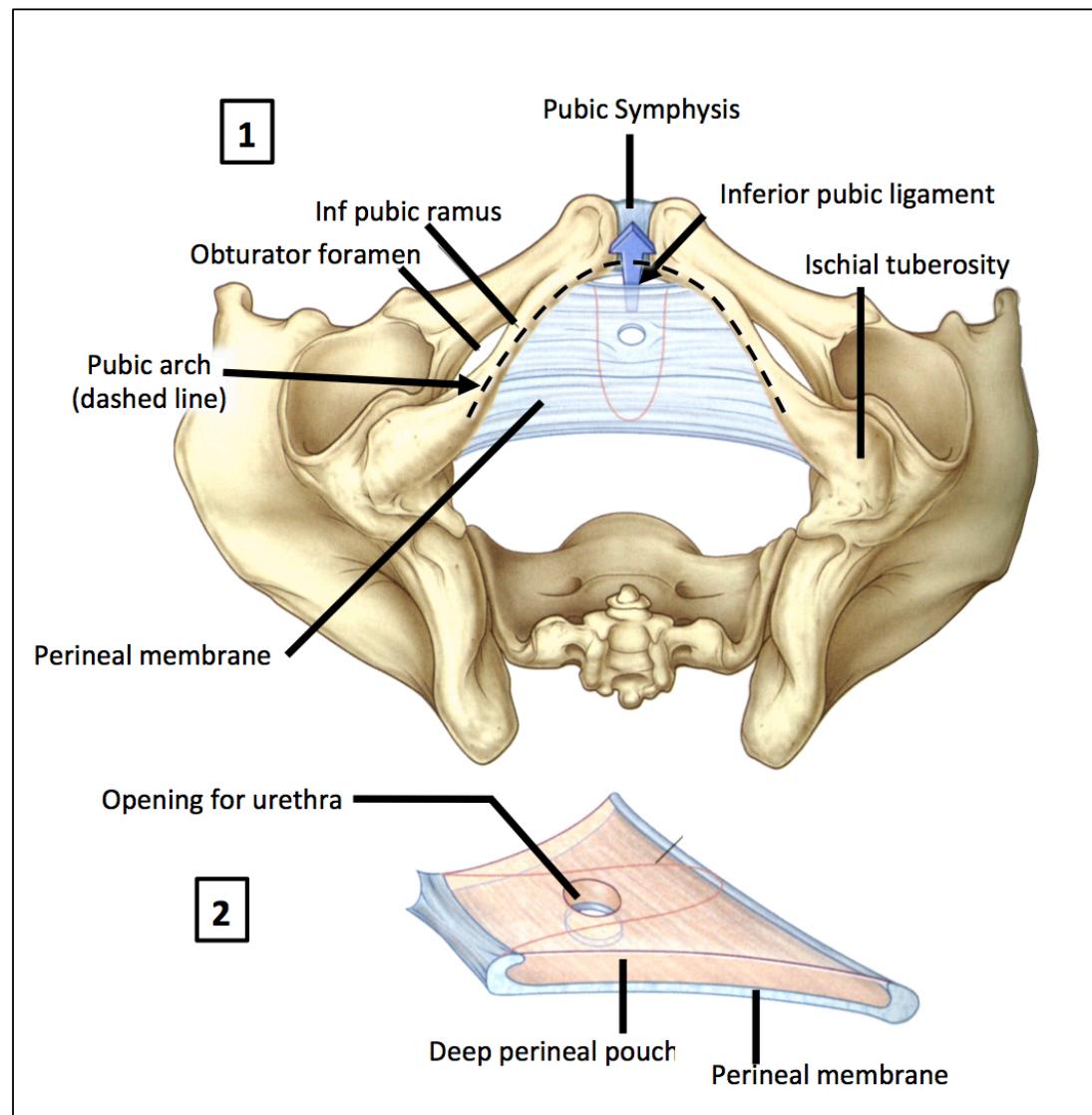


BSMS MODULE: 203, Reproduction and Endocrinology.

