

## **Rehabilitation of Australian Raptors and Owls –**

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### **Introduction**

I have been treating raptors and owls on behalf of Higher Ground Raptor Centre and ARCC Inc. for the past 8 years in conjunction with Peg McDonald. I am also the president of Australian Raptor Care and Conservation (ARCC) Inc. Australian Raptor Care and Conservation (ARCC) Inc. is a not for profit organisation dedicated to furthering and sharing our knowledge regarding the rehabilitation and release of injured and sick raptors and owls.

This presentation will cover successful and unsuccessful cases with the aim of providing tips and some pitfalls in treating raptors and owls. It also highlights the need for a standard examination protocol when these birds present to vets including an examination under general anaesthetic, radiographs, blood collection, weighing, ophthalmic examination and faecal examination.

### **Case 1: Masked owl (*Tyto novaehollandiae*); ARCC MO001**

This owl presented January 2015 after being in a motor vehicle accident in Kangaroo Valley. It was in care one week prior to examination. On examination under general anaesthetic the owl was weighed. As its weight was 690 grams it was to be determined to be a female (males on mainland Australia weigh 476 grams and females 630 grams<sup>i</sup>). Swelling was noted over the left intertarsal joint but the joint was stable and there was no evidence of osteomyelitis (bone infection) on radiographs.

There was a slight opacity in the lens of the left eye but otherwise both eyes appeared normal. Blood work was unremarkable as was a faecal wet preparation.

After examination, she was taken to Higher Ground Raptor Centre for rehabilitation.

As the bird was concussed she was given oral Vetafarm Spark via a feeding tube for the first feed. This was done carefully to avoid regurgitation and possible aspiration due to possibility of head trauma. 10 to 15mls Spark was given via a feeding tube on the first day, then egg yolk was added to the mix for another day and all was being well tolerated.

By this time the bird was bright and alert enough for hand feeding into the mouth only - small pieces of Spark soaked clean chicken (no bones or feathers) and pinkie mice. Total food intake was 100g per day. This was well tolerated and the bird was bright and alert. This regime was continued for another day, then whole mice were added to the hand feeding, chopped into fingernail size pieces. The bird was then bright and alert enough to pull pathogen free mice/rats and small rabbits until released, eating around 100g in total per day.

She was observed at the drinking bowl on several occasions via CCTV. She showed constant and steady improvement and flew strongly and well both in the free flight and when released. Importantly no evidence of vision loss or blindness were noted whilst in care.

After 10 days in care she was released in very close proximity to where she was found.

## Case 2: Sooty Owl (*Tyto tenebricosa*); ARCC SO003

This owl presented as a second opinion in November 2016 with a chronic wound on the left distal tibiotarsus with a large amount of scar tissue. It weighed 1270 grams and was thus determined to be a large female<sup>ii</sup>. There was reduced range of motion in the left intertarsal joint (by approximately 40 degrees). Examination was performed under general anaesthetic and bloods collected and radiographs taken.

There was no evidence of osteomyelitis (bone infection) in the left leg on radiographs. Her white cell count and heterophil count was within the normal range. She was started on 125 mg Amoxicillin/ clavulanic acid twice daily and also oral meloxicam at a dose rate of 0.5 mg per kg twice daily.

Prior to admission here the Sooty Owl had been kept on organic material in a box for one week, then moved to a carer who maintained her in a large box with shade cloth over the top and a soft towelling base to facilitate clean wound healing for approximately four weeks. She had been maintained on a suitable diet consisting primarily of rats and mice, and this was continued with feathered quail added once weekly.

8 days later she was re-examined under general anaesthetic. A large portion of necrotic material was removed from wound on left leg and the wound was flushed and the skin edges debrided and closed with 3-0 polydioxanone (absorbable suture material). Following surgery, she was started on clean quail and chicken and housed in the intensive care unit. The oral antibiotics and meloxicam were continued for another 5 days. Following suture removal, she was moved to a small 3 x 3 x 4m aviary to allow her access to sunshine and fresh air without a lot of movement, flying and bouncing. She had been eating well but following transferral into the small aviary she was reluctant to feed for three days, and then a very faint noise was detected when she was breathing. There was no open mouth breathing.

