

HIP LUXATION: Reduce and save!**Synopsis-- Anatomy and the Disease**

Hip luxation is all too common after major trauma. We also see it sneak in as an unexpected diagnosis with a slip on the ice or leg caught in the leash. These are usually different case scenarios and are treated quite differently...sweat equity for the former and the “wow” factor for the latter.



Marked trauma results in the more commonly recognized **CRANIODORSAL (OR DORSAL) LUXATION**; the femoral head moves laterally and dorsally (and somewhat cranially) to the acetabulum. The pet is typically 5/5 lame and the leg appears “hiked up” riding higher or seeming shorter than normal. Usually this luxation is accompanied by 1) joint capsule avulsion or tearing, 2) rupture of the ligament of the femoral head (or capital avulsion fracture), and 3) varying degrees of gluteal muscle trauma. Left untreated for hours or days, the femoral head is abnormally worn/eroded against the ilial body. Contracture of muscles and early fibrin development make reduction challenging after 1-2 days.

The second case is low-impact trauma, usually a traction force or “the splits” on the ever-present ice in this Great White North. A **VENTRAL LUXATION** occurs when the femoral head moves ventrally and medially to the acetabulum. The leg is carried in a slightly internally rotated position and often a previously normal patella is laterally luxated (this will resume normal/non-clinical status in most cases after repair.) As a traumatic event, this luxation tends to have much less soft tissue disruption and more inherent stability once reduced. And reduction is the fun part! (Usually, your technicians/nurses get the honor of this event...read on.) These dogs are quite painful and vocal, likely because the luxation is accompanied by marked stretching of the soft tissues and that is the only thing that hurts. (As compared to a HBC patient miserable in so many other ways too!)

Diagnosing a hip luxation can be easily achieved on physical exam. “The Triangle” is the trick. Radiographs are needed to fine tune the diagnosis, look for avulsion fractures and other pelvic/bladder injuries, but they are most kindly done with general anesthesia in the hurting patient. Having a good idea of what the radiographs will show (from your exam) allows pre-planning for anesthesia, rads and hip reduction in one efficient episode!

THE TRIANGLE of hip anatomy is achieved with simple palpation of common landmarks. (Think of those boney Holstein dairy cows and their pelvices!) 1) Point of the ilial wing (dorsal, most prominent point); 2) Point of the ischium (caudal most, prominent point of the pelvis); 3) Greater trochanter (lateral bump). I position patient in lateral recumbency with testing hip uppermost. Using two hands, place a finger of hand #1 on ilium and thumb of hand #1 on ischium; this creates a theoretical reference line between your fingers of hand #1. With hand #2, place a finger on the greater trochanter. Voila! A triangle. Here are the variations you will find:

- a) Normal: The trochanter is below the line and at the caudal 2/3 position.
- b) Craniodorsal luxation: The trochanter is ON the line and at the 1/2 position.
 - a. Dorsal luxation (minor variant): The trochanter is ON the line and at the 2/3 position.
- c) Ventral luxation: The trochanter is very difficult to find; when found it is BELOW the line and at the 1/2 position.
- d) Any fractures that allow the trochanter to move away from the hip joint (femoral neck, proximal femur, acetabulum) or changes the relative anatomy of the ilium and ischium (ilial body, ischial plateau) will change The Triangle. Range of motion (ROM) of the hip or palpation of landmarks that result in sharp crepitation suggest fractures. Assymetry of the pelvic “box” landmarks (bilateral ilial wing and point of the ischium) gives clues here during palpation.

Non-surgical Treatment:

Craniodorsal luxations are much easier to reduce and have a higher likelihood of successful closed reduction when reduced immediately. To achieve this, general anesthesia is required; strong pain relieving and muscle relaxing drug choices for this anesthesia makes one's job much easier! Don't be put off by this task; it takes some anatomy knowledge, a bit of huffing and puffing, and a little technique, but the patient, the hip and the owners will be most grateful!