DR SESSION 2:

Pelvic Floor Anatomy



◆ Perineal membrane

The muscles of the pelvic floor together form what is termed the **pelvic diaphragm**. This diagram in turn rests above (superior) a thick fibrous membrane called the **perineal membrane** (Figure 1) that attaches to the two medial borders of the inferior pubic rami, i.e. the **pubic arch**.

Locate the **pubic arch*** and **perineal membrane** on the plastic model. The membrane was produced using plasticine. Ask a demo if unable to view these.

*the pubic arch runs between the lower edge of the pubic body and the two ischial tuberosities (see Figure 1 on the left).

◆ Deep and superficial perineal pouches

Note on this model how the anterior and posterior free edges of this perineal membrane were folded upwards. This is to exemplify the anatomical pouch – termed **deep perineal pouch** (Figure 2) – which sits superior to the perineal membrane.

Some of the most prominent features enclosed in the deep perineal pouch are:

- Urethra
- Vagina, in females
- Glands, such as **bulbourethral** (Cowper) glands in males
- Perineal muscles that act as sphincters, such as **compressor urethrae** or **urethrovaginal sphincter** in females

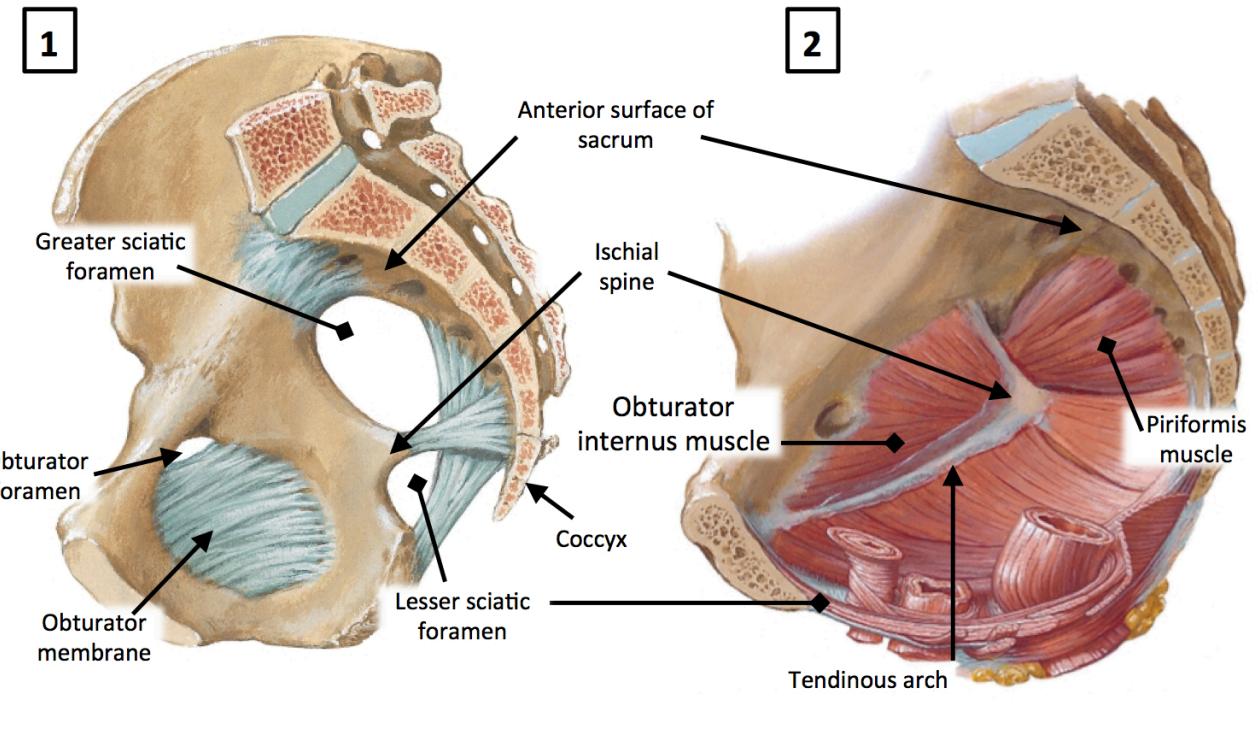
Inferior to the perineal membrane, hence more superficial with respect to the skin, is the **superficial perineal pouch**, which contains:

- Urethra
- Vagina, in females
- Glands, such as **Bartholin** in females (the equivalent to Cowper glands in males)
- Perineal muscles that provide support to the external genitalia, such as the **bulbospongiosus** or **ischiocavernosus** muscles

Both the perineal membrane, pouches and the muscles enclosed within it are very difficult to view on a prosection. Instead locate the main structures listed above using the **Netter** posters on the wall. Ask a demo if unable to find these.

