ABDOMINAL WALL PART 1.

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STRUCTURE OF THE LECTURE

- 4-part recording:
- Part 1 on the abdominal wall and its muscles
- Part 2 on the inguinal region
- Part 3 on the posterior abdominal wall
- Part 4 on hernias
- Abdo wall and hernias lab

WHERE IS THE ABDOMINAL CAVITY

- Boundaries:
- Upper is the diaphragm
- Lower is the pelvic brim
- Anterior and lateral aspects are the abdominal wall muscles
- Posteriorly are the vertebral column and posterior muscles

ANTEROLATERAL ABDOMINAL WALL

- This week we will be focussing on the anterior and lateral muscles of the abdominal cavity and the layer of soft tissue surrounding these.
- Though we will look at some posterior muscles.
- There are 4 muscles:

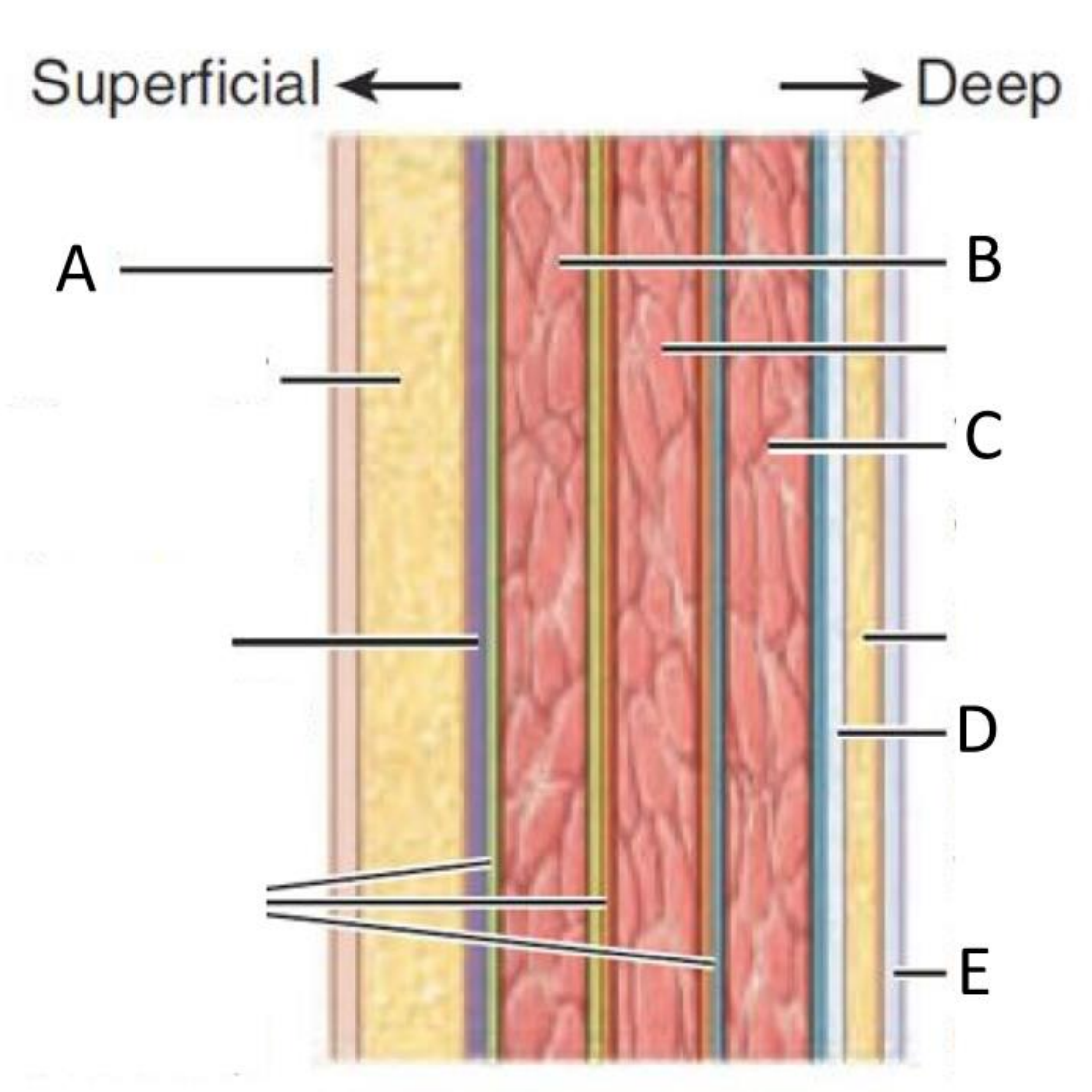
1. Rectus abdominus + Pyramidalis
2. External Oblique
3. Internal Oblique
4. Transversus Abdominus