It was decided to monitor her closely and move into intensive care again, but by the next day her condition deteriorated rapidly and she died suddenly. A post mortem revealed a pale mottled liver and

1 to 2 mm white granulomas in the right lung. Ovarian structures were also identified confirming her sex. The lung and liver tissue were sent for histopathology at Vetnostics. The histopathology results revealed chronic granulomatous pneumonia and hepatitis and fungal hyphae were found in the liver. This was consistent with aspergillosis infection.

Unfortunately poor husbandry, particularly housing the owl on damp organic matter initially is very likely to have resulted in aspergillus fungi colonising the lungs. Ideally bedding should not be organic (newspaper, straw, shavings). *Aspergillus fumigatus* is found commonly in the environment. It is also saprophytic meaning it grows in decaying organic matter, and this is the reason that organic bedding should be avoided at all times. It is also opportunistic and is more likely to infect birds with a compromised immune system.<sup>iii</sup> Clean intact towels that can be changed regularly are ideal. The bird should be kept in a well-ventilated area to ensure regular exchange of fresh air. Birds should also be removed from their enclosure before cleaning due to the risk of inhaling fungal spores that become airborne during the cleaning process.

### **Case 3: Wedge-tailed Eagle (*Aquila audax*); ARCC WTE020**

This Wedge-tailed Eagle initially presented in April 2017 to another vet clinic. She was diagnosed with a fractured right ulna and the fracture was repaired with an intramedullary pin. Her presenting weight was 4200 grams despite being thin, so she was determined to be a female.<sup>iv</sup> She presented to Higher Ground Raptor Centre three months later for pre-release flight fitness in the flight aviary. She had been kept in a very small aviary for approximately five months and was suffering from feather damage. She was underweight, lethargic and had feather mites on presentation. Her right wing was dropping but she was able to lift and extend the wing at times. Radiographs revealed an osteomyelitis in the right ulna and she had a high white cell count and high heterophil count typical of a bacterial infection.

Her blood results and radiographs indicated that she had a bone infection (osteomyelitis) at the site of the fracture repair. We commenced clindamycin tablets at a dose rate of 100mg per kg once daily (three 150mg tablets once daily). She was given clean meat only until it was felt that she had built up enough strength for casting fur. Her diet consisted of clean chicken, turkey legs and rabbit with the addition of Vetafarm moulting aid as she had many blood quills and feather damage. She moved onto whole feathered chicken, pathogen free large rats, fresh fish and furred rabbits as she gained weight and strength. To medicate her with the clindamycin tablets, she was hand fed a piece of clean chicken once daily to ensure the medication was taken. She tolerated this procedure extremely well and received all her tablets without fail and by this stage she had been allowed access to the Peter Spitzer free flight aviary.

She was re-radiographed under general anaesthetic after treatment and unfortunately the osteomyelitis had spread to the right radius and she was euthanased. We did not see the initial radiographs of the fractured ulna, so it is difficult to comment. However, if the radius was intact and only the ulna was fractured, we would have managed this case with either just cage rest or wing bandaging using a figure 8 wrap and physiotherapy under general anaesthetic twice weekly. Certainly, surgery can have some complications and osteomyelitis is definitely one of the more common complications. In our experience these fractures form a callus in 10-14 days and usually heal without complications. It is also the experience of the authors of Raptor Medicine, Surgery and Rehabilitation who work at the Carolina Raptor Centre.<sup>v</sup> Ideally the aviary used should be 2 metres by 2 metres and have a soft sand substrate on the bottom. Perches of differing size should also be used to prevent pododermatitis (bumblefoot) occurring whilst the patient is unable to fly.