There is no need to memorise the origin and insertion of the muscles located in these pouches. The important point to understand is that midway along a line joining the two ischial tuberosities lies the **perineal body**, the site where the fibres from several of the perineal muscles referred above converge.

The perineal body can become damaged during childbirth, resulting in weakened pelvic floor support and possibly prolapse.



◆ Bony landmarks and foramina

Prior to locating the muscles that bind to the wall of the pelvis – piriformis and obturator internus – use the plastic model or skeleton to recall the main features associated with these muscles (Figure 1), namely:

- the anterior surface of **sacrum**
- the **obturator membrane** and **foramen**
- the **greater and lesser sciatic foramina**
- the **greater trochanter** of the femur



Point out these features on the plastic model/skeleton

◆ The **piriformis** and **obturator internus** muscles

Next, turning your attention to the prosections and using Figure 2 as a guide, palpate for the bony landmarks described above to determine the origin of the **piriformis** and **obturator internus** muscles. Regarding the former, locate the anterior surface of the sacrum. This bone is easily discernible by the presence of the foramina, the passageway for the somatic sacral nerves.

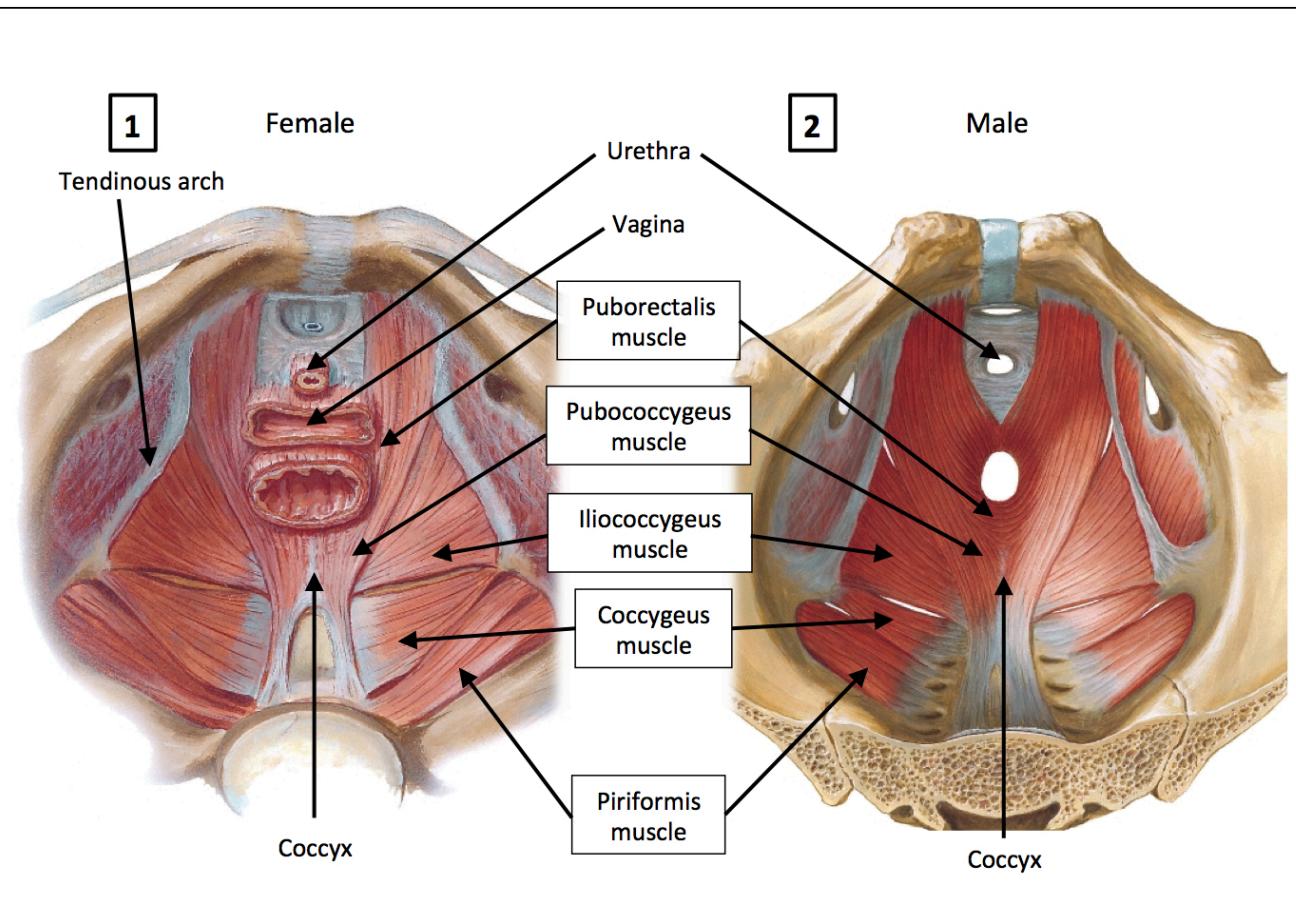
PROSECTION:

Next identify the **tendinous arch** (see Figure 2) extending from the ischial spine – palpate this – to the posterior aspect of the pubic bone and therefore over the obturator internus muscle. The tendinous arch provides the lateral attachment of the **levator ani** muscle, which is covered in another station.

Note: One easy way to locate the obturator internus muscle is to first locate the obturator foramen. If necessary place the plastic model parallel and aligned to the prosection. That way it is easier to transfer the position of the foramen on the model to the prosection.



Taking turns, point out the location and describe the path of the piriformis and obturator internus muscles. Finally, point out the location of the greater sciatic foramen, located superior to the ischial spine.



PROSECTION:

◆ Bony landmarks

Prior to locating the muscles that bind to the wall of the pelvis – levator ani and coccygeus – use the plastic model or skeleton to recall the main features associated with these muscles (Figure 1), namely:

- The internal surface of the **body of pubis**
- the **ischial spine**
- the **coccyx**
- the **tendinous arch (Figure 1)**



Point out these features on the plastic model/skeleton

◆ The levator ani and coccygeus muscles

First take a brief moment to note the general shape of the muscles that form the floor of the pelvis. This broad and thin muscle is attached to each side of the inner surface of the true pelvis. As stated in the tutorial, each levator ani+coccygeus group extends medially, covering half the pelvic outlet, but its fibres join with the opposite counterpart.

Next, again using the plastic models and Figure 1 (female) or 2 (male) as a guideline, attempt to identify on a prosection the three morphological subdivisions of levator ani: the **iliococcygeus**, the **pubococcygeus**, and the **puborectalis** muscles.

Note how it is rather straightforward in a plastic model but considerably harder to differentiate in the prosections but have a go: palpate for the bone landmarks that will indicate where each muscle originates/attaches. Ask a demonstrator if any help is needed.

- the **iliococcygeus**: from the tendinous arch, which projects from the ischial spine to the posterior (or internal) aspect of the pubic bone, to the coccyx
- the **pubococcygeus**, and **puborectalis**: the former projecting from the internal aspect of the pubis to the coccyx; the latter also from the pubis but not quite reaching the coccyx, the fibres instead sling behind the rectum
- **coccygeus**: from the inner surface of the ischial spine to attach to the lateral margin of the coccyx and side of the 5th sacral segment



