

Total Hip Replacement

Cutting

EDGE

February 2009 Edition 1

Welcome to the first Torrington Orthopaedics Newsletter

This is the first edition of our new quarterly newsletter. In this edition we will be covering the topic of Total Hip Replacement. Future editions will cover all aspects of Veterinary Small Animal Orthopaedics and Anaesthesia.



Hip Dysplasia is a common condition encountered in Small Animal Orthopaedics. The clinical impact can be very variable, with some patients appearing non

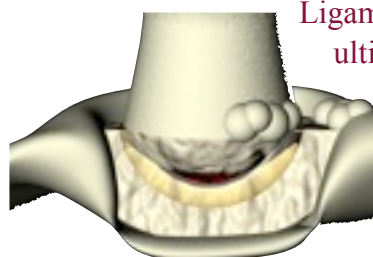
clinical or experiencing only mild stiffness after rest. For others, however it can be a cause of significant discomfort and disability, reducing the quality of life of the pet and the owners. When owners take a dog into their lives, they imagine being able to take them for walks and including them in the activities of the family. For the owners of dogs with clinically moderate to severe Hip Dysplasia, this will unfortunately be unlikely. Even with modern Non Steroidal Anti Inflammatory Drugs it is likely that restrictions on activity will be required throughout the dog's life in order to minimise the consequences of Degenerative Joint Disease. As a result of reduced physical activity, weight gain often occurs and the problem is compounded. Nine times body weight is exerted on the hips during sit to stand and thus even minor weight gain can impose considerably greater stresses on pathological hip joints.

For medium and large breed dogs experiencing pain as a result of coxofemoral DJD secondary to Hip Dysplasia, Total Hip Replacement can be a

liberating procedure. Relief from painful joint disease will result in improved well-being, reduced need for medical support and more normal activity levels. Over three to six months, the range of motion of the hip is restored along with muscle mass and tone.

Sources of Pain in Canine Hip Dysplasia

Juvenile Hip Dysplasia is characterised by instability and this results in discomfort as a result of capsular stretch. Overwork of underdeveloped muscles around the hip and early wear of the articular surface add to these sources of pain. Other sources of pain in this phase include Round



Ligament stretch and often ultimately, failure.

Exposure of the collagen from this damaged ligament causes synovitis which may be

associated with continuous low to medium grade hip pain.

The mature Dysplastic hip is generally stable, with discomfort arising from full thickness cartilage loss in areas of high pressure contact. Exposure of sensitive subchondral bone causes pain. Synovitis arising from articular cartilage debris adds to this discomfort and may result in intermittent bleeding into the joint and synovial entrapment.

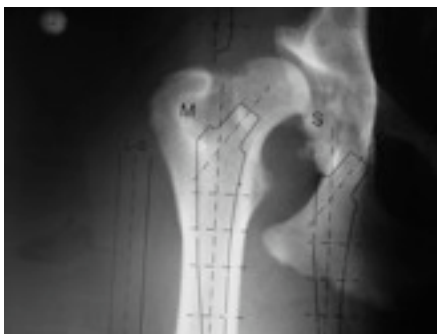
Does this dog need a THR?



The radiograph clearly shows significant hip DJD with osteophytosis and widening and flattening of the acetabulae. These signs would be consistent with a diagnosis of bilateral coxofemoral DJD

secondary to Hip Dysplasia. This does not however indicate that this dog needs a Total Hip Replacement. The correlation between radiographic appearance and clinical impact is especially poor in hip radiographs. The only indication for a THR is

the presence of moderate to severe pelvic limb lameness arising from hip pain. The definition of moderate to severe pain here being that there is a need for continuous or near continuous medical management for its control. Life quality should be significantly impacted by the presence of the joint pathology and there should be no radiographic evidence of effusion on well positioned mediolateral projections of the stifles. The latter would likely indicate Cranial Cruciate Ligament pathology. Investigation and management of this would be appropriate. The most common cause for exclusion from THR is the concurrent presence of active stifle pathology.



What makes the ideal THR candidate?

Having established the above criteria (i.e. pelvic limb lameness secondary to moderate to severe hip pain with an absence of active stifle or Lumbosacral pathology), other criteria are then assessed.

The presence of any of the following would in most cases make a patient unsuitable for THR:

- Prone to recurrent bacterial infective diseases (Pyoderma, Gingivitis, Anal Sacculitis etc.).
- Obesity
- Aggressive temperament.
- Poor Anaesthetic Risk.
- Non or poorly compliant owners.

The key as with all surgery is to maximise the benefit and minimise the risk of complications.

Pre Operative Planning

Following the clinical evaluation of the patient and having established that there are no exclusion criteria, the patient is admitted for templating radiographs. These use a 10 cm marker positioned next to the thigh on the most clinical side.

This allows assessment of the degree of radiographic magnification. Templates of the various implant sizes are placed on the radiograph and the ideal size of acetabular cup and femoral stem are established.

In patients that have had an acute exacerbation of lameness (acute on chronic event), Synovial fluid is aspirated to rule out sepsis. The synovial fluid is checked also for the presence of osteoblasts as this can help to establish that there has been a full thickness cartilage loss with exposure of subchondral bone.

Admission for the Surgical Procedure

The patient is admitted on the day before surgery. This allows the dog to become accustomed to the ward and allows us to check for any skin lesions. An analgesic protocol is planned by Briony Alderson DipECVAA MRCVS.

On the day of surgery bloods are taken to ensure there is no elevation in white cell count. Clipping and Prepping takes up to one hour with three full limb preps: two out of theatre and one in theatre. An epidural anaesthetic is given and the patient is transferred to theatre.

The dog is positioned on a positioning device. This allows us to establish that the long axis of the pelvis is parallel to the table as this is used to determine the cup insertion angle in particular.

