

Metabolic Bone Disease in Reptiles

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Metabolic bone disease, also known as Fibrous Osteodystrophy, is one of the most commonly diagnosed illnesses among reptiles. It is most frequently related to improper diet and husbandry that results from misinformation or a lack of knowledge about proper reptile care. Below, we will discuss the causes, diagnosis, and treatment as well as how you can prevent it.

What is Metabolic Bone Disease?

Metabolic bone disease (MBD) refers to a number of illnesses that weaken the bone or impair systemic function, and it occurs when there is a disruption in the metabolism of calcium. Reptiles with MBD suffer from malformation and softening of bones, deformed shells (in turtles and tortoises), and a number of other problems. It does not occur in the wild, which is why it is thought to be a result of diet and care while in captivity. Metabolic bone disease can be fatal if left untreated.

Causes

Metabolic bone disease is most often related to improper dietary and husbandry habits. Reptiles require a calcium:phosphorus ratio of 1:1 to 2:1 in their daily diet. Things that interfere with this ratio include:

- Presence of substrates that impair calcium absorption
- Vitamin D3 deficiency
- Lack of UVB light
- Improper temperatures that prevent proper digestion of food

When the ratio is skewed, hypocalcemia (too little calcium) or hypercalcemia (too much calcium) can occur.

Husbandry issues factor in when a reptile does not have the proper light or

temperature gradients in her habitat. Reptiles need Vitamin D3 to properly utilize the calcium in their diet, and UVB light promotes Vitamin D3 synthesis in the body. Improper light cycles or lack of UVB light will result in a lack of Vitamin D3, which will then lead to an inability to absorb and metabolize calcium. Improper temperatures, especially temperatures that are too low, will affect the reptile's ability to digest food.

Other causes of metabolic bone disease include diseases of the kidney, liver, small intestine, thyroid, or parathyroid. In this case, MBD is secondary to the initial disease because the disease has affected the body's ability to metabolize calcium. However, these instances are fairly rare, and most cases of MBD are related to improper diet and care.

Signs & Symptoms

When calcium, phosphorus, or Vitamin D3 levels are too low or too high, it can interfere with a number of processes in the body. These three elements control many functions, including bone growth and maintenance, muscle contraction, blood coagulation, maintenance of a regular heartbeat, metabolic functions, and neuromuscular functions.

The imbalance can result in a variety of signs that can be felt or seen at different points in the illness, most of which are related to bone and muscle issues. Most early symptoms can only be felt during a physical exam, and visible signs don't develop until later stages.

Early signs that will be felt before they are seen include:

- Hard knobs on the long bones of the legs
- Bumps along the spine on the back and tail
- Bilateral softening or hard swelling of the lower jaw (referred to as "rubber jaw")
- Softening of the plastron or carapace in turtles and tortoises

Visible signs include:

- Tremors and twitches in the muscles of the legs and toes
- Jerky gait when walking and moving around
- Shaking while being held

Signs present in advanced cases of metabolic bone disease include:

- Constipation
- Anorexia
- Lethargy
- Weakness
- Partial paralysis
- Fractured bones

If you see any of the above symptoms, seek immediate veterinary attention.

Diagnosis

Because the disease is so prevalent and the signs and symptoms are clearly indicative of the problem, metabolic bone disease is usually diagnosed with a physical exam and information obtained from the owner about the reptile's diet and husbandry. In some cases, x-rays may be used to determine the amount of damage to the bones.

Treatment

The treatment your veterinarian prescribes will depend on the cause of the disease, the severity of the signs, and how long the reptile has had the illness. Mild cases are usually treated by a change in diet and husbandry. Moderate to severe cases may also require a prescription from your veterinarian for a medication such as Calcitron, Calphosan, or NeoCalGlucon. Some severe cases may require hospitalization.

With proper treatment, the calcium deficiency can generally be corrected by changes in diet and husbandry, but deformities are usually permanent. Without treatment, the reptile will generally suffer a painful death.

Prevention

Preventing metabolic bone disease is both safer and easier than attempting to treat it, and there are a number of factors that go into preventing MBD. Proper diet is arguably most important. The [food](#) you choose should have the proper calcium:phosphorus ratio. Omnivores and herbivores should have a diet that is calcium rich and dense in nutrients. Omnivores and carnivores should be given prey that has eaten nutritious foods and been gutloaded before being fed to the reptile. Carnivores require food that contains bones in addition to meat and organs. [Calcium and vitamin supplements](#) should also be given as directed by your veterinarian.

The environment must also be properly lighted and heated. Reptiles require UVB or full spectrum [lighting](#) for proper Vitamin D3 synthesis. Photoperiods should be dictated by your reptile's natural environment to make sure that it gets enough light, and we recommend the use of a [timer](#). [Temperature](#) requirements will vary by species, but it is very important that you provide a temperature gradient in the correct range and monitor it with a [thermometer](#).

Finally, the [enclosure](#) should be large enough to provide your reptile with room to move around and get exercise.

Though caring for reptiles properly does take time and effort, it is our responsibility as herp owners to do so. Metabolic bone disease is completely avoidable with the proper diet and care, and we urge anyone considering a reptile to research the specific needs of that species before bringing the reptile home. Putting the effort in ahead of time to learn about diet and habitat requirements will

result in a healthier, happier reptile.