For craniodorsal/dorsal luxations, traction is the key. *And everyone must gird their loins; no squeamish wimping out!*

- Put a leash around the base of the thigh and assign an assistant to hang on (standing on the dorsal side of a lateral patient, bad hip uppermost). You will be standing on the foot side of the lateral patient.
- Grasp the lower thigh/knee and the hock. Start pulling against your assistant...think tug-o-war. Seriously. Pull the leg toward you and toward the floor (adducting the hip); just stand there and lean into it for 60 seconds or so. (I'm being a bit flip; use your judgement if you are a 250# body builder, and you are treating a 7# cat.)
- Now, start thinking about (while you are pulling) rotating the leg to point the knee toward the sky. Keep pulling toward you and the floor; just twist the leg. Theoretically, the femoral head is now pointed cranially, positioned at the dorso-ventral level of the acetabulum, and lying just lateral to the acetabulum.
- Ask a 2nd assistant to find the trochanter (get them oriented pre-pulling!) They must be ready to push focally, precisely on the trochanter while you do the next maneuver.
- Your next job, should you choose to accept it, is to (*keep pulling*) elevate the leg like the dog is doing the splits (abduction of hip) and simultaneously rotate the leg to point the knee to the floor WHILE your 2nd assistant is pushing laterally on the trochanter.
- Everyone will feel and hear something. Put your hand on the trochanter, relax traction, bend the knee a little (pointing toward floor; I'm usually hold the tibia/shin at this point; this is the **"safe" testing position**.) Test the hip through ROM, feeling for smooth glide. Have someone hold the tibia/shin with knee pointed toward floor and abducted away from the body. Make "The Triangle". Success? Still abnormal?
- If success, you must now try to "grind" the joint capsule fragments and hematoma out of the acetabulum so the head can seat. Put substantial lateral pressure on the trochanter; lean into it! Put the hip thru bicycle ROMs for 5min or so.
- Re-confirm "The Triangle". And here comes the "art" of this profession...play with the hip, lifting gently from medial aspect with hand on trochanter, to feel the security (or lack thereof.) Now you get to make it stay there (with an Ehmur Sling) and discuss options with the pet owner.
- If no success, try, try again. Traction for a little longer, fiddle with your technique.
- A hip that cannot be reduced or maintained reduced will ideally need surgical assistance. Internal reduction and stabilization offer the healthiest hip outcome; femoral head and neck excision arthroplasty (FHO) is a last resort salvage option.

Ventral luxations are treated non-surgically the majority of the time. If you are lucky enough to get to the ventral luxated hip before your technicians get it reduced, here are some pointers.

For ventral luxations, position is the key. They may need a gentle medial nudge.

- Position patient in lateral or dorsal recumbency.

- Extend the hip and leg with minimal restraint. (I usually hold the hock so the leg can rotate as it wants.)
- Place your opposite hand in the groin near the femoral triangle so you can feel and push on the proximal/medial femur.
- If the hip has not already popped back with the extension maneuver, apply medial pressure (push/lift the head out from under the acetabulum.) The **safe testing position** is different here; hold the legs close together, no rotation.
- Make “The Triangle”. Success? Still abnormal?
- If success, you will now hobble the legs to prevent feet from being wider apart than normal hip-width distance. I make ankle bracelets out of 1” white tape (double taped so *NO tape sticking to patient.*) Bracelets should rest just above the hock. Total wear time is 2-3wks as tolerated. Monitoring daily by owners and weekly by veterinary staff will catch and allow treatment for skin irritation or abrasion.
- If no success, try, try again. Traction in extension, push medial proximal femur more firmly up/laterally; fiddle with your technique.
- A hip that cannot be reduced or maintained reduced with hobbles will ideally need surgical assistance. Internal reduction and stabilization is tricky with ventral luxation; femoral head and neck excision arthroplasty (FHO) may be the most efficient salvage option.

Surgical Overview:

To preserve a hip after a non-reducible/maintainable luxation, an internal reduction with implanted rotation suture can be performed. This can be viewed as an internal “Ehmer” suture; it will hold the hip in internal rotation and abduction, seating the femoral head well in the acetabulum.

