Supportive Care of Rescued Birds and Requirements for Rehabilitation

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Introduction

People are becoming more aware of environmental conservation. They are interested in what role they can have in conserving the ecosystems that are present. This involves conserving the environment and the inhabitants which live there. It has mainly been through wildlife rescue and rehabilitation organisations that people have become aware that wildlife should be treated and rehabilitated by licensed and qualified people. The National Parks and Wildlife Service legislation for the rescue and treatment of wildlife is not well known by most of the public.

It is becoming more common for "sick" or injured birds to be brought in from the wild and cared for in the captive situation. It is either a veterinarian or wildlife rehabilitation organisations which become responsible for these birds.

Veterinarians have an important connection with these organisations and other individual rescuers and rehabilitators. The veterinarian not only stabilises and appropriately treats the rescued patient, but should also assess the patient for rehabilitation. The veterinary clinic is not an appropriate place for a wild bird to be kept and once recovered, the bird should be passed onto a licensed and qualified person for rehabilitation.

Presentation of the Rescued Patient.

It is common in practice to have people bring in birds that they have found. These birds are obviously injured or are found on the ground as easy prey. In this situation there are many important things that should initially be undertaken.

* The rescuer's details - name, address, phone number. The rescuers may need to be contacted for further information and details for rehabilitation purposes. It should be remembered that the rescuers are not obliged to pay for services rendered or the cost of treatment of any wildlife that is brought in. Rescue and rehabilitation organisations will usually contribute to the cost of treatment for birds and animals which they adopt for rehabilitation (Porter 1992).

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* History of the patient - a good history of the rescue will not only help in making a diagnosis but is important for the successful rehabilitation of the bird. Some of the important details needed are: where the bird was found; the ease by which the bird caught; whether the bird has received any food, water or medication and by what means of administration.

* Bird identification - it is important to identify the species of the patient and to know if it is native or introduced. Any introduced species should be humanely euthanased under the National Parks and Wildlife Act 1974. The bird should be observed for any indication of domestication and therefore be an escapee or stray. If this is the case, further investigation is needed, for example' scanning for a microchip and contacting the owners.

* The patient should be quickly assessed for shock and other life-threatening complications and the appropriate treatment administered. This initial assessment should determine the patient's prospects of rehabilitation. Porter (1992) emphasises that euthanasia is the most humane way of dealing with a bird which has low prospects for rehabilitation. At the Wildlife Centre of Virginia, approximately 20% of patients are euthanased on the first examination (Porter 1992). This allows the limited resources to be efficiently used on patients which have a greater chance at successful rehabilitation.

  Young fledglings are commonly found in spring. If these fledglings are returned to the site of rescue, the parents will usually continue to feed and teach the young. The best role the rescuers can play is to protect the fledglings from predators (Clyde 1993). Only true orphans should be brought in for rehabilitation.

* Weight. The weight of the patient should be recorded. This allows appropriate doses for treatment to be calculated, as well as giving a baseline weight so that treatment and recovery can be monitored.

Legislation For Treatment and Rehabilitation Of Wildlife In NSW

In NSW the legislation for the responsibility of native wildlife is under the National Parks and Wildlife Act, 1974. This Act applies to native birds, reptiles, amphibians and mammals which are protected in NSW. Exceptions to this are the Dingo and, in certain parts of NSW, some native birds which are either agricultural or pastoral pests. This includes:

* the Sulphur Crested Cockatoo and Galah which are locally unprotected in the Central and Western Divisions of NSW as they damage grain and oilseed crops;

* crows and ravens which are protected only in the Counties of Camden (Wollongong area), Cumberland (Sydney area) and Northumberland

(Newcastle area), because they are blamed for lamb mortality; and

* the Purple Swamphen which is not protected in the Riverina region where it causes considerable damage to rice fields.

Of the Act, Section 109 prevents the release of any animal not native to NSW or native animals into another area without authority from the National Parks and Wildlife Service (NPWS). This is to protect the environment and the genetic integrity of the animals in a particular area or habitat. Therefore this makes it an offence to care for any exotic bird, such as the Indian Mynah or Starling.

