

Module: Gastro-Intestinal Tract (GIT)

Session: 3

Lecture Title: **Surgical anatomy of the abdomen wall**

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This Lecture was loaded in blackboard and you can find the material

Moore, K.L. & Dalley, A.f. *Clinically Oriented Anatomy*, 8th Edition, Lippincott Williams & Wilkins [2018]

Drake, R.L., Vogl, W & Mitchell, A.W.M. *Gray's Anatomy for Students*, Elsevier Churchill Livingstone [2015]

For more detailed instructions, any question, or you have a case you need help in,
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Learning Objectives (LO)

By the end of the session you should be able to:

1. describe the structure and layers of the abdominal wall
2. describe the major landmarks of the abdominal wall
3. describe the abdominal wall musculature
4. describe commonly used surgical incisions in the abdominal wall
5. Describe the consequences of developmental defects as they relate to the abdominal wall and give relevant examples
6. Explain the concept of somatic and visceral referred pain
7. Relate visceral referred pain to the embryological development of the gut
8. Describe and give examples of referred pain relating to the abdominal cavity



Structure and layers of the abdominal wall

LO-1

The anterior abdominal wall is composed of skin, fasciae and muscle.

As access to the abdominal cavity requires surgical incision, knowledge of the composition of the abdominal wall is necessary before carrying out any physical or surgical procedure.



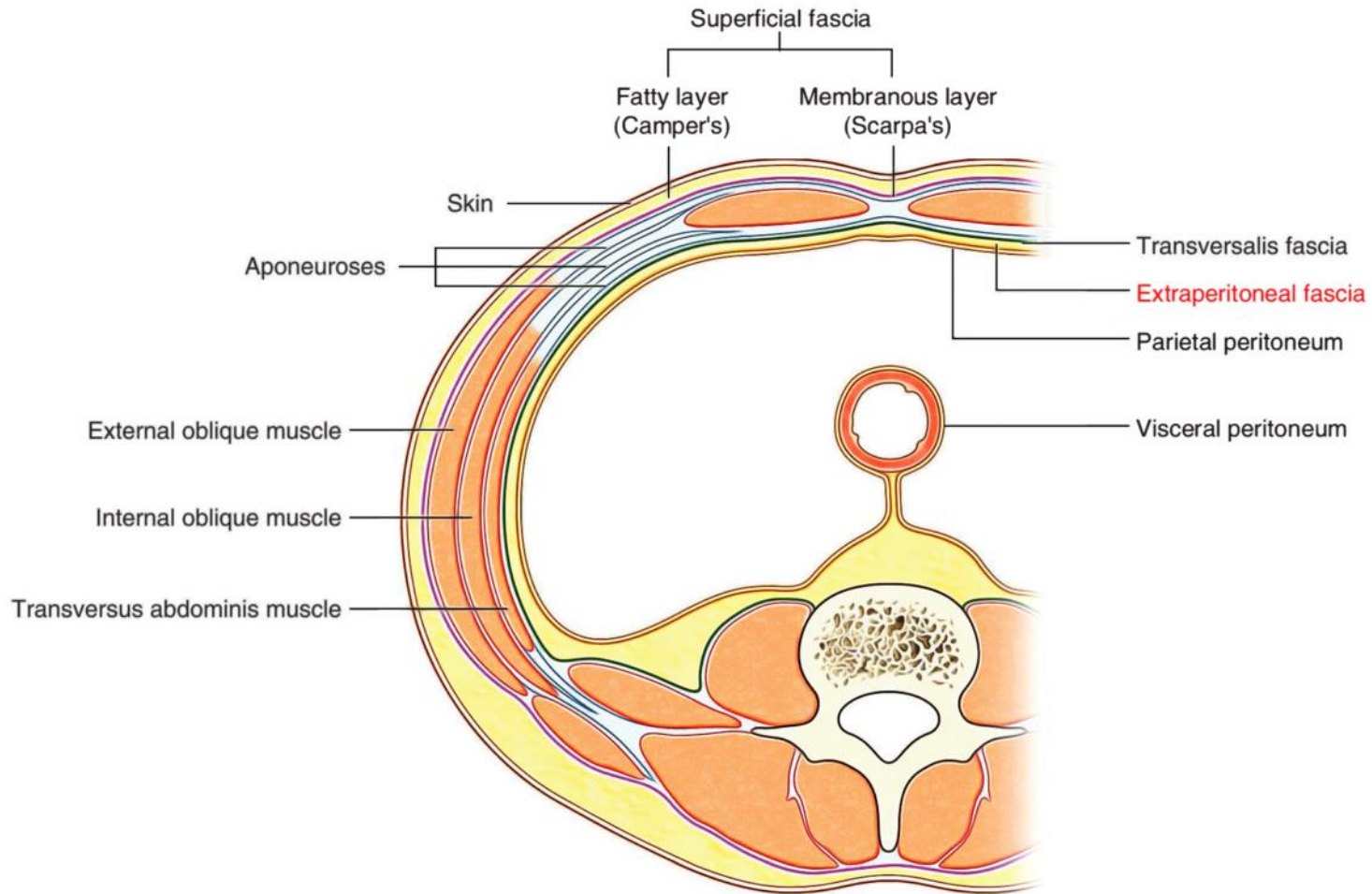
Structure and layers of the abdominal wall

