

WHEN THE DRUGS DON'T WORK - SURGERY FOR OSTEOARTHRITIS - WHEN, WHERE AND HOW?

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Introduction

Total hip replacement (THR) has been performed in dogs since the 1970s. Early systems were two-component cemented systems with little accommodation for the variance in patient size and conformation. THR is now a routine procedure in orthopaedic referral practice. Modular canine cemented and cementless systems are available from several manufacturers. The success rate of the procedure is reported as good (85-95%). Recent innovations include "nano" and "micro" systems that can be used in small (~7kg and upwards) dogs and larger domestic cats. In recent years, systems for elbow replacement have appeared and, in some cases, disappeared. A canine knee replacement is also commercially available.

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Total hip replacement

Indications

Total hip replacement is indicated for the intractably painful hip dogs. Hip dysplasia and osteoarthritis are the most common indications although chronic or recurrent luxation, malunion of fractures of the femoral head or neck, and Legge-Perthes disease are also indications.

Dogs should have exhausted conservative measures in terms of weight control, exercise management and medical treatments (NSAIDs and analgesia) to the point where quality of life is insufficient. The risk-benefit ratio of THR must be contemplated. If there is a complication with the procedure, necessitating implant removal, the function of the hip is severely compromised; this risk is in the region of 5-10% and thus owners must be made fully aware of the possible complications as well as the potential benefits.

Contraindications for THR include:

- Persistent infection of another body system (e.g. severe skin, ear or dental disease)
- Debilitating musculoskeletal disease of the ipsilateral limb
- Dogs less than 10-12 months of age (in the author's opinion)
- Dogs too small for the implant components
- (Debilitating musculoskeletal disease of other limbs)

Technique

A THR can be placed through a craniolateral approach to the hip. The femoral head is luxated and the head and neck cut using a template. The acetabulum is reamed and the acetabular component placed (cemented or non-cemented). The femur is then drilled and cancellous bone removed. The femoral component is placed and the appropriate femoral head applied to the femoral neck. The hip is reduced and the capsule sutured for stability.

Patient monitoring

In human joint arthroplasty, many countries operate joint arthroplasty registries such that patients and outcome are monitored prospectively. Such a registry has now been established for canine hip replacement and is supported by the British Veterinary Orthopaedic Association and hosted at University of Liverpool (www.caninehipreplacement.org). Surgeons from any country can submit cases for this ethically-approved programme. Owners of operated animals are asked for annual feedback via an online outcomes assessment tool (in English).

Total elbow replacement

Dogs with severe elbow lameness which is not controlled adequately with medical management, may be candidates for total elbow replacement (TER). This is a relatively new procedure and the first report of successful TER in clinical canine patients was in 2003 (Conzemius, Aper et al. 2003). This "Iowa State" total elbow replacement (IS-TER) involved placement of a high density polyethylene combined radioulnar component and a cobalt-chrome humeral component and the initial success rate was reported as 16/20 dogs. The author performed 16 IS-TERs with some success but there were short and longer term complications. The instrumentation for IS-TER evolved over time and this

solved and created issues. Post-operative complications included luxation, infection, ulnar fracture. Longer term complications included polyethylene wear and heterotopic ossification.

The IS-TER has essentially been discontinued, or at least is no longer supported by training programmes. Biomedtrix now produce the TATE TER system although peer-reviewed publications on the system are lacking (Dejardin and Guillou 2011). Over the last five years, the author has worked with a UK bioengineer and a surgical colleague at Liverpool (Rob Pettitt) to develop the Sirius TER system (*Figure 1*). Phase I trials are underway at the current time with encouraging results. In addition, Arthrex Vet Systems are launching a unicompartmental elbow system (CUE). The CUE Arthroplasty System is designed to provide a surgical treatment option for medial compartment disease (MCD) of the canine elbow. Again, peer-reviewed publications have not appeared at the current time. TER is a rapidly developing field and, hopefully, we are edging closer to clinically-acceptable results from such prostheses. However, short, medium and long-term evaluation will be required as well as ongoing refinement.



Figure 1: The 'Sirius' total elbow joint replacement

Total knee replacement

A canine total knee replacement has emerged as a spin-out from orthopaedic research using dogs as a model for human knee replacement. The system is now marketed by Biomedtrix and there are some published reports on small numbers of patients (Liska and Doyle 2009). The indications are similar to other joints: intractable pain, unresponsive to medical management. One of the common issues with knees is that many candidates have had previous knee surgery (e.g. cruciate ligament or meniscal surgery) and this is likely to increase the incidence of post-operative infection.

References and further reading:

- Conzemius, M. G., R. L. Aper, et al. (2003). "Short-term outcome after total elbow arthroplasty in dogs with severe, naturally occurring osteoarthritis." *Veterinary Surgery* 32(6): 545-552.
- Dejardin, L. and R. P. Guillou (2011). Total elbow replacement in dogs. *Veterinary Surgery: small animal*. K. M. Tobias and S. A. Johnston. St Louis, Elsevier. 1: 752-759.
- Liska, W. D. and N. D. Doyle (2009). "Canine Total Knee Replacement: Surgical Technique and One-Year Outcome." *Veterinary Surgery* 38(5): 568-582.