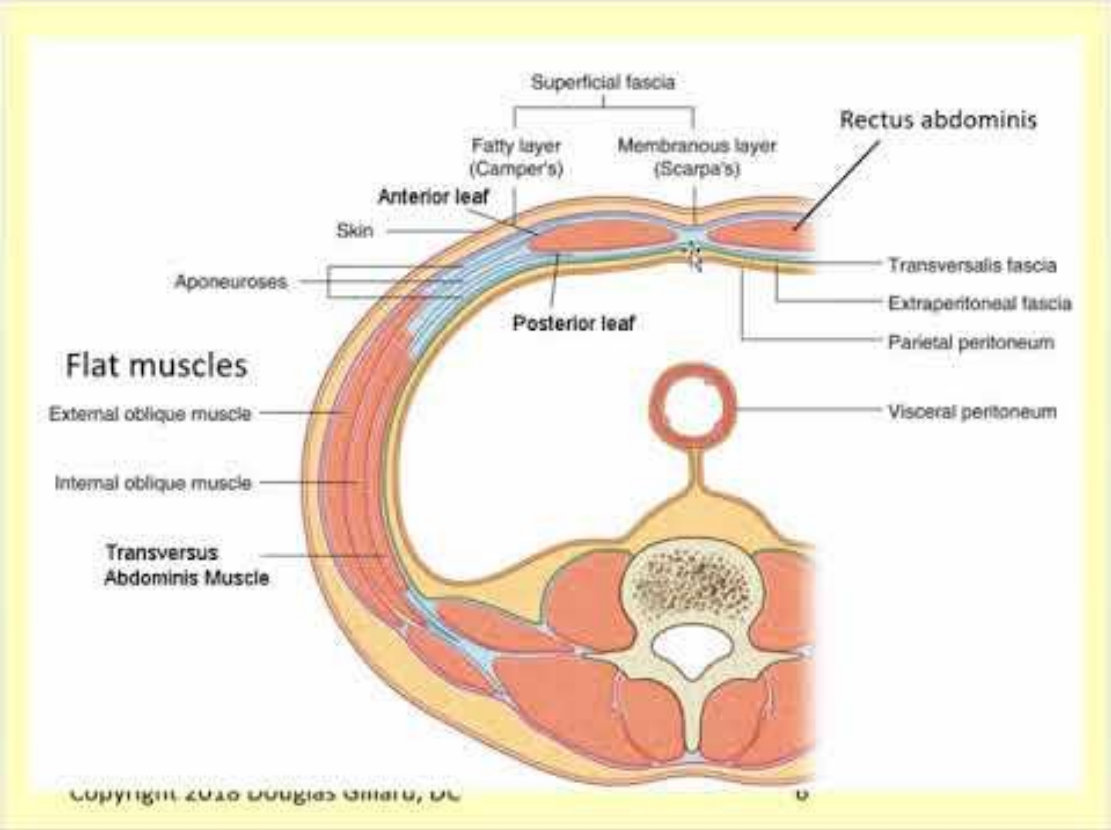
CONNECTIVE TISSUE

- Campers' fascia
- Scarpa’s fascia
- Investing fascia
- Rectus sheath
- Transversalis fascia

ABDOMINAL WALL LAYERS

- There are more than muscles to be aware of forming the abdominal wall.
- Complete anatomy illustrates this, and you can explore these layers:
- https://3d4medic.al/JW8dKyTm
- From superficial to deep we have skin, connective tissue and muscles forming the anterolateral abdominal wall.


Superficial
Deep
A
B
C
D
E


Superficial fascia
Fatty layer (Camper's)
Membranous layer (Scarpa's)
Rectus abdominis
Anterior leaf
Skin
Aponeuroses
Posterior leaf
Transversalis fascia
Extraperitoneal fascia
Parietal peritoneum
Visceral peritoneum
Flat muscles
External oblique muscle
Internal oblique muscle
Transversus Abdominis Muscle

Summary

Abdominal cavity lies between the diaphragm and the true pelvis

The posterior, lateral and anterior aspects are bound by mainly muscles

Summary

The layers of the anterolateral abdominal wall are made up from 4 key muscles.