LO-1

1. Skin
2. Superficial fascia—fatty layer(Camper’s fascia)
3. Superficial fascia -membranous layer(Scarpa’s fascia)
4. External oblique muscle
5. Internal oblique muscle
6. Transversus abdominis muscle
7. Transversalis fascia
8. Extraperitoneal fascia
9. Parietal peritoneum



LO-1



Surface Landmarks of the Abdominal Wall

LO-2

linea alba: is a vertically running fibrous band that extends from the symphysis pubis to the xiphoid process and lies in the midline . It is formed by the fusion of the aponeuroses of the muscles of the anterior abdominal wall

Umbilicus: lies in the linea alba. It is a puckered scar and is the site of attachment of the umbilical cord in the fetus.

Iliac crest: can be felt along its entire length and ends in front at the anterior superior iliac spine and behind at the posterior superior iliac spine



Surface Landmarks of the Abdominal Wall

LO-2

Pubic tubercle: is an important surface landmark. It may be identified as a small protuberance along the superior surface of the pubis. about 2 to 3 cm lateral to the median plane.

Symphysis pubis: is the cartilaginous joint that lies in the midline between the bodies of the pubic bones.



Surface Landmarks of the Abdominal Wall

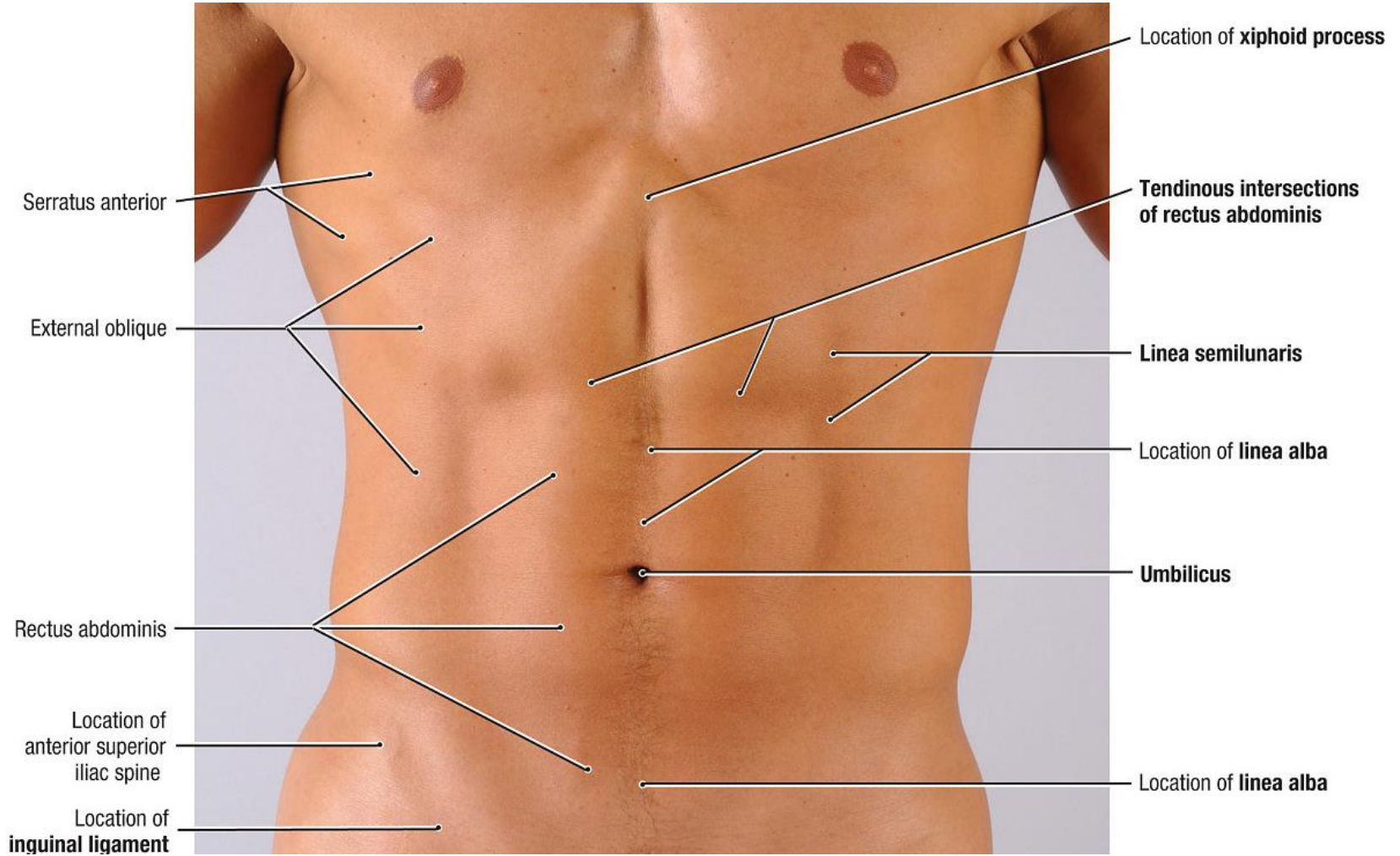
LO-2

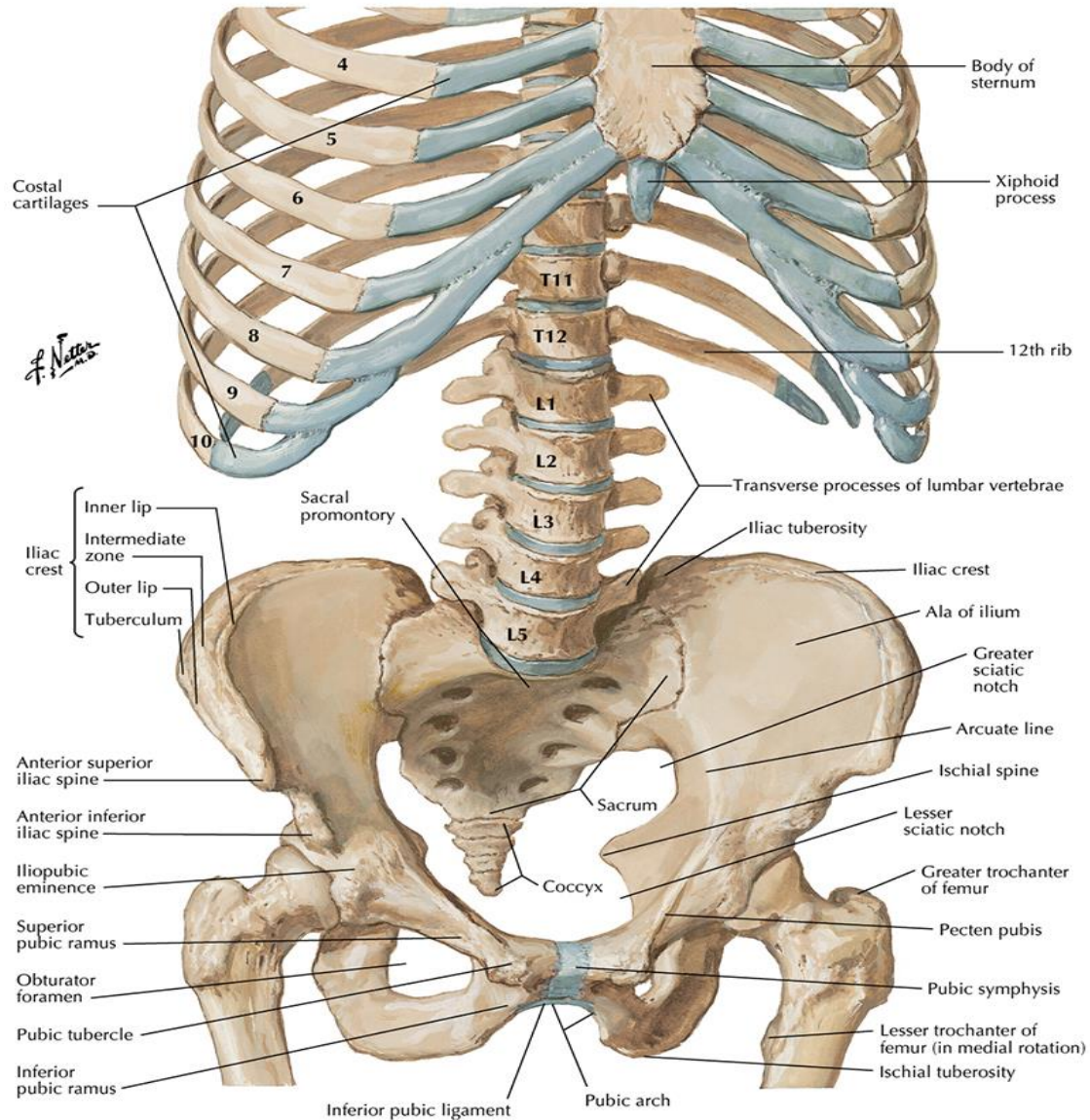
Rectus abdominis muscle: lie on both side of the linea alba and run vertically in the abdominal wall

