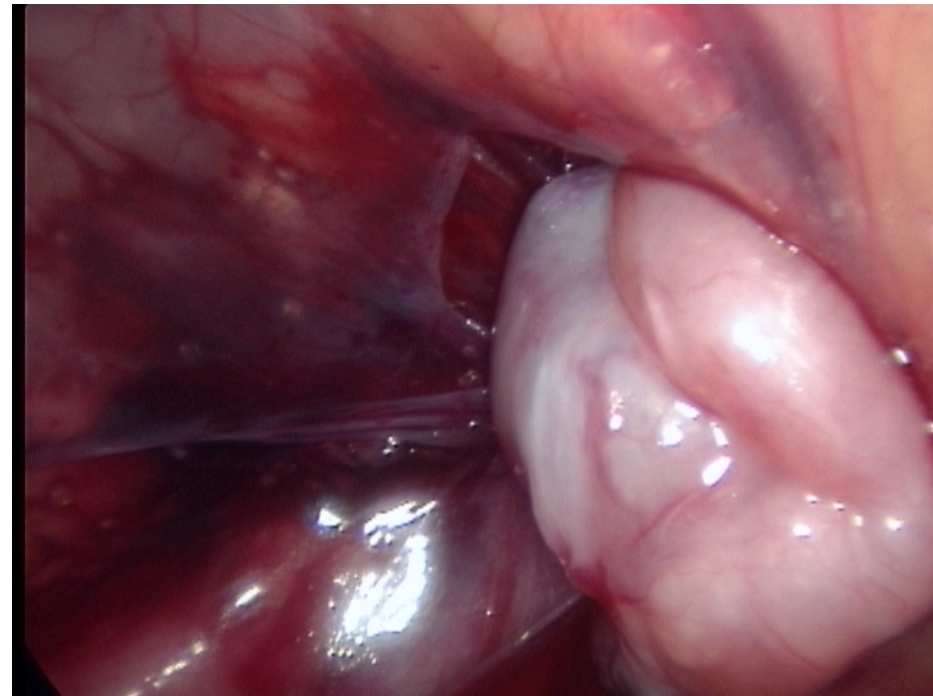
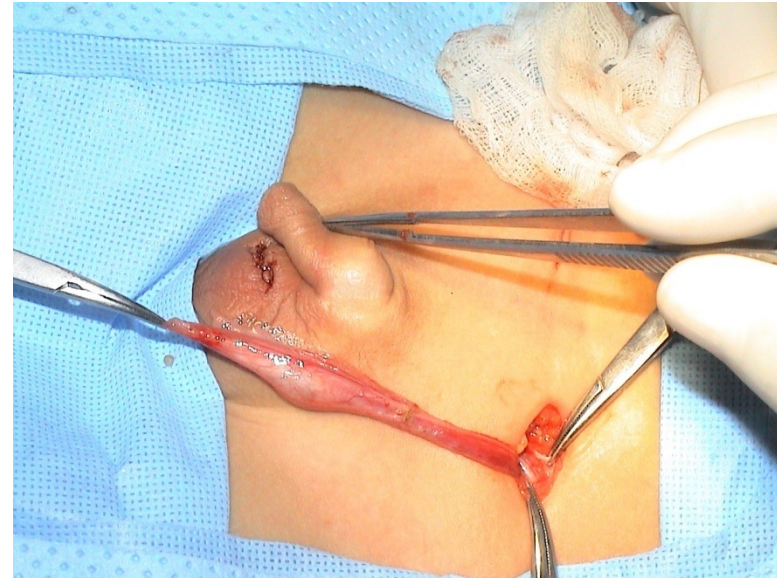
Undescended Testis

Indications:

- Abnormal fertility
- Testicular tumor
- Cosmetic/Social
- Trauma/Torsion

Treatment (6 months):

- Palpable - open orchiopexy
- Nonpalpable -
 - Laparoscopy assisted orchiopexy
 - Two stages Fowler-Stephens orchiopexy



Acute Scrotum

Introduction:

- Acutely painful +/- swollen +/- red scrotum

Pediatric surgical emergency!!!

Causes:

- Testicular Torsion
- Torsion of Appendage(s) (prepubertal*)
- Epididymo-orchitis (postpubertal*)
- Idiopathic Scrotal Edema
- Other conditions e.g. Incarcerated hernia, Acute hydrocele, HSP, Trauma

Testicular Torsion

Introduction:

- Incidence: 1:4000
- Two peaks: peripubertal and perinatal

Symptoms:

- Lower abdominal pain and vomiting
- Hemiscrotal pain
- Swollen → red hemiscrotum

Signs:

- Tender
- Cremasteric reflex- absent (most specific)
- Lies higher than contralateral testis
- Horizontal in position

Duration of Torsion and Testicular Salvage

Duration of Torsion (Hours)	Testicular Salvage (%)
< 6	85-97
6-12	55-85
12-24	20-80
>24	<10

