An introduction to the housing and treatment of snakes

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ABSTRACT
Information is given on the housing of snakes and some other reptiles. A short description of some anatomical and physiological factors introduces a description of a number of disease conditions frequently seen in snake patients. The aim of the paper is to introduce veterinary surgeons to their reptilian patients in the hope that it will assist them in diagnosis and treatment.

HOUSING
Clean, warm and escape-proof vivaria are essential for all snakes, lizards, geckoes, iguanas etc. The amount of space will vary considerably depending on the species; for example, iguanas must have ample climbing space and basking areas, whereas terrestrial snakes require only a flat surface area with a shelter in which to hide. Many of the smaller snakes and the majority of lizards are said to be thigmotactic, which implies that they only feel safe when they are in immediate contact with a solid surface on all sides.

It is wrong to introduce soil, moss or living plants into a reptilian vivarium as these rapidly become contaminated with helminth eggs and pathogenic bacteria. Avoid using sharp sand as this will be swallowed with the food and acts as an intestinal irritant. When gravel is used it must be sterile. In order to obtain optimum hygiene the vivarium should be cleaned and disinfected monthly, the gravel being washed and re-sterilized before re-use.

An alternative base particularly useful for snakes, is paper—paper towels being more acceptable than newspaper. The advantage is that all excreta, whether it be faecal or urate excretions, can be rapidly removed on the paper, the vivarium floor swabbed with disinfectant and clean paper put down.

Most disinfectants, the halogens, quaternary ammonium compounds, hexachlorophenes, chloroxylenols and chlorhexidine are safe for reptiles. Phenols and coal tar disinfectants are dangerous.
Fresh drinking water must always be available. Some snakes like to get into the water bowl while others regularly defaecate into water, so such water bowls can rapidly become a source of infection. The shelter most commonly used is bark. Tree bark has an advantage over cork bark in being less expensive, disposable, more easily disinfected and replaceable. Cork bark is softer and slightly warmer.

Many disease problems occur from overcrowded conditions.

TEMPERATURE AND LIGHT

Reptiles come from many parts of the world where widely varying climatic conditions exist. Therefore, the photoperiod and the temperature requirement will vary according to the species and their country of origin.

Because of this variant and because reptiles from one continent appear to be very susceptible to diseases occurring in reptiles from other continents, any unbalanced assortment in a vivarium always leads to trouble.

Aim at a light cycle in excess of 12 hours. If breeding is seriously contemplated the photoperiod must be adjusted by a time switch (Peaker, 1969; Frye, 1973).

Because reptiles are poikilothermic their temperature is but 2°F above that of the environment. They are therefore very dependent on the environmental temperature for many vital functions. The digestive enzymes are only functional in the preferred optimum range; below this temperature digestive upsets can occur and many reptiles will refuse to eat.

At the other end of the preferred optimum range is a critically high temperature, when reptiles are extremely restless and attempt to find escape routes from the heat. Temperatures in excess of 38.5°C (101°F) will kill many snakes. Iguanas, however, have a much higher optimum temperature range and a critical high temperature of 46.1°C (114.8°F) (Wallach, 1969). (See Table 1).

SOME ANATOMICAL AND PHYSIOLOGICAL ITEMS OF INTEREST

Snakes have six rows of teeth, four in the upper jaw attached to the maxillary and palatine bones, and two in the lower jaw, one on each mandible. All teeth, including poison fangs, can be shed and can be replaced regularly throughout the snake’s life (Fig. 1).

Snakes have no eyelids. This is one of the identifying features separating legless lizards from snakes. The eyes are covered by a fixed transparent convex scale, the spectacle, which is shed with the skin whenever a snake sloughs.

Snakes have no external auditory meatus whilst lizards do. The inner ear is present and all reptiles have a righting reflex.