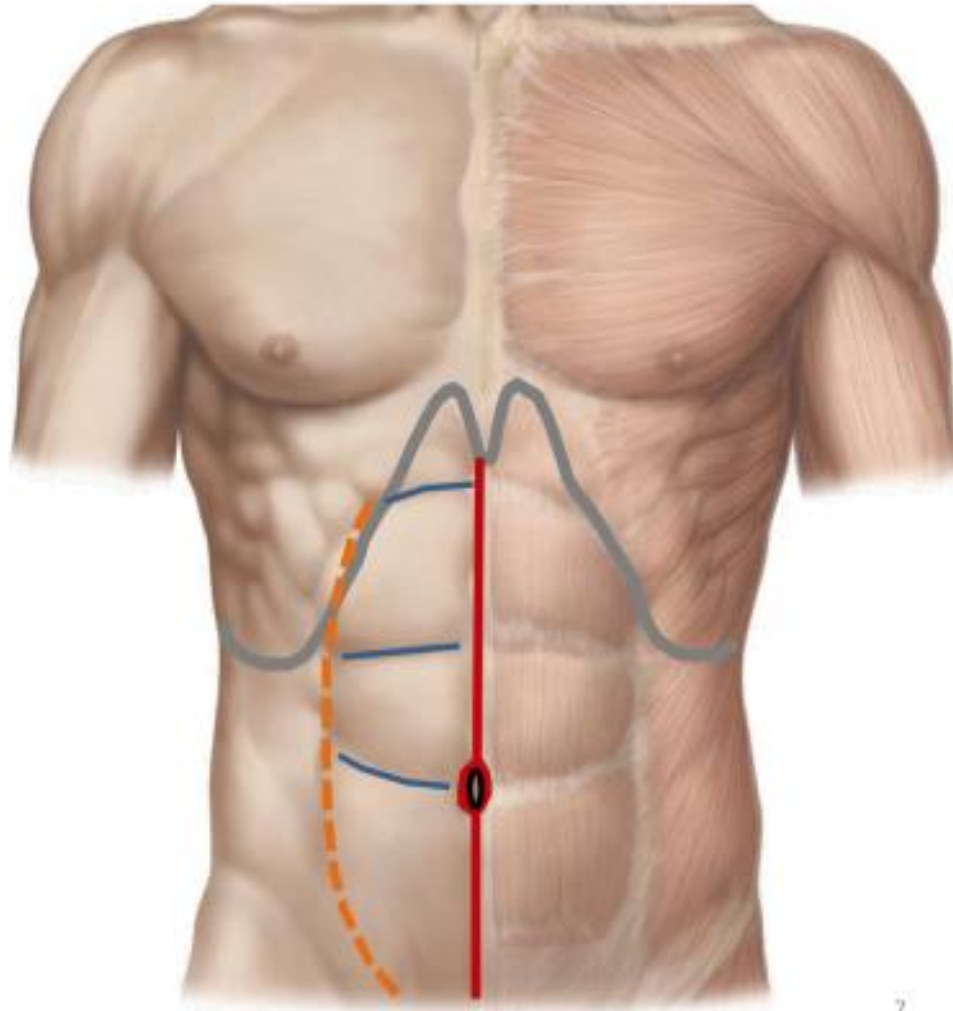
Tendinous Intersections: of the Rectus Abdominis are three in number and run across the rectus abdominis muscle.

linea semilunaris: is the lateral edge of the rectus abdominis muscle









Abdominal wall musculature

LO-3

There are five muscles (3 flat and 2 vertical) in the antero-lateral abdominal wall;

The flat muscles end anteriorly in a strong aponeurosis in the midline at the linea alba.



LO-3

The muscles are important in flexing, twisting and lateral flexion of the trunk. Their contraction increases intra-abdominal pressure during activities such as lifting, coughing, defecation, urination, etc.



Muscles of anterior abdominal wall

1. External oblique muscle
2. Internal oblique muscle
3. Transversus abdomemis muscle
4. Rectus abdomenis muscle
5. Pyramidalis muscle



Abdominal wall musculature

LO-3

External oblique muscle

Origin : lower 8 ribs.

Insertion: linea alba, pubic tubercle,
and anterior iliac crest.



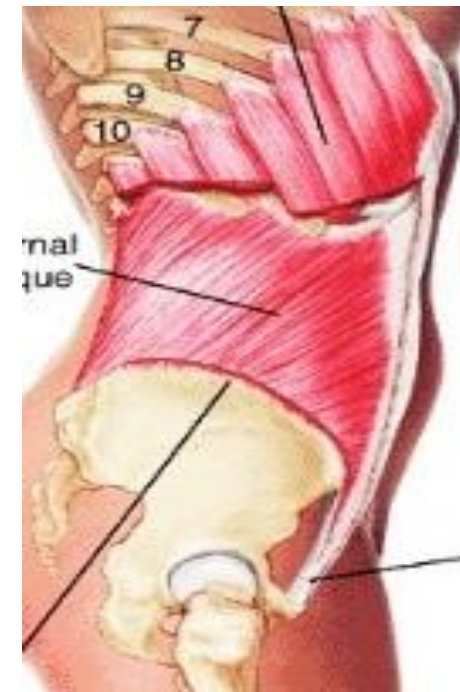
Abdominal wall musculature

LO-3

Internal oblique muscle

Origin : thoracolumbar fascia, anterior iliac crest, and inguinal ligament.

