Perineum

DONE BY: ZAID AL-GHNANEEM
Hello everyone, this sheet will talk about 2nd Lecture which is Perineum but there are some slides and info from 1st Lecture. Everything included “Slides + Pics”
Let’s Go 😊

Arteries of the False Pelvis
• Common iliac a.
  – Divides at the pelvic prim in front of the sacroiliac joint
• External iliac a.
  – Continue at the brim
  – Pelvic branches
    • Deep circumflex iliac
    • Inferior epigastric
  .... these arteries for abdomen
  – Leave the false pelvis
dee to the inguinal lig.

Common iliac artery in inferior abdominal wall, if we take the relation the abdominal aorta in the midline and inferior vena cava just posterior to the right of abdominal aorta, bifurcation of abdominal aorta to common iliac arteries, and just inferior to this bifurcation there is bifurcation of inferior vena cava. The common iliac artery exits just inferior to inguinal ligament through femoral opening toward femoral triangle, remember above inguinal ligament we have inguinal canal that is connection between abdomen and perineum, and remember in inguinal triangle we have "VAN" vein, artery, nerve so vein is the most medially, note that these structures are part of false pelvis.

Arteries of the True Pelvis
• Internal iliac a.
• Superior rectal a.
  – Continuation of inferior mesenteric a.
  – Mucus membrane of rectum & upper anal canal
• Ovarian a.
  – From abdominal aorta – L1
  – Cross the external iliac at the brim
  – Reach the ovary by passing through suspensory lig. – broad lig. – mesovarium
• Median sacral a.
  – Rise at the bifurcation of aorta
— Descend anterior to sacrum & Coccyx
ovary and testes developed in upper part of abdomen then descend and pull ovarian and testicular arteries with them, we will take them soon in details.

Internal Iliac Artery
• Supply the pelvic viscera & walls, perineum, & buttocks
• It divides at the upper margin of the greater sciatic foramen
• Divisions
  — Anterior
  — Posterior

Internal Iliac Artery
Anterior Division
• Umbilical a.
  — Superior vesical a.
• Obturator a. ... exit with obturator nerve through obturator foramen
• Uterine a.
  — Cross the ureter superiorly
  — Ascend on the lateral side of the uterus
    • Through the broad lig.
    • Anastomose with ovarian a.
• Inferior vesical a. (Vaginal a.)
  — Artery to the vas deferens
• Middle rectal a.
• Internal pudendal a.
  — Leave via GSF
  — Come back via LSF
  — Enter the pudendal canal with the nerve
• Inferior gluteal a.
  — Below piriformis m. via GSF

Lets talk about umbilical artery, in adults it is called superior vesical artery, in fetus it is for placenta, proximal part of it becomes adult artery "superior vesical" but the distal part becomes ligament called Medial umbilical ligament.

Internal Iliac Artery
Posterior Division
• Iliolumbar a. .. ascending artery
  — Ascend posterior to external iliac vessels,
psoas & iliacus mm.
• Lateral sacral aa.
• Superior gluteal a.
  – Above piriformis m. via GSF

Veins of the Pelvis
• External iliac v.
  – Medial to the external iliac a.
  – Tributaries
    • Deep circumflex iliac
    • Inferior epigastric
• Internal iliac v.
  – Tributaries correspond to the arteries
• Median sacral v.
  – Drain into the left common iliac v. .. not drain in bifurcation

→ Lymphatics of the pelvis
  – Lymph drains into the node associated with arteries
  • External iliac, internal iliac & common iliac lymph nodes

Now Let’s start the 2nd lecture which is Perineum 😊

Perineum
– Diamond-shaped area medial to thighs and buttocks of males and females
– The perineum is inferior to the pelvic diaphragm that
– Extends from the pubic symphysis anteriorly, to the coccyx posteriorly, and to the ischial tuberosities laterally.
– Composed of anal triangle and urogenital triangle
– Contains external genitalia and anus

perineum just inferior to pelvis and it is enclosed within bony pelvis and externally with perineal skin, it has anterior triangle and posterior triangle, anterior is called urogenital triangle and posteriorly anal triangle and as we said perineum inferior to pelvic floor.

