

Reptile Care and Related Problems

Clermont Animal Hospital Inc.



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Introduction

The vast majority of medical problems seen in reptile patients are due, in full or in part, to poor nutrition and husbandry (care). In addition, almost every reptile patient presented for veterinary care, including those who come for well-pet evaluations, is fed a less than ideal diet. This is due to several factors. In many cases, the owner does not know or has been misinformed as to what the proper diet should consist of for a specific species. In other cases, reptile owners are feeding their pet the proper foods, but from sources that provide low nutritional quality. Finally, most reptile owners are not providing a sufficient variety in their reptile's diet due to convenience or cost concerns.

In addition to a properly balanced diet, all reptiles (especially tropical species) require a warm environment for proper food digestion and ultraviolet (UV) light for calcium metabolism. The type of cage substrate (bedding) used is also important. Fine loose substrates such as sand can cause an intestinal blockage leading to problems with food digestion and absorption. While these aspects of care may not be a part of the diet, they are essential to proper food digestion and overall health. Water quality is also very important, especially for the health of aquatic species of reptiles.

The Reptile Diet and Nutrition

It is VERY important to understand the unique nutritional needs of your pet to properly provide a balanced diet. There are no commercial diets that are complete and balanced for reptiles. Each species of reptile has very specific nutritional needs. In addition, nutritional needs may vary within a species due to age, size or health status.

The best diet for a reptile is one that closely mimics the natural diet of the species in the wild. This is not always practical or possible to provide. At the very least, reptile owners should provide their pets with as much variety in the diet as possible to ensure proper nutrition. Multi-vitamin and calcium supplements are also recommended for most reptiles.

There is a brief discussion below on the four major reptile nutritional groups. Please note that these are very much generalizations. Most species do not fall strictly into a single group and will incorporate foods from two or more groups, at least occasionally, into their diet. Whenever caring for an unfamiliar reptile species, it is important to take the time to research any unique nutritional needs of that species. If you need further information about your particular reptile's dietary needs, be sure to speak with one of the doctors at Clermont Animal Hospital.

Carnivores (pythons, constrictors, monitors, bearded dragons, young water turtles, etc.)

Carnivorous reptiles, or reptiles that eat meat, should be on a diet that is at least 90 percent whole-animal prey. Feeding your reptile diet of only meat without the bones and internal organs is very deficient in most vitamins and minerals, especially calcium. Therefore it is better to feed your reptile prey animals. The size of the prey animals fed will depend on the species, the age, and the size of the animal. The smallest carnivores can be fed day-old pinkie mice as well as invertebrates, which are animals without backbones. The largest snakes can be fed rats, chicks and rabbits.

While most species of carnivores will do well on a rodent-based diet, some species have a very specialized diet of amphibians, such as salamanders, frogs, etc.; mollusks (shell fish); eggs; or snakes. Aquatic species should be fed whole fish whenever possible, but many will eat amphibians, snails or even small birds as part of their natural diet.

Adding variety to the diet by feeding multiple prey species helps provide balanced nutrition. **All prey that are mammals (have hair) should be dead or stunned** when they are fed to your reptile to prevent injury to your pet. Hardboiled eggs (whole or diced) including the shell can be fed weekly to enhance the diet.

Insectivores (chameleons, geckos, some skinks, etc.)

Insectivores, or animals that eat insects, should be fed as large a variety of insects and worms as possible. Crickets and mealworms have poor nutritional quality unless they are “gut-loaded.” This means they must be fed a diet rich in vitamins and minerals for at least 48 to 72 hours before they are fed to the reptile. Nutrient-rich cricket and mealworm diets are commercially available. You can also feed the crickets or mealworms alfalfa mash or chicken layer mash to help enrich their nutritional value. Cricket nutritional value can also be improved by shaking them in a multi-vitamin or calcium powder. It is recommended to do this on alternate days.