Two families of snakes possess heat receptors, the Boiids and pit vipers. These heat receptors respond to infra red (I.R.) radiation of a wavelength of about 10 μ. Harris & Gamow (1971) have shown that a snake’s brain received the neural
### Table 1. Temperature requirements for various species

<table>
<thead>
<tr>
<th>Species</th>
<th>Preferred optimum temperature range °C</th>
<th>°F</th>
<th>Critical high °C</th>
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<tbody>
<tr>
<td>Aesculapian snake</td>
<td>20-35°</td>
<td>68-95°</td>
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<tr>
<td>Boa constrictor</td>
<td>26-34°</td>
<td>78-93.7°</td>
<td></td>
</tr>
<tr>
<td>European grass snake</td>
<td>18-28°</td>
<td>64.5-82°</td>
<td></td>
</tr>
<tr>
<td>Garter snake</td>
<td>20-35°</td>
<td>68-95°</td>
<td>40.5°C</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(105°F)</td>
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<tr>
<td>Boa constrictor</td>
<td>26-34°</td>
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<td>20-35°</td>
<td>68-95°</td>
<td>40.5°C</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>(105°F)</td>
</tr>
<tr>
<td>House snake</td>
<td>18-28°</td>
<td>64.5-82°</td>
<td></td>
</tr>
<tr>
<td>Indigo snake</td>
<td>22-31°</td>
<td>71.5-88°</td>
<td></td>
</tr>
<tr>
<td>Indian python</td>
<td>26-34°</td>
<td>79-93°</td>
<td></td>
</tr>
<tr>
<td>Rat snake</td>
<td>22-31°</td>
<td>71.5-88°</td>
<td></td>
</tr>
<tr>
<td>Reticulated python</td>
<td>26-34°</td>
<td>79-93°</td>
<td></td>
</tr>
<tr>
<td>Chameleon</td>
<td>23-30°</td>
<td>73-86°</td>
<td></td>
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<tr>
<td>Five lined skink</td>
<td>28-36°</td>
<td>82-97°</td>
<td></td>
</tr>
<tr>
<td>Iguana</td>
<td>30-40°</td>
<td>86-104°</td>
<td>46.1°C</td>
</tr>
<tr>
<td>Greek tortoise</td>
<td>27-30°</td>
<td>81-86°</td>
<td>43°C</td>
</tr>
<tr>
<td>Painted turtle</td>
<td>20-30°</td>
<td>68-86°</td>
<td>(109°F)</td>
</tr>
<tr>
<td>Red-eared terrapin</td>
<td>20-30°</td>
<td>68-86°</td>
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**Fig. 1.** Skull of an African Puff Adder (*Bitis arietans*) showing the functional poison fang folded back beside the maxillary teeth with the next replacement poison fang fully grown and housed alongside the maxillary bone.
impulse within 35 milli-seconds of applying an I.R. stimulus for 8 milli-seconds.

Snakes have poor visual acuity but they are quick to detect movement.

The long, forked tongue can be retracted into a sheath on the floor of the mouth ventral to the trachea. Characteristically the tongue is flicked in and out through the labial notch. This is a sign of health as the reptile is using its tongue to explore its surroundings. The tips of the tongue pick up scent particles and place these in contact with 'taste buds' in Jacobson's organ, which lies on the roof of the mouth (Fig. 2).

![Diagram of a snake's head showing the position of the tongue and Jacobson's organ](image)

**Fig. 2.** A diagrammatic sagittal section of a snake's head showing the position of the Organ of Jacobson.

When drinking, snakes suck up water into the mouth and oesophagus. The tongue is not used while drinking.

The glottis is easily visible on the floor of the mouth as is the anterior portion of the trachea. This part of the respiratory system is movable, it gets placed close to the posterior nares during normal respiratory movements, but it is carried

<table>
<thead>
<tr>
<th>Table 2. The average organ positions in boas and pythons</th>
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<tr>
<td>Position expressed as % of total length, nostrils to cloaca*</td>
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<tr>
<td>Heart</td>
</tr>
<tr>
<td>Lung</td>
</tr>
<tr>
<td>Air sac</td>
</tr>
<tr>
<td>Liver</td>
</tr>
<tr>
<td>Gastric stomach</td>
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<tr>
<td>Intestine</td>
</tr>
<tr>
<td>Anterior kidney (right)</td>
</tr>
<tr>
<td>Posterior kidney (left)</td>
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<tr>
<td>Colon</td>
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* NB tail length, which is very variable, must NOT be used in this calculation.
forward to the elastic ligament of the 'mandibular symphysis' to enable the snake to breathe during the somewhat protracted period while swallowing whole prey.

The trachea leads to the only functional lung, the right lung. This part of the respiratory system occupies the first two-fifths of the reptile's length measured from the head to cloaca. The left lung forms an abdominal air sac in some species. There is no diaphragm.

The heart has three chambers, two atria and one ventricle from which emerge twin aortae. The pulse rate varies with the body temperature and the species, rates of between twelve and forty beats per minute being normal. With the snake in dorsal recumbancy the heart can usually be seen beating under the ventral scales about one quarter of the way down the snake (Table 2).

