SOME CONSIDERATIONS AND TECHNIQUES FOR SUCCESSFUL REHABILITATION OF REPTILES

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Abstract

Most people who undertake wildlife rehabilitation are involved in the care of mammal and bird species. Occasionally reptile species are found that require some rehabilitation. Many people have the perception that reptiles are more difficult to care for because of the need for specialised lighting and heating equipment and the provision of specific or difficult to acquire foods. While this may be true for reptiles requiring long term care, it is possible to adequately keep reptiles over the short term using some very basic facilities and methods. This talk will outline some of these basic care techniques and discuss some other relevant issues to be considered in the rehabilitation of native reptiles.

Introduction

Rehabilitation of reptiles back to the wild is generally a short term undertaking. There are a number of issues that need to be considered in the early stages of the rehab process and some of these early decisions will affect the course of subsequent events. Reptiles bought in for rehab need to be assessed for injury or illness in the first instance and then treated in an appropriate fashion. Once assessed and treated, the reptile may need to be housed for some time until it is ready for release. There is no need for a "casual" reptile "rehabber" to build elaborate holding cages if they are not otherwise interested in long term care of "pet" reptiles. I will describe some basic cages and equipment to get by with in rehab of several types of reptiles. Feeding is another area where a rational approach may lead to better outcomes for the reptile and the rehabber. I will also briefly discuss some issues related to the effects of stress – captivity may be stressful and may exacerbate the condition rather than assist in the resolution of the problem.

HISTORY:

One of the most important things to find out is what the previous history of the reptile specimen you are presented with was. Where is the animal from? Is it a local species? If it is not a local species, it may be an escaped captive from someone else's collection. If that is the case it may have had contact with exotic diseases like Paramyxovirus, IBD or others. (If you suspect that the specimen has been in contact with exotic species or diseases, you should ensure that the specimen is never released into the wild).

If it is a local species, it may still be an escaped captive. Clues to look for if this is the case are:

1. Weight – many captive snakes are obese.
2. Long claw length in lizards (due to soft substrates and lack of wear on the claws).
3. Abrasions on and around the tip of the nose area (from rubbing on enclosure walls or mesh while trying to escape).

If the animal is from the wild the typical plan should be to rehabilitate and release into an appropriate habitat ASAP. (NEVER RELEASE INTO THE WILD UNLESS 100% CERTAIN IT IS A WILD ANIMAL!).
Also NEVER allow wild rehab animals to mix with your captive collection! (this is for disease prevention in both directions).

If animal is an escaped captive it is preferable to rehabilitate and then find alternative long-term care with a reptile keeper.

ASSESSMENT;

What has happened to the animal in the recent past (i.e. why have you got it?).

-Road trauma?
-Dog/ cat attack?
-Found inactive in bush or around dwellings?
-Other?

Following is a quick list of potential problems to look for during assessment.

- Wounds – open or sealed. Old or new, including burns & cuts.
- Broken bones – head, spine, ribs, limbs, toes, tail.
- Skin – retained slough (all or part), scale rot / shell rot, dehydration. Pay attention to lizards toes for retained skin. Are there lumps or bumps in the skin? (maybe parasites such as skin worms, pentastomids or alternatively abscesses)
- Eye problems: Recent trauma, or cataracts or blindness.
- Mouth – canker, loose teeth, colour of mucosa, tongue use & condition.
- Claws – worn, damaged, overgrown.
- Rostral (nose) abrasions (may indicate escaped captive specimen).
- Parasites – obvious ectoparasites (mites, ticks, maggots in open wounds).
  -endoparasites: skin worms.
  -Signs of internal worms e.g. diarrhea around cloaca.
  -Salmonella or protozoan infections.
- Respiration – is it breathing normally or not? Is it wheezing, or have fluid around the nostrils?
- Body condition – is it skinny, fat, or does it appear dehydrated?
- Body posture – does it sit in a normal position for that species? If abnormal, it may indicate CNS problems due to head trauma or infection with a virus such as IBD or Paramyxovirus. If it's a turtle that swims tilted to one side, it may indicate pneumonia.
- Lumps bumps or obvious things in gut? Maybe it has swallowed a foreign object (most often in snakes and goannas).

