



Welcome to the first iPad version of cutting edge. Anyone who knows me will know that when Apple released this device, there was no way I was going to be able to resist it. All of the word processing and image placement has been done entirely on the device with the MacBook only being used for the 3D models for the pelvic fracture section. I hope you enjoy reading it as much as I enjoyed playing with my new gadget!

In this edition the main focus will be on pelvic fractures. The aim of this article is not to tell you how to repair pelvic fractures but how to assess them and decide whether surgery is indicated or whether conservative management is appropriate and why. We will also look at key prognostic indicators in patients with pelvic fractures. I have designed a decision tree or algorithm for the assessment of pelvic fractures which I hope you will find useful.

To begin though I want to introduce a technique that will change the way we can manage advanced Degenerative Joint Disease of the patellofemoral joint secondary to Patellar luxation. Patellar luxation is often considered as a purely mechanical disease of the stifle rather than a painful condition. This may broadly be true, however there is a group of patients for whom, the dissociation of the articular surfaces of the patella and the femur is not the main issue. These are patients with sub patellar articular surface pathology and contact loss of the articular surface of (usually) the medial trochlear ridge. It should be remembered that articular cartilage is entirely insensitive as a result of a lack of innervation. The subchondral bone however is richly innervated and loss of cartilage exposes this sensitive tissue. Even minor instability with mediolateral movement of as little as a couple of millimetres will be associated with discomfort. For these patients, restoration of

the normal mechanics of the patellofemoral joint may be advantageous but may not completely resolve their discomfort if there is continued contact with an ulcerated articular surface. Torrington Orthopaedics is one of only twelve practices in the world that can offer a definitive solution for these patients: Trochlear

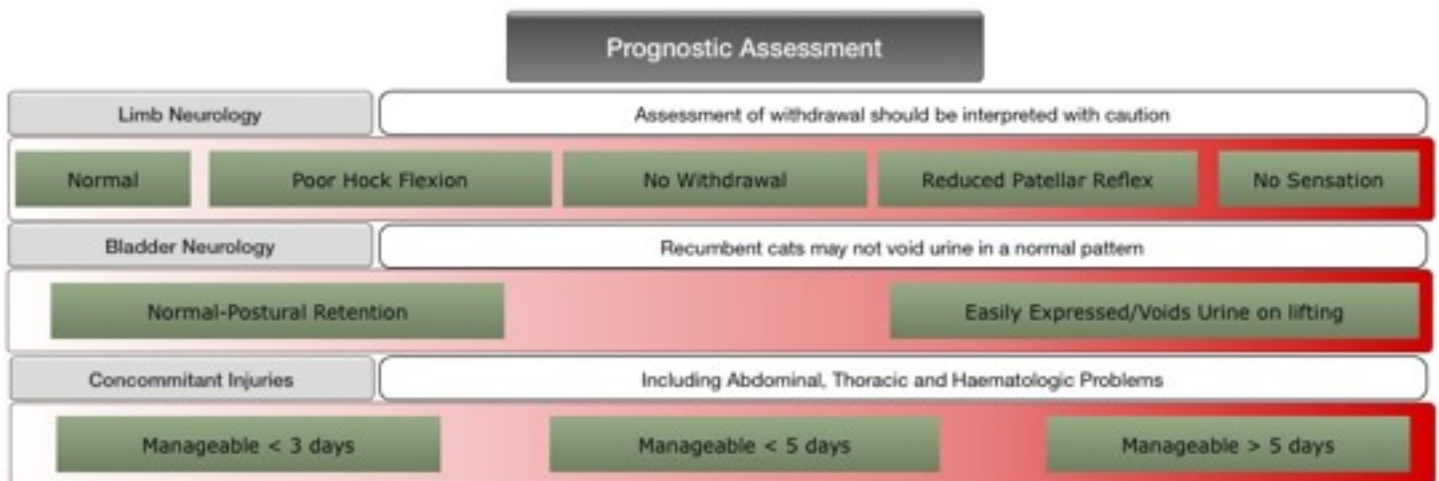
Prosthesis and Patellar resurfacing. The entire trochlea is excised and replaced with a Titanium Trochlear prosthesis that is engineered to perfection by Kyon and coated with the same "Diamond-Like" coating now used in Kyon's Femoral head component of the Total Hip Replacement. This has an incredibly low coefficient of friction. The damaged sub patellar surface is resurfaced using an osteochondral graft harvested from the intact lateral trochlear ridge. This restores the mechanics of



