eSupplement

Workshop layout:

Part 1a: A video reviewing relevant anatomy and bone marrow biopsy technique. Available via DVD/CD.[1]

Part 1b: A review of prepared specimens led by an anatomy expert (see Figures A-G). We recommend discussing the following:

Figure A: Bony pelvis

- Landmark PSIS, ASIS
- Identify SI joint

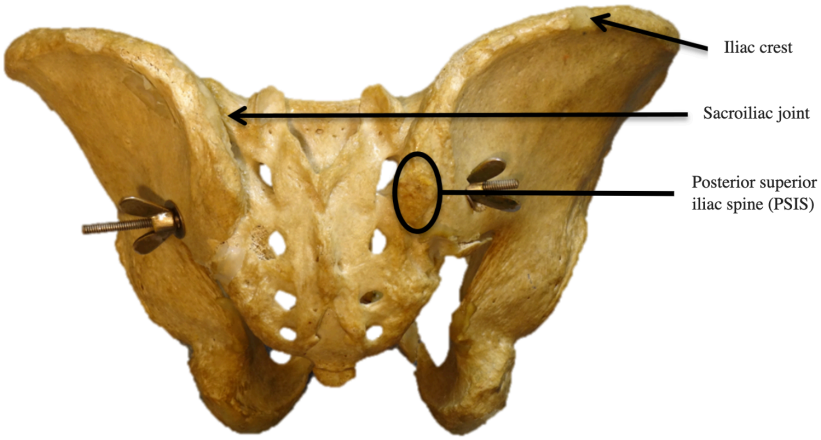

Figure A: Bony pelvis (posterior view)

Figure B: Lateral pelvic dissection

- Identify superior gluteal neurovascular bundle – an area of potential complication
- Identify sciatic nerve – pressure applied during bone marrow procedures can cause leg pain