If something is wrong or "not quite right" or the animal definitely requires treatment – see your **Vet**.

Below are listed some common injuries or situations that present for the listed species.

- Crocodiles are not considered here as most rehabbers are unlikely to have appropriate facilities or expertise to deal with crocs adequately – refer to a croc farm via Parks and Wildlife.
- Turtles. Usual presentations are either "displaced" healthy turtles found wandering about or turtles with injuries from being hit by vehicle or suffering from animal bites (dogs, cats, eagles and Crocs).
- Lizards, there are lots of different sorts.
  -Goannas usually present as either road victims or dog/cat victims. (they have lungs that are very susceptible to punctures if bitten in the chest area).
  -Geckoes are not commonly presented but may be cat victims or due to human accident (e.g. squashed in door)
  -Blue-tongued skinks can be road victims, dog/cat victims or lawn mower victims. May also get some presented as burn victims from dry season burn offs.
  -Legless lizards are rarely presented alive- they are often mistaken for snakes and killed
  -Dragons: both Frillies and bearded dragons can present as road victims. Smaller species (like Gilbert's dragons and long-nosed dragons) may be dog/cat victims.

- Snakes
  -Pythons are often presented as road victims or with burns and occasionally with ingested items.
  -Elapids are not usually presented for rehabilitation and would require a rehabber to have extensive experience and a venomous snake permit for them to consider treating a venomous species.

TREATMENT:

Some things to consider before or during treatment;
Even before approaching your Vet with a reptile for assessment and treatment, it is very useful if you have a good knowledge of the biology of the species concerned. There may be specialized aspects to the species biology that need to be considered when assessing how to treat the animal. You cannot afford to expect the Vet to know everything about every species. So do some research before you go and give the Vet a bit of help!

Stress and its effects on healing is an area that probably merits a lot more research. In my view stress can be a compounding factor in the rehabilitation of sick or injured reptiles. It is well known that animals with moderate to heavy parasite burdens seem to cope well with these burdens in the wild, but will quickly show adverse reactions to them when brought into captivity. Animals in the wild have some parasite burden. We maybe should aim to **reduce** this burden during treatment rather than trying to **eliminate** it.
Below are 2 reasonably well studied examples of limiting captive stressors on reptiles by adopting a non conventional approach to treatment based on the species known habits in the wild or on the principle of limiting the stress of captivity over time.

Example 1)

Frillneck Lizards are often found with broken mandibles. This is often thought to be due to impact from cars, but actually is often due to male to male combat in the breeding season. The usual tendency is to take the animal for treatment/ rehab which may involve wiring broken jaw bones and a long period of captive care, but it is probably a better idea to leave it at the collection site, so it can heal naturally. Radio-tracking studies have revealed that animals with broken jaw bones still feed, & the bones heal & re-set rather quickly on their own. So the animal in this case will very likely survive and heal with no human interference needed. Frillnecks in captivity require spacious surroundings, & are very wary lizards that are easily stressed by human activity/ movements close to them. In the wild they naturally spend most of their time high up in the trees, which gives them a level of security. Wild Frillies can detect human activity at distances of 80 meters so a caged captive will be very aware of your presence and possibly stressed if it doesn't feel secure. Caged animals from the wild will take a long time to settle, so treatment & captivity may actually hinder the healing process through stress.