Insertion: Lower 3 ribs, linea alba, and pubis via conjoint tendon.



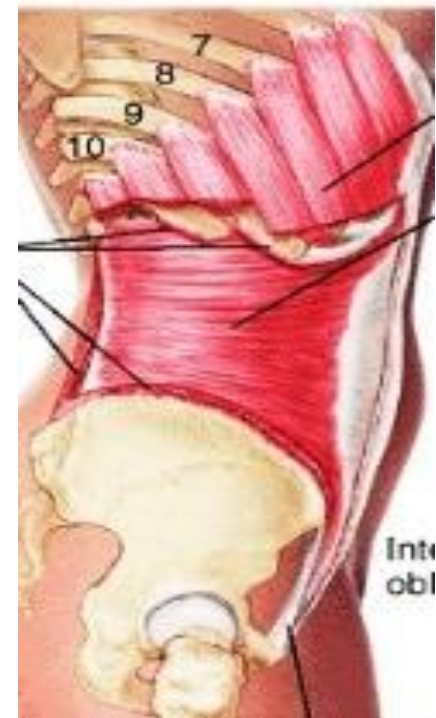
Abdominal wall musculature

LO-3

Transversus abdominis muscle

Origin : Lower 6 costal cartilages, thoracolumbar fascia, iliac crest, inguinal ligament

Insertion: Linea alba, pubis (via conjoint tendon)



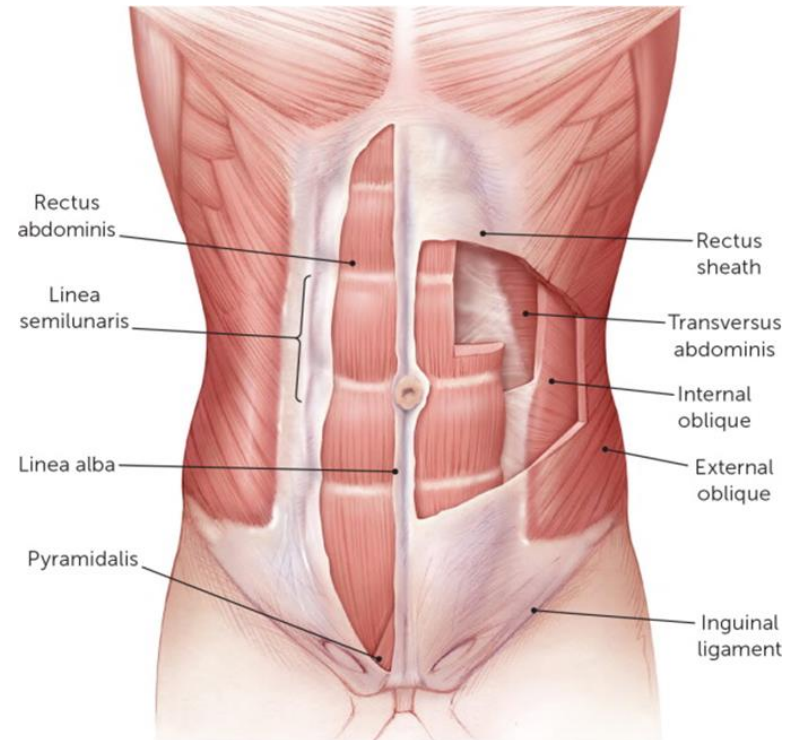
Abdominal wall musculature

LO-3

Rectus abdominis

Origin : pubic symphysis
and pubic crest.

Insertion: xiphoid
process and 5th to 7th
costal cartilages)