How does this Act apply to the veterinarian presented with a native bird? It is necessary for whoever is caring for the bird to apply, in writing, to the Director of the National Parks and Wildlife Service within 7 days of being presented the bird, for permission to hold and care for it. Permission is granted based on the patient fulfilling the legislative requirements and the carer being qualified to care for the bird. The aim is to rehabilitate the bird back into its native habitat or to keep the bird in permanent care. Permanent care
is only granted when the bird has a role in education, instructional, publicity, scientific or alternatively as a small number which are used as foster parents or companion birds for others undergoing rehabilitation. Permission for permanent care is rare and the bird is usually required to be euthanased.

For birds to be rehabilitated the NPWS requires that the bird:

* has no permanent disabilities which prevents normal life in the wild;

* is not suspected of carrying disease which can be transmitted to other wildlife; or

* is native to the area of release. Birds are required to be released in the general locality of rescue - within 150 km of the encounter point. The exception to this is where it is not practical. For example, the Sulphur Crested Cockatoo, Galah, Little Corella and the Long-billed Corella can be released any where within their ranges where they are commonly occur west of the Great Dividing Range. These birds are not to be released in the areas of Wollongong, Sydney, the Central Coast, Newcastle or the Blue Mountains, Birds should not be released if the general location of the original encounter is not known. (Adapted from Hardy, J. (1993) Wildlife Rehabilitation on behalf of the National Parks and Wildlife Service.)

Assessment and Supportive Care of the Patient.

Birds which are brought into a veterinary clinic are usually hypothermic, dehydrated and in a negative energy balance as well as being sick and/or injured. The sick bird will

have been chronically affected due to the "flock protection mechanism" of birds (Doneley 1994)). This mechanism allows avian species to mask the signs of illness and therefore will only show signs when it is no longer capable of compensating the disease.

The goal of triage is always important. Any life threatening problem should always be treated first. This includes stasis of any haemorrhage, normalising body temperature, rehydrating the animal and begin to correct the negative energy balance before treatment of illness or injuries (Clyde 1993).

A bird which is "in shock" will die if handled excessively. These birds should be treated for shock before completing the physical examination on the patient (Filippich 1994).

Normalising body temperature.

Birds which are brought in for veterinary attention are usually no longer capable of maintaining normal body temperature. Body temperature is usually regulated by varying metabolic heat. This includes increasing food consumption and increasing the metabolic rate to increase body temperature. Birds will also fluff up their feathers to trap warm air between the feathers to maintain heat. By providing a warm environment, this decreases the demands on the thermoregulatory system and thus decreases the metabolic energy demand for body temperature control.

The normal body temperature of the bird is 40-42°C (Filippich 1994). An environmental temperature of 26-29°C is usually the ideal temperature at which to place the avian patient. This can be achieved by several different means, including heat lamps, brooding box or incubator. It is important to maintain normal humidity as dry air will further dehydrate the bird.

Hydration.

Correction of dehydration should occur as quickly as possible to prevent further circulatory collapse and to maintain tissue perfusion. For this reason it has been suggested by Cannon (1991) to assume that most birds brought in are 10% dehydrated and then the fluid balance will be sufficiently corrected. With this assumption, hydration should be periodically re-evaluated. Hydration deficit is best corrected over 72 hours and should include the assumed deficit, any further fluid deficit and the daily fluid maintenance of the bird. Daily fluid maintenance for avian species is 50ml/kg/day (Cannon, 1991).

Fluid Therapy

Fluids can be replaced by several methods. The method used will depend upon the degree to which the patient is dehydrated and personal preference.

* *Per os* fluids - Supplementary administration may be necessary using a crop tube or needle. This will require a functional crop and should not be done in a vomiting patient. This is the most common method of fluid administration in the stable patient and Cannon (1991) believed it to be less stressful than placement of intravenous catheters. The fluid should given every 4-6 hours and the volume should not exceed 50-66% of the maximum volume of the crop (Cannon, 1991). The maximum volume of fluid administered into the crop is listed in Table 1 for a range of species.

Table 1. Maximum Fluid Volume Administered into the Crop (Cannon 1991).

