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Topic Overview

The physical examination, combined with a thorough history with husbandry, shapes the differential diagnosis and guides the diagnostic plan for reptilian patients. The physical examination of reptiles consists of a distant examination and a hands-on examination. Components of the physical examination differ between species. This article provides an overview of how to examine chelonians (turtles and tortoises), lizards, and snakes.

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EXOTIC MEDICINE

Performing Physical Examinations of Reptiles in General Practice

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The reptilian physical examination follows the same basic principles as used in examining small animals. First, the clinician needs to obtain a detailed history, including a thorough husbandry evaluation. Basic guidelines for taking this history can be found elsewhere.[1,2] Together, the history and physical examination findings allow the clinician to formulate a complete problem list, which then leads to the differential diagnosis for the reptile and guides the diagnostic plan.

The physical examination of reptiles is made up of a distant examination and a hands-on examination (**BOXES 1 THROUGH 3**). Practice is needed to become proficient in each of these areas, and this article is only an introduction. Components of the physical examination differ based on species. This article broadly covers the orders Testudines (chelonians, also known as turtles and tortoises) and Squamata (lizards and snakes).

BOX 1 Suggested Order of Complete Physical Examination of Snakes

1. Distant examination, including evaluation of feces
2. Eyes, including fundic examination and evaluation of the spectacles to evaluate for dysecdysis
3. Nares
4. Heart evaluation using Doppler ultrasonography
5. Dorsal spinal musculature palpation and determination of body condition
6. Coelom palpation
7. Vent examination
8. Oral cavity, paying close attention to the teeth, tongue, and glottis

Learning Objectives

- As with mammalian physical examinations, it is important to develop a consistent order for the reptilian examination to thoroughly evaluate each body system.
- Performing a thorough physical examination is essential to obtain information about the presenting complaint and assists in developing the differential diagnosis.
- Some components of the physical examination differ between reptilian species. For example, snakes do not need limb palpation, and the presence of a shell limits coelomic palpation in chelonians.
- Reptiles can be a source of zoonotic diseases. Salmonellosis is a disease of significant public concern.
- Examination of large, dangerous, or aggressive reptiles should only be performed by experienced clinicians and trained veterinary team members.

BOX 2 Suggested Order of Complete Physical Examination of Lizards

1. Distant examination, including evaluation of feces
2. Eyes, including fundic examination and evaluation for retained spectacles in some gecko species
3. Ears
4. Nares
5. Heart evaluation using Doppler ultrasonography
6. Dorsal spinal, tail, and pelvic limb musculature palpation and determination of body condition
7. Feet and limb examination
8. Coelom palpation
9. Vent examination
10. Oral cavity, paying close attention to the teeth, tongue, and glottis

BOX 3 Suggested Order of Complete Physical Examination of Chelonians

1. Distant examination, including evaluation of feces
2. Eyes, including fundic examination
3. Ears
4. Nares
5. Heart evaluation using Doppler ultrasonography
6. Dorsal skull and limb musculature palpation and determination of body condition
7. Feet and limb examination
8. Coelom palpation
9. Vent examination
10. Oral cavity, paying close attention to the tongue and glottis

Classically, reptiles take longer than mammals to show evidence of illness and can take longer to improve from illness as well. This tendency makes routine and regular veterinary visits essential.

DISTANT EXAMINATION

Evaluating a reptile from a distance before restraining it for a full physical examination is valuable. If possible, asking owners for videos of the animal moving around its enclosure, where it is comfortable, can provide information that may not be gleaned during the veterinary visit. Some reptiles may be nervous or aggressive in the clinic, which may affect the clinician's ability to assess them accurately. Evaluate the feces, if available, and collect them in case they are needed for diagnostic testing following the physical examination (**FIGURE 1**).

HANDLING AND RESTRAINT

Safe handling involves safety for both the handler and the reptile. As the handler, it is important to recognize the defensive mechanisms of the type of reptile being handled. For many species, the first instinct is to escape. However, some may be quicker to resort to aggression, such as male green iguanas, and the clinician and handler should be aware of this. Handling gloves and long sleeves can be used to help protect the handler's hands and arms. Due to the concern for *Salmonella* species, which all reptiles have the potential to shed intermittently, the handler and the examiner should wear gloves. It is also recommended that owners wash their hands after handling reptiles at home.

Handling Snakes

Identify the head of the snake and restrain it first, before removing the animal from its container. The head can be held behind the skull, using the thumb and

FIGURE 1. Normal feces and urates produced during the physical examination of a bearded dragon.

fingers along the lateral aspects of the body. The other hand is used to assist in supporting the remainder of the body; in general, there should be 1 handler per 3 feet of snake. Docile snakes can be allowed to roam over the hands and arms to get an idea of muscle tone, mobility, and proprioception.

