Managing Macropod Fractures

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Introduction:

Taronga Western Plains Wildlife Hospital (TWPWH) is situated within Taronga Western Plains Zoo, Dubbo, in regional NSW. In addition to delivering veterinary care to the Zoo's animal collection, the TWPWH provides a fully funded veterinary and rehabilitation service for free-ranging Australian native wildlife. The Wildlife Service sees approximately 400 wildlife cases annually and about 25 % of these are macropods. The Wildlife Service medical database includes approximately 1900 macropod cases of which more than 320 presented with bone injury

Fractures in macropods:

In our experience, the long bones of the hind limbs are the most commonly injured bones in macropods.

The most common causes for bone injury in macropods presented to our clinic are

Road traffic injuries

Trauma to orphaned joeys being hand reared

Macropods hit by cars are usually killed or seriously injured as a result. Pouch young are often orphaned by these events and may themselves sustain bone and soft tissue injuries.

Orphaned joeys being hand reared also injure their bones. Sometimes this occurs during vigorous activity (e.g. in response to getting a fright) and other joeys seem to fracture their bones as a

consequence of only gentle forces acting on the bone due to normal, quiet activity. It is not clear why the bones of these particular joeys are weaker than normal bones although it appears not to be due to calcium or vitamin D deficiency. Our impression is that joeys that have regular, supervised physical activity through the pouch emergence phase are less likely to be affected by these kinds of fractures.

Decision making:

Macropods suspected to have fractured bones need to be anaesthetised and the fracture assessed by clinical examination and radiography. It is impossible to properly assess a fracture and the options for repair without veterinary examination of a radiograph. Features of a particular fracture such as the point along the bone at which it occurs and the fracture configuration (i.e. the shape of the fracture, the number and orientation of any fragments etc) are important when considering the various options for fracture management and repair and these can only be determined by examination of an xray.'Compound' fractures are those where the broken bone ends have pushed through the skin and these have a particular risk of developing bone infection.

Fracture repair is undertaken where there is a reasonable prognosis for healing and full recovery of normal function, where a carer and facilities are available to manage the animal through convalescence and where an appropriate release site is available. If these criteria are not met the animal is euthanased. Although the general principles of fracture management of dogs and cats are applicable to macropods there are some important differences. Failure of fracture repair to the hind limbs is more likely in macropods due to the forces generated by their powerful legs and the greater weight borne through the hind end of these bipedal animals. The difficulty of confining wild macropod patients through the healing stage also complicates fracture management in these patients. For this reason euthanasia is often elected for adult macropods with hind limb fractures. Pouch dependent joeys are much better candidates for fracture repair.

Identification of fractures:

The possibility of broken bones should be considered in any macropod with a history of trauma. Signs of fractures include inability to bear weight on a limb, abnormal angulation of a limb, swelling of the injured part and 'crepitus' (a grating of fractured bone ends that can be heard and/or felt by the examiner). Although fractures are often the most obvious injury sustained by a traumatised macropod, consideration should be given to the possibility of additional injuries (internal bleeding, ruptured bladder, spinal cord damage etc) which may have significant implications for the patient's well-being. The principles of first aid should be applied to any traumatised macropod (i.e. ensure the animal is breathing, stop any bleeding, provide warmth to joeys etc) before fractures are addressed. Macropods that have been hit by cars often have spinal fractures. These usually result in hind limb paralysis. Fractures of the pelvis can also affect the animal's ability to use its back legs. Fractured skulls can be accompanied by signs of brain injury and broken ribs by breathing abnormalities. Broken bones in pouch young that are orphaned by car accidents can sometimes be missed unless the animal is examined carefully.

Initial management of broken bones:

First priority is to stabilise the patient by identifying and addressing any other life threatening issues.

First aid for a fracture requires:

management of pain and stress

minimisation of movement of the fractured bone ends

Wild macropods are severely stressed by contact with humans. Use of injectable, short acting sedatives such as diazepam (Valium™) and reducing sensory stimuli by confinement in a bag are useful strategies to reduce this fear and stress. Macropods, and many other animals, show surprisingly little behavioural indication that they are in pain. Despite this, a macropod with a broken bone is very likely to be experiencing an equivalent level of pain to a human with a broken bone.