Regardless, **crickets should not comprise more than 50 percent of a reptile’s diet.** The other half of the diet should consist of a variety of other insects (grasshoppers, cicadas, fruit flies, flies, moths, etc.) and worms (mealworms, wax worms, earthworms, super worms and silk worms). Silk worms are perhaps the single best source of nutrition as they are high in protein, low in fat, and provide a variety of vitamins and minerals. They can, however, be difficult to find at local pet stores. It may be necessary to mail-order these worms or to raise them at home for regular use.

There is a debate among experts as to whether wild-caught insects are a good food source for reptile pets. Wild insects are more likely to carry disease and may have exposure to pesticides and/or other toxins that may be harmful to reptiles. However, wild-caught insects are, in general, much more healthy, less stressed and better in nutritional value than insects available commercially. For this reason, the doctors at Clermont Animal Hospital recommend using wild-caught insects to supplement your pet’s diet. Be sure that these insects are taken from areas where pesticides and other potentially harmful chemical treatments are not used. Wild insects can be caught using a butterfly net to sweep through tall grass or by catching insects drawn to a light after dark.

While fruit is not considered part of the diet of strict insectivores, most reptiles that fall into the insectivore class do consume at least small amounts of fruit in the wild and will benefit from it as an occasional part of their diet. Fruit should be provided as a fruit puree or fruit varieties of human baby food.

Herbivores (green iguanas, land tortoises, etc.)

Herbivores, or animals that eat plants, need a variety of vegetables grains and fruits. Each feeding should consist of items from the six categories below. Failure to provide herbivorous reptiles with a balanced diet can result in severe metabolic deficiencies, disease and death.

1. **Calcium-Rich Vegetables**—30 to 40 percent of diet; includes turnip greens, mustard greens, beet greens, kale, collard greens, bok choy, Swiss chard, dandelions, parsley, romaine lettuce, spinach and alfalfa pellets
2. **Other Vegetables**—30 to 40 percent of diet; includes frozen mixed vegetables, squash, zucchini, sweet potatoes, bell peppers (all colors), broccoli, peas, beans, okra, grated carrots, cacti, edible flower blossoms and sprouts
3. **Grain/Fiber**—up to 20 percent of diet; includes whole grain breads, whole grain pastas and whole grain cereals (This category is not needed with every meal but should be provided at least weekly)
4. **Fruits**—up to 15 percent of diet; includes figs, papaya, melon, apple, peaches, plums, strawberries, banana (including peel), seedless grapes, kiwi and oranges (including the peel); Please note that frugivores (fruit eaters) will need a much higher concentration of foods from this group.
5. **Vitamin and Mineral Supplementation**—Calcium supplementation is VERY important; this should be combined with a multivitamin supplement designed for reptiles.
6. **Non-Plant Protein**—up to 5 percent of the diet; includes insects and worms (see Insectivore section) or small (pea to marble-sized) balls of canned dog or puppy food. While strict herbivores should not require any animal based-proteins, our doctors endorse feeding small amounts of animal-based proteins. This can be especially helpful in reptiles that are growing or those recovering from illness or injury. Please note, however, that this food group should only be a minor part (less than 5 percent) of the diet, if used. Food items from this group should only be fed once every one to two weeks for healthy adult animals, but may be recommended more frequently for growing, ill or healing animals.

Omnivores (box turtles, skinks, tegu lizards, mature water turtles, etc.)

Many species of reptiles are true omnivores for all or part of their lives. Animals in this group will eat

Many species of reptiles are true omnivores for all or part of their lives. Animals in this group will eat a combination of foods from two or more of the other three groups. The types of foods each species prefers and the balance between plant and animal food sources will vary greatly among species and with the age of the animal. For example, many young water turtles are primarily carnivores. As they age, algae and other plant matter becomes increasingly a part of their natural diet.

Animals in this group should be offered as much variety in the diet as possible; however, it is important that the amounts of foods from the different food groups mimic that animal's natural diet as closely as possible.