SAFE ANAESTHESIA FOR SNAKES

In snakes that are in good bodily condition the current method of inducing anaesthesia uses the sedating effect of ketamine hydrochloride (Vetalar–Parke Davis) in combination with halothane (Fluothane–ICI, or Halothane–May & Baker).

Ketamine, when given by the subcutaneous or intra muscular route into the dorsal musculature at 50 mg per kg body weight, produces a cataleptic state in 30 or 40 minutes (Glenn, Straight & Snyder, 1972; Cooper, 1974). In this state it is possible to open the snake's mouth and spray the glottis with a topical local anaesthetic (Xylocaine—Astra Hewlett) preparatory to passing an intubation tube. Select a tube of suitable size, pass it into the trachea and connect it to the volatile anaesthetic machine using an Ayre's 'T' piece with a side arm of a size to suit the snake. A snake weighing 1 kg will require a length of gas pressure tubing 1 metre long while a large 20 kg (44 lbs) python will require a length of 'elephant' tubing 1.5 metres long. Do not use rebreathing bags as excessive pressure may easily rupture the air sac.

Deepen anaesthesia to the required depth by using 3% halothane, carrying out artificial respiration by occluding the open end of the 'T' piece for 15 seconds twice every minute. Once a satisfactory depth is reached where the tail reflex is very sluggish, the flow should be reduced to a maintenance concentration between 1 and 2% halothane.

Always keep the reptile warm during the surgical procedure, between 15° and 22°C (59°–71.5°F).

Always 'wash out' the volatile anaesthetic agent from the lung and air sac by giving artificial respiration using pure oxygen. The signs of recovering consciousness will soon be apparent. Remove the intubation tube before returning the snake to a warm hospital vivarium.

Snakes take up to 24 hours to detoxicate ketamine. If the snake is debilitated do not use ketamine. Use a small face mask suitable for the head of the snake in question and induce slowly with oxygen and 4% halothane. Jackson (1970),
described the stages of anaesthesia that are seen during induction using this method but it is time-consuming as snakes are capable of voluntary breath-holding for many minutes. Once anaesthesia is deep enough an intubation tube may be passed as previously mentioned.

DISEASES AND CONDITIONS COMMONLY ENCOUNTERED IN SNAKES


**Abscess**

Multiple subcutaneous abscesses are common. The frequency with which multiple abscesses are found at post mortem within the body cavity and affecting some of the viscera shows that generalized blood borne spread is common. When reptilian abscess material is cultured a mixed growth is obtained and often up to four bacteria can be identified from a single swab.

Reptilian abscesses should not be lanced and left open as the pus tends to be somewhat inspissated, lesions do not drain and secondary bacterial infection occurs. Not all infections become encapsulated and some spread by tracking down the numerous small oblique muscles under the skin. Therefore it is advisable to give a general anaesthetic prior to incising the abscess. Make the incision between scales rather than across the scales. After removing the inspissated pus, investigate the whole of the cavity before swabbing the entire area with an iodine-based antiseptic, Betadine antiseptic solution. Suture the entire length of the incision with a suitable nonabsorbable, non-capillary suture material in order to make a watertight suture line. Healing in snakes can be very slow and sutures should not be removed prematurely, 12 weeks is suggested.

**Bacteria**

The following micro-organisms from reptilian abscess material have been frequently recorded: *Aerobic*—Proteus, Pseudomonas, Klebsiella, Aeromonas, Enterobacter, Escherichia, Streptococci including *S. pyogenes* and *S. faecalis*, Salmonella, Citrobacter and Serriutia; *Anaerobic*—Bacteroides, Clostridia including *Cl. tetani*.

**Antibiotics**

Even though reptiles have not been subjected to antibiotic therapy many organisms that cause pathology are antibiotic resistant. Many organisms are resistant to chloramphenicol and this drug should not be used. Work by Smith (1970) showed that removing an antibiotic from use did not greatly reduce the incidence of antibiotic resistant organisms after 4 years. Ampicillin, Chlortetra-cycline, Lincomycin, Oxytetracycline, Sulphamezathine and Tylasin are all useful.
Reptiles show reactions to modern antibiotics that do not occur so readily in mammals and the following must be taken into account.