Example 2)
Large snakes & lizards with cuts/ abrasions that require stitching:
Radio-tracking studies of large snakes where the transmitter is placed into the body cavity have indicated extremely good results of wound healing without long post operative care before release. Use of good aseptic surgical technique & absorbable stitches, allows release 36-48hrs post op, without the need for follow up antibiotic treatment. Again, lack of stress during the recovery period is likely to be a factor in this success. This system has been used on hundreds of pythons studied in the field around Australia with no losses of snakes to infections or other complications of wound healing. By extension, it may well be preferable to clean and stitch wounds on large snakes and release them in appropriate habitat a few days after collection rather than waiting the normal few weeks to see how the wound is progressing.

HOLDING DURING REHABILITATION:

Some Rehabbers may have an interest in keeping captive reptiles already and may have their own private reptile collection. If that is the case, they will probably already have suitable housing available for holding rehab reptiles. In that case they should ensure that the rehab animals are kept in strict quarantine away from their captive reptiles. This strict quarantine will help to prevent any "contamination" of the wild rehab animal with captive reptile diseases, pathogens or parasites (or visa versa).

For those rehabbers who will only occasionally look after a reptile at home there are some "short cuts" that can reasonably be taken with regard to housing a rehab reptile over a relatively short term (say less than three months) without the expense associated with more traditional "proper" reptile accommodation.

CAGING - Short Term (up to 3 months);

For people who normally doesn't keep reptiles as pets there are several "alternative" types of enclosures that may be quite suitable for the short-term accommodation of rehab reptiles. These "alternative" enclosure types are discussed below.

Mesh cages.

Enclosures made from nylon or metal mesh increase the surface area available to a climbing species of reptile as they can use the walls as climbing space as well as any "furniture" like branches that are provided in the enclosure.

Mesh cages come in a variety forms, but some very useful ones for the rehabber are those commercially available ones made of woven nylon mesh over a wire or plastic frame. These can be purchased from pet stores or specialty reptile supply dealers. These nylon mesh cages have the advantage of being light enough to carry around, so that they can easily be placed outside in the sun shine so that the rehab reptile can get the benefits of natural UV light. If this is done, shade must also be provided so that the reptile cannot overheat. Another advantage of these mesh cages is that the nylon fabric can be removed from the frame in most instances and washed thoroughly in a washing machine – which is great from a hygiene aspect.

I have seen some very useful home made mesh enclosures based on a cylinder of 12mm or 6mm mesh with large round plant pot saucers attached as the top and base plates. Usually the top plate is attached in a way that keeps it secure but also allows easy removal for access into the enclosure.

Plastic Tubs and Storage boxes.

Plastic enclosures are very easy to clean out when soiled and some types of Storage box are quite cheap and most are readily available through a variety of outlets.

Plastic Storage boxes come in a large variety of sizes and a suitable size can be found for most reptiles likely to rehabed. Most come with a plastic lid that can be "locked" onto the box with inbuilt clips – this makes a reasonably secure enclosure. Some extra air holes (drilled or poked through with hot wire) will add to the ventilation of the box. Alternatively a larger part of the lid can be cut out and a wire mesh panel can be fixed into the cut out area. Some of the larger Storage boxes come with little wheels attached and so can be wheeled into and out of the sun if so desired.

A larger type of Plastic tub that can be used for some reptiles is the plastic "stock trough". These open topped tubs come in various sizes and are made from quality plastics that are UV light resistant and will last many years out in the sun. They are very useful for housing freshwater turtles and some larger lizard species. If suitable covers are made and fitted they can also be used for snakes. Most have a built in drain hole moulded into the side wall of the tub that is useful when changing the water or cleaning out the tub. These larger tubs are usually used outdoors due to their size.

Aviaries.

