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A basic guide to hospitalising snakes

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ABSTRACT: In small animal first opinion practice we occasionally see patients of the furless and legless variety. Often portrayed as the 'stuff of nightmares' our serpent friends have a bad reputation, and, for most, are not at the top of the list of our favourite animals. Unfortunately, the majority of the reptilian patients that grace our surgeries have fallen foul of poor basic husbandry, which is left for us to discover and fix. This article aims to give a basic guide to hospitalising some of the more common reptile species seen in veterinary practice and addresses the essential questions that need to be asked on admission, as taking a detailed history of the husbandry is an essential part of the diagnostic process. .

Keywords: POTZ; thermo gradient; air flow; restraint; reptile

Introduction

In my experience, the more commonly seen snake species are from the following family groups: Colubridae, Pythonidae and Boidae. Each genus will require a slightly different approach from the others due to their varying temperaments and behaviours and, of course, their natural place of origin.

If your practice is happy to see and hospitalise snake species it is essential that you have appropriate facilities. Snakes are adept escape artists and will find weak areas in your vivarium very quickly so it needs to be lockable and of a solid structure, made of an easy-to-clean material – plastic with glass fronts are best for a hospital scenario as wooden structures will absorb liquids with time and could harbour bacteria. The hospital (and home) set-up should be as shown in **Figure 1**.

Vivarium set-up

Ventilation

Good ventilation is essential. Respiratory disease is common in snakes, as their anatomy dictates that they lie low to the ground, thus breathing in faecal bacteria. To achieve good circulating air flow, air vents need to be opposite each other, one placed high, near to the heat source, with a larger one placed lower down.

Artificial heat sources

- Heat mats will radiate heat locally, so avoid positioning these where the snake can come into direct contact with them. Snakes have no thermal receptors on their ventral surfaces, and larger 'sit and wait' predators, such as the boas and pythons, will burn if they rest on hot surfaces for too long.
- Heat/basking lamps will emit heat and provide an ambient temperature; they should be positioned to one end of the vivarium to produce a temperature gradient, in other words a "hot end" and a cooler end, which will then allow the patient to thermoregulate. Reptiles are ectothermic and need to be able to choose their own preferred optimum temperature zone (POTZ); this is especially important when the snakes are sick. Sick non-ambulatory snakes are likely to dehydrate if they are stationary and unable to move away from the heat source, likewise if the temperature is too low then the patient will not function optimally and digestion and normal metabolism will be impaired. Bulbs should be secure and caged to avoid the snake from coming into contact with the bulb and burning itself. Infrared bulbs or ceramic heaters can be used continuously, but need to be thermostatically controlled.

There are multiple opinions on temperature ranges for given species, however it

Table 1. Commonly encountered species and their requirements. The information is based on what has worked best in practice and is similar to other published ranges across many different sources.

Species	Temperature Range	Humidity Range %	Caution	Comments
 <p>Common Boa <i>Boa constrictor imperator</i></p>	28°C–32°C	50–80	In larger patients, two people may be required for restraint	Medium-sized boas of a stocky build Females usually larger than males Bear live young
 <p>Royal Python <i>Python regius</i></p>	25°C–30°C	50–80		A short stocky snake, usually placid in nature They curl in a tight ball when threatened. Often called a Ball Python
 <p>Corn Snake <i>Pantherophis guttatus</i></p>	24°C–28°C	30–70		Attractive colourful snakes Slim build Can reach lengths of up to six feet
 <p>King Snake <i>Lampropeltis getula</i></p>	25°C–30°C	30–70	Cannibalistic tendencies – best housed singly	Slim-built snake May musk when threatened King snakes have immunity to some venomous snakes on which they prey in the wild
 <p>Tree Python <i>Morelia viridis</i></p>	25°C–35°C	70–90	Can be aggressive	Arboreal species spending much of their time in trees Have curved fangs to help hold onto their prey
 <p>Western Hognose <i>Heterodon nasicus</i></p>	25°C–30°C	30–50	A venomous species	Have an upturned nose and rear fangs A burrowing species A stocky snake Will turn on its back and play dead when threatened
 <p>Burmese Python <i>Python bivittatus</i></p>	25°C–30°C	50–80	A large and potentially dangerous patient	Large, heavy-built snakes Mainly nocturnal hunters
 <p>Reticulated Python <i>Python reticulatus</i></p>	25°C–30°C	50–80	A large and potentially dangerous patient	The longest species of snake but slightly slimmer than other large snakes An excellent swimmer



Hot end.

Cool end.

Figure 1. All electronic equipment should be checked by an electrician prior to use; do not overload sockets and check for frayed cables prior to use

is important to judge your patient's POTZ based on clinical symptoms and behaviour whilst in the suggested temperature zones. In non-ambulatory patients it is imperative that the patient does not overheat.

