

Sternal Bone Marrow Aspiration Protocol

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

Step 2. Palpate the sternum from the point between the forelimbs caudally
(approximately 16 cm) in order to identify the caudal most aspect of the
sternum.

Step 3. Clip and aseptically prepare an area directly between the forelegs and
extending at least 8-10 cm caudally and 2 cm lateral of the sternal midline.
(Figure 1)



Figure 1. Clipped and aseptically prepared sternum

Step 4. Block an area approximately 8 cm cranial to the caudal most aspect of the ilium
with 6cc's of mepivacaine hydrochloride. This area of the sternum is chosen
due to the close approximation of sternebrae. (Figure 2)

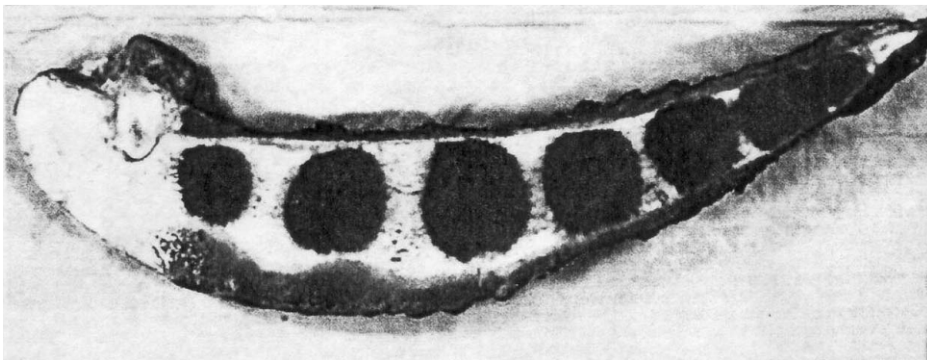


Figure 2. Equine sternal cross section

Note: *Care should be taken to locally anesthetize subcutaneous tissues as well as the deep muscle and periosteal layers of the sternum.*

Note: *The more caudal the Jamshidi needle is placed in the sternum, the less distance exists between the ventral and the dorsal surfaces.*

Step 5. Make a stab incision through the skin and deeper subcutaneous tissue with a #15 scalpel blade to the point of the sternum.

Step 6. Insert an 11gauge 4" Jamshidi needle through the incision approximately 2 cm to the ventral sternum.

Note: *The needle end should be carefully angled cranially and caudally to confirm direct contact with the sternum prior to insertion through the ventral surface.*

Step 7. Once direct sternal contact has been confirmed, gently rotate the Jamshidi needle using mild, controlled force until the needle extends approximately 3cm's into the sternum.

Note: *To avoid puncturing through the dorsal sternum it is important that the needle not be inserted more than 3 cm's.*

Step 8. Remove the obturator and attach a 60cc syringe pre-loaded with sodium heparin solution directly to the Jamshidi needle. (Figure 3)

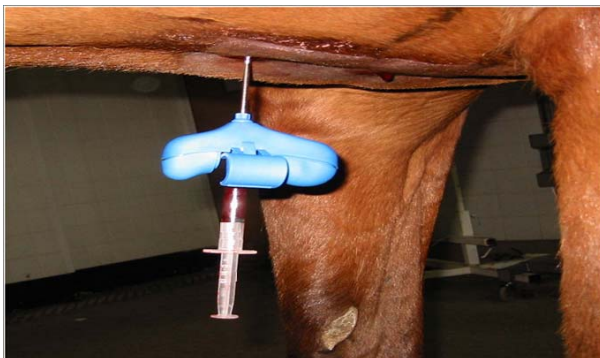


Figure 3.

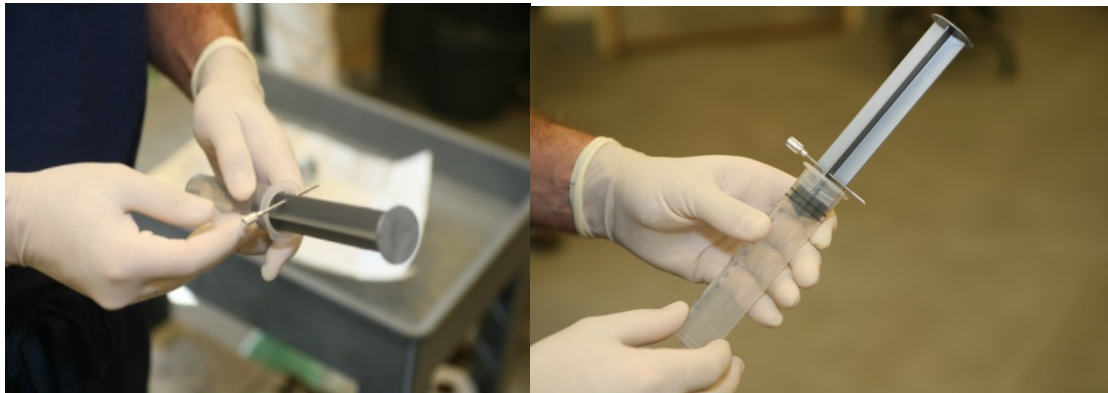
Note: *Do not use an extension set as this tends to result in significant clotting and lower yields.*

Note: *For each 5 ml of anticipated marrow drawn load 1500 units of sodium heparin. If you are using 1,000 USP heparin solution this translates into 1.5ml heparin for the 5 ml aspirate. If you are using 10,000 units/ml then use 0.1ml of heparin and qs to 1.5ml using LRS or a sterile buffered physiologic solution.*

Step 9. Obtain 5-7ml 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 needle and withdraw plunger to initiate suction. Re-insert needle through hole in plunger to maintain vacuum during aspiration (Figures 4 & 5).



Figures 4 & 5

Step 10. Detach syringe and re-insert obturator into aspiration needle.

Step 11. For second marrow sample it may be necessary to slightly reposition the needle within the sternum by withdrawing the needle approximately 1-2cm and redirecting cranially or caudally. Conversely a second location along the sternum may be locally anesthetized and aspirated as in steps 6-9 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.