### **Case 4: Australian Hobby (*Falco longipennis*); ARCC AH003**

An Australian Hobby with a fractured left radius after a motor vehicle accident presented for a second opinion after treatment at another vet clinic. The hobby was found in the Kurri Kurri area. He also presented to ARCC for assessment of flight capabilities in the flight aviary.

On presentation the hobby had a dropped left wing which shook slightly after flying. Severe neurological symptoms were also present. Examination and radiographs under general anaesthesia revealed a healing left radial fracture, but reduced range of motion in the left elbow. The left radial fracture was close to the elbow joint and the left elbow was thickened due to scar tissue. Further examination revealed no further injuries and blood biochemistry and haematology testing was unremarkable. The bird's weight was 240 grams making the bird more likely to be a male (male 217 grams, female 270 grams<sup>vi</sup>). He was unable to feed

unassisted for almost three weeks, by which time he was standing and balancing normally, and was able to start pulling food on his own.

Initially he was tubed with Vetafarm Spark, then Spark and egg yolk and then Spark, egg yolk and Hills AD over a three day period. After 3 days, clean meat was introduced, and he was hand fed for three weeks. Mice were his preferred diet, given at a rate that maintained the muscle mass on his keel.

Despite this elbow stiffness, the hobby flew exceptionally well in the circular flight aviary and was given time to improve. When flying in the free flight aviary commenced, the number of mice needed generally doubled, and prior to release he was seen to fly 800m (8 laps) non-stop. Wings were symmetrical and he was avoiding obstacles normally. He was eventually released after spending 2 weeks in the flight aviary and a total of 8 weeks in care. He was given a soft release from the flight aviary. This meant the hobby could return for food if it needed it or disperse if it wanted to. Young hobbies disperse after a period of dependence on their parents of up to 3 months and have been reported to migrate up to 900kms.<sup>vii</sup>

### **Case 5: Eastern Osprey (*Pandion cristatus*); ARCC EO001**

This Eastern Osprey was found on the 18<sup>th</sup> of September 2017 sitting on the edge of a boat in Lake Macquarie. She was found near a regular nesting site and two fledglings were visible in the nest. She couldn't fly and was ataxic (wobbly) for the first four weeks she was in care. She was radiographed on initial presentation and no fractures were found. Weight on initial presentation was 1000 grams.

She came into ARCC care on the 14<sup>th</sup> of November 2017. She was examined under general anaesthesia. Her weight was 1240 grams and was determined to be a female (male 1013 grams, female 1235 grams<sup>viii</sup>).

Examination of the eyes and mouth was unremarkable as was routine biochemistry and haematology. Radiographs taken under general anaesthesia revealed significant pelvic abnormalities and extension of both femurs was not possible past 90 degrees (as visible on the radiographs). The pubic bones were unaligned and there excessive bone formation along the body of the pelvis and there were changes around the head/neck of the femurs. Healed pelvic fractures were one possibility but given her young age a developmental abnormality was also possible. In theory this may have led to the parents ejecting her from the nest.

Despite this she had excellent flight capabilities so we were reluctant to euthanase her. We elected to trial her in the flight aviary at Higher Ground Raptors.

Eastern Ospreys are notoriously difficult feeders. This bird had been in care for two months previously and had not fed well unassisted the whole time. She was generally being maintained by hand feeding her a mix of mice, chicken and fish. As she was in good body condition, Peg McDonald commenced a regime of tube feeding with blended fresh fish 15mls three times daily, each time placing a little of the blended fish mixture in his beak as each feed was finished, and then putting some of the whole fish in the aviary next to him each time.

Within three days she was feeding unassisted and fed on fresh and frozen fish during her time in care. Frozen fish were supplemented with Vetafarm Sea Bird tablets, despite the fact that

they were never frozen for more than 3 weeks. Whiting, flathead and tailor were preferred, all being a species an osprey would prey on. She was also observed eating mice on the Vetafarm CCTV.