Hot rocks are not advisable in a hospital setting due to the fact that they get very hot, are not thermostatically controlled, and are in direct contact with the patient.

Thermostats and thermometers

Thermostatic controllers are essential pieces of equipment and should be used on heat sources in order to prevent temperature fluctuations and to maintain the ambient temperature. These consist of a temperature probe which sits inside the vivarium, a control head which enables the maximum temperature to be set, a plug for the mains and a socket in which the heat source is plugged. Thermometers positioned at each end of the vivarium will allow accurate temperature readings, ensuring that the patient's POTZ is maintained.

Light

Light-emitting bulbs should be turned off at night to ensure that natural day length is being mimicked thus avoiding stress to the patient.

Humidity

Hygrometers will allow assessment of the humidity level within the vivarium, which is particularly important for species that originate from rainforest locations. These patients may require regular 'misting' with

fine sprays of warm water throughout the enclosure – some arboreal species are behaviourally conditioned to drink from wet leaves. Dysecdysis (poor shedding) is common, and therefore damp hides can be useful. Sphagnum moss in a small container for the patient to rest in works well. Sphagnum moss has an acidic surface which prevents bacterial/fungal growth despite the damp environment.

Water

Water sources are essential. Size and depth requirements will vary according to species, for example the semi-aquatic Anaconda will require a large water source in which it can submerge fully, while a Kenyan Sand Boa will only require a shallow bowl. The species likely to be seen in practice should be fine with a large ceramic dog bowl, cleaned and replenished daily. In areas of hard water it may be necessary to filter the water or use bottled spring water.

Hides and cage furnishings

Although these may be seen by many as for aesthetic purposes only, they will encourage natural behaviours and help to eliminate stress during the snake's stay. They should be strategically placed in all areas within the temperature zone you have created – having only one hide may cause a particularly shy patient to stay in that one place even if the area is not of an adequate temperature. This, in turn, could

cause further problems such as delayed healing or anorexia due to stress.

Vivarium size and orientation is also patient specific: arboreal species such as tree pythons and tree boas will require a tall vivarium with branches to sit in, whereas terrestrial species will benefit from the shorter, wider landscape-style vivarium.

Substrate

Substrates should be easily cleaned and non-toxic; strong-smelling, wood-based substrates may irritate snakes and should be avoided. Burrowing species will require a deep-litter substrate in order to hide and feel secure.

Feeding

When using loose substrate in the hospital it is best to move the patient to a separate container for feeding to avoid ingesting foreign materials. Long tongs should be used to avoid injury when feeding snake patients – snakes strike fast and are not always accurate!

Cleaning

Cleaning of vivariums should be done using odourless disinfectant, or F10 solution, while the patient is in a holding container away from the chemicals!

The first contact

Reptile patients are frequently transported to the surgery in inadequate containers, if indeed anything is used at all. Not only is



Figure 2. Two nurses restraining a reticulated python



Figure 3. The Adder is the UK's only indigenous venomous snake

this dangerous, it can also cause problems in the waiting room if other clients are phobic. It is obviously impractical to transport a six-foot vivarium in the car so, when clients ask the receptionists for an appointment, it is worth having some basic information on hand explaining how to transport the patient safely:

- Light pillow cases enclose the patient but are soft, allowing the patient to move freely
- Ventilated plastic containers, large enough for the snake to coil in without restriction, will prevent any damage during the journey. In large species this could be a duvet cover inside a large dustbin
- Heat sources are often overlooked: a hot water bottle, well covered and filled

with warm water (rather than boiling) and not in direct contact with the patient, is advised.

A gentle enquiry regarding exotic pet insurance may be useful as this is not necessarily something new reptile owners will be aware of, but may be very useful: reptilian patients can take a long time to recover and treatment plans are often lengthy and expensive. Some mainstream pet insurers will cover reptiles but there are also companies that specialise in insurance for exotic species.

The examination

It is best to get a full clinical history before looking at the patient as this will allow it to settle after their journey. This is a good time to establish the size and temperament of the patient – with the

larger Pythons (Reticulated and Burmese) two or more people may be required for safe handling, due to their large size and strength (Figure 2).

Before handling the patient it is important to establish a few vital pieces of information:

- What species and family group is this patient?
- Is this the client's pet or has it been obtained from an unknown source?
- Has this patient been correctly identified? Of the native species of snakes in the UK, Adders (Figure 3) are venomous and should only be dealt with by an experienced handler, while grass snakes and slow worms (which are actually lizards) are harmless. However, as non-indigenous escapees may be brought to the surgery, it is essential to know the species before handling!
- Is the patient used to being handled (and what is its temperament during handling)?
- Sex and reproductive status: is the patient likely to be gravid?
- When did the patient last eat? If within the previous 48–72 hours, handling should be restricted and minimal

A full physical examination should be performed by the veterinary surgeon and an accurate weight should be obtained and recorded. Ectoparasites are easily noticed between the scales and around the eyes and mandible; mite transference between patients is a possibility and should be prevented with use of good barrier nursing procedures and thorough disinfection of the vivarium once the patient has been discharged from the hospital.

