

Pelvis and perineum

Boundaries and neurovascular content

Curricular Objectives: By the end of this session students are expected to:

Theory

1. Outline the boundaries of the pelvic cavity (walls, inlet, floor, outlet)
2. Define the terms false pelvis, true pelvis, perineum, obstetric and diagonal conjugates
3. List the structures passing through & spaces related to various foramina of true pelvis
4. Review the differences between the male and female bony pelvis
5. Outline the main parts of viscera located within the pelvis
6. Describe the fascial & peritoneal linings of the pelvis and their reflections on viscera
7. Describe the nerves entering, leaving and supplying (the walls of) the pelvis
8. Recall site of referred pain and the muscle involved in diagnosis of pelvic appendicitis
9. Outline the main blood vessels of the pelvis and their main branches
10. Discuss the risk of severe internal bleeding from fractured pelvis

Practical

1. Identify the pelvis (true & false), the bones forming it and its main features
2. Trace the structures passing through greater & lesser sciatic foramina
3. Distinguish the obturator foramen, membrane & canal, and the traversing structures
4. Label the muscles (piriformis, obturator internus) and name the fascia covering them
5. Identify the pelvic diaphragm, muscles forming it, and openings within it
6. Distinguish pelvic viscera of male and female
7. Trace the pelvic peritoneum and locate the spaces formed by its reflections
8. Distinguish the sacral plexus, sciatic nerve, pudendal nerve, and obturator nerve
9. Trace the ovarian and superior rectal arteries down to their termination
10. Follow the internal iliac artery and its main branches

Selected references and suggested resources

- ✦ Clinical Anatomy by Regions, Richard S. Snell, 9th edition
- ✦ Grant's Atlas of Anatomy, 13th Edition
- ✦ McMinn's Clinical Atlas of Human Anatomy, 7th Edition
- ✦ [Anatomy for Babylon medical students](#) (Facebook page)
- ✦ [Anatomy for Babylon medical students](#) (YouTube channel)
- ✦ [Human Anatomy Education](#) (Facebook page)
- ✦ [Human anatomy education](#) (YouTube channel)

Feedback and suggestions

- ✦ <http://goo.gl/forms/SjyjGeUpvH>

Session check list

❖ Clinical highlights

- Bone marrow biopsy (Collecting samples of bone marrow) from the iliac crest is used to diagnose and assess the severity of many blood pathologies
- Knowledge of the anatomy of the female bony pelvis, its viscera and related peritoneal spaces is crucial for delivering quality antenatal care in primary health care centers
- The pelvic cavity contains parts of the gastrointestinal system, the urinary system, and the reproductive system, it is a region of interest for general surgeons, urologists, and OBGYN specialists in addition to orthopedic surgeons in case of bone trauma

❖ Boundaries of the pelvis (Bones, Joints, Ligaments, and Muscles)

- The pelvis is the part of the trunk surrounded by the pelvic girdle
- The perineum is the area between the thighs and buttocks from the pubis to the coccyx. It contains External genitalia of male and female, in addition to external openings of the urinary, reproductive and gastrointestinal systems.
- The pelvic walls are made of bones and ligaments, covered by muscles
- There are four groups of bony pelvis: gynecoid, android, anthropoid, and platypelloid
- Pelvic Conjugates (Diameters) are measured to assess the capacity of the female pelvis for birth
- The pelvic diaphragm (floor) separates between the true pelvis above and the perineum below
- The perineal body is an ill-defined fibromuscular structure that receives the attachment of muscles of pelvic floor and perineum. It lies between the vagina & anal canal in female

❖ Fascial and peritoneal coverings of the pelvis and pelvic viscera

- Pelvic fascia and parietal peritoneum cover the muscles of the pelvis
- The pelvic fascia is divided into parietal and visceral layers.
- The visceral layer of pelvic fascia covers and supports pelvic viscera and forms fascial ligaments connecting the viscera to the pelvic walls
- The peritoneum reflect from the anterior abdominal wall over the pelvic viscera forming peritoneal pouches that are different in male and female

❖ Nerves of pelvis

- They are parts of lumbar plexus, sacral plexus and pelvic part of the sympathetic plexus
- They lie on the posterior pelvic wall (anterior to piriformis muscle)
- They include nerves to the pelvis, perineum and lower limb
- They can be compressed by fetal head or pelvic pathologies leading to pain at sites supplied by affected nerves

❖ Vessels of pelvis

- The internal iliac artery is the main supply to the pelvic viscera and walls. It also supplies the perineum, and the buttocks.
- The gonadal arteries (testicular and ovarian) take a different course
- The sacroiliac joint marks the bifurcation and formation of common iliac arteries and veins
- A rich network of veins drain the pelvic viscera to the internal iliac vein