Finch	0.1 - 0.5 ml
Budgerigar	0.5 - 1.0 ml
Cockatiel	2.0 - 4.0 ml
Small Parrot	3.0 - 6.0 ml
Medium Parrot	10.0 - 15.0 ml
Large Parrot	20.0 - 25.0 ml

* Intravenous fluids - Intravenous fluids are usually given in the brachial vein and right jugular vein. Fluids can be administered as a bolus using the gauge of the catheter to regulate the rate of fluid flow. Redig (1984) uses a 23-25 gauge needle whereas Cannon (1991) uses a 26-30 gauge needle to decrease post-injection per-vascular haemorrhage.

  Table 2 gives a guide for the maximum initial iraravenous bolus. Intravenous fluids are most commonly used to stabilise the bird initially.

Table 2. Maximum Initial Intravenous Fluid Bolus (Orosz 1992)

Finches	0.5 ml
Budgerigars	1.0 ml
Cockatiels	2.0 ml
Cockatoos	14.0 ml

* Intraosseous fluids - Fluids given by this route allows continued administration of fluids to the bird through a catheter. The catheter can be placed with the bird anaesthetised or conscious.

* Subcutaneous fluids - Large amounts of fluids can be safely given in the inguinal and interscapular areas. It should be remembered that this method requires an adequate peripheral perfusion to be effective.

Any fluids given should be wanned and contain the necessary electrolytes, especially if the patient is metabolically acidotic, and glucose, to begin correction of the negative energy balance. Any further correction of the negative energy balance should be

postponed until the patient is stable.

The patient should be left in a quiet and dark environment to stabilise before further examination and treatment occurs. Once stable it is possible to assess the overall mental attitude, examine its physical condition more closely and carry out any necessary sampling and other diagnostic tests. A plan for treatment can be devised.

Energy Assessment.

Birds, like other species, will eat to satisfy the energy requirements. The protein requirements are the next limiting factor (Hume 1995, Nott & Taylor 1993).

Energy requirements can be measured by a number of experiments in a number of ways but are specific to particular species in particular environments and particular levels of activity.

The most practical means of determining energy requirements of a bird is to use basal metabolic rate (BMR) (Hume 1995). BMR is the energy requirements of a bird at rest in the post-absorptive state. This is determined under experimental conditions.

Body size is the major factor affecting the BMR for birds, both within a species and for birds of different species. There is an allometric relationship between energy requirement and body size. An equation has been determined from several energy requirements experiments. The equation takes the form of

$$\text{Metabolic rate (kJ/day)} = kW^{X}$$

where k is a species specific constant that varies with the level of activity, W is the weight of the bird in question in kilograms, and x is derived from the slope of a regression line derived from the results of direct energy requirement experiments (Hume 1995).

Therefore, from particular species experiments, a specific equation can be determined for that species. The number of species studied is relatively small compared to the numerous species that require calculation of energy requirements. Lasiewski and Dawson (1967) determined an equation that could be used on all species and all sizes of bird.

$$\text{ME (kJ/day)} = 4\ 5\ 1W^{\ 0.668}$$

The equation gives the energy requirements for a relatively inactive bird. It must be corrected for the increased activity levels of the bird. To account for the hormonal status, temperature adaptation, plumage cover and the normal activities of the bird, the use of multipriers and constants added to this value will determine the energy requirements for the bird (Hume 1995; Nott & Taylor 1993). These correction values have been determined for many species and different physiological states. These should

be researched for individual species.

The energy requirement from the above equation is not accurate, but gives a reasonable estimate of the energy needs and gives agood basis on which to balance the nutrient profile to the energy of the diet (Nott and Taylor, 1993).

Along with meeting the energy requirements of the bird, the nutrients in the feed should be balanced. This means that the essential nutrients are provided in the correct proportion in relation to the energy requirements (Hume 1995). Therefore when feeding birds it is not only important to know the energy requirements of the species but also to know the energy and nutrient availability of the foods fed. This is where commercial diets are an advantage over a naturally prepared diet. Naturally prepared diets are more important for the recovered rehabilitated bird. The nutrient and energy requirements are still important to determine adequate balanced feeding.