Handling

Handling can be gentle when looking at normal movement, but when a physical examination is needed gentle but firm restraint will be necessary.

Holding the head gently with your hand wrapped around the neck, high up and firmly so that the snake cannot move its head, will prevent anyone getting bitten (Figures 4 and 5); the rest of the body needs to be supported and on a flat surface. Constrictors are likely to wrap around something in order to feel safe and to use their power against the handler to work free. In the case of a person becoming constricted, ensure that the head is securely restrained and gently unwind the snake from the tail upwards.



Figure 4. Restraint of reticulated python

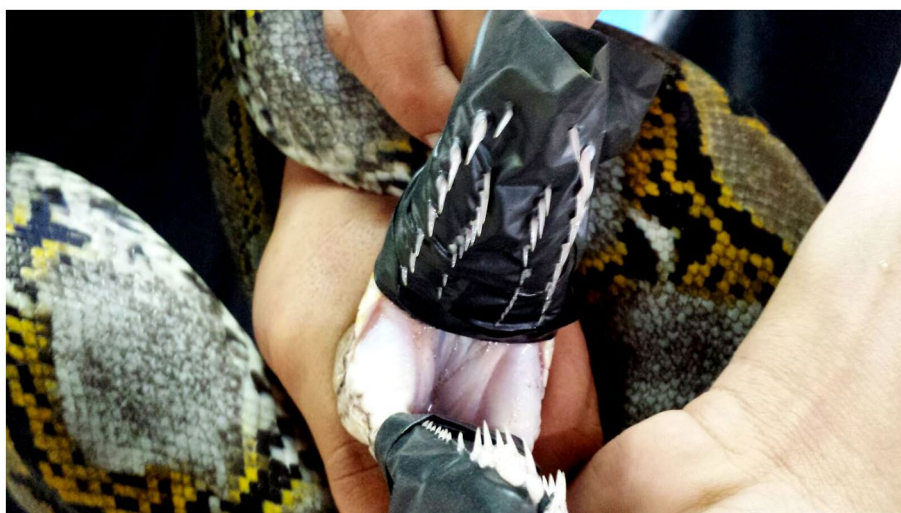


Figure 5. Rows of teeth in an 8ft reticulated python (Image taken whilst python was being handled by venom milking experts to display teeth)

Zoonosis

There are obvious health and safety concerns when handling reptiles, so personal protective equipment (PPE) should be worn and meticulous hand hygiene observed. Snakes commonly carry *Salmonella* in their gut flora, but there is also a risk of bacterial infections such as *Campylobacter*, *E. coli*, *Aeromonas* (in aquatic species) and *Pseudomonas*, all of which can pose serious health concerns to handlers.

Venom

Although venomous species are not as common, people do still own them. Only experienced handlers should be dealing with these patients. If there are none at your practice, referral to a specialist should be sought. Not all owners of venomous snakes are required to have a Dangerous Wild Animal (DWA) licence and the rules and regulations regarding

the species which can be kept as pets are currently in the process of being updated. A current list of species can be found on the DEFRA website.

Admission

In the event that the patient needs to be admitted to the hospital, several vital pieces of information should be obtained from the owner:

- What environmental temperatures are maintained at home?
- What times are lights turned on and off daily?
- What prey items are used (including size and colour in some cases)?
- How often is food offered?
- When did the patient last eat?
- When did they last shed?
- What substrate is used?

- Are any supplements added to the diet (type, quantity, frequency)?
- Is this patient housed with others?
- Is this patient part of a collection? If so, are any others showing similar signs?

Getting an accurate description of the home set-up can give vital clues as to where the problem is originating. Photos can be helpful. It may also be necessary for the owner to bring in frozen food for their pet if the practice does not maintain stocks on the premises and the patient is to be hospitalised for a long period of time. Frozen food should be thawed fully before offering to the patient.

Conclusion

There is a lot of contradictory information on the internet and it can be a minefield for inexperienced owners to get a balanced and appropriate method of caring for their pet. It is important that veterinary practices have access to a wealth of up-to-date, evidence-based information from experienced veterinary and herpetology specialists in order to give advice on safe products and husbandry techniques that are applicable to the UK. In cases where books such as the BSAVA manuals are not available, being able to access an exotics specialist, for advice and referral if necessary, can be useful.

Image copyright

Thanks to Tom Casey of Wildside Reptiles for providing the Tree Python *Morelia viridis* and Western Hognose *Heterodon nasicus* images and to Jet Prince Marsh of Burmese_Python_Relics for the Burmese Python *Python bivittatus* image.

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