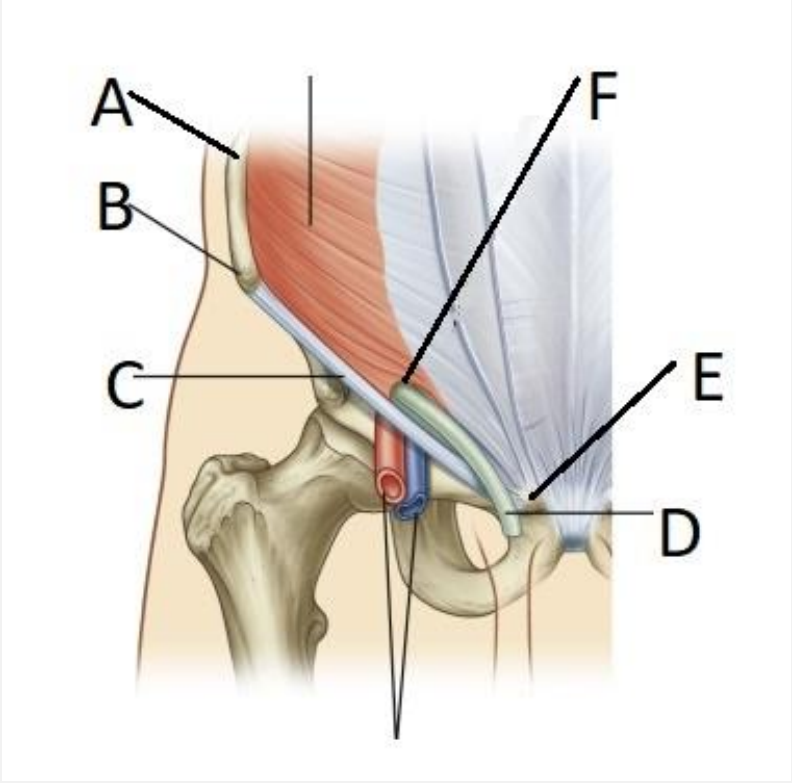
Summary

The layers of the anterolateral abdominal wall are made up from 4 key muscles **AND** connective tissue:

1. Skin
2. Campers' fascia
3. Scarpa's fascia
4. Ext Oblique/Rectus abdominus
5. Internal oblique
6. Transversus abdominus
7. Transversalis fascia

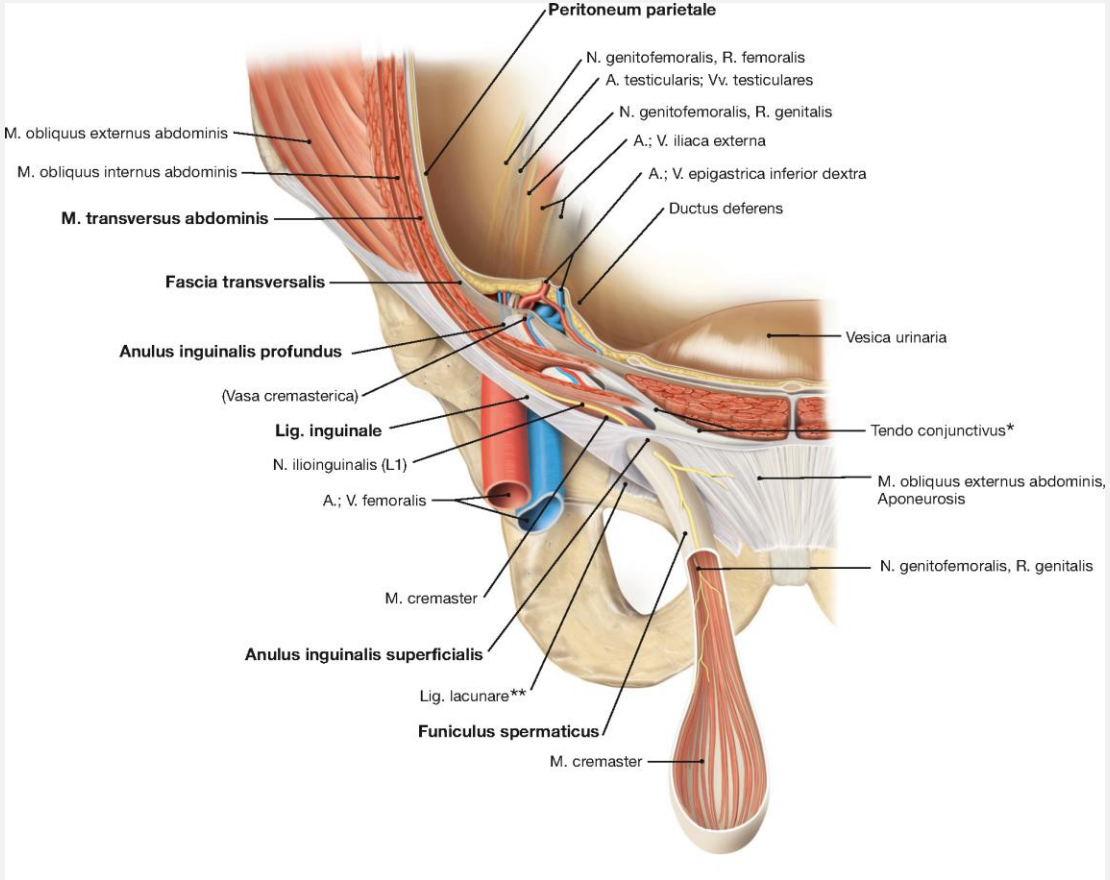
INGUINAL LIGAMENT

- An important landmark of the inguinal region.
- Runs between the ASIS and the pubic tubercle.
- Deep to the ligament we find the femoral artery and vein.