Anal Triangle
• Boundaries
  – Coccyx – posteriorly
– Sacrotuberous lig. & ischial tuberosity – laterally

• Content
  – Anal canal & anus .. in the midline just inferior to pelvic floor
  – Ischioanal (ischiorectal) Fossae .. lateral we have recess like structure called ischioanal fossae

Imaginary line between ischial tuberosities is the separation line between the 2 triangles, and medially is the pelvic diaphragm “levator ani muscle”. Also, as we said it is diamond in shape if we look coronally.

**Anal Canal**

• 4 cm length
• Oriented downward & backward
• Relations
  – Posteriorly – anococcygeal body and end of coccyx
  – Laterally - Ischioanal fossae
  – Anteriorly – perineal body

& content of the urogenital triangle
  • Male
  • Female

Anal canal is continuation of GI, downward backward, separated from rectum by puborectalis muscle, rectum is oriented downward forward, so make angle between them, and the content differ between male and female.

**Anal Canal: Structure**

• Upper half
  – Columnar epithelium
  – Anal columns & valves
  – Blood supply: superior rectal vessels
  – Nerve supply: autonomic hypogastric plexuses
  – Lymphatics: along the superior rectal a.
  – pararectal nodes – inferior mesenteric nodes
    ➔ Pectinate line

• Lower half
  – Stratified squamous epithelium
  – Blood supply: inferior rectal vessels
  – Nerve supply: inferior rectal nerve (somatic)
  – Lymphatics: superficial inguinal nodes or internal iliac nodes.

Anal canal is 2 parts classified as how it they are developed embryologically, the most important things here are innervation and vessels of each part, if we take the upper part, upper half veins drain to inferior mesenteric vein so it is part of portal system, whereas lower half veins drain to internal pudendal vein “systemic circulation” so we have connection between portal and systemic circulation and that’s why we may have varicose veins in this region.

Also, upper half is considered visceral organ because the innervation is autonomic, but the lower half is somatic, so pain in upper half for example is less severe and vague.
As we know lymphatics they are going to follow are arteries.

Anal Canal

- Muscle coat- smooth m.
  - Outer – longitudinal
  - Inner - circular
- Anal sphincters
  - Internal sphincter- smooth m.
  - Thickening of the inner circular m.
  - External sphincter- skeletal m.
  - Subcutaneous part
  - Superficial part
  - Deep part
  - With puborectalis form anorectal ring
- Puborectalis m.
  - Anorectal angle

Inner circular ends as internal anal sphincter which is involuntary muscle, Let’s talk about external sphincter, external sphincter has different parts, just beneath the skin we have the subcutaneous part, the deep part is close to puborectalis muscle and make what is called anorectal ring, and puborectalis form the Anorectal triangle “the angle we talked about it that lies between rectum and anal canal”
Ischioanal fossa
- Wedge-shaped space
- Boundaries
  - Obturator internus m. laterally
  - Levator ani m. & anal canal medially
  - Skin inferiorly

Medial view from left
80° anorectal angle at anorectal junction

Table 13-8: Muscles of Perineum

<table>
<thead>
<tr>
<th>Name of Muscle</th>
<th>Origin</th>
<th>Insertion</th>
<th>Nerve Supply</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>External anal sphincter</td>
<td>Circles anal canal, no bony</td>
<td>Coccyx</td>
<td>Inferior rectal nerve and perineal branch of fourth sacral nerve</td>
<td>Together with puborectalis muscle forms voluntary sphincter of anal canal</td>
</tr>
<tr>
<td>Subcutaneous part</td>
<td>circles anal canal, no bony</td>
<td>Coccyx</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Superficial part Deep</td>
<td>Circles anal canal, no bony</td>
<td>Coccyx</td>
<td></td>
<td></td>
</tr>
<tr>
<td>part</td>
<td>circles anal canal, no bony</td>
<td>Coccyx</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Puborectalis (part of levator ani)</td>
<td>Pubic bones</td>
<td>Sling around junction of rectum and anal canal</td>
<td>Perineal branch of fourth sacral nerve and from perineal branch of pudendal nerve</td>
<td>Together with external anal sphincter forms voluntary sphincter for anal canal</td>
</tr>
</tbody>
</table>
• Content
  – Filled with dense fat
  – Pudendal n. & internal pudendal vessels
  • In pudendal canal on the lateral wall
  – Inferior rectal n., a., v.