During her time the flight aviary we observed her perching, flying and feeding without any problems so after over 2 months at Higher Ground Raptors she was released on the 25<sup>th</sup> of January 2018, at the location she was originally found. Post release he was observed several times with his presumed parents, the latest observation many weeks after his release.

#### **Case 6: Powerful Owl (*Ninox strenua*); ARCC PO004**

A powerful owl presented from the Milton area on the South Coast of NSW. He was found by a member of the public who lived in an area surrounded by forest. This owl was observed sitting/lying on the ground and progressively weakened over a period of five days, during which time the member of public tried to contact an appropriate rescue group.

On presentation he was extremely thin and very weak. He was also ataxic and unable to walk. He was presumed to have suffered some sort of traumatic event resulting in him being unable to fly and thus hunt. His weight was 1070 grams (females average 1250 grams and males 1450 grams.<sup>ix</sup>) and given his current starved state he was likely to be a larger male. It is important to note that Powerful owls (along with other *Ninox* owl species – the Rufous and Barking owls) exhibit normal sexual dimorphism where the males are larger than the females. Reversed sexual dimorphism, where the females are larger than the males, occurs in other owl species such as the Sooty owl and Masked owl.<sup>x</sup>

He was examined under anaesthesia and blood was collected. Radiographs were unremarkable and there were no other findings on physical examination. 50 ml warmed Hartmann's was given under the skin prior to recovery from anaesthesia.

Interestingly his blood results revealed he had a very mild anaemia with *Haemoproteus* parasites present on approximately 5% of his red blood cells. He also had elevated muscle enzymes (CK) due to muscle loss/damage (see table below). *Haemoproteus* is spread by biting insects such as the *Culicoides* midge.<sup>xi</sup> Treatment can be attempted using chloroquine and mefloquine<sup>xii</sup> but as obtaining these medications is difficult and that less than 10% of red blood cells were infected (meaning the infection was less severe) we elected not to treat this patient. It was also very likely that this infection was not this owl's primary problem and was more likely an incidental finding.

He required intensive treatment to ensure his survival. Peg McDonald started him on Vetafarm Spark, giving 10mls via tube feeding every couple of hours. After 12 hours egg yolk was added to the Spark mix and he was fed every 4-5 hours. After 24 hours blended chicken meat to puree consistency was added to the Spark and egg yolk mix – feeding around 18mls every 4-5 hours. After 36 hours hand feeding commenced using clean chicken breast. This regime saw him eating solid food faster than a more typical patient, but he was at high risk of starvation and required a faster progression onto solid food.

Once the ataxia (wobbliness) resolved after 10 days he was allowed to feed unassisted. He was provided with clean chicken and quail meat. Owls can't digest bones and fur as their proventriculus produces much less acidic stomach acid, so it is important to provide clean meat whilst they are convalescing.

Feeding food items with bones and skin will require the owl to work much harder digesting this food and is less desirable in a hospital situation. In fact, raptors like goshawks have stomach acid 20 times stronger than owls meaning they can digest bone, whereas owls can't digest bone and need to pass bones and fur as castings.<sup>xiii</sup> One month later and the Powerful Owl was doing very well. He had gained weight and was showing no signs of ill health.

He was re-examined under anaesthesia and blood was collected to check the status of the *Haemoproteus* infection. His weight had increased to 1400 grams. The blood results showed his red cell count had increased too within the normal range (see table above). It was now very difficult for the pathologist to locate *Hameoproteus* organisms, meaning the infection had almost completely resolved without treatment, as his health had improved and he gained weight. He was released in the same area he was found after one month in care.