Temperature Requirements

Because reptiles are ectothermic, or cold blooded, their body temperature changes with that of their environment. Therefore, they require an environment that allows them to regulate their internal body temperature as needed. A reptile can raise its body temperature by basking in an area of concentrated heat. By moving from warmer to cooler areas, it can lower its body temperature if it becomes too hot. In order for a reptile to thermoregulate (control its body temperature) properly, it must have a temperature difference of at least five to ten degrees within its enclosure.

A varied temperature is best provided by using a basking lamp in small enclosures or by combining several different heat sources in larger enclosures. Acceptable sources of heat include incandescent lights, heat lamps, under-the-cage heating pads, ceramic heaters or heat bulbs, or high ambient room temperature. **Hot rocks or heating pads placed within the enclosure are NOT acceptable forms of heat because they can cause severe thermal burns**, especially in sick or debilitated animals. Regardless of the heat source(s) used, it is very important that reptile owners use a movable thermometer to measure the temperature in different spots within the enclosure to confirm that a proper temperature gradient is provided. The preferred temperature gradient varies greatly by species. Below are some general guidelines:

- Temperate climate species, such as corn snakes and red-eared sliders, prefer a daytime temperature gradient around 75 to 85 degrees.
- Tropical species, such as green iguanas and bearded dragons, prefer a daytime temperature gradient of 85 to 95 degrees.
- Nighttime temperatures can typically fall ten degrees below the daytime gradient. For most species, this means that room temperature with no supplemental heating is adequate overnight.

Sick or injured animals should be housed at the high end of their temperature gradient or slightly warmer. While endothermic (warm-blooded) species run a fever during illness, reptiles rely on increased basking to raise their body temperature. During illness, higher ambient temperatures allow the animal to expend less energy on thermoregulation and increase the rate at which the chemical reactions involved in healing can occur.

While it is important to keep a reptile's enclosure warm, caution must be taken not to make the environment too hot. As a general rule, no spot in the cage should be hotter than 105 degrees for tropical species or 95 degrees for temperate species. This includes areas near the top of the cage, if the animal has access to these areas via cage furniture or vegetation. The coolest region of the cage should not be above 90 degrees for tropical species or 80 degrees for temperate species to ensure that the reptile can cool itself if it becomes too hot.

Ultraviolet Lighting

Providing adequate ultraviolet (UV) light is very important to the health of your reptile. The UV spectrum is part of natural sunlight. It is required by all vertebrates (animals with backbones) to convert vitamin D into its active form (Vitamin D3). Vitamin D plays an essential role in calcium absorption and metabolism; therefore, a vitamin D deficiency due to lack of ultraviolet light will result in low blood calcium for your pet even if calcium is present in sufficient amounts in the diet.

In addition, UV radiation naturally kills bacteria. Aquatic species require a UV spectrum in their basking area to prevent shell rot. Most tropical species have evolved in an environment where they are exposed to large amounts of UV light and, therefore, have the highest UV light requirement. All reptile species, however, will benefit from UV light.

How do I know what source of UV light to use?

There are several important factors to consider when choosing a source of UV lighting for reptile pets. The most important consideration is the type of UV light chosen. Natural sunlight is always the best source of UV rays, as long as it is not filtered by glass, Plexiglas or plastic. Owners can sun their reptiles outside whenever the temperature is above 80 degrees for tropical species or 70 degrees for temperate species. For most of the year, however, artificial UV light supplementation will be necessary.

There are two sub-spectrums within the UV light range. The Ultraviolet-A (UVA) range is 320-400nm while the Ultraviolet-B (UVB) range is 290-320nm. (Visible light is 400-700nm). **It is the UVB spectrum that is essential for vitamin D3 conversion;** therefore, a UVB light or (preferably) a UVA/UVB light is required for reptile health. Many of the commercially available lights are advertised as UV lights, but closer examination shows that they only emit the UVA spectrum.

How often do I replace the bulbs?

The next issue regarding UV lighting is the frequency of bulb replacement. Most reptile owners will replace the UV bulb only when it burns out. Unfortunately, most commercially available UV bulbs will continue to emit visible light long after they have ceased to provide UV rays. Most commercial bulbs will only emit UV rays for **two to four** months. Because the human eye cannot detect the UV rays it is impossible to determine when the UV emissions have ceased. For this reason, regularly scheduled bulb replacement is recommended.