Care of the Recovering Patient.

Whilst the bird is being treated and is on its way to recovering, dehydration and weight gain should be assessed and progress of treatment for disease or injury monitored. The patiem's environment should be warm and remain free from drafts. There should be free access to clean water in the appropriate water containers and placed in the cage so there is minimal contamination. This is especially important with parrots who are particular that the bathing water is clean, but are less particular that the drinking water is clean (Stoodley, Hadgkiss & Rance 1989).

The bird will require an appropriate cage and cage setup including perches suited to the bird and its condition, adequate hygiene and habitat stimuli, suitable temperature and humidity control. The bird should be introduced into a social structure once it has recovered and is able to withstand the competition. Once the patient has fully recovered the long rehabilitation process can begin.

Veterinary clinics are not ideal places for birds to be kept due to the stress of the noise and the presence of common predators. It is best to place the patient in the care of a licensed, reliable carer as soon as possible.

Whilst the bird is in captivity, keeping adequate records is just as important as with the other animals brought into the veterinary practice. These should include treatment plans, medication doses and record of administration, daily weights of the patient, assessment of recovery and any complications encountered. This not only provides a good database for rehabilitation and statistical analysis, but can aid in learning from mistakes and successes (Clyde 1993; Porter 1992).

Daily weighing of the bird allows its weight to be monitored and an idea on prognosis can be made. Weight gain indicates that the patient is recovering. The patient should be watched for obesity. Cominued weight loss by the patient should immediately be

investigated. The energy demands of the patient should be reassessed and energy intake increased accordingly.

Nutrition.

The energy and nutrient requirements of the diseased and injured bird are much greater than what is required for maintenance. Also, as the recovering bird becomes more active and regains condition, its nutrient requirements will increase. Continue reassessment of the energy and nutrient requirements is essential to prevent condition loss and the development of nutrient deficiencies or toxicities. In captivity, this can be overcome by increasing the energy density of the food and thus, the nutrient balance accordingly. This is usually done by increasing the amount of a specific food offered, by supplementary crop feeding with a specifically formulated food or by total parental nutrition.

The effects of increasing the amount of food offered is limited by the volume of the crop and the rate of crop emptying as well as the presence of a good appetite. The crop is limited in its capacity to hold food. Increasing the energy density of food and maintaining the nutrient balance is most successfully done using commercially formulated diets.

Crop feeding.

Crop feeding is usually done as a supplement to normal feed access in the cage. It is indicated for patients which are partially anorexic, anorexic and/or underweight birds which are sick or unable to prehend the food to eat effectively (Degernes, Davidson, Kolmstetter, Flammer & Munger 1992).

Crop feeding is contraindicated when the patient is vomiting, has diarrhoea, suffers from a malabsorption/maldigestion disorder, has gastrointestinal tract stasis or is being fed postoperative to gastrointestinal surgery

The principles of crop feeding are:

1) Make sure that the bird is not hypothermic and is sufficiently hydrated.
2) Use a soft plastic tube which is easily directed into the crop.
3) Always check that the tube is into the crop and not into the trachea or lungs. This can be done by palpating that the tube is inside the crop.
4) The food or gruel should be mixed before each feed or mixed fresh each day. If the gruel is mixed fresh once a day, it should be checked before each feed to make sure it has not fermented, has not been contaminated or is too solid to be feed through the crop tube.
5) The gruel should initially contain mostly calories with a small amount of digestible protein. More protein is added later if liver disease is not suspected or confirmed. Protein levels should remain adequate and low

so that energy is not wasted on utilising the excess protein. Formulated diets are most commonly used for crop feeding. These diets are useful as there is commonly a list of the amounts of the nutrients in the formula.

6) Initially only a small amounts of gruel should be fed with each tube feed, especially if the bird has been anorexic. The amount can then be built up as the crop adapts to feeding.

Table 3 below, is a guide to the maximum volume that should be feed to a range of species.

Table 3 . Maximum Volume of Food Fed Into the Crop (Orosz 1992).