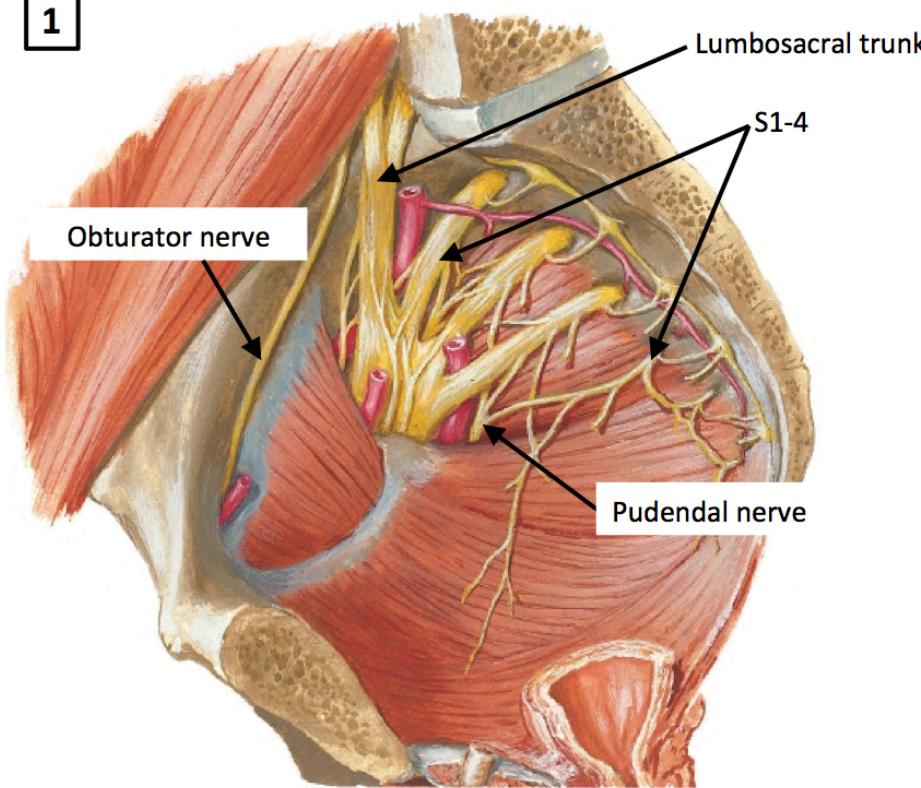
Taking turns, point out the location and describe the path of the levator ani and coccygeus muscles. Finally, point out the location of the tendinous arch on the prosection.

BSMS MODULE: 203, Reproduction and Endocrinology.

DR SESSION 2:

**Pelvic Floor Anatomy
Nerves and Vessels**

1



◆ Lumbar and sacral plexus

The **sacral plexus** is the main nervous supply within the pelvis. Despite its name, the sacral plexus is formed by the **anterior primary rami** of **L4, 5** as well as **S1–4**. The contribution from L4 joins with L5 to form the **lumbosacral trunk**, which in turn joins the anterior rami of the sacral nerves as these emerge from the **anterior sacral foramina** (Figure 1). It is possible to deduce the root number (e.g. S2, S4) according to which foramen each exit.

The sacral plexus projects inferolaterally, crossing anterior to the piriformis muscle, and most of its branches leave the pelvis via the greater sciatic foramen. A few remain within the pelvis, though, e.g. the piriformis nerve that innervates the piriformis muscle.

Recall the main branches of the sacral plexus covered in the lecture:

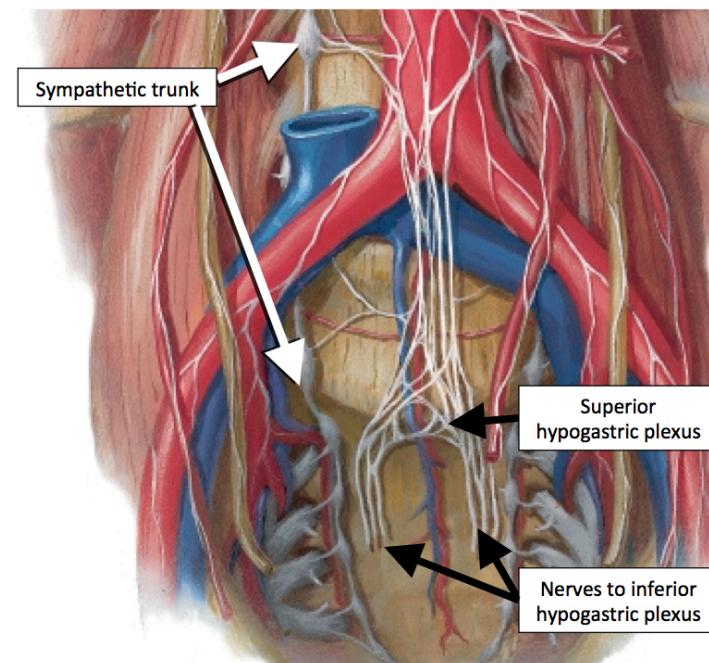
- **Sciatic nerve**, L4,5 plus S1-3: the largest nerve in the body and the largest branch of the plexus. This nerve will be studied at a later module
- **Superior gluteal nerve**, L4,5 plus S1: supplies gluteus minimus and medius of the buttock
- **Inferior gluteal nerve**, L5 plus S1,2: supplies gluteus maximus of the buttock
- **pudendal nerve**, S2-4: exits the pelvis through the greater sciatic foramen then re-enters through the lesser sciatic foramen by crossing over the ischial spine and towards the perineum to which it innervates

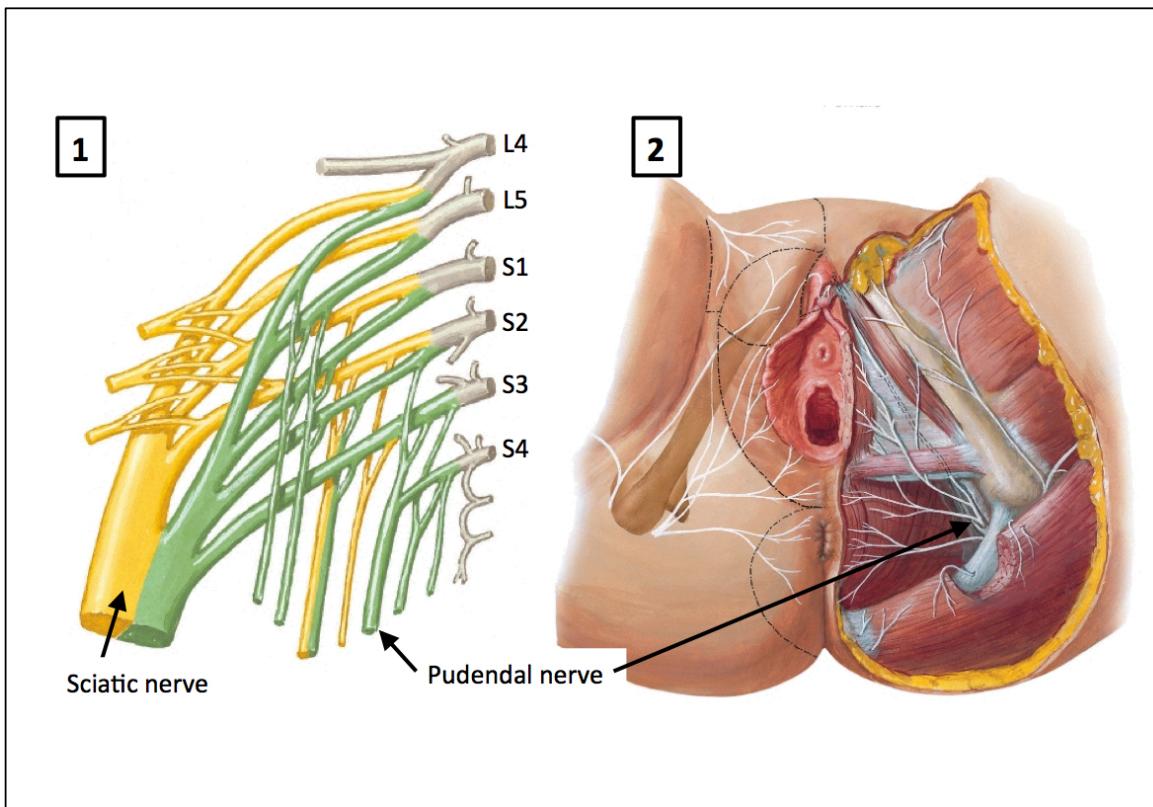


Point out on the prosection the piriformis muscle and any nerve roots from the lumbosacral plexus. Try to identify from which specific foramen these nerve roots come from.