INGUINAL CANAL

- A short passageway travelling through the abdominal wall.
- It runs inferiorly and medially **AND** deep to superficially (meaning from inside the abdominal wall to the surface of the wall).
- Why do we need a passage way which essentially connects the abdominal cavity to the surface structures?



- The borders of the canal are:

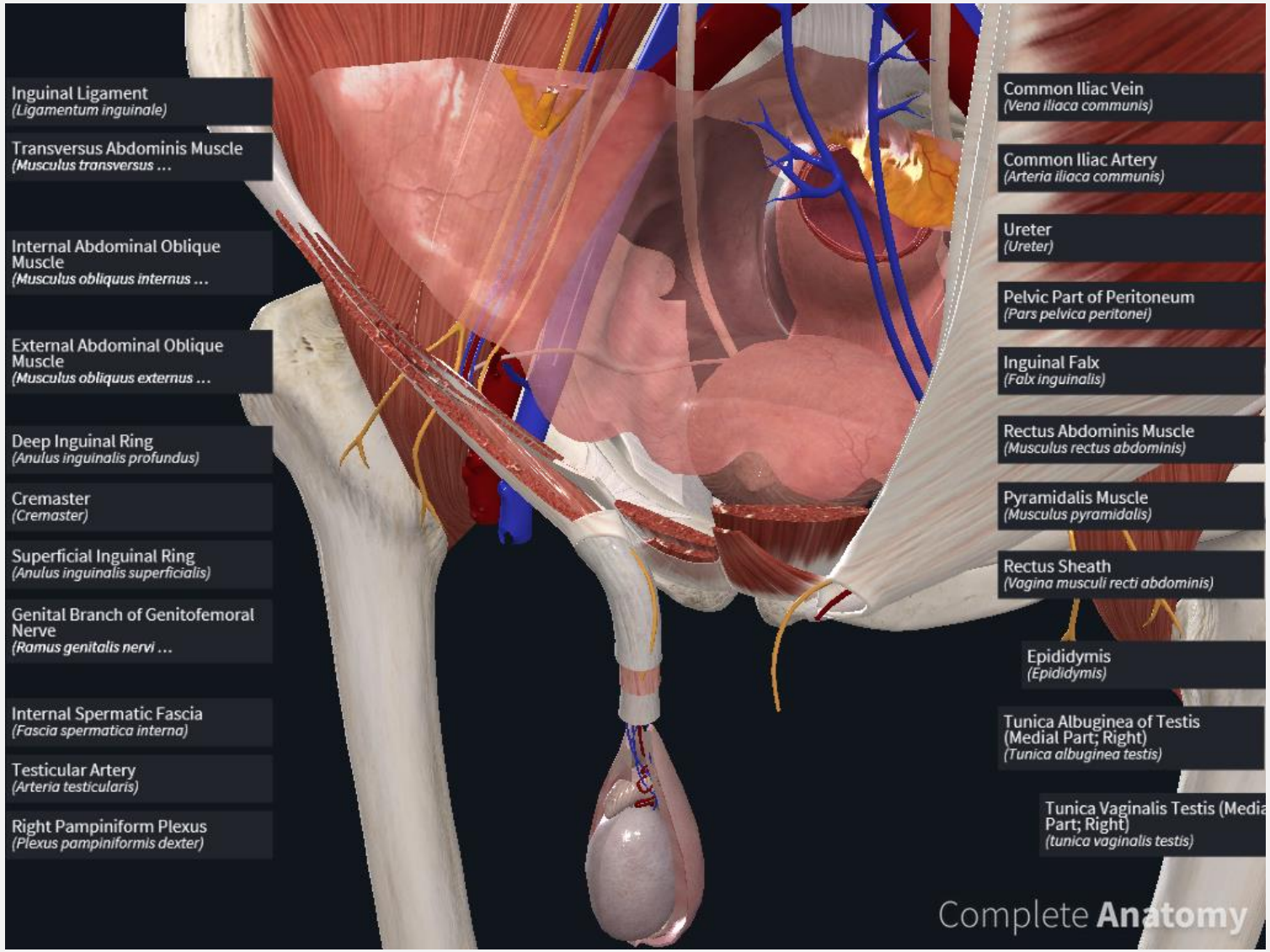
Anterior wall – aponeurosis of the external oblique, reinforced by the internal oblique and transversus abdominus muscles.

Posterior wall – transversalis fascia.

Roof – transversalis fascia, internal oblique, and transversus abdominis.

Floor – inguinal ligament

- The canal begins at the deep inguinal ring – A space in the transversalis fascia
- The canal ends at the superficial inguinal ring – A space in the external oblique muscle aponeurosis



https://3d4medic.al/JW8dKyTm

CONTENTS

- Male
  - **Spermatic cord**
  - **Ilioinguinal nerve** – contributes towards the sensory innervation of the genitalia
  - **Genital branch of the genitofemoral nerve** – supplies the cremaster muscle and anterior scrotal skin in males, and the skin of the mons pubis and labia majora in females.
- Female
  - **Round ligament**
  - **Ilioinguinal nerve** – contributes towards the sensory innervation of the genitalia
  - **Genital branch of the genitofemoral nerve** – supplies the cremaster muscle and anterior scrotal skin in males, and the skin of the mons pubis and labia majora in females.

