DIMENSIONS IN SURGERY

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Dimensions in Surgery is now in its 15th year!

Surgical Case Report:
Femoral Head and Neck Fractures: Deep Gluteal Tenotomy Approach

EMPHASIS:
Fractures of the femoral head and neck (See Figure 1) are fairly common in veterinary practice. Though dissimilar fractures, the repair is achieved through a similar technique, so we will discuss these together.

Capital physeal fractures are seen in young patients, before the physis closes. Almost all of these patients are less than twelve months of age. These fractures should be repaired as quickly as possible. If repair is delayed, there will be further trauma, decalcification, and vascular compromise of the fragment.

Femoral neck fractures are more common in adult dogs and cats. These are typically oblique fractures, but occasionally comminution is seen.

Although the fracture fragment in these cases is not as susceptible to ongoing damage as the epiphyseal fragment in a capital physeal fracture, repair should still be performed as soon as possible. Otherwise, the fracture ends may be abraded due to movement of the leg, resulting in poor interdigitation and a diminished likelihood of stable fixation.

In this paper, we will discuss the repair of these fractures, via a partial deep gluteal tenotomy approach.

PREOPERATIVE DIAGNOSIS:
1. Complete physical examination.

AXIOM: Identify all other orthopedic injuries.

AXIOM: Be sure to document that there are no neurologic deficits on the involved limb.


3. Radiographic examination:
   a. Two view radiographs of the femur.
   b. Two view radiographs of the thorax and abdomen, in cases where blunt trauma is suspected.

DANGER
Before performing surgery for either of these fractures, advise the client that avascular necrosis of the fracture fragment is always a possible sequela. A total hip replacement, or a femoral head and neck excision, may be then be needed.

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Figure One: This schematic drawing depicts A) The normal femoral head and neck. B) A capital fracture or fracture separation of the proximal femoral epiphysis. C) A femoral neck fracture.
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AXIOM: Occasionally, these cases may be presented with a chronic fracture. In these cases, surgical stabilization will not be possible since the fracture ends will be badly abraded due to chronic movement. In these cases, a total hip replacement or a femoral head and neck excision should be advised.

PREOPERATIVE CARE:
1. Indwelling cephalic catheter.
2. Intravenous anesthetic induction protocol (Ketamine/Valium, Propofol, etc.)
3. Endotracheal intubation and inflate cuff.
4. Isofluorane inhalant anesthesia to effect.
5. Lead II ECG and pulse oximetry monitoring during prep and surgery.
6. Clip and prepare the hemipelvis, and the limb circumferentially.
7. Cefalexin 20 mg/kg IV immediately preoperatively.

SURGICAL TECHNIQUE:
1. Skin and subcutaneous incision along the ilium to the cranial border of the greater trochanter, then distally just below the trochanter (See Figure 2).
2. Incise the fascia lata and retract the tensor muscle cranially and the biceps femoris caudally.
3. With an elevator, gently elevate the insertion of the deep gluteal tendon from the underlying joint capsule.
4. Incise the insertion of the tendon of the deep gluteal muscle at its ventral extent, extending through two-thirds of its width dorsally, 5-8 mm from the point of insertion (See Figure 3).
5. Extend this incision cranially, paralleling the muscle fibers of the deep gluteal (see Figure 3) to allow this portion of the muscle to be reflected cranially.
6. Incise the joint capsule from its cranialmost extent, to the caudalmost extent (see Figure 4).
7. Elevate the joint capsule from the ventral aspect of the femoral neck to permit complete exposure of the joint (See Figure 5).
8. Remove any blood clots and debris from the surfaces of the fractured bone.
9. Realign the fracture.

Figure Two: This schematic drawing depicts the skin and the subcutaneous incision along the ilium to the cranial border of the trochanter and then distally below the trochanter.

Figure Three: This schematic drawing depicts: A) The tendons of the middle and deep gluteal muscles are shown inserting on the proximal femur. B) A tenotomy is performed in the deep gluteal muscle tendon. The longitudinal cut in the tendon leaves 1/3 of the tendon undisturbed. It is also essential to leave 8 mm of normal tendon attached to the proximal femur.
10. Pass a stainless steel IM pin from the base of the trochanter, through the femoral neck, and into the femoral head.

**AXIOM:** To ensure that the pin is seated maximally into the femoral head:

a. Place a delicate osteotome or hemostat into the acetabulum and lever the femoral head slightly outward, so the femoral head can be visualized as you drive the pin just through the cartilage (or feel with a probe the pin point as it protrudes) (See Figure 6).

b. Back the pin out slightly so the tip is just below the level of the cartilage.

11. Place two more pins at divergent angles, from the mid-portion of the trochanter into the femoral head.

**AXIOM:** This divergence prevents rotation of the fragment and maximizes the strength of fixation.

12. Manipulate the joint through its range of motion to ensure there is no crepitation or pin contact with the acetabular cartilage.

**AXIOM:** If crepitus is noted, reinspect the femoral head, and back out the offending pin as far as necessary.

13. Cut the pins off flush with the outer bony cortex.

14. Flush the joint with isotonic solution.

15. Routine joint capsule closure with gauge 0 to 2-0 polypropylene.

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16. Using polypropylene suture (of gauge 2 to 2-0 depending on the patient’s size) close the deep gluteal tenotomy in a running suture pattern (see Figure 7).

17. Routine closure of the remaining layers of the incision.

POSTOPERATIVE CARE:

1. Postoperative antibiotic therapy (Cephalexin 20 mg/kg PO TID for 5 days).

2. Pain management using oral, injectable, or transdermal analgesics.

3. Strict confinement during the next 4 weeks.

4. Suture removal 14 days postoperatively.

5. Postoperative radiographs 4 weeks and 8 weeks postoperatively.

PROGNOSIS:

Optimistic, with the great majority of patients returning to excellent weight bearing. Only a small percentage will develop avascular necrosis.

AUTHOR'S NOTE

If you have any questions concerning this paper, additional references, surgical supplies or sources of products mentioned or used in this protocol, please FAX us at 1-310-479-8976. We will answer your questions promptly.

Figure Seven: This schematic drawing depicts the tenorrhaphy using a continuous polypropylene double armed swedged suture. A) The pattern begins dorsally and continues ventrally. B) The pattern then reverses and goes from ventral to dorsal. The two loose ends are securely tied dorsally. C) The longitudinal incision is closed with continuous or interrupted sutures.