Neuromuscular blockade can be produced by several aminoglycoside antibiotics: gentamycin, framycetin, kanamycin, streptomycin, neomycin and polymyxin B. This blockade effect is accentuated if given in association with anaesthetics or muscle relaxants. In snakes the signs of neuromuscular blockade are a lack of muscle control, the snake tending to hang like a limp rope. It is said that it can be antagonized by calcium and neostigmine when caused by streptomycin or neomycin.

Metronidazole (Flagyl—May & Baker) (160 mg per kg) is most useful against anaerobic bacteria, but the dose should not exceed 400 mg in the larger boas and pythons or neuromuscular blockade occurs. Never dose for more than three consecutive days.

**Burns**

These occur in reptiles that escape from their vivaria and coil themselves around bar heaters, infra red lamps and other sources of heat. Burns cause the scales to lose their pigment and die. The dead scales separate and raw ulcerated lesions appear, which become infected. It is difficult on occasions to differentiate the ulcerated lesions from those of infectious dermal ulceration (see under Scale rot). Treat burns in reptiles as you would treat burns in mammals.

**Conjunctivitis**

Snakes do not have a conjunctival membrane. Bacterial infection under an unshed spectacle can cause an opaque sub-spectacle abscess (vide infra).

**Constipation**

Much of the problem stems from an improper diet and insufficient exercise. Snakes do not digest keratin, hair, horn, hoof or feather. Snakes fed heavily furred rodents tend to produce large dry masses of ‘felt’. These can be palpated and show clearly on X-ray. Treat with liquid paraffin or stool softening agents given by stomach tube.

**Ecdysis** (Normal and impaired)

Sloughing occurs in all snakes. The smaller snakes should slough the entire skin in one piece. Juveniles slough frequently during the period of rapid growth. Some snakes only slough twice a year, others every 4 or 5 weeks. The larger pythons and boas slough piecemeal.

Impaired ecdysis occurs (a) in debilitated snakes; (b) sub-optimal conditions in the vivarium, e.g. low humidity; (c) in snakes that are dehydrated.

The snake should be soaked in tepid water at 20°C and assisted by removing the non-separated skin on wet towelling held in the hand. If spectacles have failed to slough they should be removed by gently lifting the edges. Do not use force or the underlying cornea will be torn causing irreparable damage.
**Ectoparasites**

Reptiles often arrive from the wild with ticks. Vivarium infestations with mites (*Ophionyssus spp*) are also common. Remove the infested snake to a clean vivarium and suspend a dichlorvos (Vapona strip, Shell Chemical Co.) impregnated strip in this clean vivarium for 3 days. Scrub out the vacated vivarium then stand a dichlorvos impregnated strip in it for 10 days to kill larval mites that hatch. Burn all wood and bark from the vacated vivarium. Sterilize all materials before reconstructing the vivarium and re-stocking it. Both mites and ticks may transmit blood parasites and infectious diseases, and severe infestations cause anaemia. Mites cause great irritation round the spectacle.

**Intestinal Parasites**

**Nematodes** The most common eggs seen on microscopic examination of the 'felt' or urate excretions are trichostrongyle like eggs. For nematode infestation dose with thiabendazole (Equizole, Merck, Sharp and Dohme) (100 mg per kg) given by stomach tube (Cooper, 1974; Jackson, 1974).

**Cestodes** These sometimes look like linen threads along the intestine but often tend to form a ball in the intestine. They can cause smaller species of snake to lose weight even when they are feeding normally (Jackson & Muller, 1976). Treat cestode infestation with a suspension of dichlorophen (Dicestal, May & Baker) (182 mg/kg) given by stomach tube.

**Amoebiasis** Cases of massive haemorrhagic enteritis are caused by infection with *Entamoeba invadens*. In some collections amoebiasis can assume epidemic proportions. Treatment with metronidazole (Flagyl, May & Baker) (160 mg/kg up to a maximum of 400 mg) given by stomach tube is most efficient. *Flagellate* infection—see under Protozoan.

**Medication**

The author uses parenteral medication as little as possible. Some drugs, like *Ketamine hydrochloride*, have to be given by injection. Cooper (1974) shows how the needle should be directed in a forward direction to penetrate through the softer tissue between scales. When a snake is dehydrated and debilitated isotonic fluids can be given by injecting them into the body cavity, via the ventral scales, in the caudal third.

Snakes absorb drugs from the alimentary tract very well and the technique of passing a stomach tube in a snake is a very simple procedure. This route is imperative when dosing with anthelmintics. Experienced herpetologists find the technique easy to master.