SUMMARY

The inguinal ligament attaches from the ASIS to the PT

The mid inguinal point – halfway between PS and ASIS – marks the carotid pulse

The midpoint of the inguinal ligament – halfway between PT and ASIS – marks the deep inguinal ring

SUMMARY

The inguinal canal is a short passageway running from the deep inguinal ring to the superficial

The canal runs parallel to the ligament

Contents of the canal are the spermatic cord/round ligament, ilioinguinal nerve and branch of genitofemoral nerve

ABDOMINAL WALL PART 3

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STRUCTURE OF PART 3

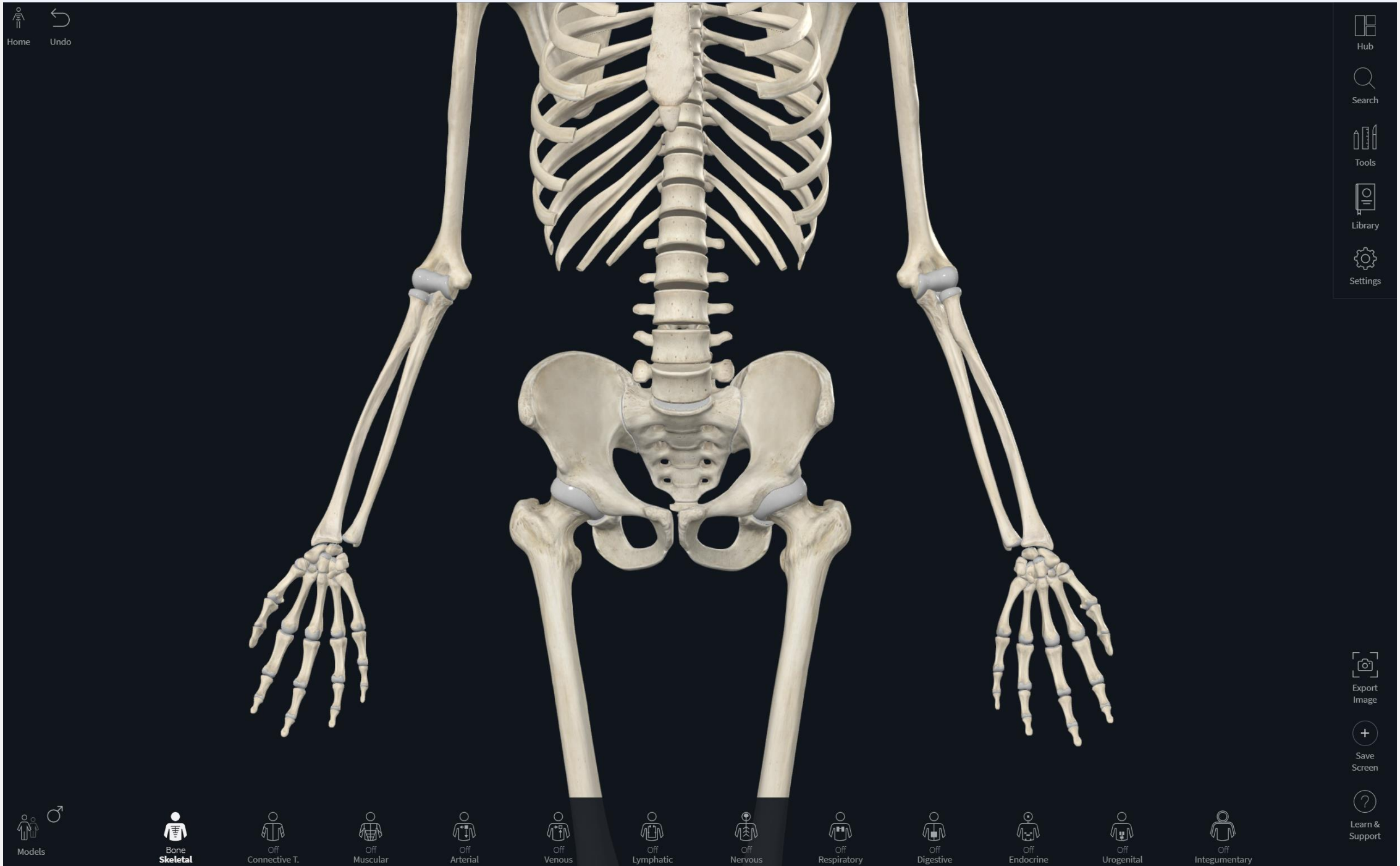
- Posterior abdominal wall
- Muscles and related structures

SUPPORT OF THE POSTERIOR WALL

- Vertebral column – T12-L5
- Thoracolumbar fascia

MUSCLES OF THE POSTERIOR WALL

- Quadratus lumborum muscle
- Psoas major and minor muscles
- Iliacus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Arterial
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Venous
Off
Lymphatic
Off
Nervous
Off
Respiratory
Off
Digestive
Off
Endocrine
Off
Urogenital
Off
Integumentary

Lumbar Nerves (Left)

Nervi lumbales

...