the quadriceps-patella-tibial mechanism and resolves the cause of pain. If you want to discuss this procedure further, please do not hesitate to call me or drop me an e mail at [andy@torvet.co.uk](mailto:andy@torvet.co.uk).

# Introduction to Pelvic Fractures

Pelvic fractures account for 20-25% of all fractures seen in small animal veterinary practice. Most pelvic fractures are multiple involving two or more of the bones of the pelvis (Ilium, pubis and ischium). Most cases presenting with pelvic fracture will have sustained a major traumatic incident and in terms of prognosis the injuries associated with the fracture may be more important than the fractures themselves. All pelvic fractures (apart from some cases of unilateral sacroiliac luxation) will have suffered considerable intrapelvic haemorrhage which can reduce the haematocrit to less than 20% and just as importantly reduce blood Albumin levels to a point that may result in pulmonary oedema if fluid therapy is over aggressive. The neurological structures in the region include the Sciatic Nerve, Obturator Nerve and the Pudendal Nerve. Damage to one or more of these structures is not uncommon, assessment of reversibility of this injury and the impact of the injury on outcome is mandatory to establish optimal mode of management.



## Prognostic Factors

The table above gives a breakdown of the major prognostic factors associated with pelvic fractures. As with all trauma patients, the priority is to stabilise the patient before considering stabilisation of the fracture(s). With pelvic fractures this may involve managing chest and/or abdominal injuries which may themselves dictate the overall prognosis for the case. The management of these injuries will necessarily extend the period before orthopaedic intervention is feasible without incurring significant risk and this delay may result in an inability to manage the pelvic fractures surgically. In these cases if the pelvic fracture pattern is of the type which generally indicates the need for surgical intervention (e.g. those associated with significant narrowing of the pelvic canal or those that include an acetabular fracture), delay to surgery may dictate that only salvage procedures will be possible (subtotal colectomy, excision arthroplasty respectively). The suitability of these procedures in each individual patients (in terms of long term impact on quality of life) will need to be determined in order to assess their suitability for that patient. For example, excision arthroplasty in a patient with other clinical orthopaedic disease such as contralateral advanced Hip DJD, Stifle DJD or Elbow pathology, may result in significant problems in the immediate post surgical period and may have a significant impact on



long term quality of life. Whilst euthanasia is never a "first option", we must remember that our aim is not to fix the fracture but to manage the patient in such a way that offers them an outcome that they themselves would value.

A major aspect with regards to the prognosis of pelvic fracture patients is urinary and faecal continence. Tail-pull injuries are commonly seen in association with pelvic fractures and the resultant tail paralysis/paresis may also be associated with injury to the Pudendal Nerve (spinal cord segments S1S2S3). These injuries are often nerve root avulsions and the resultant neuropathy is therefore irreversible.

In these cases we will see a flaccid anus, reduced/absent bulbourethral reflex (pinch prepuce or vulva and observe for anal constriction) and a bladder that is easily voided. This should not be confused with altered urination/defecation seen in recumbent patients and in particular recumbent patients that have considerable pelvic canal trauma. Long term urinary incontinence is a source of suffering for owner and patient alike and in my view is generally an indication for euthanasia. For this reason an accurate assessment and interpretation of findings is essential for optimal management. If in doubt, extend the period of observation until you are certain, but it is important to share your concerns with the owners in order that they can prepare themselves if the situation does not improve.