Cemented Vs Cementless THR

The main method for locking the femoral stem into the femur has historically been by bone cement. This method allows good load distribution within the femur and good early stability due to microcrystalline interlock with the femoral endosteal surface. The main problem with bone cement is seen in the longer term. The main issue is Aseptic Loosening of the femoral stem. This accounted for 59.2% of re operations in a National Survey in Sweden between 1979 and 2005 (Swedish Hip Arthroplasty Report 2005). In a paper by Skurla et al (JBJS 2005) in which the dog was used as a model for cemented THR the incidence of aseptic loosening at post mortem was 63.2%. The chief reason for loosening was debonding between the femoral stem and the cement mantle. Aseptic loosening of the femoral stem causes rotational instability of the prosthesis and can result in a return of lameness and upper limb pain. These facts inform the rationale of using Cementless Total Hip Prostheses at Torrington Orthopaedics.

Cementless: Press Fit Vs Screw Fixation

The main method of implanting the femoral stem without cement has been to use "Press-Fit" to provide stability. This system entails sequential, incremental broaching of the femoral canal until a cavity marginally smaller than the intended stem is created. The stem is then hammered into

position. The two key issues with this method are:

1. Iatrogenic Femoral Fracture
2. Implant Loosening
 1. Femoral fracture can occur due to the osteoporotic effects of disuse due to hip dysplasia. This is particularly the case in juvenile THR candidates. Whilst cerclage wires can be used to reduce the risk of further fissuring, the widening of the canal even by a millimeter may result in poor press fit from the outset.
 2. The initial press fit is provided by the friction between the bead blasted stem and the endosteum. Ultimate bone ongrowth and ingrowth provides long term stability. The question with these systems is whether there is uniform contact between stem and endosteum. Failure to achieve this will result in uneven ingrowth and may compromise long term stability. Subsidence of Press Fit hip systems is a cause for concern in human orthopaedics.



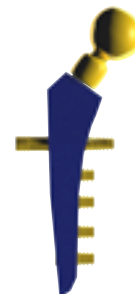
Press fit cementless left, Kyon™ cementless right

These problems led to some concern at Torrington Orthopaedics with regard to the suitability of this technique in our younger patients in particular. This concern led us to look for a technique that combined the advantages of cemented prostheses (no reliance on press

fit) and the cementless prostheses (no aseptic loosening).

Use of the Kyon™ Cementless THR

The Kyon™ THR uses initial screw fixation of the femoral stem and acetabular cup. This prevents subsidence or distal migration of the stem which is seen in the Press Fit THR prostheses. The stem is coated in Titanium beads and this permits bony ingrowth so that the screws ultimately become redundant.



The design of the femoral neck and head unit permits greater than physiological range of motion. This component as with other systems is interchangeable.

The design of the cup (below) with a porous flexible shell allows more rapid osseointegration by allowing the convection of fluids from the cancellous



bone bed created during the reaming process. This fluid brings with it factors that accelerate bony ingrowth into the perforated shell. Ingrowth has been shown to occur as early as six weeks post implantation. There is also a polar screw which holds the cup in position until bony ingrowth is sufficiently strong. After this the screw is redundant.

At what age can Total Hip Replacement be performed?

Generally the clinical signs of Hip Dysplasia will be noted at around 5 to 7 months of age. These signs are associated with hip laxity. Whilst some surgeons are advocating very early THR, we feel that 8 to 9 months is the youngest patient we would consider for THR. This allows the



evaluation of response to non surgical management: NSAIDs, Physiotherapy and Hydrotherapy. Many patients will experience such improvement through these techniques that they no longer have a clinical need for THR. By allowing further skeletal maturity, the implant sizes selected will be those appropriate to the dog's mature body size and the improved bone density will result in better screw anchorage. We also feel that the period between 5 and 8 months is important in terms of general development including learning social skills and so forth. Early intervention with strict post operative confinement may interfere with these processes and thus have an adverse effect on the dog's temperament throughout its life.

Post Surgical Risks

There are two chief post operative risks:

Luxation: This risk is greatest in the first three weeks post surgery and becomes unlikely after week 6. This is due to early limb use resulting in stretch of the periarticular soft tissues and the slow healing of the joint capsule. Revision is by replacement of the head and neck unit with a longer unit. This is not extensive surgery and has no impact on progression of osseointegration of the prostheses. This risk is minimised by strict activity restriction during this period. A cage is recommended in the house during the first 6 weeks. Covering laminate and other slippery floors is also recommended. Using a sling as a "safety net" when taking the dog to the garden for urination is also important. If the dog is known to become hyper-excited when the post is delivered, we recommend redirecting mail for the full first twelve weeks post surgery!

Lifelong: Most orthopaedic implants are not required to be present for life as they become functionally redundant once healing occurs. Prostheses are permanent however. There is a possibility for a transient bacteraemia to localise to the prostheses at any time. Key risk factors however are dental disease and dental surgery and chronic infected foci such as otitis externa, pyoderma and anal sacculitis. Prompt antibiotic intervention in the face of these diseases is required to prevent infection at the prosthesis. The course should continue for two to three weeks. In the case of planned dental surgery, we would advise antibiotic use for 3 to 7 days before planned surgery where this is possible.



Upcoming Events at Torrington Orthopaedics Continued Professional Development

Along with this Newsletter you will also see that we have enclosed the main program of upcoming evening CPD meetings. We are limited to no more than 50 attendees to most seminars although the Instrumentation seminar (Nursing) is limited to 20 delegates as it is very much a "hands on" seminar. Book early to avoid disappointment.

Other News

The website at www.torvet.co.uk is in the process of being overhauled and brought up to date. The plan is to give greater access to resources such as Newsletters and client information sheets. Check it out in a few weeks and let me know what you think.



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