ISOLATE
HIDE
FADE
HIDE OTHERS
FADE OTHERS
MULTI SELECTION

Description Models Origin Path Branches

Isolate Branches

Highlight Branches

Vena Cava
(Vena cava inferior)

Capsule of Kidney
(Anterior; Right)
(Capsula fibrosa renis)

Artery (Right)
(Arteria renalis)

Renal Vein
(Vena renalis dextra)

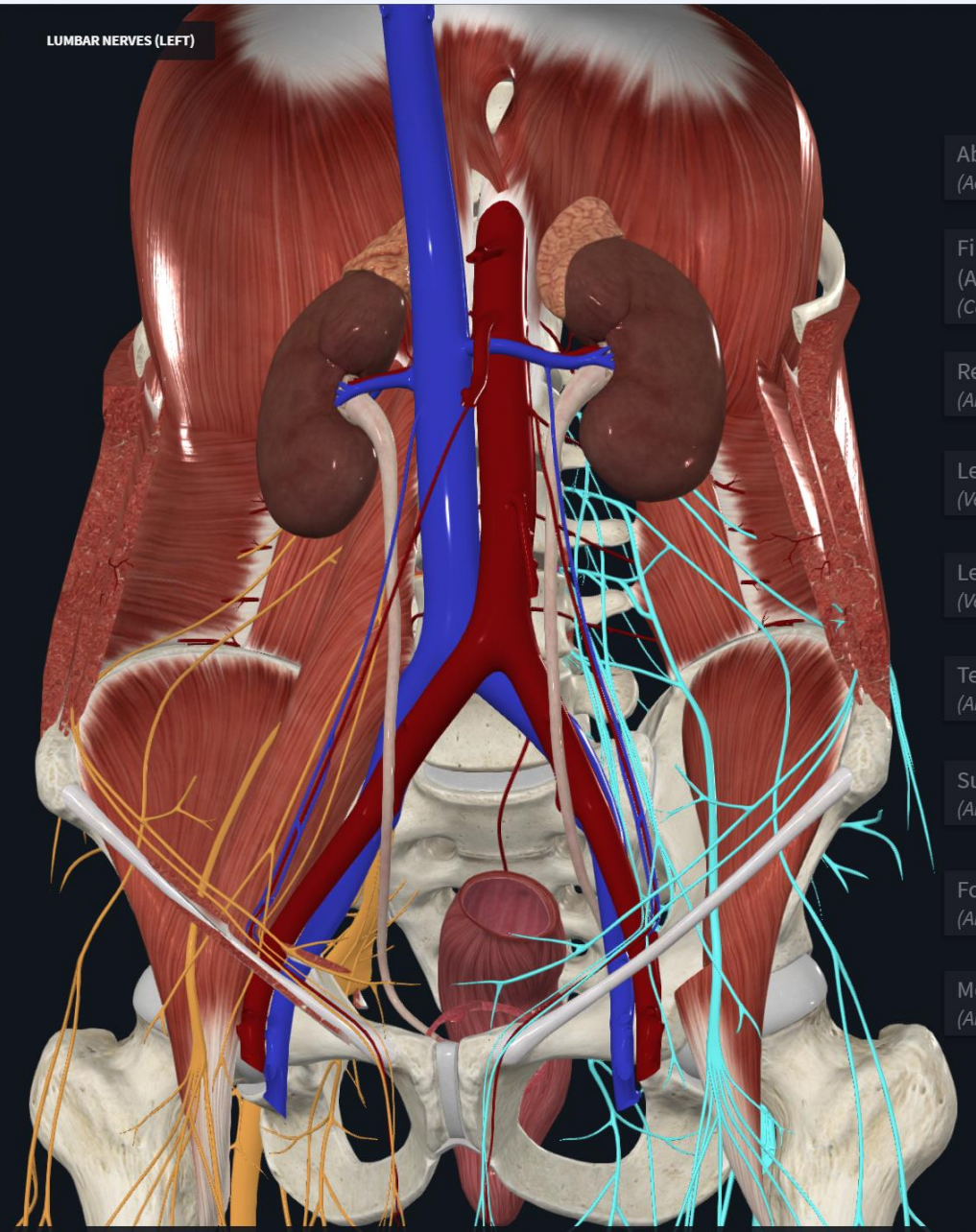
Testicular Vein
(Vena testicularis dextrae)

Testicular Artery (Right)
(Arteria testicularis)