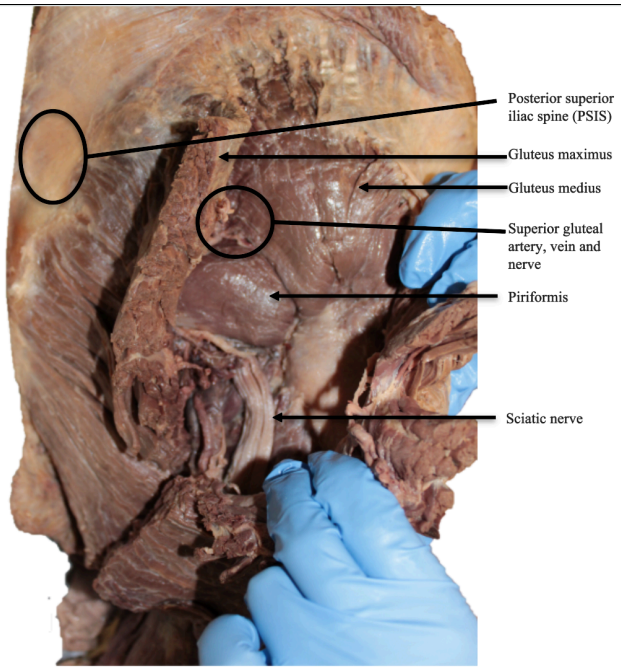

Figure B: Lateral pelvic dissection with gluteus maximus removed

Figure C: Lateral pelvic dissection

- Identify superior gluteal neurovascular bundle
- Identify sciatic nerve

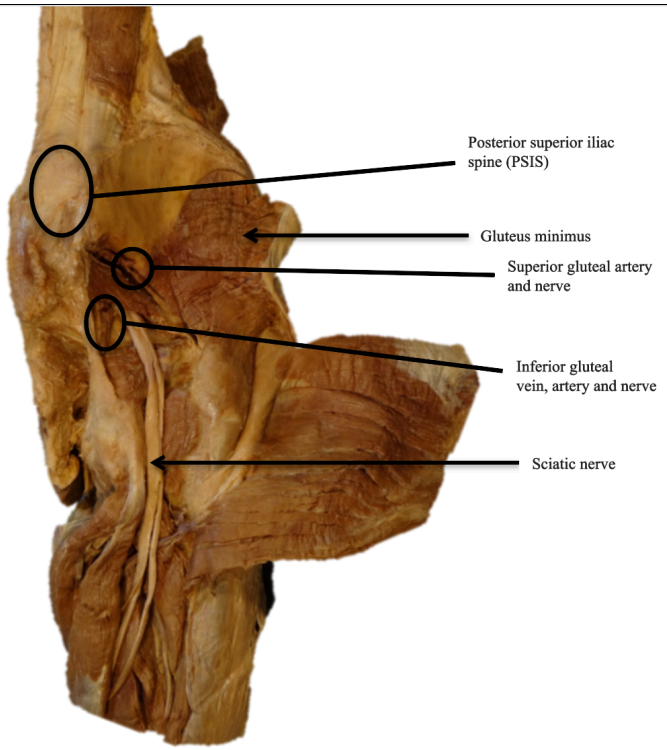

Figure C: Lateral pelvic dissection with gluteus maximus and gluteus medius removed

Figure D: Posterior pelvic dissection

- Identify superior gluteal neurovascular bundle
- Identify sciatic nerve

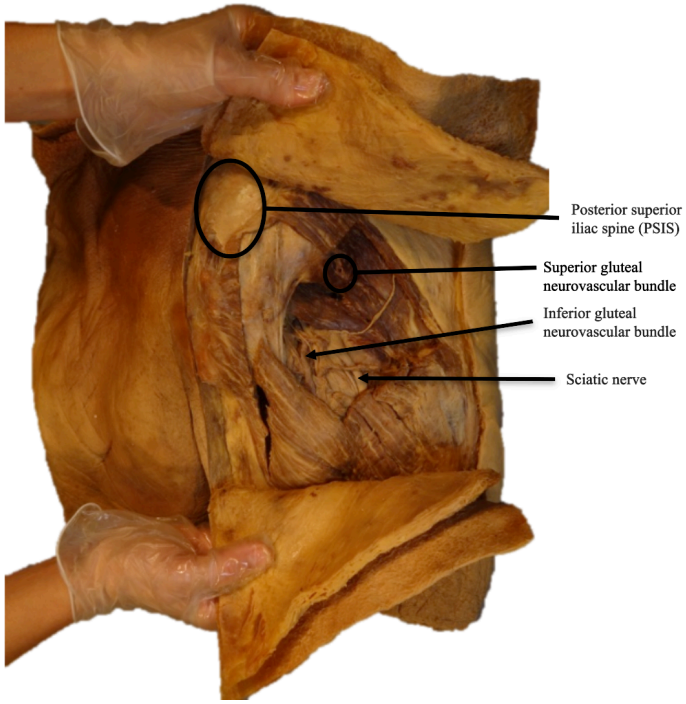

Figure D: Posterior pelvic dissection with gluteus maximus and minimus removed

Figure E: Parasagittal pelvic section

- Note the depth of the bone at the PSIS

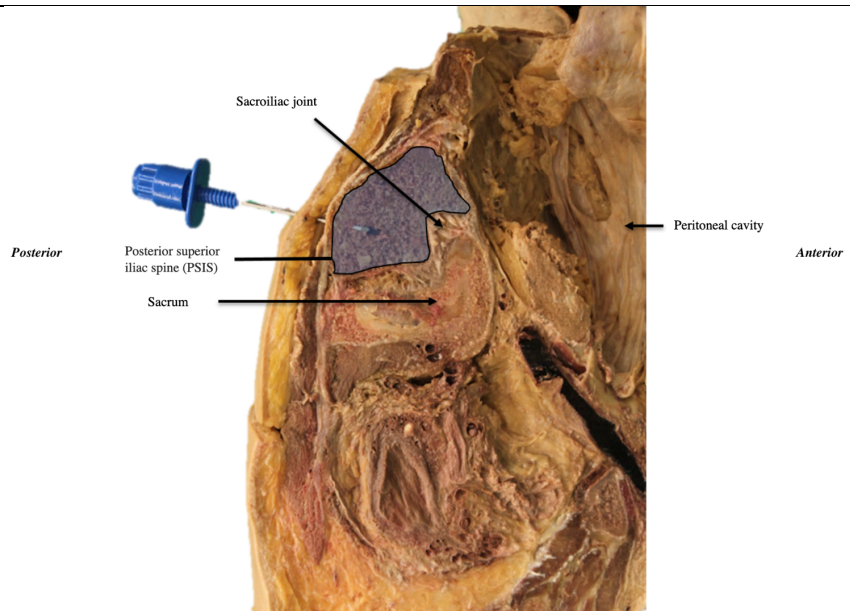

Figure E: Pelvis sectioned through the PSIS (parasagittal view with bone marrow biopsy needle in situ)