A dog oesophageal tube (AS 56 Size FG 23, Arnold Veterinary Products Ltd.) is suitable for pythons and boas. A Ryle stomach tube cut down to 10 inches long is ideal for smaller species like garter snakes. Hold the snake gently but firmly behind the occiput. Insert the rounded end, lubricated with liquid parafin, into the labial notch, which makes most snakes open their mouths. Pass the tube a short
distance down the oesophagus where it can be felt passing the fingers of the holding hand. It cannot enter the trachea because the glottis is well forward on the floor of the mouth. Hold the snake with the anterior third of the body vertical. Give the medicinal dose and allow the whole dose to descend to the stomach by gravity. Remove the tube slowly while still holding the anterior third of the snake vertically.

**Mouth Rot (Necrotic stomatitis)**

Most amateur herpetologists consider that this is the only disease that affects reptiles as it had been recognized as a commonly occurring disease since reptiles were first kept in captivity. It occurs in all types of reptile, lizards, chelonians and snakes.

In very early lesions the mouth can be opened and the oral mucous membrane will be slightly oedematous and petechiation will be seen. It is not always possible to identify any one area that is the seat of the trouble. In this early stage swab out the oral cavity with hydrogen peroxide and apply a dressing of Penicillin/Streptomycin intra mammary cerate.

If the lesion is left untreated the subgingival tissue rapidly becomes invaded with bacteria which produce a caseous mass attached to the teeth. This caseous material fuses the jaws together and distorts the lips.

In neglected cases the bacterial infection, which is often caused by several bacteria, invades the dental arcade, causing bone necrosis and osteomyelitis.

In cases which have caseous material present it is advisable to treat them under general anaesthesia. Efficient debridement can then be carried out. A swab should be taken for bacteriology to ensure that a suitable antibiotic be used. The whole mouth should be given a thorough cleansing with either hydrogen peroxide or Betadine. Antibiotics in an ointment base which will remain in the mouth are an advantage. Regular daily or 12-hourly treatment is necessary. Further debridement may be necessary.

**Obstructed nares**

When the nares are partially obstructed respiratory noise occurs and if they are totally obstructed the reptile uses mouth breathing. There are many causes such as, an extension of inflammation from forcing the nose against rough surfaces in constant attempts to escape, bites from rodent prey, poor sloughing, bacterial infection from the mouth etc. Gentle cleansing of the external nares, examination of the mouth and the area of the internal nares should be undertaken. The irrigation of the nares with hydrocortisone 5 mg/ml with neomycin 5 mg/ml (Neobiotic H.C. drops, Upjohn Ltd.) assists in reducing the inflammation and produce a clear airway.

**Protozoan infections**

Amoebiasis has been mentioned under intestinal parasites. Intestinal flagellate infection in reptiles can cause wet cloacal voidings. Reptiles drink excessively.
When fresh material is examined under the low power microscope objective (× 100) the live flagellates can be seen in great numbers. Treatment with metronidazole (Flagyl, May & Baker) (160 mg per kg) given as an aqueous suspension by stomach tube is most efficient. Do not exceed a dose of 400 mg.

Radiography

Good quality radiographs of reptiles can be of great assistance in diagnosis. Frye (1973) demonstrates many examples in his book on the husbandry and diseases of captive reptiles. When taking X-rays of snakes avoid the common error of attempting to coil the reptile onto an X-ray plate. Keep the reptile straight, place arrow-markers on the plate to identify the area under examination and have this area under the centre of the beam (Fig. 3).

![Fig. 3. A dorso-ventral radiograph of a boa (Constrictor constrictor) taken to identify two lumps palpable through the ventral scales. These enteroliths are displaced to the right of the midline by the left kidney, which is not radiopaque.](image)

Until one is conversant with the organ positions, a useful guide to identify the organs involved in or associated with any mass that can be palpated, is to use the following formula:

\[
\frac{\text{length from nostrils to lesion} \times 100}{\text{total length of snake from nostrils to cloaca}} = x\% 
\]

Under the section on anatomy (Table 2) the organ positions in boas and pythons are given. Reference to this table will serve as a guide to organs that are in the proximity.

Uric acid deposits are radio opaque—see under visceral gout.