How close should the bulb be to the pet?

The final consideration regarding UV lighting is the position of the bulb in relation to the reptile's basking area. UV rays are very weak and are easily diffused. They will not penetrate through glass, Plexiglas or plastic; therefore, it is essential that these materials do not separate the light from the basking area in the cage. It is also important to position the light 18-24 inches from the basking area. If the light is greater than 24 inches from the reptile, the UV rays will be too diffuse to provide optimal results.

Cage Set-up and Substrate (Bedding)

The cage or enclosure size and set-up will vary with the size and species of your reptile. Arboreal (tree-living) species will require tall cages with cage furniture that allows for climbing. Ground dwelling animals need plenty of horizontal space to stretch out and move around. Semi-aquatic species require water deep enough to submerge themselves as well as dry areas for basking. Water quality is very important for these species. It is important to make sure that a water filter is used and/or that water is routinely changed to ensure water quality. Using a separate tank for feeding live prey may also help prevent bacterial and fungal contamination of the water.

What type of water source should I use?

Water is not just something to consider for aquatic species. All reptiles need water from some source. Different species take in water in different ways. Aquatic species take in water when they feed and also absorb it through their cloacae cavity. Geckos lap water droplets off of vegetation and require a misting or drip system. Many desert species drink little or no water, using the moisture from food as the primary water source. Many land species also benefit from soaking in water on a regular basis. Snakes especially need shallow soaking areas in their enclosure.

What type of substrate (bedding) should I use?

For all species, it is important to consider the substrate used at the bottom of the enclosure. **Sand, gravel, aquarium pebbles or any other loose substance smaller than the reptile's mouth is considered inappropriate.** Some of these substrates are labeled and marketed specifically for use in reptile cages, but that doesn't make them safe for your pet. It is not uncommon for reptiles to ingest portions of substrate while feeding. This can lead to devastating implications. Paper, Astroturf or

large rocks are the preferred substrate for most reptiles. The substrate should be cleaned and disinfected or changed regularly to prevent bacterial or fungal build-up.

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Common Reptile Problems

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Metabolic Bone Disease (MBD)

Species most commonly affected: green iguanas, although many species can be affected

Husbandry (Care) Problem: poor dietary calcium and/or insufficient ultraviolet-B (UV-B) light

Systems Affected: Primarily musculoskeletal

How is metabolic bone disease diagnosed?

Metabolic bone disease (MBD) is a medical condition in which a calcium deficiency leads to a calcium-phosphorous imbalance and low blood calcium levels. While reptiles of any age can be affected, classic MBD is most prevalent in young animals, due to the increased calcium needs associated with growth.

A diagnosis of MBD can be made when clinical signs of MBD are present with one or more of the following:

- Poor dietary calcium
- Excessive dietary phosphorous with adequate or low dietary calcium
- Insufficient UV-B lighting

Less common factors include:

- Low environment temperature
- Dietary vitamin D deficiency
- Low total protein

Moderate to severe MBD can be confirmed on skeletal radiographs. Decreased visibility of boney structures, particularly the small bones of the limbs is characteristic of MBD. Irregular thickening of the long bones may also be seen due to a condition called fibrous osteodystrophy. Blood tests may be done to look at blood calcium levels.

What are clinical signs of metabolic bone disease?

The earliest and most consistent sign of MBD in lizards is lack of truncal (body) lifting. A normal lizard should stand and walk with its chest and pelvis elevated off of the ground. Early in the course

of the disease, the lizard may drag its pelvis while still keeping its chest elevated. As the disease progresses, both the chest and the pelvis will be on the ground when the animal is standing.

Eventually, the lizard will be unable to move because it cannot raise its body enough to allow movement. Lameness and/or reluctance to move may also be the result of broken bones due to the fragile condition of bones with this disease.