◆ Sympathetic and parasympathetic innervation

These are very difficult to identify and dissect, so you are not expected to be able to locate these in this session but if your prosection happens to show any of these then please share it with other students.





This station concerns structures that exit the pelvis, to the gluteal region so the content is only an adjunct to the material relevant to module 203. Most of the structures described and labeled below, such as the gluteal artery will be covered in more detail in module 204.

◆ **Sciatic nerve**

The sciatic nerve is also available to view in this and many of the other prosections around the room. The most surprising physical feature of this nerve is the large cross section, making it the widest nerve in the human body. The reason for its large size is the need for greater amounts of myelin to insulate the axons travelling considerable distances, such as to the end of the foot. Note also how this nerve passes inferiorly to the piriformis muscle (this muscle is covered in another station). On occasions the nerve may pass through the piriformis, resulting in pain or sciatica.

The presence and size of the sciatic nerve in the lower, medial quadrant the gluteal region is the reason why injections to the buttocks are always done both lateral and high.



Point out on the prosection the piriformis muscle and the sciatic nerve (Figure 1)

◆ **Pudendal nerve**

This route of this nerve is demonstrated in Figure 1 and can be viewed in the prosection. The pudendal nerve is of particular importance to clinicians as the target for the **pudendal block**, the act of injecting an anaesthetic drug to numb the perineal region. To achieve this the physician will insert a finger into the vagina and palpate for the ischial spine, used as a landmark for the nerve passing nearby and the point of injection. This procedure is commonly employed to help with labour pain, but should not be confused with an **epidural**, where the target of injection is at the lower spine.

The roots of the sacral plexus that contribute to form the pudendal nerve is covered in another station.



Point out on the prosection the pudendal nerve and the ischial spine. Also view on the **Netter** poster on the wall the extent of innervation by the pudendal nerve.

◆ **Gluteal vessels**

This prosection may have the gluteal muscles removed, or dissected in a way that allows folding these muscles to reveal deeper structures. If so, try to locate the superior and inferior gluteal vessels.

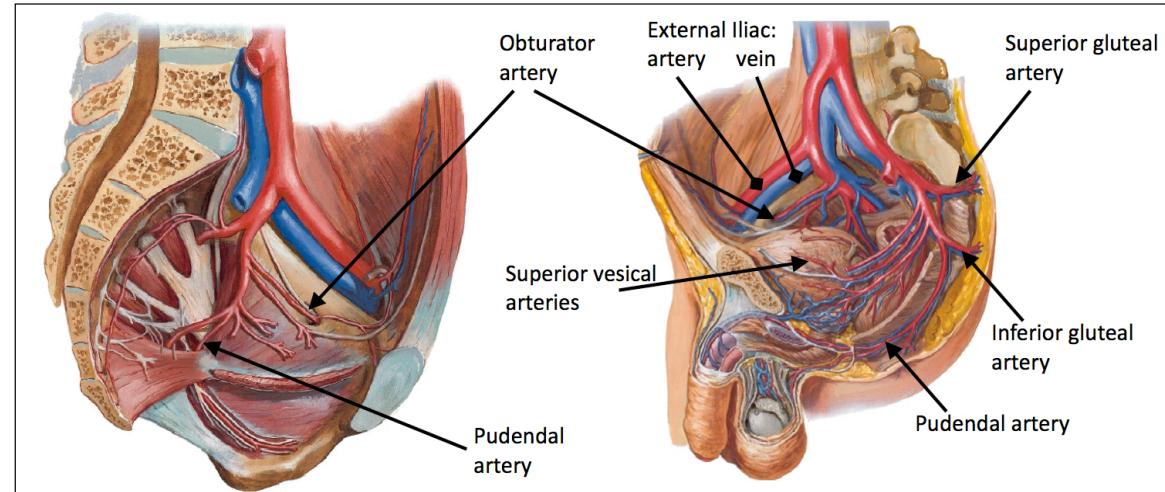
- The **superior gluteal artery**:
 - branch of the **posterior division of the internal iliac artery**
 - exits the pelvis through the greater sciatic foramen and **superior** to the piriformis muscle
 - supplies **gluteus minimus and medius**
- The **inferior gluteal artery**:
 - branch of the **anterior division of the internal iliac artery**
 - exits the pelvis through the greater sciatic foramen and **inferior** to the piriformis muscle
 - supplies **gluteus maximus**

The corresponding veins will then be located adjacent to the respective arteries.