Ishioanal fossa is just lateral to anal canal, medial to lateral wall of anal triangle, it is closed space, recess like fossa mostly obliterated by adipose tissue but pass it blood vessels and nerves bundles.

All vital structures and blood vessels that nourish the perineum enter through the lesser sciatic foramen which lies in the posterior part of anal triangle, and continue toward the urogenital triangle, some of the vessels and nerves that enter are pudendal nerve and internal pudendal artery and vein.

• Pudendal nerve
  – Supply external anal sphincter & muscles & skin of perineum
  – Branches
    • Inferior rectal nerve
      – External anal sphincter
      – Mucus membrane of lower half of anal canal & perianal skin
    • Dorsal nerve of the penis (clitoris)
    • Perineal nerve
      – Urogenital triangle mm.
      – Skin of posterior scrotum (labia majora)

• Internal pudendal a.
  – Inferior rectal a.
  – Branches to the penis (clitoris & labia)

Pudendal nerve and the arteries called "trunk of pudendal nerve and arteries" will enter the anal triangle in specific canal called pudendal canal to reach the urogenital triangle, through this course it will give many branches, inferior rectal nerve for example is mixed nerve "sensation and motor" will be branched within anal triangle, same thing to internal pudendal artery that within anal triangle it will gives many branches also and same thing to veins.

Urogenital Triangle

• Boundaries
  – Pubic arch – anteriorly ... lower edge of pubic arch
  – Ischial tuberosities – laterally

• Content
  – In male – penis & scrotum
  – In female – external genitalia & orifices of urethra & vagina

• Fascia
  – Superficial fascia
  – Superficial perineal pouch
• Content
• Urogenital diaphragm
  — Fascia
• Deep perineal pouch
  — content

Urogenital triangle: just anterior to anal triangle, anterior to the same imaginary line between the ischial tuberosities.

Also, we have superficial fascia which is continuation of superficial fascia of abdomen, and if you remember in abdomen there are 2 fasciae one fatty and one membranous, these fasciae will continue in the urogenital triangle and we will take them soon.

Ok 😊 Now remember we talked that in pelvic diaphragm the anterior part is deficient, this deficiency will be completed by urogenital diaphragm, this urogenital diaphragm is mixture of muscles that attached to the inferior rami of the pubis “pubic arch”.

Read this carefully :P → urogenital diaphragm is part of perineum " part of urogenital triangle " not from pelvis ! BUT the upper part of it " the deep fascia that covers the urogenital diaphragm " is part of Pelvis

Superficial perineal pouch which is lined by superficial fascia SEPARATED from deep fascia that line the urogenital diaphragm, this separation called superficial perineal pouch.

In another word superficial fascia separated from Deep fascia okay? this separation is called superficial perineal pouch

so urogenital triangle is actually 2 parts: urogenital diaphragm that contains deep perineal pouch , and superficial pouch.

**Urogenital Triangle**

**Superficial Fascia**

• Fatty layer (fascia of camper)
  — Continuous with the fat of the ischioanal fossa
  — Replaced by dartos muscle in scrotum
• Membranous layer (Colles’ fascia)
  — Attachments
    • Posteriorly – to urogenital diaphragm & perineal body
    • Laterally – pubic arch
    • Anteriorly – continuous with the Scarpa’s fascia
    • At penis (clitoris) – form tubular Sheath

Fatty layer is continuation of superficial fascia of the abdomen.

**Superficial Perineal Pouch**

• Enclosed between the Colles’ fascia and the urogenital diaphragm, were they meet:
– Posteriorly – at perineal body
– Laterally – at pubic arch .. laterally there is pouch like structure that attached to lateral borders of the deep fascia of urogenital diaphragm which is attached to pubic arch.