Aviaries are basically a big outside version of the mesh cages discussed earlier. They are generally not very portable but some rehabbers will already have an aviary in their yards. Aviaries can be quite useful for the housing of some of the larger lizards and snakes. Care needs to be taken that the birds normally kept in the aviary are not going to become food for the reptile – an obvious need for prior thought about compatibility! Some reptiles can injure themselves in wire enclosures by rubbing their noses along the rough wire as they test all the walls trying to find a way out. Such animals are probably stressed and maybe should not be kept in this type of enclosure if the behaviour persists. Sometimes it is just a short term behaviour as the reptiles "explores" its new surroundings. One way to minimize the damage done initially is to place a 30cm high strip of woven shade cloth along all the internal walls and doors at ground level to "smooth out' the rough wire edges. The shade cloth can in this situation act as a visual barrier that discourages the reptile from trying to get through the mesh. Well positioned aviaries give the rehab reptile plenty of space as well as access to sunlight and shade.

CAGING – Long Term:

Long term caging (for a period of rehab greater than 3 months) will require the set-up of "professional" type reptile caging with attention to heating/ lighting of suitable type for long term captive maintenance. Examples of this type of caging/enclosures were seen at TWP yesterday.

HEATING & LIGHTING

Artificial heating and lighting may be required with captive reptiles to allow the reptiles to thermoregulate properly. Thermoregulation is where the reptile moves into or out of a warm zone to behaviourally keep its body temperature at the optimum level (preferred body temperature). It is important to note that this preferred body temperature is the temperature the reptile tries to achieve when it is active. Often reptiles prefer to have a slightly cooler body temperature when they are inactive, resting or asleep.

Reptiles are "cold blooded" and require sources of environmental heat to warm their bodies up to the preferred body temperature. The preferred body temperature for many lizard species is about 37 degrees Celsius – just like us – so the reptiles at operating temperature are actually warm blooded. It is just that they cannot generate this heat themselves – it needs to come from the environment. In most cases the sun directly or indirectly supplies this needed heat in the wild. Achieving preferred body temperature each day is very important for a whole range of physiological functions in the reptile including the ability to digest food and importantly for animals in rehab, the ability of their immune system to work most efficiently to help ward off disease and to repair damaged tissues.

So in the captive situation a rehabber would need to allow the reptile to achieve preferred body temperature by either allowing the reptile to warm up in the sun each day or by providing another type of heat source that will allow the reptile to reach adequate body temperatures.

Other types of heat source that may be suitable for this will vary according to the climate the rehabber lives in, the season and the species of reptile, as each reptile species has its preferred temperature and that will differ between species (i.e. most snakes like 28 - 32 degrees C while many lizards will prefer temps around 34 – 38 degrees C).
Ideally an enclosure will have a heated area where the reptile can achieve it's preferred body temperature and other areas of lower temperature where the reptile can retreat to cool off a bit.
In warm climates it may be possible to adequately keep a reptile near its preferred body temperature by placing the enclosure in the shaded area of a verandah or in a house room. Usually however the rehabber will need to supply additional heat by either placing the enclosure in part sunshine part shade or by providing some sort of electrical heating device.
Electrical heating and lighting systems for captive reptiles can be rather complex for those that wish to keep a reptile long term, but luckily in the short term, much more basic systems can work effectively.
Light globes of various wattages can be used to heat reptiles effectively. I have found standard desk lamps to be useful for this purpose especially when used from above the mesh on mesh or plastic tub style enclosures.
Heat pads can be used in or under a section of the floor of an enclosure to provide a warm spot the reptile can lie upon to warm up. Suitable heat pads can be Home brew heating pads or pet pads made especially for warming pets like dogs and cats.

In the case of either lights or pads the aim is to provide a warm spot for the reptile in part of the enclosure. It is best to measure the temperature of the hot spot with a thermometer – a range of 35 – 45 degrees C is good if the reptile is alert and mobile (depending on species preferred temperatures). An active reptile can move to and from the warm spot as needed to adjust its body temperature. For rehab reptiles that have reduced mobility it is necessary to have the hot spot at the preferred body temperature for the species as the reptile cannot readily move away if it gets too hot.