### **Case 7: Pacific Baza (*Aviceda subcristata*); ARCC PB005**

In January 2018, a Pacific Baza was hit by a motor vehicle near Lake Tabourie on the NSW South Coast. 50 kilometres later the driver stopped and realized the bird was trapped underneath the surfboards/roof racks. He presented to a local vet who examined him and took some radiographs. One week later he presented to us for a second opinion. On presentation, he had a lack of tail tone and was reluctant to eat. He weighed 300 grams and was thus determined to be a male (male 307 grams female 347 grams)<sup>xiv</sup> Radiographs taken under general anaesthesia revealed pelvic fractures were present. The left and right pubic bones were fractured. Blood work and further examination were unremarkable.

Pacific Bazas' tend to be quiet and very malleable birds in care. This bird had good muscle mass around the keel but had been extremely dehydrated and stressed on presentation. Peg McDonald began the intensive care regime of 10 ml Vetafarm Spark given via a feeding tube four times daily initially on day 1 then Spark plus egg yolk on days 2 and 3.

Pinkies and clean meat were introduced on day 4. The food was put on a clear takeaway container lid in front of the bird and Peg moved her fingers underneath to attract attention. The Pacific Baza ate these well and after another two days whole mice were placed fresh each day into the intensive care unit. After a further two days the Pacific Baza began feeding unassisted on the whole mice and other forms of feeding ceased. He also received oral meloxicam at a dose of 0.5mg per kg orally twice daily for 5 days to manage his pain.

After spending 8 days in intensive care, the Pacific Baza was placed in a small aviary (3 metres x 2 metres x 2 metres) for another 7 days. He was then placed in a large 16 metre aviary for another week, where he flew very well before being moved into the circular flight aviary. He spent 10 days in the circular flight aviary and demonstrated excellent flight capabilities and no evidence of tail dropping and was subsequently soft released. Pacific Bazas migrate to either lowlands areas or northwards for the winter<sup>xv</sup> so there was no need to release this individual at the site where he was found as he was released at the start of Autumn.

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- <sup>i</sup> Higgins 1999 Australian High Country Owls, Jerry Olsen, CSIRO publishing 2011 page 305
- <sup>ii</sup> Debus 2009 Australian High Country Owls, Jerry Olsen, CSIRO publishing 2011 page 307
- <sup>iii</sup> Raptor medicine, surgery and rehabilitation, David E Scott 2<sup>nd</sup> edition page 108-112
- <sup>iv</sup> Birds of Prey of Australia- A Field Guide, Stephen Debus, 2<sup>nd</sup> edition page 40
- <sup>v</sup> Raptor medicine, surgery and rehabilitation, David E Scott 2<sup>nd</sup> edition page 184
- <sup>vi</sup> Birds of Prey of Australia- A Field Guide, Stephen Debus, 2<sup>nd</sup> edition page 50
- <sup>vii</sup> Birds of Prey of Australia- A Field Guide, Stephen Debus, 2<sup>nd</sup> edition page 133
- <sup>viii</sup> Birds of Prey of Australia- A Field Guide, Stephen Debus, 2<sup>nd</sup> edition page 4
- <sup>ix</sup> Australian High Country Owls, Jerry Olsen, CSIRO publishing 2011 page 314
- <sup>x</sup> Australian High Country Owls, Jerry Olsen, CSIRO publishing 2011 pages 109-110
- <sup>xi</sup> Practical Handbook of Falcon Husbandry and Medicine, Margit Gabrielle Muller, Nova Science Publishers, 2009
- <sup>xii</sup> Practical Handbook of Falcon Husbandry and Medicine, Margit Gabrielle Muller, Nova Science Publishers, 2009
- <sup>xiii</sup> Australian High Country Owls, Jerry Olsen, CSIRO publishing 2011 page 95
- <sup>xiv</sup> Birds of Prey of Australia- A Field Guide, Stephen Debus, 2<sup>nd</sup> edition page 14
- <sup>xv</sup> Birds of Prey of Australia- A Field Guide, Stephen Debus, 2<sup>nd</sup> edition page 105