Figure F: Midsagittal thoracic section

- Landmark for sternal aspirate: 2nd or 3rd intercostal space
- Note the depth from sternum to pericardium

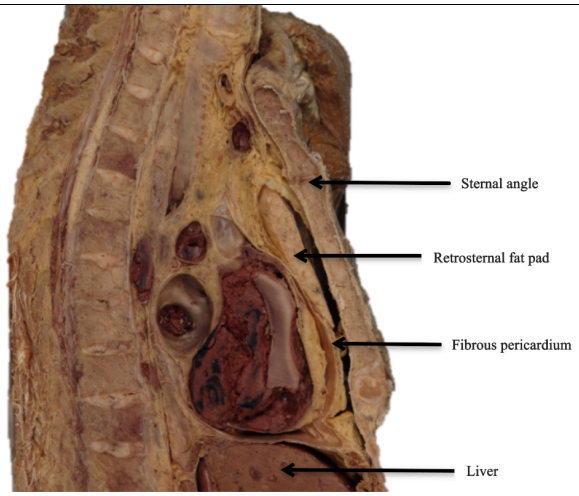

Figure F: Midsagittal thoracic section

Figure G: Anterior pelvic dissection with abdominal wall resected

- Locate the ASIS
- Identify deep circumflex iliac artery/vein and inferior epigastric artery/vein – areas of potential complication

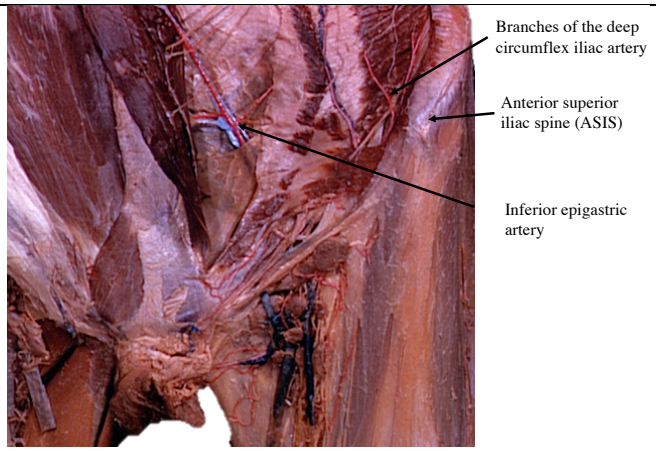

Figure G: Anterior pelvic dissection with abdominal wall resected[2]

Part 2: Hands-on practice of bone marrow procedures on cadavers.

We recommend cadavers of varying habitus to simulate clinical practice. A staff hematologist should begin by demonstrating the proper technique for PSIS and ASIS bone marrow biopsies and sternal bone marrow aspirates on a cadaver. A discussion of the advantages and disadvantages of each site is recommended (Table 2, available upon request).

Participants should practice:

- Bone marrow biopsies of the PSIS in the prone position and the ASIS in the supine position
- Bone marrow aspirate needle insertion into the sternum with sternal guard in place

Trainees are encouraged to practice each procedure 3-5 times and on at least two different cadavers. A staff hematologist should circulate to give participants feedback on their PSIS, ASIS and sternal sampling techniques.

Safety: We advise ensuring safety measures are taken in accordance with anatomy lab protocols to protect participants. These include appropriate participant footwear, good hand hygiene and dawning protective gowns and gloves while handling specimens. All sharps (including scalpels, biopsy needles and aspirate needles) should be dealt with using caution and disposed of safely in accordance with the anatomy lab's policy.

References

1. Zeller M, Goldszmidt M, Cristancho S, Johnson M, Creces D, Mangel J. Bare bones: A return to anatomy for teaching bone marrow biopsy and aspirate procedures. MedEdPORTAL Publications. 2015. https://doi.org/10.15766/mep_2374-8265.10091
2. Bourn D. Figure 137-6: Dissection of female inguinal region. Bassett Collection of Stereoscopic Images of Human Anatomy Stanford Medicine Lane Medical Library.