

Complications of Multitrauma - The story of Rocky - by Alex Walker

Steve Withrow famously said that “dogs come with 3 legs and a spare”. True, but when dogs are reduced to two functional legs from trauma, the smallest complication can quickly become catastrophic.

I was once told by a renowned orthopaedic surgeon that “once an animal has more than one orthopaedic injury the effect is much greater than the sum of the individual parts”. In other words once an animal has lost use of 2 or more legs then the complication rate climbs exponentially. Such is the case of Rocky. Rocky was involved in a vehicular accident in which he fractured his left femur and luxated his right hip. The initial repair was performed well, with the open reduction of the hip and stabilisation with a transarticular pin. The femur was reduced and stabilised with a 9 hole, 4.5mm DCP plate. Reduction was excellent but a small defect remained in the medial cortex. The right hip caused problems so the transarticular pin was removed and a soft tissue technique used to maintain stability. Five weeks post-op Rocky's femoral plate broke (see Fig. 1a) and he was unable to bear weight on his right hip. Referral was made at this point. Clinically, despite the loss of stability of the femoral fracture, Rocky was more painful on manipulation of his right hip. The hip felt reduced so I suspected sepsis to produce this level of pain. Radiographs supported the diagnosis of septic arthritis and femoral osteomyelitis (see Figure 1b). Decision making at this point was critical.



Figure 1a

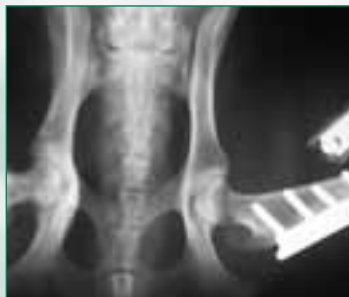


Figure 1b

- Options for the right hip - not much choice.
FHO with culture and soft tissue debridement. Physiotherapy was going to be an important part of the recovery of this limb and this was paramount to success of the contralateral femoral repair.
- Options for the left femur.
Remove broken plate, reduce and stabilise with a technique that will not have foreign material at the site of infection. Presence of implants makes osteomyelitis very difficult to manage and minimises the chances of bony union. In the femur the best option is a Type 1A or Type 1B external skeletal fixator (ESF). Selecting a frame that will be stiff enough to provide stability in a non-load sharing situation is critical. Using all the knowledge known about increasing stiffness of ESF frames is employed:
 - Increasing number of pins - minimum 2 per fragment.
 - Increasing size of pins.
 - Predrilling pin holes with appropriate guide hole.
 - Use positive profile pins (IMEX or Securos)

- Using modern clamp design (IMEX SK or Securos clamps are much stiffer than KE clamps)
- Decreasing the distance from the skin to the bar and adding a second bar doubles stiffness.
- Frame design influences stiffness - Type III > Type IB > Type II > Type IA.

These were some of the considerations taken into account when choosing the treatment for Rocky. I decided on a Type IA with double bars because I was worried that a Type IB would damage the quadriceps and predispose to quadriceps contracture in such a young dog.

The surgery was performed (see Figure 2). The right hip had lost all articular cartilage and there was no synovial fluid remaining. The femoral head was removed and submitted for culture which grew *Enterococcus* spp. on enrichment media. Post-operative pain was managed with epidural morphine, constant rate infusion (CRI) Fentanyl (changing to Fentanyl transdermal patch) and Rimadyl. Sensitive antibiotics were maintained for 6 weeks. Over the next 14 weeks Rocky regularly visited our physiotherapist Lindsey Craig who worked mainly on the right hip. We dealt with the many minor problems of ESFs, especially weeping pin tracts. At 10 weeks post-op the frame was reduced to 5 pins and one bar. Clinical union was recorded at 14 weeks post-op (see Figure 3) and the ESF removed. At that time Rocky was bearing good weight on both legs and has gone on to become sound.

Why did this all happen in a case that was handled well initially? Trauma, surgery and anaesthesia all cause immunosuppression. Multitrauma patients often require long surgical procedures and multiple anaesthetic/surgical episodes. Often nutrition is inadequate, further suppressing immunity and predisposing to infection. Strict aseptic technique is paramount. The small medial cortical defect would probably not have been significant if Rocky had three other legs to transfer weight to (remember small gaps are worse than large gaps due to high strain in small gaps) but in this case the plate was loaded without a complete medial buttress. Infection delayed the production of a supporting callus which would have relieved load on the plate. Implant failure was due to a combination of infection and excessive loading due to the problem with the right hip.

I would like to thank both Dr Don Alexander and Mrs Munday for their support throughout the process.



Figure 2



Figure 3