Finches	0.5 ml
Budgerigars	l ml
Cockatiels	8 ml
Cockatoos	15-20 ml

(Orosz 1992; Clyde 1993; Filippich 1994).

Total Parental Nutrition.

Total parental nutrition is the provision of the required nutrients and maintenance fluids. It includes electrolytes, carbohydrates, amino acids, lipids, vitamins and minerals. It is indicated when the patient has severe nutritional and/or liver disease. It requires the placement of an indwelling catheter which are difficult to keep in place with birds as they easily remove the catheters. Therefore manual restraint of the bird is usually necessary but not always tolerated. For repetitive intermittent infusions, Degernes *et al.* (1992) has recommended the use of a venous access device which is said to eliminate the problem with patient destruction of the catheters. The other disadvantage of using total parental nutrition, is the easy haematoma formation (Degernes *et al.* 1992).

Rehabilitation.

Wildlife rehabilitation involves the medical treatment and captive management of injured and orphaned native wildlife, with the ultimate goals of returning an animal that will be able to survive, to a suitable environment (Porter 1992).

For a bird to be successfully rehabilitated, there are many complex issues that need to be addressed.

1. *Conservation consideration.*

This involves two considerations. Firstly, has the bird a maximal chance of

survival in the released environment and secondly, what is the effect of release on other species in that area. The possibility of local extinction of a species due to limited habitat and competition for food sources is a real issue.

2. *Release site consideration.*

Before release of the rehabilitated bird, it is necessary to research the bird's history and species ecology. Food availability is a major consideration for a successful rehabilitation.

3. *Food recognition and supplementary feeding.*

A major problem with rehabilitation of hand-raised birds is recognition of natural food sources. Food recognition is learnt by what is fed by the parents before leaving the nest as well as being instinctual.

4. *Imprinting.*

Successful rehabilitation of any bird, especially hand-reared birds is best if the degree of imprinting is decreased. Imprinting makes it difficult to release birds successfully and have maximal survivability in the wild. This is where the use of foster parents is an advantage.

Imprinting can be onto humans as a parent or sexual partner, or to other animals which are natural predators, or to the unnatural environment in which it is held. Birds which cannot recognise others of its species as a sexual partner do not contribute to establishing a population. This is of particular importance when the species is extinct in that area and raises the issue of why such birds are rehabilitated.

5. *Behavioural needs.*

This is very difficult to satisfy and is commonly deficient in the essential food gathering skills. Behavioural stimuli should begin once the bird has recovered.

6. *Adaptation.*

It is important that the bird becomes adapted to the environment in which it will be released. This includes weathering and building up stamina and muscles for flight which have been compromised by being kept in a cage. Adaptation for flight can take a year or longer before it can fly well enough to return to the wild.

7. *Identification.*

Identification of individual released bird is useful if the bird is ever recaptured. It allows statistical data to be collected on the rehabilitation. There should be access to the history of the bird if required (Porter 1992; Hardy 1993).

Conclusion.

Knowing how to approach treatment on a wild bird, which have been rescued and brought to the clinic, is the most humane way of dealing with the bird and most efficient way of utilising the limited resources available for wildlife. Whenever dealing with wildlife, the legislation set by the National Parks and Wildlife Service should be adhered to. The aim of which is not only in conserving specific species of native wildlife, but in conservation of habitat and all of its inhabitants.

As a veterinarian, the role in rehabilitation is an important one. Not only does it involve stabilising the bird and treating any disease or injury, but there is the important role of maintaining health throughout the rehabilitation process and making sure that diseases are not released with the bird.

Euthanasia is a controversial issue but the legislation by the NPWS and animal welfare, will set the guidelines. Euthanasia is strongly considered when the bird is in extreme discomfort, is chronically diseased, has irreparable disabilities or if the bird is an introduced species.

Rehabilitation is not the most successful means of keeping a bird alive. If possible, returning the bird as soon as possible to the social structure of its species can only be an advantage to the bird. This is especially true for young birds which have maximal chance of survival with its parents.

Rehabilitation is a complicated and a timely venture which should be undertaken by people who are licensed and can provide the bird with the necessary stimuli and skill acquisition which will maximise the bird's chance of survival.

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