

Iliac Bone Marrow Aspiration Protocol

The ilium is A.R.T.'s preferred location for bone marrow aspiration and can be easily utilized in a standing, sedated, locally anesthetized or anesthetized horse.

Note: *A thorough clinical examination should first be performed noting any past trauma to the tuber coxae region of the right and left side of the horse. If any previous trauma has occurred, the contralateral side should be chosen for collection.*

Step 1. Sedate horse with 0.02mg/kg detomidine hydrochloride.
(Dormosedan®, Pfizer Animal Health, Exton, PA).

Step 2. Palpate the ilium to determine the dorsal, ventral, cranial and caudal borders of the tuber coxae (TC) (Figures 1 & 2).



Figure 1. Dorsal/Ventral palpation of TC



Figure 2. Cranial/Caudal palpation of TC

The TC has been observed to be the most “stem cell rich” upon dissection (Figures 3 & 4)

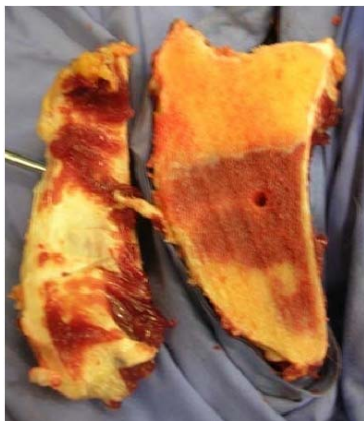


Figure 3

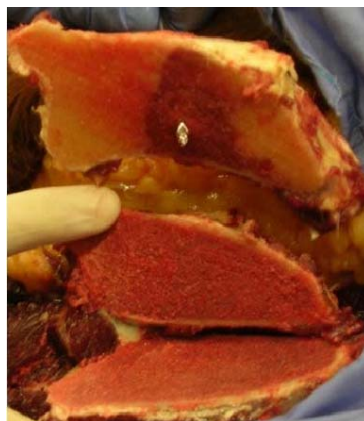


Figure 4.

Step 3. Identify the Iliac Wing of the TC and inject 5cc's of mepivacaine hydrochloride to locally anesthetize the area (Figure 5)

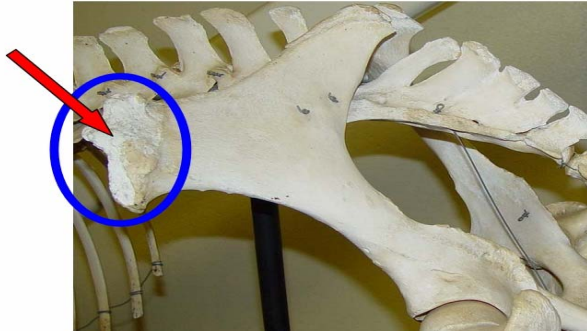


Figure 5. Red arrow points to the site where needle should puncture the tuber coxae.

Step 4. Aseptically prepare the region around the TC.

Step 5. Make stab incision at TC down to the periosteum using a #15 scalpel blade. (Figure 6)



Figure 6. Stab incision of TC

Step 6. Insert an 8ga x 4" Jamshidi needle using a moderate amount rotating force until the end of the needle extends approximately 4 to 5 cm into the ilium (Figure 7)

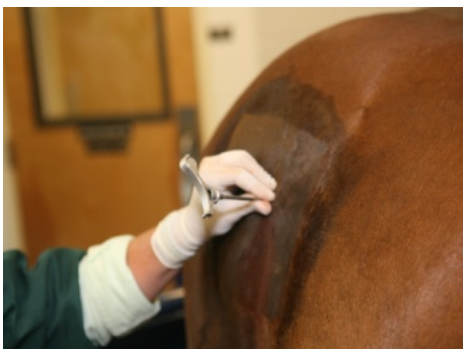


Figure 7. Insertion of Jamshidi needle into Ilium

Step 7. Remove the obturator from the Jamshidi needle and attach a 60cc syringe pre-loaded with sodium heparin solution directly to the Jamshidi needle. (Figure 8)

(Do not use an extension set as this tends to result in significant clotting and lower yields.)

Note: For each 10 ml of anticipated marrow drawn load 3000 units of sodium heparin. If you are using 1,000 USP heparin solution this translates into 3 ml heparin for the 10 ml aspirate. If you are using 10,000 units/ml then use 0.3ml of heparin and qs to 3 ml using LRS or a sterile buffered physiologic solution.



Figure 8. Aspiration of bone marrow

Step 8. Obtain 8-10ml of bone marrow aspirate. To create sufficient negative pressure for aspiration of the thick bone marrow, withdraw the plunger the length of the syringe.

Note: It may take 1-2 minutes of constant pressure to begin to retrieve the aspirate.

HINT: To maintain constant suction, create a hole with a 14 gauge needle in the syringe plunger above the plunger head. Remove the needle, attach syringe to the Jamshidi and withdraw plunger to initiate suction. Re-insert needle through hole in plunger to maintain vacuum during aspiration (Figures 9 &10).



Figure 9



Figure 10

Step 9. Detach syringe and re-insert obturator into aspiration needle.

- Step 10.** For second marrow sample it may be necessary to slightly reposition the needle within the ilial wing of the TC.
- 10A.** Withdraw the Jamshidi needle approximately 2cm
 - 10B.** Redirect the needle (dorsally or ventrally) being careful to stay within the center of the TC.
 - 10C.** Remove obturator and attach heparinized syringe
- Step 11.** Obtain second 8-10ml of bone marrow aspirate as in Step 6 above.
- Step 12.** Remove Jamshidi needle and close incision with skin staples.
- Step 13.** Obtain 12ml blood sample in serum collection tube
(For cryopreservation of stem cells)
- Step 14.** Package and ship aspirate containing syringes along with serum sample tube according to ART Shipping Instructions.