Abdominal wall musculature

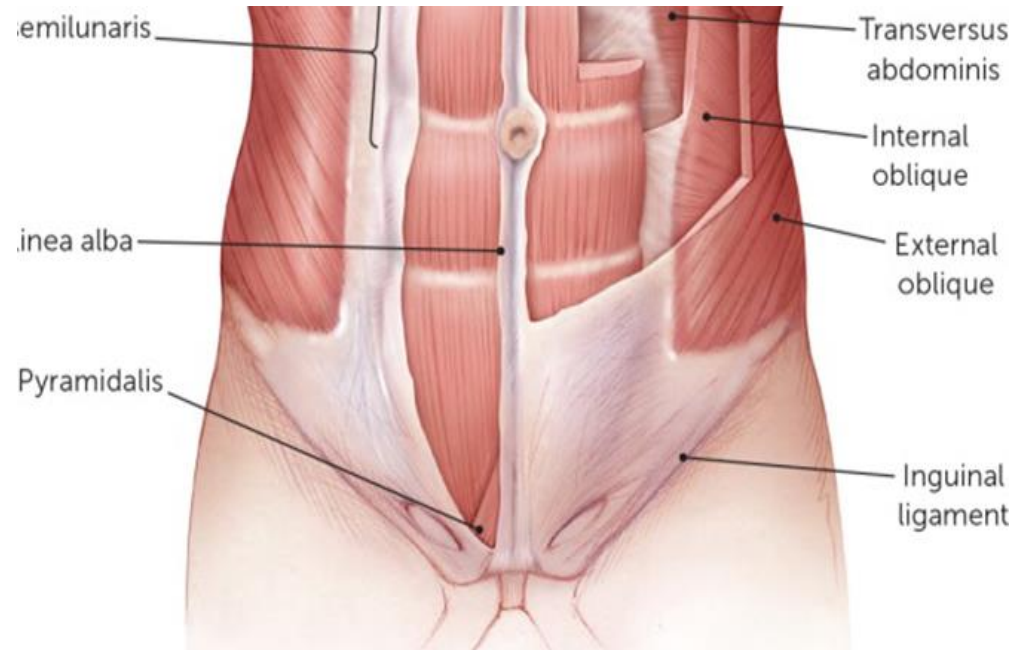
LO-3

Pyramidalis

small triangular muscle

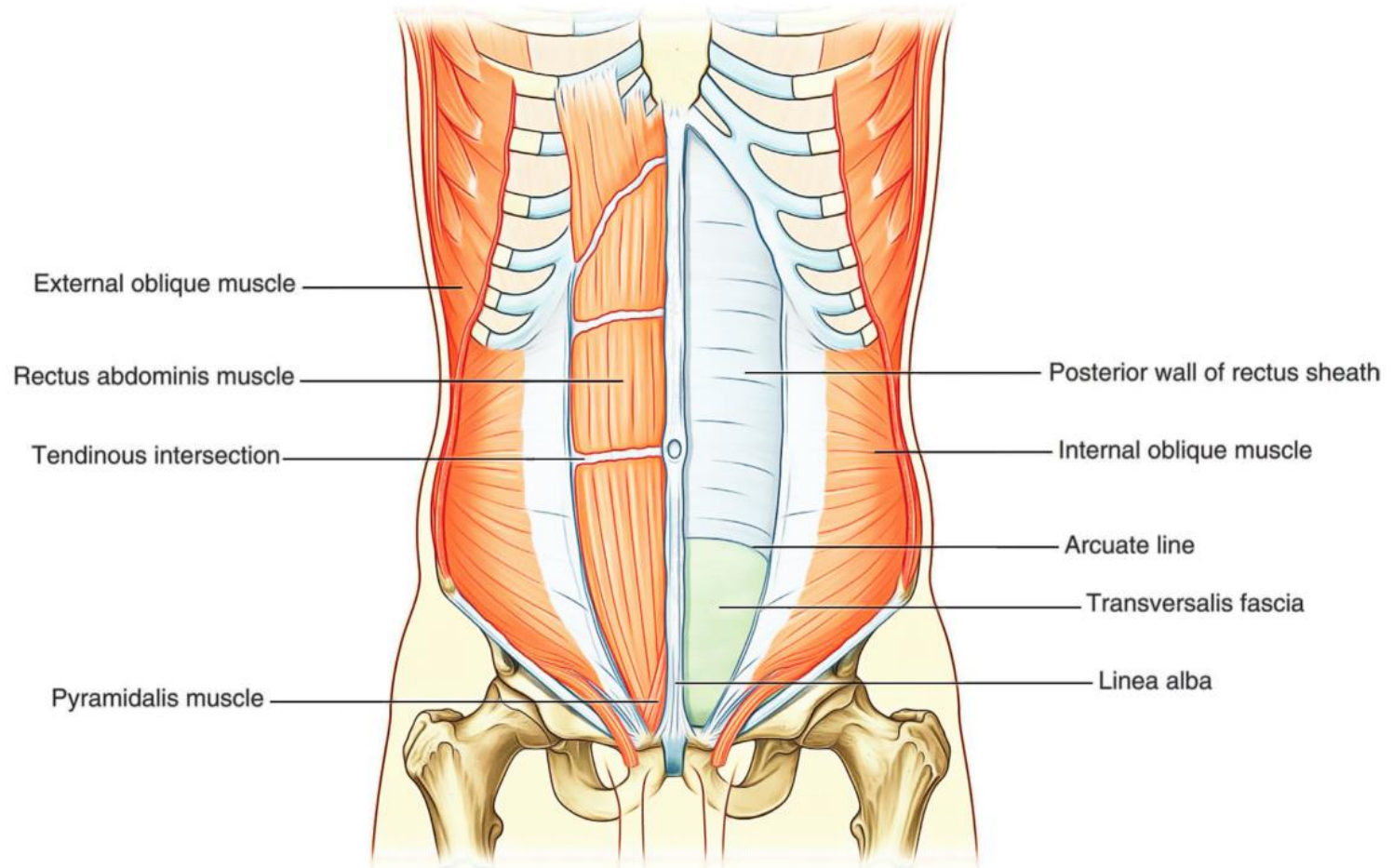
anterior to the rectus abdominis

(absent in 20% of people).



Abdominal wall musculature

LO-3



Surgical incisions in the abdominal wall

LO-4

Various incisions are made in the abdominal wall to gain access to the structures within the abdominal cavity.

The location of the incision depends on the type of surgical operation, the location of the abdominal viscera (organs), avoidance of nerves (particularly motor nerves), maintenance of blood supply, etc.



Surgical incisions in the abdominal wall

LO-4

For example, cutting of a motor nerve(s) will lead to muscle paralysis, thereby causing abdominal wall weakness. Improper healing of a surgical incision or scar may become a site where herniation of the abdominal viscera can occur through the abdominal wall.