In young animals or animals affected by MBD before maturity, several growth deformities are commonly noted:

1. A lower jaw shorter than the upper jaw, resulting in an underbite
2. Fibrous osteodystrophy—a condition in which fibrous tissue builds up along the cortices of long bones as the body attempts to stabilize the bone
3. Kyphosis—a side-to-side curvature of the spine
4. Scoliosis—a top-to-bottom curvature of the spine
5. Abnormal shell or beak growth in turtles.

Low blood calcium associated with MBD is responsible for many of the clinical signs, especially in adults. Calcium is required for normal muscle contraction and relaxation. Low calcium may result in fine intermittent muscle tremors that are often most noticeable in the toes or at the base of the tail. As the disease progresses, muscle tremors may worsen and decreased appetite may occur. In the most severe cases of low blood calcium, seizures or partial paralysis may be seen.

How is metabolic bone disease treated?

Diet change and improved UV-B lighting are the MOST important part of treatment.

In most cases the veterinarian will give your reptile injections of calcium and vitamin D3. This will start to improve the amount of calcium in your pet's body. Usually a calcium supplement is sent home for continued at-home treatment of low calcium levels. Please remember that because MBD is directly related to poor husbandry (care), no treatment protocol will be effective unless the owner improves the animal's routine care by providing better nutrition, UV-B lighting and adequate temperature gradients. Nutritional problems take a long time to develop and a long time to treat. Don't expect to see an overnight cure for your pet.

Palliative therapy and supportive care will be recommended for your pet, depending on the types of signs your pet is experiencing. In moderate and severe cases, hospitalization is often necessary to provide your pet with the best treatment and nutritional support. This is especially true if your pet is not eating or has a markedly decreased appetite.

Vitamin A Deficiency and Related Disease

Species Most Commonly Affected: Water turtles

Husbandry (Care) Problem: Lack of sufficient vitamin A in the diet

Systems Affected: Eyes, respiratory system, skin, ears

How is vitamin A deficiency diagnosed?

A diagnosis of vitamin A deficiency is made based on clinical signs and history of a marginal or poor diet. Any turtle under four inches in diameter or recently acquired from the pet trade should be assumed to have been on a suboptimal diet. Response to vitamin A therapy supports the diagnosis.

What are the clinical signs of vitamin A deficiency?

1. **Ocular (Eye) Changes:** Early in vitamin A deficiency, mild eyelid swelling may be the only sign present. As the deficiency progresses, the eyelid swelling may become quite pronounced, and significant conjunctivitis may be seen. Secondary bacterial infections may result. Because vitamin A is essential for vision, blindness may ultimately result.
2. **Anorexia:** Turtles are strict visual feeders. If they cannot see, they will not eat. Once eye changes become severe enough to interfere with vision or cause blindness, the turtle will stop eating. This further contributes to the vitamin A deficiency.
3. **Pneumonia/Upper Respiratory Infection:** Infections of the respiratory tract occur frequently because of the essential role that vitamin A plays in epithelial cell health. Epithelial cells line the skin, digestive tract and respiratory tract. When they are not healthy, they cannot resist infection. Respiratory infections are often associated with open-mouth breathing, neck

extension (to facilitate breathing) and discharge/bubbles from the nose.

Pneumonia can be diagnosed with a special radiograph; however, this test is complicated and expensive. A cheap and easy test is to observe the turtle floating in water that is too deep for him/her to stand. A turtle with pneumonia will float slightly tipped to one side. The down side is the side with the most severe pneumonia. If the turtle floats on keel, the infection is either limited to the upper respiratory tract or the turtle has double pneumonia that equally affects both lungs. These can usually be distinguished by other clinical signs. To evaluate the upper respiratory tract, watch for bubbles from the nostrils. If bubbles are seen rising from the nostril, it can be assumed that the upper respiratory tract is clear on that side.