## Assessing the Need for Surgery



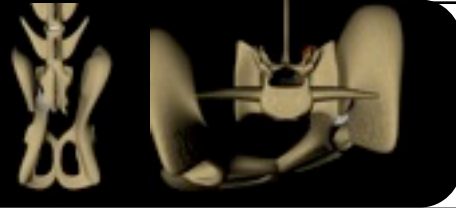
It can reasonably be argued that surgical management offers advantages over non surgical management in any fracture. Pelvic fractures hold an almost unique place however in the spectrum of fractures as the pursuit of the functional malunion has a higher positive outcome than the same goal in fractures of other bones. This is because the pelvis is composed of vascular corticocancellous bone and thus heals more rapidly than the cortical bone of the appendicular skeleton and due to the splinting effect of the strap like muscles surrounding the box-like pelvis. The pelvis however is part of the weight bearing axis for the hindlimbs, transferring load from the hind paws to the spinal column and thus permitting propulsion and load bearing. Loss of integrity of this axis will impair locomotion and the ability to maintain a standing posture. As this will be a temporary phenomenon in most pelvic fracture patients, this is seen as one of the “short-term” considerations in the assessment of the benefit of surgical stabilisation. Some fracture configurations will be associated with potentially long term compromise of hindlimb function. This relates to acetabular fractures in particular. It has been suggested that this indication relates only to fractures in the cranial 50% of the acetabulum, however in medium and large breed dogs, failure to resolve articular surface steps resulting from

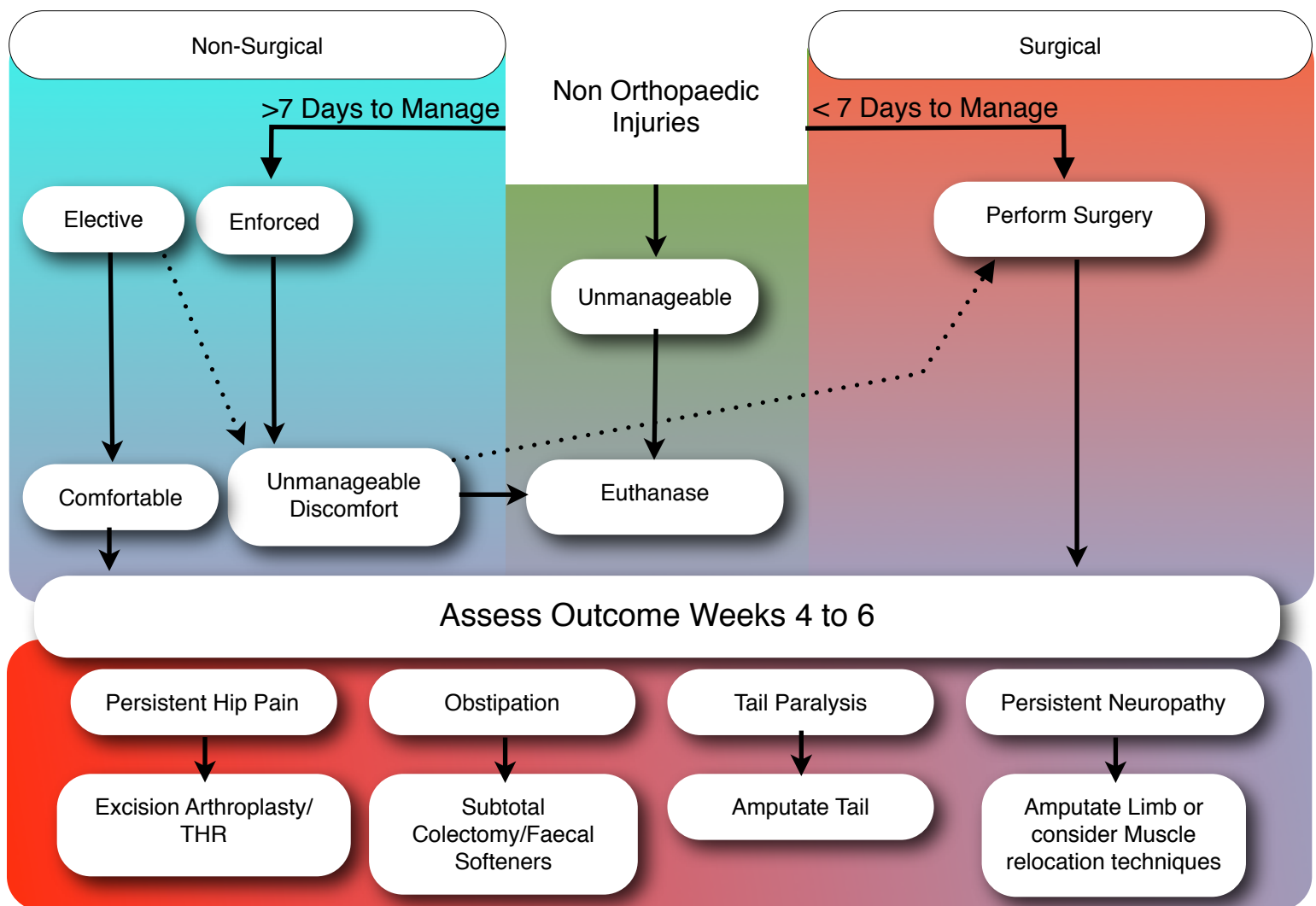
malunion may have long term implications for hip function.