Whilst there is a large volume of literature about the importance of providing "proper" lighting for captive reptiles, the vast majority of this literature is concerned with long term captive care. In the short term (< 3 months) it is unlikely that any long term deleterious effects would be noted in adult reptiles if no specialized lighting was provided at all (juvenile dragon lizards would be a different story – but most rehab reptiles are likely to be adults or at least advanced juveniles).
If it is at practical it would be best if the rehabber could place the rehab reptile into an outside enclosure and expose the reptile to 15 – 20 minutes of sunshine 2 - 4 times per week. This would expose the reptile to more UV light than it would get under most specialty reptile lamps in 8 hours per day 7 days per week!
Provision of lighting for the rehab reptile enclosure will depend on the species and the general light levels of the enclosure surrounding. Obviously an outside enclosure will not require additional lighting. Inside enclosures for Dragon lizards may need UV light provided in the longer term if the lizards cannot be taken outside occasionally.

Feeding and Diet of Reptiles in Rehab.

Reptiles in general have an ability to withstand reasonably long periods of food deprivation without severe health impacts. This means that most reptiles in good body condition probably don't need to be fed regularly in the short term.

This has a couple of implications for the care of wild reptiles in rehabilitation.

1. Reptiles in good body condition can go without feeding for weeks (or months in some cases). This seems wrong to most people more familiar with dealing with mammal or bird rehab, but should be noted as it is a factor that can work for the rehabber.
2. Stress of handling and treatment can affect the recovery of injured wild reptiles. Many reptiles will not voluntarily feed for weeks after capture – even if they are completely healthy and uninjured. Frequent attempts to get an injured reptile to feed regularly will add to the stress and may be detrimental to the recovery process. Such attempts are often more for the peace of mind of the rehabber than for the health requirements of the reptile. People often use feeding in wildlife as a measure of their "success" in care – this is not necessarily appropriate with reptiles.

A related issue is that of diet specialization in some reptile species. While most captive snakes for example can be fed on laboratory rodents or day old chicks, many will refuse these foods initially and need to be "trained" or "tricked" into accepting them as food. The larger goanna species are usually fairly easy to coax into feeding on a wide variety of meat based items, but smaller lizard species and snakes and turtles can be more of a challenge due to diet preferences that may not be readily available or be illegal to supply to them. (e.g. It is illegal to collect skinks and frogs to feed to snakes or lizards that prefer them as prey). Some lizards and turtles have a preference for a particular sort of insect or water snail that may be difficult for a rehabber to supply – even if you can identify the preference in the first place!

Also there could be animal welfare issues around the issue of offering live vertebrates as prey to captive reptiles. Most snakes need to be "taught" to accept pre-killed animals as prey.

DIET – Short Term (up to 3 months):

-A suitable diet for a rehab reptile will depend on the species and the time of year but remember most adult reptiles (**in good body condition**), could easily survive a 3 month period without food.

-Some reptiles could take 3-6 months to settle into their new surrounds before they will begin to eat (in captivity or in the wild, but more likely in captivity).

-Also note that many reptile species will refuse to eat in the winter months (April to September) even if given adequate heat and shelter and offered suitable foods.

DIET – Long Term (period greater than 3 months):

- A suitable diet for a rehab reptile will depend on the species and on the time of year, but attempts should be made to feed animals at the appropriate times of the year if they are going to be held for long periods.

-Use appropriate foods for the species.

Freshwater Turtles should be offered a variety of live insects, small or chopped fish or prawns, small pieces of raw meat and a variety of vegetable, fruit and water plant pieces. Long-necked turtles generally only eat meat type food (insects fish/prawns or red meat and sometimes tinned or dry dog or cat food), while the short-necked species may also eat meat based foods but will normally also consume a variety of different plant foods (leaves and fruits).

Lizards of most species will accept live insects of various sorts. Bigger skinks (Blue-tongues) and larger goanna species will also accept meats and commercial dog foods. Larger goannas may also readily accept mice at various growth stages.