4. **Ear Abscesses:** Changes in the epithelial cells of the Eustachian (ear) tubes lead to ear abscesses. These appear as a protrusion (lump) on the side of the head just behind the eye. The thick pus usually requires surgical treatment.
5. **Hyperkeratosis:** Thickening of the skin and mouth parts may occur.

How is vitamin A deficiency treated?

Vitamin A can be given for three to six weekly treatments or until clinical signs begin to resolve. In severe cases, the turtle may need vitamin A injections every three days for two weeks before switching to weekly dose. Vitamin A injections should only be administered by a veterinarian, as too much vitamin A can cause serious side effects.

Owners should make sure their turtle is on a diet rich in vitamin A. Appropriate sources of vitamin A include algae, whole fish prey and reptile vitamin supplements. A reptile multivitamin containing vitamin A is recommended for at least one to three months following the diagnosis.

Routine long-term use of the multivitamin may be recommended in some cases. Anorexic animals should be force-fed an appropriate diet, including vitamin supplements, until they are eating adequate amounts on their own. Secondary problems such as pneumonia, ear abscesses, and eye infections will be treated as necessary.

Iodine Deficiency and Related Disease

Species Most Commonly Affected: Mature turtles

Husbandry (Care) Problem: Insufficient iodine in the diet

Systems Affected: Thyroid gland, connective tissue, skeletal muscle

How is iodine deficiency diagnosed?

A diagnosis of iodine deficiency can be made in animals presenting with clinical myxedema, a soft swelling of the head, neck and/or body. Goiters (enlarged thyroid glands) may also occur in turtles as a result of iodine deficiency. These are similar to goiters in other species—a firm enlargement in the lower neck. It should be noted, however, that there are other causes of goiters besides iodine deficiency. These include iodine toxicity, goitrogens in the diet and selenium deficiency.

What are the clinical signs of iodine deficiency?

Myxedema, goiter and signs of hypothyroidism (lethargy, decreased appetite) are associated with iodine deficiency.

How is iodine deficiency treated?

Oral iodine supplementation is generally the only treatment necessary. Iodine can be supplemented in the form of iodized salt, kelp tablets or povidone-iodine added to the water. In severe cases, fluid therapy, forced nutritional support and supportive medical care may be needed.

Shell Rot

Species Most Commonly Affected: Water turtles

Husbandry (Care) Problem: Poor water quality, lack of basking area, insufficient ultraviolet (UV) light

Systems Affected: Shell, skin

How is shell rot diagnosed?

How is shell rot diagnosed?

Shell rot is diagnosed on physical exam when pitting or areas of ulceration (sores) are noted on the shell of a turtle. In general the wet ulcerative lesions are usually from bacterial infection, while the dry ulcerative lesions (less common) are usually due to fungal infection. Cultures may be used to determine the type of infection.

What are the clinical signs of shell rot?

Pits or ulcerative lesions are the most consistent clinical finding. A whitish growth or discoloration of the affected area may accompany the lesion. With deep ulcerations, a foul odor may be noted.

How is shell rot treated?

With deep lesions, it may be necessary to surgically treat the affected areas. Once all dead tissue has been removed, topical medication is usually applied twice daily. With deep lesions or more severe cases, oral medication may also be necessary. Superficial lesions usually only require the topical treatment.

Owners should work to improve water quality issues, as poor water quality is the most common cause of shell rot. Water filters should be used to keep water clean, and the water in the tank should be changed completely on a regular basis. Turtles with shell rot should be housed separately from other turtles. A few drops of iodine can be added to the water to help minimize the bacterial load.

It is also important to make sure that the turtle has an adequate basking spot. While insufficient basking will not cause an infection, it can certainly worsen an infection once it starts. A turtle needs to be able to dry out completely in order to minimize bacterial and fungal growth. UV lights are also helpful in minimizing bacterial and fungal infections, as the UV rays naturally eliminate microorganisms. For these reasons, a turtle with shell rot should be encouraged to bask and to spend much time out of water; however, be sure the turtle has access to clean water for at least several hours a day to maintain adequate hydration.