The pelvis is also the canal for the intestinal and urogenital tracts. For this reason, non-neutered females should be neutered once the fracture has healed (irrespective of fracture configuration). It is often the impact of malunion on long term urinary tract and colorectal function that will determine significant benefits of surgery.

The multiple orthopaedic injury patient is also a special case, where resolution of pelvic instability by surgical intervention will be beneficial in the management of other orthopaedic injuries.

The presence of neurological injuries will also influence the benefit derived from early surgical stabilisation. In patients with bilateral pelvic fracture (irrespective of the absence of other indications for surgery) and unilateral neuropathy, surgical stabilisation will always confer benefits to the patient. Reversible neuropathies (neuropraxic injuries in particular) will take between 2 and 6 weeks for recovery. Having a stable contralateral hemipelvis or weight bearing axis will clearly permit some independent ambulation during this period of recovery. In cases with irreversible, unilateral neuropathies, where amputation may be considered as the only option, the benefits are very clear.

Non Surgical Management	Surgery is beneficial	Surgery is Mandatory
Isolated Unilateral Sacroiliac Fractures (see below for exception).	Any bilateral fracture configuration. Especially when associated with mononeuropathy.	Fractures associated with significant pelvic canal attenuation.
Minimally displaced iliac shaft fractures.	Acetabular Involvement.	Bilateral Fractures with Unilateral Irreversible Neuropathy
	Intractable pain.	
		
The fracture on the left appears “benign”, however these can be associated with canal obstruction. Digital rectal palpation should be performed.	Intractable pain may be associated with nerve impingement or significant instability.	An inability to deal with these fractures due to unmanageable concomitant injuries may heavily influence long term prognosis.



The above chart may seem rather simplistic, but it can help in explaining your decision making process to owners and nursing staff. Often it is the non orthopaedic injuries that will dictate outcome in pelvic fracture patients. These injuries relate to the high velocity impact associated with them and whether this is blood loss, urinary tract, respiratory or neurological co-injuries, the outcome with these will be key in terms of early mortality and long term complications. I would generally never engage in management of the orthopaedic injuries in pelvic fracture patients within the first 48 hours following injury as this period is associated with a significant increased risk of anesthetic death.



## Upcoming Events at Torrington Orthopaedics

### Continued Professional Development

If you are interested to delve deeper into this subject, there is an evening seminar on the 22nd of September. The seminar will start at 8 p.m. with food and refreshments being served at 7:30. The seminar is limited to 50 places and there is already keen interest. Please contact us if you wish to attend and are not already booked on the course.

## Other News

We will likely be one of very few practices shortly that can offer a new technique for the management of Elbow Dysplasia. I will update you with the indications and rationale for this surgery in the next newsletter or before. Stay tuned!



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