Handling Lizards

Due to the variety of sizes, temperaments, and strengths of the animals in this group, a variety of handling techniques are needed. Lizards should never be grasped by the tail because some species, including leopard geckos and green iguanas, undergo tail autotomy to avoid predators.

Small individuals can move quickly; therefore, caution must be exercised when removing them from containers. Restraint of small lizards can be achieved by holding them around the pectoral girdle with the forelimbs against the coelom. Use caution to avoid impairing the animal's ability to breathe. Larger individuals can be restrained with the forelimbs held laterally against the body, and the pelvic limbs can be held laterally against the tail base to avoid the handler getting scratched.

Handling Chelonians

The presence of a shell creates challenges in the handling and physical examination of chelonians. This may lead to a need for sedation, even for basic procedures, as access to the head and limbs may be limited. Aquatic species are generally more apt to bite than terrestrial ones. Tortoises tend to be stubborn and uncooperative, which can make working with them frustrating. Due to these challenges, the importance of the distant examination cannot be emphasized enough.

Smaller species can often be examined on a table with restraint only needed for coelomic palpation and examination of the mouth. Larger species may require sedation for a full examination due to their strength. For coelomic palpation, the chelonian should be restrained in a vertical position, with the head up and the tail down. The restrainer should position their hands along the bridge area to avoid being scratched by the forelimbs and to stay out of the way of the examiner. Once the examiner is in position to palpate, rocking the animal back and forth can allow for appreciation of abnormalities.

HANDS-ON EXAMINATION

Once the reptile is in hand, monitor its mentation, response to stimuli, and behavior throughout the physical examination and restraint period. During palpation, be aware that reptiles do not have lymph nodes.

A general, brief neurologic examination should be performed with each physical examination.[1] While moving through the physical examination, note the cranial nerves and appreciate reflexes and motor and sensory responses.

The oral evaluation is often left for last as it can be the most stressful part of the examination, but this decision is ultimately based on clinician preference.

Lung auscultation is not routinely performed in reptiles due to the challenges associated with scales and artifact noise; however, in lizards, a damp gauze can be placed between the stethoscope and the scales to decrease noise.

The vent of all species, which is the external opening of the cloaca, should be evaluated. The cloaca is the communal chamber of the digestive tract, urinary tract, and reproductive tract.

Every animal should be accurately weighed, and a body condition score should be assigned. Pairing these measurements is important and allows for tracking trends over time. Body condition scoring is subjective but becomes more accurate and precise with repetition. Either a 5-point or 9-point scale may be used as long as it is consistent within the practice. To assess body condition in lizards, palpate over the tail, pelvis, and

FIGURE 2. Example of a body condition score of 1 on a 9-point scale in a bearded dragon.

pelvic limb areas. Some species store fat within their tail, such as leopard geckos. In snakes, palpate over the spine to evaluate the musculature. Weight loss can lead to loose skin folds with more of a pronounced spine in lizards and snakes (**FIGURES 2 AND 3**). Assessing body condition in chelonians often relies on the musculature of the limbs and dorsal skull, as well as the subcutaneous fat stores.

Physical Examination of Snakes

Evaluate the entirety of the integument, including the head and ventrum, for dysecdysis (**FIGURE 4**). Snakes should shed their skin all in 1 piece, including their fused eyelids, known as spectacles. Also evaluate the integument for any evidence of trauma, infection, or parasitism. The infraorbital pits and nares should be clear, without any debris or discharge. The mouth can be opened gently with a plastic spatula to evaluate for masses, ulceration, hemorrhage, or foreign material. The state of the teeth should also be evaluated. Evaluate the eyes closely, as this group commonly has issues with shedding of the spectacles.

The heart rhythm and rate are evaluated using a Doppler ultrasonography probe placed over the heart, which is typically in the cranial third of the body. Heart murmurs cannot be ruled out with Doppler ultrasonography. The clinician may be able to palpate the heart; stomach; liver; gastrointestinal tract and fecal material; and female reproductive tissue, including active ovaries and/or eggs. The vent should be clean

FIGURE 3. Example of a body condition score of 2 on a 9-point scale in a ball python.

FIGURE 4. Dysecdysis in a bull snake. Note the patchy, transparent skin that should have shed all in 1 piece.

FIGURE 5. Hemipene openings in a male bull snake.

and free of discharge and have adequate tone. In males, the hemipenes can be used to confirm the sex of the animal (**FIGURE 5**), though probing may be needed if the hemipenes are not readily apparent.