Pain management is essential when treating macropods with fractures. In our hospital we routinely use veterinary anti-inflammatory drugs such as meloxicam (Metacam™) and carprofen (Rimadyl™) for pain relief in macropods with broken bones. For additional pain relief, one of these anti-inflammatories will often be given in combination with an opioid (i.e. morphine family) drug such as buprenorphine (Temgesic™). Appropriate dosages of these drugs for macropods have not been established by scientific studies and so doses are usually extrapolated from those given to domestic dogs.i

Movement of the fractured bone ends causes additional pain and soft tissue damage. Reducing fear and stress by use of sedatives and confinement in a bag reduces the activity associated with struggling and escape attempts and is an important part of fracture first aid. Where appropriate, splints and/or thick, padded bandages (e.g. 'Robert Jones bandage') can be employed to provide additional temporary stabilisation until such time as the patient is stabilised and the fracture can be assessed, but only if they can be applied without undue animal struggling.ii

Fracture healing and repair:

There are several requirements that must be met for broken bone ends to heal back together:

the bones ends must be close together (i.e. the fracture must be 'reduced' and the bone ends 'in apposition')

there must be minimal movement of the bone ends (i.e. the fracture must be 'stabilised')

the bone ends and tissue surrounding them must be free of infection.

After radiographic assessment of the fracture, the veterinarian is in a position to decide how to approach fracture reduction and stabilisation. Compound fractures need special management to address the risk of infection.

Broadly, there are 2 options for reducing and stabilising fractures; surgical and non-surgical. The decision between them is made based on which bone is broken, the size of the animal and the fracture configuration. Either option requires general anaesthesia.

Non surgical reduction ('closed' reduction) is chosen for the simplest fractures where the bone fragments can be brought back into alignment just by manipulating the limb. It is often used where the fracture is to be stabilised by external means (i.e. 'external coaptation'-splints, casts etc). Radiographs are used to ensure that reduction and alignment are adequate when this technique is used. Surgical reduction is used for more complicated fractures. It is necessary when implants (e.g. pins, plates, screws, wires etc) will be used for fracture stabilisation.

Closed reduction and the use of external coaptation (i.e. splints, casts etc) are generally chosen for simple fractures in smaller patients (e.g. pouch dependent joeys). Advantages of this approach are simplicity and avoiding the need for surgery with all the cost and risks that it brings (anaesthetic risk, infection etc). The major disadvantage is that fracture stabilisation is less effective than with the use of surgical implants. In fact, for many broken bones, fracture stabilisation using splints and casts is inadequate for fracture healing.

Surgical reduction and the use of surgical implants enable a more precise reduction of the fracture because the surgeon can actually see the bone ends with which he/she is working. Use of surgical implants tends to result in more effective stabilisation of fractures resulting in faster and more efficient healing.

Aftercare:

A well stabilised fracture usually takes between 4 and 6 weeks to heal. Pain relieving medication is usually prescribed for the week following reduction and stabilisation of the fracture. Some degree of activity restriction is usually recommended depending on the size of the patient, type or repair etc. As fracture healing progresses, the patient is gradually re-introduced to normal activity. The veterinarian may schedule the patient for check-ups during the period of fracture healing and will often take radiographs at these times to monitor bone healing. Casts and splints need to be checked to ensure they are comfortable. Some or all surgical implants are usually removed when radiographs confirm that bone healing is complete.

REFERENCES

1 Brinker WO et al (2006) Handbook of Small Animal Orthopaedics and Fracture Treatment 4th ed. WB Saunders Company. Philadelphia.

1 Vogelnest L & Woods R (2008) Medicine of Australian Mammals. CSIRO Publishing. Victoria.

1 Lane DR & Cooper (2009) Veterinary Nursing 4th ed. Butterworth Heineman. Oxford

JANE BURGESS is a Senior Vet Nurse and Supervisor of the Taronga Western Plains Wildlife Hospital. Jane started employment at Taronga Zoo as a Zookeeper on the Ungulate Division in 1986. During this time she had the amazing opportunity to hand raise a baby Giraffe “Jerry” which was one of the highlights of her career.

After her ten year career in that area, Jane applied for a nurse’s job at Taronga’s Veterinary Clinic where after becoming the Manager in 1999 Jane remained until 2003.

In 2003 Jane decided it was time for a change and challenge and was offered the Supervisors Position at Taronga Western Plains Zoo

Wildlife hospital. She moved to Dubbo, Central West, N.S.W. where she has been managing the hospital for the past ten years.

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