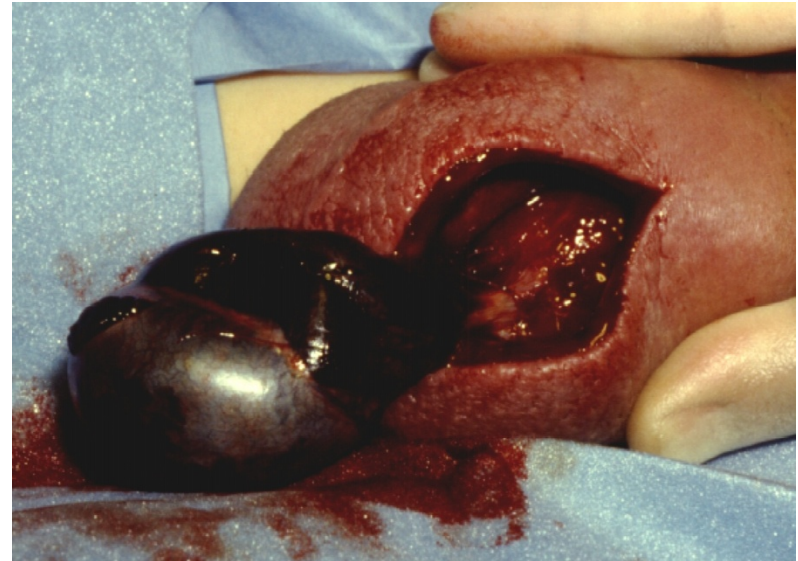
Testicular Torsion

Investigations:

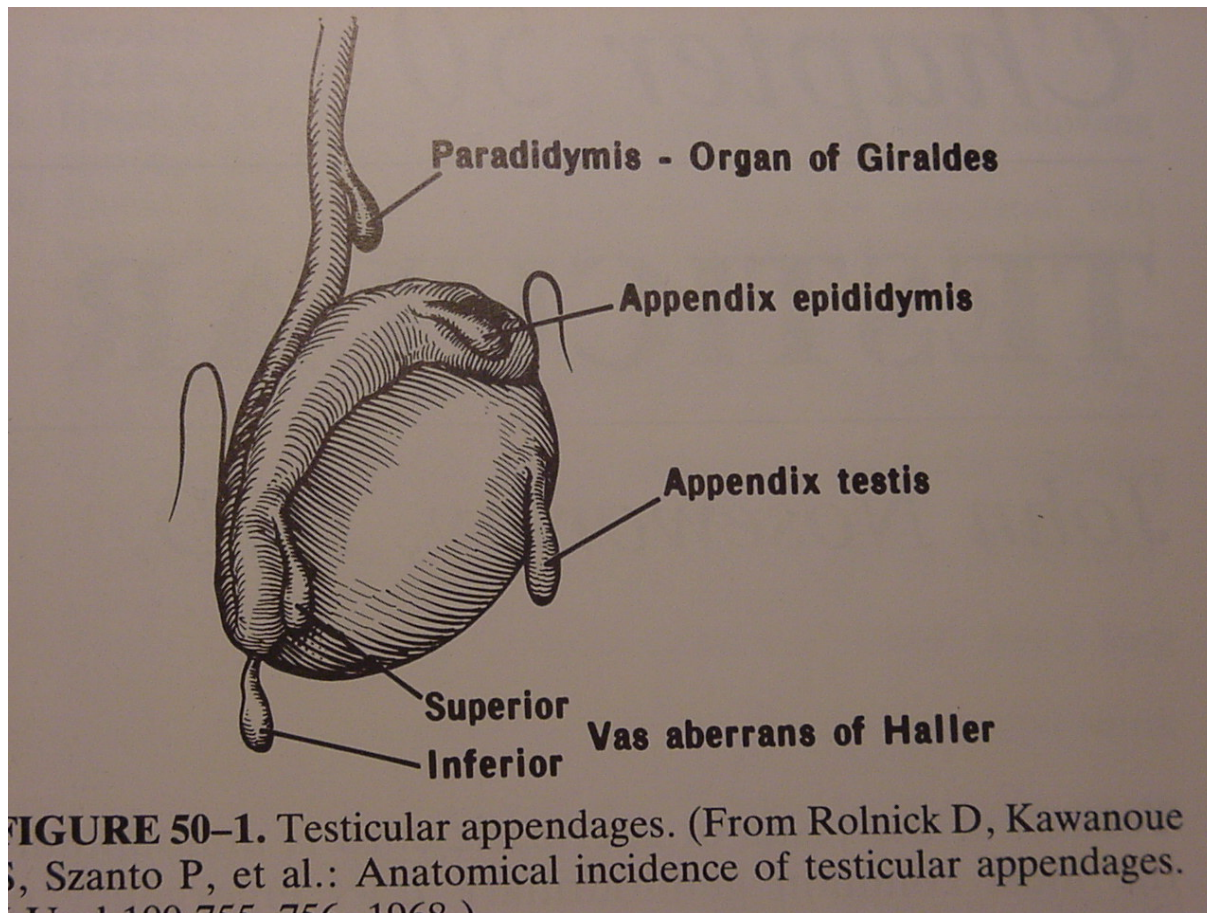
- Color Doppler US
- Radionuclide Scan

Management:

- Timing is critical 4 - 6 hours
- Exploration if any doubt
- Untwist (open book) and assess viability
- Fix the other side
- If more than 12 hours, it is likely to be non-viable and may need orchiectomy



Testicular Appendages



Torsion of Appendage(s)

Introduction:

- Embryological remnants of the mesonephric and mullerian duct system occur as tiny (2-10mm long) appendages of testis
- Appendix testis (hydatid of Morgagni), appendix epididymis ...etc
- Peak age: 10-12 yrs

Presentation:

- pain – more gradual onset
- Blue dot sign
- Swollen → red hemiscrotum

Color Doppler scan

Management: Conservative or operative if torsion cannot be excluded

Idiopathic Scrotal Edema

- Introduction:

- Cause?
- Peak age: 4-5 yrs

- Presentation:

- Swollen, red scrotum
- Minimal pain

- Management:

Conservative, self limiting
within 1-2 days



Any questions?