• Anteriorly – continuous with the potential space between the Scarpa’s fascia and the abdominal mm.
If we take the relation of this pouch, walls of superficial pouch are part of superficial fascia, externally there is dartos fascia, internally there is colles fascia, these 2 fasciae make the walls of this pouch.
Anteriorly, because of the potential space, if there is infection in abdomen or superficial pouch can be spread to each other

Content of Superficial Perineal pouch
• Root of the penis or clitoris
• Muscles
  – Bulbospongiosus mm.
    • In male – cover the pulp of penis
    • In female – cover the pulp of vestibule
  – Ischiocavernosus mm.
    • Cover the crura of the penis or clitoris
  – Superficial transverse perineal mm.
Penis is 2 parts: pulp and it is covered by bulbospongiosus, and crura which is covered by ischiocavernosus, these muscles help the penis in ejaculation.
Also, we have superficial transverse perineal muscle which is the posterior edge of urogenital triangle.

Deep Perineal Pouch
• Musculofascial triangle at the pubic arch
• Muscles
  – Sphincter urethrae
  – Deep perineal muscles
• Fascia – enclose the mm.
  – Superior fascial layer
  – Inferior fascial layer (perineal membrane)
and remember lower part of deep fascia is called perineal membrane

  – Attachments
    • Anteriorly – the two layers fuse together
    • Posteriorly – the two layers fuse & attach to the perineal body
    • Laterally – pubic arch
• Deep perineal pouch – enclosed between the two layers of fascia
What will traverse the urogenital diaphragm at the midline? the urethra and vagina in female, so logically the sphincter urethrae muscle will be one of content of deep pouch.
Content of Deep perineal pouch

- **Muscles**
  - Sphincter urethrae m.

- **Surrounds urethra and vagina**
  - Deep transverse perineal mm.

- **Internal pudendal a.**
  - Branches
    - Artery of crus
    - Artery of pulp
    - Dorsal artery of penis (clitoris)

- **Dorsal nerve of the penis (clitoris)**: pure sensory nerve

- **Part of urethra**
  - In male – membranous urethra

- **Part of vagina**

---

**Table 13-8: Muscles of Perineum**

<table>
<thead>
<tr>
<th>Name of Muscle</th>
<th>Origin</th>
<th>Insertion</th>
<th>Nerve Supply</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Male Urogenital Muscles</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bulbospinosus</td>
<td>Perineal body</td>
<td>Fascia of bulb of penis and corpus spongiosum and cavernosum</td>
<td>Perineal branch of pudendal nerve</td>
<td>Compresses urethra and assists in erection of penis</td>
</tr>
<tr>
<td>Ischiocavernosus</td>
<td>Ischial tuberosity</td>
<td>Fascia covering corpus cavernosum</td>
<td>Perineal branch of pudendal nerve</td>
<td>Assists in erection of penis</td>
</tr>
<tr>
<td>Sphincter urethrae</td>
<td>Pubic arch</td>
<td>Surrounds urethra</td>
<td>Perineal branch of pudendal nerve</td>
<td>Voluntary sphincter of urethra</td>
</tr>
<tr>
<td>Superficial transverse perineal muscle</td>
<td>Ischial tuberosity</td>
<td>Perineal body</td>
<td>Perineal branch of pudendal nerve</td>
<td>Fixes perineal body</td>
</tr>
<tr>
<td>Deep transverse perineal muscle</td>
<td>Ischial ramus</td>
<td>Perineal body</td>
<td>Perineal branch of pudendal nerve</td>
<td>Fixes perineal body</td>
</tr>
<tr>
<td><strong>Female Urogenital Muscles</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bulbospinosus</td>
<td>Perineal body</td>
<td>Fascia of corpus cavernosum</td>
<td>Perineal branch of pudendal nerve</td>
<td>Sphincter of vagina and assists in erection of clitoris</td>
</tr>
<tr>
<td>Ischiocavernosus</td>
<td>Ischial tuberosity</td>
<td>Fascia covering corpus cavernosum</td>
<td>Perineal branch of pudendal nerve</td>
<td>Causes erection of clitoris</td>
</tr>
<tr>
<td>Sphincter urethrae</td>
<td>Same as in male</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Superficial transverse perineal muscle</td>
<td>Same as in male</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Deep transverse perineal muscle</td>
<td>Same as in male</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Good Luck for all