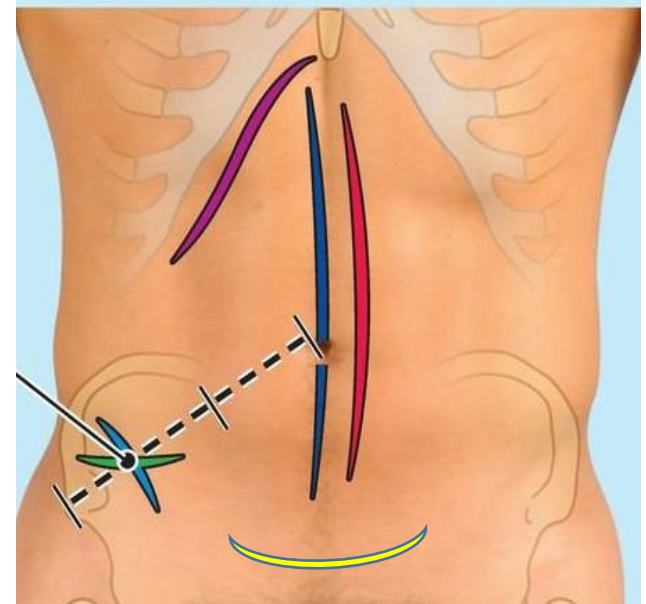


Surgical incisions in the abdominal wall

LO-4

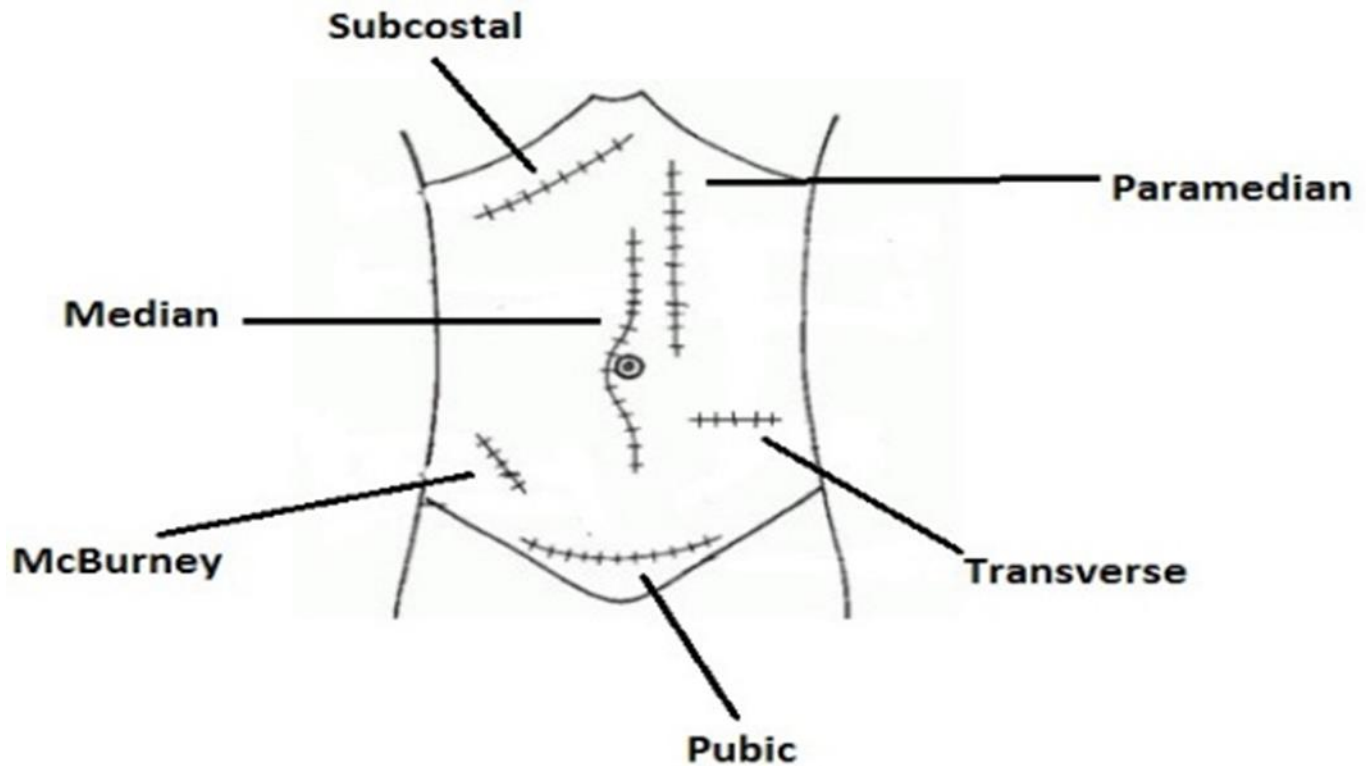
Key

- Median or midline incision
- Left paramedian incision
- Gridiron (muscle-splitting) incision (traditional McBurney incision)
- Transverse (abdominal) incision
- Suprapubic (Pfannenstiel) incision
- Subcostal incision



Surgical incisions in the abdominal wall

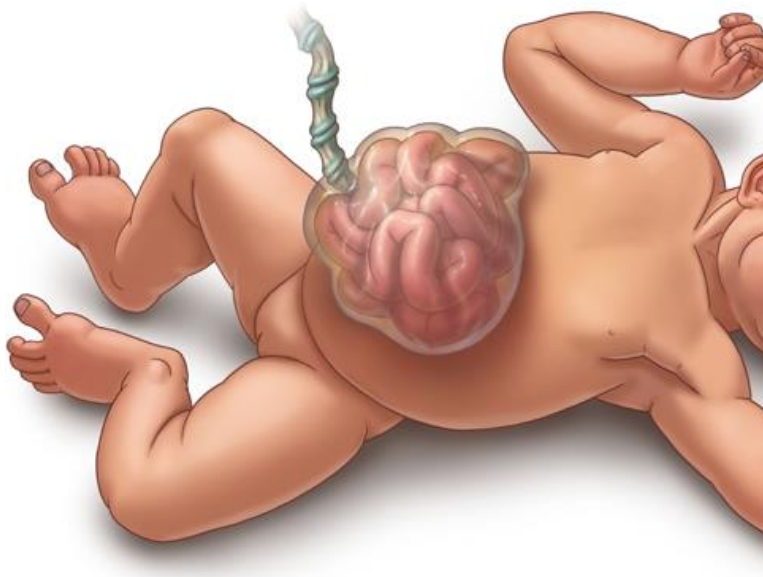
LO-4



Abdominal wall defects

LO-5

Omphalocele



Abdominal wall defects

LO-5

Gastroschisis



Abdominal wall defects

LO-5

Prune belly syndrome



Visceral and somatic pain

LO-6

Visceral pain is pain that results from the activation of nociceptors of the thoracic, pelvic, or abdominal viscera (organs).

viscera have no dedicated pain fibers and instead using sympathetic afferents, the pain is usually felt in the midline and in either the epigastrium (foregut), around the umbilicus (midgut) or suprapubic region (hindgut).



Visceral and somatic pain

LO-6

Visceral structures are highly sensitive to distension (stretch), ischemia and inflammation, but relatively insensitive to other stimuli that normally evoke pain such as cutting or burning.

Visceral pain is diffuse, difficult to localize and often referred to a distant, usually superficial, structure. It may be accompanied by symptoms such as nausea, vomiting, changes in vital signs as well as emotional manifestations.

Visceral pain typically associated with involvement of the autonomic nervous system



Visceral and somatic pain

LO-6

Once the parietal peritoneum is stimulated (which is derived from the somatic mesoderm) somatic neurons relate pain to dorsal route ganglions in the spinal cord. Pain is then localized to the dermatome nearest to the pathological process, which is much more specific than visceral pain.



Referred pain

LO-7,8

Referred pain is pain perceived at a location other than the site of the painful stimulus/ origin. It's the result of a network of interconnecting sensory nerves. This network supplies many different tissues

Right tip of <u>scapula</u>	<u>Liver, gallbladder</u>
Left shoulder	<u>Thoracic diaphragm, Spleen</u>
Back	<u>Pancreas</u>