Lab Activity List

For each task below, identify the listed structures then answer the related questions

❖ Task 1: Boundaries of the pelvis (Bones, Joints, Ligaments, and Muscles)

- **Hip (right and left):**
 - ✓ Ilium/ ischium/ pubis
 - ✓ Arcuate line/ Pectineal line/ Iliopectineal line/ Pelvic brim (inlet)
 - ✓ Ischial tuberosity/ Ischial spine/ Greater and lesser sciatic notches
 - ✓ Superior and inferior rami of pubis/ Pubic arch/ Subpubic angle/ Pelvic outlet
 - **Sacrum & Coccyx:** Sacral promontory/ ala of the sacrum/ Anterior sacral foramina
 - **Joints & Ligaments:** Sacroiliac J./ Symphysis pubis J./ Sacrotuberous L./ Sacrospinous L.
 - **Muscles:** Piriformis/ Obturator internus/ Levator ani/ Coccygeus/ Perineal body
 - **Foramina of the pelvis:**
 - ✓ Obturator foramen/ Obturator canal/ Greater and lesser sciatic foramina
 - ✓ Urogenital hiatus/ Opening for the rectum (openings within pelvic diaphragm)
- ⊕ The right and left hip bones articulate directly with each other posteriorly (True/False)
- ⊕ The true pelvis is located below which line?
- ⊕ The obturator canal connects which two spaces? List the structures passing through it
- ⊕ The base of the sacrum articulate with _____
- ⊕ The greater sciatic foramen provides a doorway between two spaces, name them
- ⊕ The diagonal conjugate extends between which structures?
- ⊕ The obstetric conjugate extends between which structures?
- ⊕ The urogenital hiatus transmit what structures in female?

❖ Task 2: Fascial and peritoneal coverings of the pelvis and pelvic viscera

- ✓ Urinary bladder/ Rectum/ Uterus
 - ✓ Rectouterine Pouch/ Uterovesical Pouch/ Rectovesical Pouch
- ⊕ Which space is the deepest of the pelvic cavity in erect position?
- ⊕ Name the fascia covering the obturator internus muscle

❖ Task 3: Nerves of pelvis

- ✓ Lumber plexus: Obturator nerve/ Lumbosacral trunk
 - ✓ Sacral plexus: Sciatic nerve/ Pudendal nerve
- ⊕ The obturator nerve provides sensory supply to what regions?
- ⊕ The lumbosacral trunk pass _____ to psoas to reach the pelvis
- ⊕ The pudendal nerve passes from the true pelvis to the perineum through what foramina?

❖ Task 4: Vessels of pelvis

- ✓ Common iliac artery and vein/ External iliac artery and vein/ Internal iliac artery and vein
 - ✓ Anterior and posterior divisions of internal iliac artery/ Internal pudendal vessels
 - ✓ Ovarian Artery, superior rectal artery
- ⊕ Which of the above arteries do not enter the true pelvis?
- ⊕ The two common iliac veins join together at the level of which vertebra?
- ⊕ What vessel is an anterior relation of both common iliac veins?
- ⊕ What is the origin of the ovarian artery?
- ⊕ The left common iliac vein is longer than the right, why?

Review questions:

1. Which part of the ilium forms the iliac fossa?
2. What forms the inlet and outlet of the pelvis?
3. Which foramen is situated below the pelvic diaphragm?
4. List the structures closing the obturator foramen from superficial to deep
5. The obturator canal is located within which part of the obturator membrane?
A. Anterior B. Posterior C. Superior D. Inferior E. Central
6. What are the pelvic structures that can cause irritation of obturator nerve if inflamed?
7. Which of the following arteries is not present in female?
A. Superior rectal artery B. Inferior rectal artery
C. Superior vesical artery D. Inferior vesical artery
E. Middle rectal artery
8. There is a risk of internal bleeding from

Homework:

1. A 20 years old female in her first pregnancy attended a private clinic for regular antenatal care. The examining doctor assessed her pelvic diameters and suggested that she may suffer dystocia and may need to go for elective caesarian section
 - A. What type of examination is used to assess the pelvic size in pregnant females?
 - B. What are the measurements used in this test (for inlet and outlet) to decide if delivery will be obstructed? Describe each one
 - C. What type of pelvis is ideal for easy labor with lowest risk of dystocia?
2. A 24 years old pregnant female was in labor. The head of the baby was big and the doctor decided to perform episiotomy procedure to protect the perineal body from tearing
 - A. Describe the position of the fetal head in relation to the inlet and outlet
 - B. Which nerve should be anesthetized to perform painless episiotomy?
 - C. Which bony landmark is the nearest to this nerve?
 - D. What area of skin is expected to be anesthetized?
3. Pelvic fractures can cause severe internal bleeding that can be life threatening, Explain