BSMS MODULE: 203, Reproduction and Endocrinology.

DR SESSION 2:

**Pelvic Floor Anatomy
Vessels**



◆ Arteries

Locate the bifurcation point of the common iliac artery at the **sacroiliac joint** into **external** and **internal iliac arteries**. Observe the course of the external iliac artery along the medial border of psoas major and passing under the **inguinal ligament**.

More relevant to this session is to observe the course and divisions of the **internal iliac artery**. Note it projecting towards the upper margin of the **greater sciatic foramen** and pinpoint where it divides into **anterior** and **posterior divisions**.

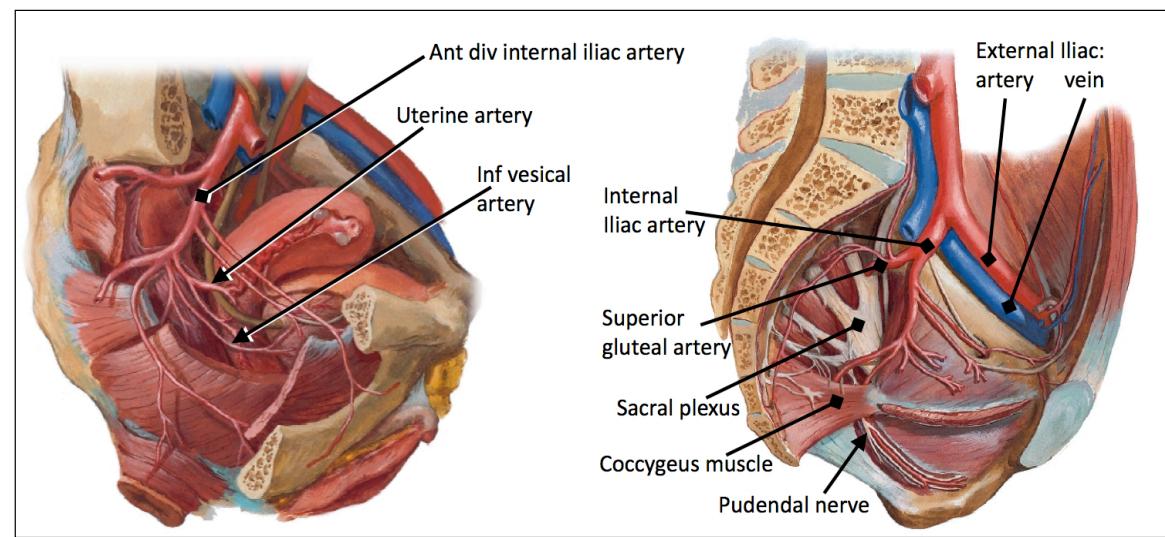
First try to locate the root of the **superior gluteal artery**, the largest branch from the posterior division, which supplies the **gluteal region**.

Next, using Figure 3 as a guide, try to identify as many of the arteries listed below, branching from the anterior division. Note that some may be difficult to trace if the target organ is no longer present or obscured by other structures:

- **pudendal artery**, supplying the perineum, and its neighbour the **inferior gluteal artery**
- **obturator artery**, supplying the adductor region of the thigh
- **vesical arteries**, supplying the bladder
- **uterine arteries**, supplying the uterus



Point out any arteries that can be easily identified if the target organ is visible on the prosection.



◆ Veins

Locating and identifying the main veins in the pelvis should be reasonably straightforward as these follow roughly the same course and have the same nomenclature as their neighbouring artery, e.g. common iliac veins, obturator veins, etc.



Take a couple of minutes to repeat the exercise above, naming as many veins as you can.

Check with a demonstrator if unclear or unable to identify any of the above.