The surgical approach is much like an FHO, using the craniolateral approach to the hip. A heavy gauge suture is anchored through the caudal aspect of the ilium (just cranial to acetabulum) and thru the lateral aspect of the greater trochanter and secured with the hip in abduction and internal rotation. The soft tissues around the joint are approximated, when possible, to promote re-establishment of the joint capsule. Additional reconstruction of the soft tissues is completed as needed with periarticular anchoring.

The hip carriage is restricted and awkward while time passes (6-8wk) allowing the soft tissue fibrosis to take over hip stability. Often owners report an isolated event “patient cried out walked funny for a few minutes”, then seemed ok (and leg was less restricted.) This is when the suture breaks. The fibrosis race is won if the suture breaks after the body did its job. The race is lost if the suture breaks too early; re-luxation for lack of inherent stability may result.

The **indications & rationale** for surgical treatment are:

- Hips with a craniodorsal/dorsal luxation that failed non-surgical treatment.
- A capital epiphyseal avulsion fracture is a relative contraindication to successful closed reduction; size matters.

Other options for treatment (besides surgery) are:

- Closed reduction and Ehmer sling (craniodorsal/dorsal luxation)
- Closed reduction and hobbles (ventral luxation)

Supportive/ancillary options with surgical treatment are:

- Physical therapy modalities that promote circulation and organized fibrosis

The **perioperative experience** for pet and owner includes:

- One general anesthesia for hip diagnosis and closed reduction/sling placement.
- Second general anesthesia for surgical stabilization (or FHO) as indicated by injury and response to closed reduction.
- Ehmer sling or hobbles (depending on type of luxation) for 2-3wks; frequent veterinary visits while in bandages for “Triangle Testing”, adjustments and evaluation. Additional sedation may be required to manage bandage adjustments.
- 2-4 sets of radiographs to diagnose and monitor hip status.
- Restricted activity for 8wks (closed reduction and surgical reduction)
- Expectation for some level of transient skin excoriation from bandage wear (closed reduction).
- Risk of early implant failure and re-luxation following open reduction/stabilization.

Expectations for outcome are:

- Long-term hip health dependent upon pre-injury hip health (degree of DJD)
- Long-term hip health dependent upon time hip is luxated pre-reduction (1-2wks luxated → progressive DJD)
- Long-term hip stability dependent upon pre-injury hip anatomy/stability (shallow acetabulum and hip laxity/dyplasia increase risk of poor post-treatment stability (closed or open reduction)

Complications that may arise with this procedure are:

- Implant premature breakage (rare and significant, often requiring additional surgery)
- Insufficient joint stability (rare and significant, often requiring additional surgery)
- Superficial or deep surgical infection (rare, requiring long course Abx),
- Implant infection (rare and significant, requiring long course Abx and surgical implant removal)

Postoperative **outcomes may be poor** due to the above complications, and/or:

- Progressive DJD (see [Conservative Treatment DJD](#))
- Recurrent intermittent luxation (ventral luxation)
- Recurrent traumatic luxation (craniodorsal luxation)

What a surgeon needs prior to surgery:

- Radiographs to rule-out other injuries, intraarticular fractures.
- Neurologic exam sufficient to appreciate good limb function.
- Hip reduced and maintained w/ Ehmer sling or hobbles preoperatively (to optimize hip health)
- Affected leg “marked” by owner for confirmation (wax “costume makeup” works well)
- Skin near the surgery site CLEAR of infection (papules, pustules, crusts, collarettes, etc.) If urgent surgery, owner must be alerted to increased risk of incisional, deep and/or implant infections.

General considerations and complications for all surgery/anesthesia procedures are:

- *Difficult and/or painful anesthetic recovery (variable; may require additional medications or re-hospitalization)*
- *Incisional infections (rare, minor; usually require oral antibiotics)*
- *Incisional dehiscence (rare, minor or major; may require surgical revision)*
- *Adverse anesthetic event (rare, major; may result in serious impairment or death)*

Proper owner expectations are important to a successful experience and patient outcomes. Please discuss this information with your clients while assisting them with decision-making for **Hip Luxation**.

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