Snakes like pythons and the larger Elapid snakes may accept laboratory mice or rats. Some will need to be "trained" to accept pre-killed mice and rats. Some large snakes like Black-headed pythons and Mulga (King brown) snakes are mainly reptile eaters in the wild and are difficult to encourage to eat rodents. Mulga snakes are notorious for taking weeks or months to settle into captive conditions before commencing feeding voluntarily. Some smaller snake species may prefer lizards or frogs as food and feeding them can be problematical.

DIET "TRICKS" FOR RELUCTANT EATERS:

Scent manipulation;

-For reptile-eating species try rubbing a mouse/rat pinky in reptile droppings e.g. house gecko droppings (or you can use a commercial "scenting" product). Be aware that doing this may well introduce parasites from the lizard droppings to the rehab reptile, but in this case getting food into the animal may be of grater benefit – most parasites can be treated later if need be.

-For frog-eating reptiles try rubbing a pinky on the skin of a Green Tree Frog from the garden.

-For fish-eating species place a couple of Gold Fish in a water dish inside the cage, but also put some pinkies in the water. The pinkies will look like they are moving as they float around the dish because of the movement of the fish.

Other Tricks;

-if a snake is eating but will only eat a difficult to source food you can try "THE RODENT TRAIN". This is a string of pinkies or adult rodents sewn together with dissolving stitches and stitched to a single item of the preferred food. The idea is that the snake eats the preferred food item and has to eat the rest of the "train". This method can help put weight on snakes very quickly.

-Certain lizards are attracted to particular colours (e.g. Netted Dragons love yellow), so entice them to eat by adding foods of this colour (or you could use food colouring to make the food more attractive to the reptile).

-Assist feeding and Force feeding techniques. These techniques are both stressful to the reptile and should only be used as a last resort. Force feeding is particularly stressful. These techniques need to be learned from a knowledgeable person and will not be described in detail here.

HYDRATION:

-Water should be provided for all captive reptiles – ideally on a daily basis but some species may be better served by offering water less frequently (e.g. some desert species) as they can often crawl through water bowls making the substrate wet which can lead to skin problems or cause chills. Such species can be offered water for a short period (several hours) once or twice a week.

-Many lizards will only drink droplets, not from a water bowl (e.g. dragons and geckoes). So use a spray bottle to lightly spray the lizards head and the surrounding walls or cage furniture so that the lizards can lick up the water droplets. Be careful not to saturate the enclosure.

RELEASE TO THE WILD:

- Early in the rehab process it is important to get a positive ID of the animal's species/ race/ form from a QUALIFIED person. This is just a double check that the specimen is suitable to release in the area you have chosen as a release area.
- Only release the animal into its appropriate habitat & range. (usually no more than 50 kms from collection site and ideally within 5 kms of the collection site).
- Only release into an area that you are sure will contain appropriate food and adequate levels of food and shelter resources.
- Only release the animal when the weather conditions are suitable (do not release on very hot or very cold days).
- Release animals at an appropriate time of day or night (e.g. release nocturnal animals at night time and day active animals during daylight hours).
- Only release if you are reasonably sure the animal's condition is OK (i.e. can avoid predators & find food adequately, & has enough body condition to last a while without food while it settles back into the wild).

Concluding remarks;

The above points of discussion are my own thoughts on things to consider and methods that can be used to successfully deal with reptiles that need rehabilitation. I'm certain that others may have differing viewpoints on some aspects of this subject and that is fine. What I have described works for me, however other considerations or sets of practices may well work better for others. The more choices that are available to rehabbers, the better they will be able to find a methodology that suits their personal situation and capabilities. It is far better to try and fail than to not have tried at all. Rehabbers are often the only people who will try to save an injured animal – if not for them, many animals would needlessly die without any help given at all. Reptiles deserve that same type of chance and if I have encouraged any non reptile rehabbers to think that they might give reptile rehab a go in the future, then this will have been worth it.