# REPTILE AND AMPHIBIAN IMAGING

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**Abstract:**
Radiographs are a primary noninvasive diagnostic tool for reptiles and amphibians. Orthogonal views are needed in all species, with segmental body imaging for larger snakes, and 3 views (AP, DV, and lateral) for chelonians. Reptiles and amphibians are susceptible to osseous and soft tissue pathology, similar to other species. Positioning for imaging can be challenging, and the use of props and restrain assistance materials (tape/foam packing material/bowls or buckets, etc.) may be helpful to obtain diagnostic images. Due to the nature of the coelomic cavity being continuous, with no division between the thoracic and abdominal compartments, serosal detail of soft tissue can be difficult to define and GI contrast often is used to help outline or highlight areas of the coelomic anatomy. Some common pathological conditions that occur in reptiles and amphibians include nutritional secondary hyperparathyroidism, cardiac disorders, GI motility delay and impaction, hepatomegaly, parasitism, enteritis, foreign body ingestion, pneumonia, neoplasia, osteomyelitis, fractures, etc. Radiographs offer an initial baseline for evaluation for these conditions, and advanced imaging with ultrasound, CT, MRI and fluoroscopy may be needed, based on the findings on radiographs.

Knowledge and understanding of normal anatomy and physiology for reptiles and amphibians are essential for interpretation of normal radiographic structures and any abnormalities or deviations from normal that may be present. Clinical signs and presentations are important for diagnosis of pathology and illness, and review of husbandry is critical, as ~80% of disease in captive reptiles and amphibians is related to suboptimal husbandry and diet. Nutritional secondary hyperparathyroidism is the most common metabolic disorder in reptiles, and is often relative to lack of appropriate/adequate calcium supplementation of the diet (with exception of snakes due to whole prey diet) in conjunction with appropriate UVB lighting. This condition leads to osteopenia, osteodystrophic change, hypocalcemia which allows for pathological fractures, spinal deformities, limb deformities, fractures, neurological deficits, and in severe cases seizures and death, and is more common in younger and growing animals. In adult animals, renal pathology can alter metabolism of calcium and cause renal secondary hyperparathyroidism. Osteomyelitis can also occur in reptiles, and in some cases can be difficult to treat due to slower metabolic rates. Fractures may require surgical intervention, external coaptation, and rectification of any potential housing or diet issues that may have allowed for trauma or entrapment. Shell fractures may require Another osseous condition in reptiles is osteoproliferative disease, which may be due to infectious, traumatic, nutritional or unknown causes. In snakes and lizards, this condition eventually leads to fusion of the spine and impingement on the spinal cord, which can alter mobility and be painful.

Folliculogenesis is a common finding on radiographs and occurs regardless of exposure to male animals in most reptiles. Follicles develop on the ovaries and are preovulatory during this time and these may reabsorb or move into the oviduct. Once these move into the oviduct and are postovulatory, they will develop into eggs. In species that lay eggs, oviductal inertia can occur, and may require changes to husbandry, treatment with hormonal stimulation, or surgical intervention. Additionally, ruptured follicles can lead to coelomitis and become life threatening in untreated cases. Cystic calculi can occur in species with bladders (chelonians, lizards, amphibians) and the radiographic appearance of calculi suggests organic composition in many cases. Many calculi in reptiles are urate in nature, and can occur due to renal disease, dehydration, high protein diets, etc. In some cases, these are incidental findings on imaging, but if too large to pass or impinging on other structures, surgical intervention may be necessary. Gout may also be initially identified on radiographs, usually as enlargement of the joints, but definitive diagnosis requires FNA for cytology to confirm urate crystals, versus pseudogout, infection, fluid accumulation or inflammation.

As in other species, organomegaly due to inflammation, infection and neoplasia can occur in virtually any organ system, and radiographs often allow for visualization of an enlarged organ silhouette, impaction of fecal material or gastric ingesta, and improve selection of follow-up diagnostics. Pulmonary pathology is also a common condition in reptiles and amphibians, and radiographs are an excellent way to evaluate the lungs and pulmonary linings for change. Baseline radiographs are an excellent way to follow change over the course of treatment for multiple conditions and are readily available in most clinics.

Obesity is also a condition of concern in many reptiles and amphibians, and radiographs allow for evaluation of coelomic fat bodies for symmetry, mineralization, and size changes. Radiographs are a simple, available, and noninvasive method for initial diagnostic work up in reptiles and amphibians.

**References:**

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