Regurgitation of stomach contents

Five separate conditions cause 'vomiting' or voluntary regurgitation in snakes: (1) Reflex escape reaction from handling the specimen within about 3 days of eating; (2) Temperature too low in the vivarium, therefore no digestive enzyme activity. Regurgitation occurs before the food decomposes; (3) In cases of gastritis
and bacteremia; (4) In cases of any form of obstruction affecting the lower bowel; and (5) Within 48 hours of death.

Although force-feeding is advocated under certain conditions, the food is sometimes regurgitated because of the reflex escape reaction. Certainly any snake that has been anorectic for a long period, 4 months, and is then force fed, will regurgitate; probably because the stomach is not ready to accept food. For this reason alone it is inadvisable to leave a reptile fasting for such long periods and force-feeding should be instigated within 4 weeks.

The exception to this rule is in species that have a dormant winter period, which includes most species from temperate parts of the world.

**Respiratory infection**

Lung and air sac infection is very difficult to diagnose in life. It is possible to auscultate the lung area and fluid/mucoid sounds are sometimes heard when the lungs are infected. At post mortem large parasites (*Pentastomes*), foreign bodies and plugs of mucopurulent material are often found when the lung is opened up even when lung involvement was hitherto unsuspected.

**Scale rot (Infectious dermal ulceration)**

These lesions are normally multiple and involve both the wide ventral and the small dorsal scales. Initially, the areas between the scales appear red, then the area, which may vary in size from 1 sq. cm. up to 10 sq. cms, forms a 'blister', the edges of the blister separate and finally the lesion is a raw infected dermal ulcer. Infection is almost certainly blood borne and therefore a bacteremia is present.

In any one patient lesions at different stages may be present. Lesions never look quite as bad after ecdysis, which is often one of the reasons that owners consider the patient is improving and thus prevaricate before bringing it in for treatment. Treatment is extensive and long because reptiles heal slowly. Initially swabs should be taken for culture and sensitivity, the owner advised to cleanse all the lesions daily and apply a topical antiseptic such as Betadine. Ensure that the snake is kept in a clean warm hospital vivarium as the build-up of harmful bacteria can be very rapid. The snake should not be allowed to immerse itself in its water bowl or further water borne infection may occur. Once the bacteriological report has been received, the snake should be dosed with an appropriate antibiotic, but it is often necessary to give consecutive treatments with several antibiotics.

The owner should be asked to record the snake's body weight, for while the weight remains moderately constant the reptile is surviving on its fat body (reserves). Do not worry about the snake not eating initially but offer food after a few weeks. Advise that healing can be expected to take 12 weeks or more and recommend that the patient be brought back if any lesion begins to deteriorate or if a bacteremia recurs. As soon as the snake begins to lose body weight further antibiotic therapy should be instigated as this is an early sign of a relapse.
**Septicaemia**
Generalized septicaemia/bacteraemia occurs readily in reptiles and can be associated with almost any of the bacteria that cause pathogenic lesions. Snakes that are seen writhing in contortions throwing their ventral scales uppermost have either septicaemia or acute pain. Prognosis is very poor, death usually occurring within a few hours.

**Subspectacle abscess**
In cases of incomplete sloughing (ecdysis), if the old spectacle is not shed from the eye, infection can occur under it which, if untreated, will penetrate the eye and cause panophthalmitis. Treat subspectacle abscess by incising along the ventral surface from 4 o’clock to 8 o’clock (based on a 12-hour clock face), drain and flush out the pus, taking a swab for culture and sensitivity, apply an antibiotic oculentum and replace the spectacle. Ensure that the area is kept clean and ask the owner to inspect it regularly until healing has occurred.

**Visceral gout**
In long term patients that die despite all treatments, deposits of uric acid are found at post mortem. These deposits occur on viscera and the following tissues are often involved: pericardium, epicardium, liver and kidneys. Bacteria are often cultured from swabs taken from these uric acid deposits. Uric acid is radio opaque and the larger lesions show on X-rays.

**Wounds**
Newly caught snakes in the wild often arrive with wounds from pangas, grabsticks and incorrect handling by the inexperienced. These wounds can be sutured under sedation or general anaesthesia.

A reptile in captivity that constantly attempts to escape can make its nose (rostral scales) raw by constantly abrading them on rough surfaces in the vivarium in attempts to find an escape hole. These lesions should be treated with Betadine but ensure that the owner obtains a new vivarium with smooth surfaces everywhere.

Rat bites can be avoided by not feeding live rodents, for snakes can be conditioned to eat freshly killed rodents. Such wounds are a potential source of infection and they always result in scarring.

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REFERENCES