Common Iliac Artery (Right)
(Arteria iliaca communis)

External Iliac Artery (Right)
(Arteria iliaca externa)

Femoral Artery (Right)
(Arteria femoralis)



Abdominal Aorta
(Aorta abdominalis)

Fibrous Capsule of Kidney
(Anterior; Left)
(Capsula fibrosa renis)

Renal Artery (Left)
(Arteria renalis)

Left Renal Vein
(Vena renalis sinistra)

Left Testicular Vein
(Vena testicularis sinistra)

Testicular Artery (Left)
(Arteria testicularis)

Superior Mesenteric Artery
(Arteria mesenterica superior)

Fourth Lumbar Artery (Left)
(Arteria lumbalis quarta)

Median Sacral Artery
(Arteria sacralis mediana)

Summary

4 muscles of the posterior abdominal wall

Quadratus lumborum, psoas major and minor, and iliacus

Summary

Related structures include but are not limited to:
Lumbar plexus
Aorta and IVC
Lumbar, sacral and gonadal vessels
Kidneys and ureters

Summary

Posterior abdo wall is supported by the vertebral column and thoracolumbar fascia

ABDOMINAL WALL PART 4

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STRUCTURE OF PART 4

- Why are the layers of the abdominal wall and inguinal canal important to know for clinicians.
- We will discuss the various types of hernias and relate them to the abdominal wall.

HERNIAS

- Hernia is a term for an internal part of the body pushing into another, unnatural, part of the body.
- The hernias we will consider are inguinal hernias and femoral hernias – though you can get hernias all over the body.

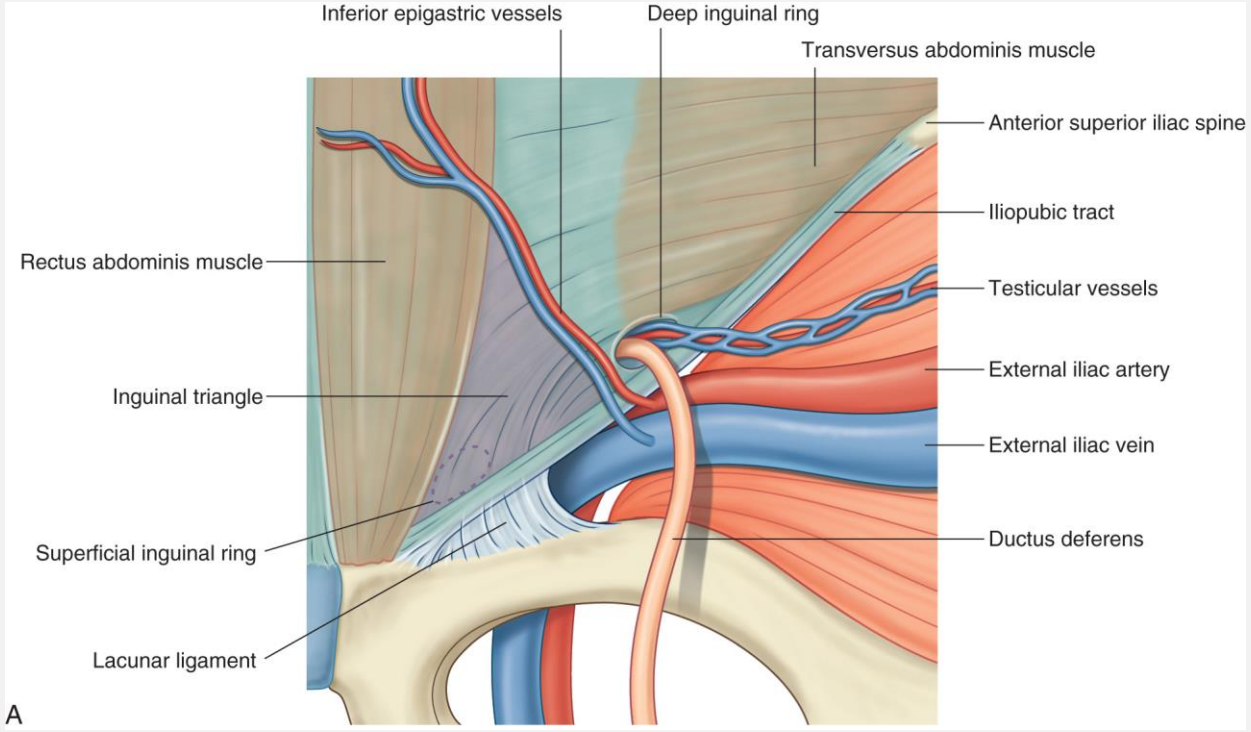
INGUINAL HERNIAS

- Can be classified into two categories:

1. Direct – meaning part of the bowel pushes through the abdominal wall into the inguinal canal.
2. Indirect – meaning part of the bowel pushes its way into the inguinal canal through the deep inguinal ring.