Substrate Impaction/Foreign Body

Species Most Commonly Affected: Any species housed on improper substrate (ground material)

Husbandry (Care) Problem: Loose ground material with particles smaller than reptile's mouth

System Affected: Digestive system

How is it diagnosed?

Substrate impaction is when your reptile ingests particles of the loose ground material (substrate) in his or her cage. Diagnosis of a substrate impaction or foreign body is made on abdominal radiographs. In most moderate to severe cases, the foreign material can be clearly identified on routine films. Most substrate impaction causes only a partial gastrointestinal obstruction, so films using a contrast (dye) material may be helpful in diagnosis if the foreign material is not clearly evident on routine radiographs. In some cases, the substrate impaction or foreign body can be felt during abdominal palpation.

What are the clinical signs of substrate impaction?

The most consistent sign associated with substrate impaction or a gastrointestinal foreign body is anorexia (not eating) or decreased appetite. Decreased stool volume and frequency may also be noted. When the condition is more chronic, weight loss and signs of malnutrition may also be evident.

How is substrate impaction treated?

In most cases of substrate impaction or foreign body, surgical removal is the preferred treatment. In mild cases, a hairball remedy laxative may be tried. This is only an option if the reptile is still eating and is in otherwise good health. Fluid therapy may also be helpful, especially if the animal is stressed or showing signs other than decreased appetite. If the impaction is in the colon or near the end of the small intestines, soap-and-saline enemas may be helpful.

If medical treatment is attempted, it is very important to ensure that the cage temperature and humidity are appropriate. Low body temperature will result in decreased gastrointestinal motility, further aggravating the problem.

Incomplete Shed

Species Most Commonly Affected: Snakes (Lizards can also be effected)

Husbandry (Care) Problem: Low humidity, lack of rough/porous material in cage, low temperature

System Affected: Skin

How is incomplete shed diagnosed?

Incomplete shed is diagnosed when patches or sections of the old skin remain following a normal shed cycle. The speculum, the clear scale over the eye, is commonly affected.

What are the clinical signs of incomplete shed?

The most evident sign is flaky, dry patches of dead skin. Extra scales over the eyes are commonly present and may be the only sign. This may give the eye a cloudy or slightly bluish appearance that does not go away following a shed cycle. In some cases, pus or blood may be present in the eye as a result of a secondary eye infection.

How is incomplete shed treated?

Soaking the snake (or lizard) in warm water or wrapping it in a warm wet towel will moisten and loosen the areas of dry dead skin. You can then peel off these patches. This sometimes requires several sessions of soaking and peeling. It is very important to peel the skin gently and only after it is thoroughly moistened. If the old skin is peeled too aggressively, the new skin beneath it may be damaged or accidentally removed. If old speculums are present over the eye, the same method of soaking and peeling can be used; however, **this should be done by a veterinarian**, as it is very easy to damage the new speculum or even the eye itself in the process.

How can I prevent incomplete sheds?

After an incomplete shed, it is very important to identify and correct the problems that caused it. The most common cause is low humidity, especially when combined with low temperature (see Temperature section). This can be corrected by using a humidifier, regularly misting the cage with water from a spray bottle, or placing a damp towel under the basking light (be sure to change the towel at least daily to prevent mold growth). Proper humidity is needed for good skin hydration and proper separation of skin layers during a shed.

It is also important to provide an area for the reptile to soak in water. A large shallow dish with a few inches of water is an important part of a snake's cage set-up. Be sure the water is adequately warmed, or the snake will avoid soaking. Lizards such as iguanas can be put in the bathtub or in a children's swimming pool (one NOT used by children) for soaking. Soaking helps ensure adequate hydration.

Finally, snakes need a rough or porous surface to rub against to start a normal shed. Bark, cement blocks/cage furniture, and pumice stones are all commonly used for this purpose. At the start of the shed, the snake will rub his or her head over the rough surface causing the old skin to split. The snake then continues to rub against this surface to gradually peel back the skin in one continuous sheet. If no adequate surface is available, the snake may not be able to properly shed.

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