

THE TRIPLE PELVIC OSTEOTOMY:

Prophylactically treating hip laxity/dysplasia to minimize future DJD and disability.

**Synopsis-- Anatomy and the Disease**

Congenital hip dysplasia is an excessive laxity in hip joint support that results in repetitive microtrauma to the femoral head and acetabulum over the course of pediatric development. By the time the patient is mature, depending on how lax the hip was during growth (i.e. how much architectural trauma occurred), there may be subtle to profound radiographic “secondary changes” we label as degenerative joint disease or osteoarthritis. Historical data has linked these radiographic changes to abnormal cartilage health and loss. We can presume that some degree of hip morbidity, subtle to severe, will follow through the pet’s lifetime.

The **three life-stages of hip dysplasia** tend to be as follows:

- 1) As puppies with lax hips grow and become more active, they may enter the **"young dog pain period"**. This usually starts around 9-10 months of age (but can start as early as 6 months) and ends around 14-18mo of age. The pain comes from stretching of the joint capsule (repeated “sprains”) and microfractures of the femoral head and acetabular rim.
- 2) As they age, they then enter the **"adult dog pain-free period"**. Nothing inside has become normal, but the bones are maturing and becoming less susceptible to microfractures, the joint capsule is thickening, tightening up and stabilizing the joint, and muscles are getting bigger and more supportive of the hip. Osteoarthritis is progressing slowly and silently during this period of variable length; the dogs are fully active and mobile.
- 3) Then the dogs enter the **"old(er) dog pain period"**. This can start as young as 3yrs of age or as late as 14yrs of age. The abnormal hip environment has created an unhealthy home for joint cartilage; osteoarthritis is defined by damaged joint cartilage and exposure of the innervated subchondral bone. “Bone on bone” contact is painful.

The challenge with decision-making in these young patients, when considering prophylactic procedures, is that we cannot accurately predict which patients will have how much osteoarthritis and when. There is a fair amount of data reporting outcomes of various treatment options, but as with many veterinary scenarios, this data is not prescriptive. Choices need to be made by pet owners with as much information as we can provide to guide. Decision-making is directed as much by the owners’ approach to problems (i.e. address head-on vs. wait-and-see) as the medical status of the patient.

Surgical Overview:

The triple pelvic osteotomy procedure is designed to reposition the acetabulum such that it acts as a better “roof” for the femoral head in the hip joint arrangement. Cutting the pelvis in three locations around the acetabulum allows the rotation of the cup to better capture the head during weight bearing. It is best performed young when bone healing is rapid, joint anatomy has not been too badly damaged by the microtrauma of joint laxity, and the plasticity of the joint is sufficient to accommodate the new position.

The vast majority of patients with congenital hip dysplasia are affected bilaterally. Intervention young enough, allows comfortable/preferred staging of two procedures versus rushing against time with a bilateral procedure (higher risk of implant failure and urethral morbidity). The ideal patient for the TPO is one who does not have much microtrauma to the hip joint. This ideal age varies based on degree of laxity, body condition of the puppy (lean, overweight, obese), size/breed of puppy, and activity level during growth. Our best guides to determine this window of opportunity are physical examination of the hips and radiographs of the hips.

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

- Hip pain and disability in a medium/large breed puppy less than 12mo of age.
- Ideal candidates are probably in the 7-10mo age range.
- Positive Ortolani Sign with a “sharp” reduction (vs. “soft”/subtle reduction)
- VD pelvic radiograph demonstrating poor femoral head coverage without the following:
 - Loss of dorsal acetabular rim
 - Significant flattening of femoral head
 - Significant periosteal proliferation (osteophytes/enthesiophytes)

Other options for treatment (besides TPO surgery) are:

- Rapid weight loss to lean-ideal (for overweight/obese puppies)
- Physical therapy to improve/build muscling that supports and maintains hip reduction through daily activities.
- Physical therapy to adjust conformation (wider rearlimb stance) to promote hip reduction through daily activities.
- Chondroprotectants and high-dose fish oil supplements
- Low-impact, moderately active lifestyle
- Future total hip replacement or hip denervation (months to years later) if hip morbidity becomes significant.

Supportive/ancillary options with surgical treatment are:

- Maintenance of a lean-ideal body condition lifelong.
- Chondroprotectants and high-dose fish oil supplements
- Postoperative professional physical therapy to optimize recovery

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

- Significant assistance with ambulation provided to pet for 2-4wks postop
- Lameness present and diminishing over 8-12wk period postop

Expectations for outcome are:

- Altered appearance of pelvic girdle (narrower conformation)
- Slower development of pelvic musculature as compared to unaffected/unoperated pets
- No restrictions for return to normal, active lifestyle
- Longterm osteoarthritis and associated joint stiffness and disability may develop (presumably less than if unoperated)

Complications that may arise with this procedure are:

- Implant infection (very rare and significant, requiring long course Abx and surgical implant removal),
- Implant failure—screw backout/break (rare and not significant, no treatment typically),
- Implant failure—plate pull off (very rare and significant, may require additional surgery if early in postop course and loss of rotation occurs)
- Urethral obstruction (rare, significant, majority transient, more common with bilateral procedures and/or during 2nd of staged procedures)

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

- Progressive osteoarthritis (common with older preop age and more significant preop secondary changes)
- Insufficient joint rotation (variably significant, additional surgery rarely attempted)

What a **surgeon needs prior** to surgery:

- Affected leg/body part “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.
- Straight VD pelvic radiographs within 2wks of planned procedure
- Relaxed/sedated hip exam confirming Ortolani Sign with “sharp” reduction within 2wks of procedure

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--superficial (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 **the Triple Pelvic Osteotomy procedure**.

Lara Rasmussen, DVM, MS

Diplomate, American College of Veterinary Surgery

DIRECT VETERINARY SURGERY, LLC

(See additional materials at www.directvetsurg.com for veterinary professionals and pet owners.)