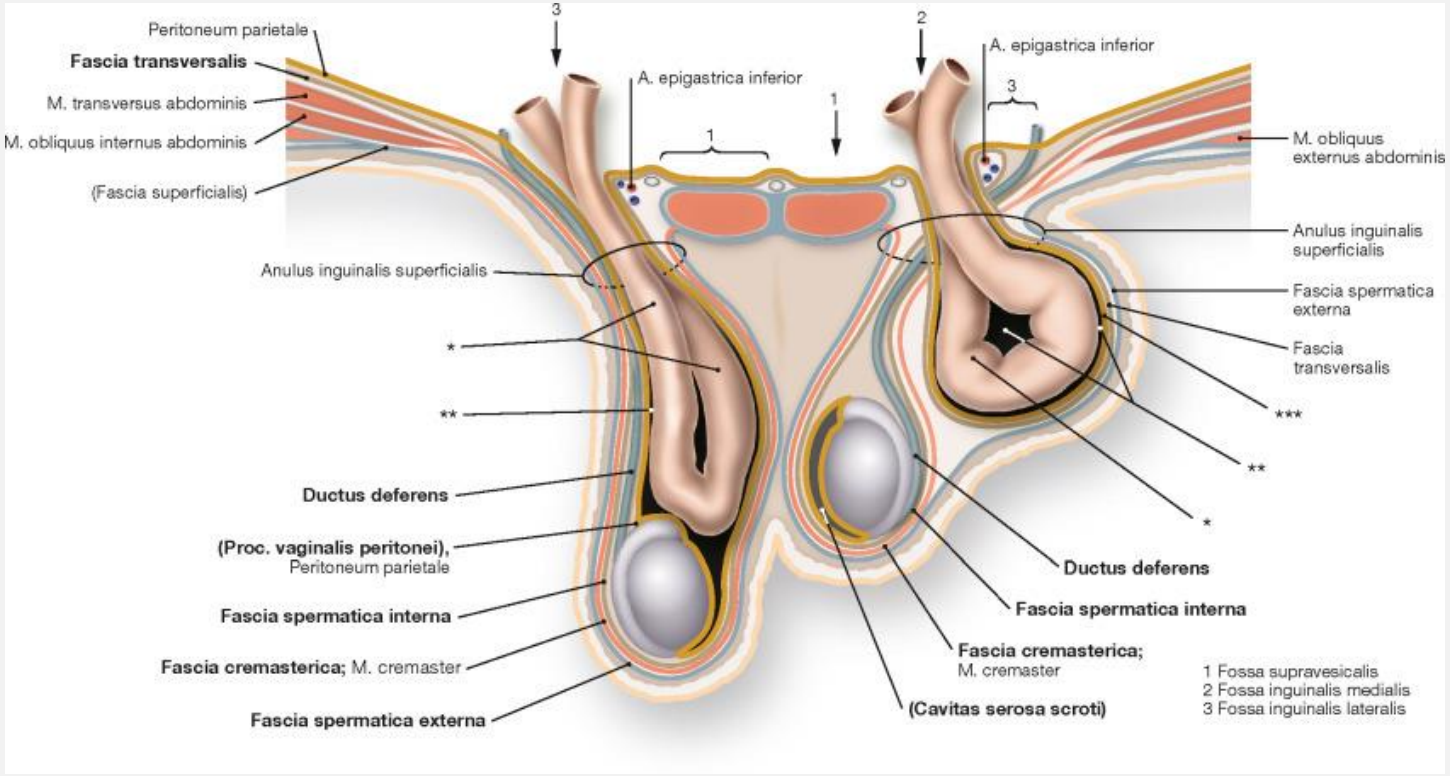
DIRECT INGUINAL HERNIAS

- Direct hernias push through a weakness in the abdominal wall known as Hesselbach's triangle. Or the inguinal triangle
- This triangle is an area of weakness in abdominal muscles bordered by the inguinal ligament, rectus abdominus and inferior epigastric artery.



INDIRECT INGUINAL HERNIAS

- Indirect hernias pass through the deep inguinal ring and into the inguinal canal.



EXAMINATION

- Presentation often is a painless groin lump which may disappear and come back or may be constant.
- Heavy lifting and constipation may exacerbate the problem.
- Examination involves reducing the hernia if possible, covering the deep inguinal ring and asking the patient to cough.
- This can help you distinguish between the direct and indirect hernias.
- Hernias may become strangulated meaning the blood supply to the tissue is cut off – this is very serious and can cause ischaemic bowel.

SUMMARY – Direct inguinal hernias

Travel through the inguinal triangle

Push into the inguinal canal and can end up in the scrotum

After reduction and examination with a cough impulse, the direct hernia will reappear

SUMMARY – Indirect inguinal hernias

Travel in through the deep inguinal ring

Run through the lengths of the canal and can end up as a scrotal lump also

After reduction on examination and cough impulse an indirect hernia does not reappear