Physical Examination of Lizards

Most lizards shed their skin in stages; therefore, retained skin must be differentiated from patchy dysecdysis. Retained skin is often brown and dry, whereas dysecdysis is often pliable and transparent (**FIGURE 6**). Rostral damage in any species can be indicative of escape attempts; if seen, the enclosure should be evaluated closely for appropriateness for the species. Skin folding and tenting can indicate dehydration or a low body condition score.

The mouth can be opened by placing 1 hand on the maxilla and 1 hand on the mandible and applying gentle traction. The oral cavity should be evaluated for masses, hemorrhage, ulcerations, or foreign material. The state of the teeth should also be evaluated. Periodontal disease is not uncommon in bearded dragons and should be graded (**FIGURE 7**).[3]

Evaluate nares and tympanic scales for swelling or discharge. Eyes should be clear and free of discharge. Some species of geckos have spectacles, like snakes, and these should be evaluated for retained shed. All limbs should be palpated for swelling, masses, or fractures, as nutritional secondary hyperparathyroidism and renal secondary hyperparathyroidism are common in lizards.

As in snakes, a Doppler ultrasonography probe is used to evaluate the heart's rate and rhythm and can be placed ventrally between the forelimbs or laterally in the axillary region (**FIGURE 8**). On coelomic palpation, the clinician may appreciate the gastrointestinal tract and fecal material; the liver; fat bodies; or female reproductive tissue, including active ovaries and/or eggs. The vent should be clean and free of discharge and have adequate tone. In large lizards, such as adult green iguanas, a digital cloacal examination should be performed to palpate for enlarged kidneys or masses. The kidneys lie in the pelvic region in many species, including green iguanas and bearded dragons. Many species are sexually dimorphic, and the tail region should be evaluated for hemipene bulges, cloacal pores, and prominent femoral pores in males (**FIGURE 9**).

FIGURE 6. Dysecdysis in a Jackson's chameleon. Note the patches of transparent skin.

FIGURE 7. Periodontal disease in a bearded dragon.

FIGURE 8. Doppler ultrasonography probe placement for assessment of heart rate and evaluation of heart rhythm in a bearded dragon.

FIGURE 9. Comparison of male and female sexual dimorphism in crested geckos. The hemipene bulges can be appreciated in the male **(left)** and the absence of them in the female **(right)**.

Physical Examination of Chelonians

Chelonians shed both their skin and their scutes, the keratin coverings on the shell, at regular intervals. This happens more frequently in aquatic than terrestrial species. Like lizards, their skin sheds in patches. Check the shell for flaking, trauma, infection, or pyramiding. The causes of pyramiding are multifactorial and include temperature, humidity, and diet.[4,5]

Slow, gentle, steady pressure on the maxilla and mandible can be successful in opening the mouth. When this is done slowly and with patience, tools are often not required. Alternatively, high-value food items can be used with gregarious species to encourage them to open their mouth. Evaluate the mouth for plaques, masses, hemorrhage, and other abnormalities.

The eyes should be clear and free of discharge, with the exception of some tearing. This is normal due to the lack of a nasolacrimal canal.

The eyes should be clear and free of discharge, with the exception of some tearing. This is normal due to the lack of a nasolacrimal canal. The nares should also be clear and free of discharge.

The tympanic scales should be flat. Bulging can indicate aural abscessation. The limbs can be extended using gentle, steady traction to palpate for any fractures, masses, or swellings.

As in the other groups, the heart rate and rhythm are evaluated using a Doppler ultrasonography probe. The probe can be placed in the prehumeral area lateral to either side of the neck. A pencil probe attachment can be useful for this group.

For coelomic palpation, the examiner will need to restrain the pelvic limbs caudally to access the prefemoral fossa. Very little should be palpable in a normal animal. Evaluate for evidence of cystic calculi, fat, enlarged gastrointestinal loops, and eggs in females.

Evaluate the vent and tail, which should be clean. In males, the tail is typically longer to accommodate the phallus, and in females the position of the vent is closer to the shell. Most species are sexually dimorphic. Other

FIGURE 10. Male characteristics in a red-footed tortoise. Note the concave plastron, the long tail, and the placement of the vent near the distal portion of the tail.

male characteristics can include a concave plastron in tortoises and longer forelimb claws in aquatic species (**FIGURE 10**).

SUMMARY

The physical examination of reptiles follows the same basic principles as those for small animals. Practice improves both comfort level in handling and the speed of the examination. Use of sedation may be required to allow examination in some species. TVP

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CE QUIZ QUESTIONS

1. **Which group of reptiles does not have teeth?**
   a. Lizards
   b. Chelonians
   c. Snakes
   d. None of the above

2. **Which of the following organ systems is not a component of the cloaca in reptiles?**
   a. Reproductive
   b. Urinary
   c. Gastrointestinal
   d. Respiratory

3. **Which species would be expected to shed its skin in a single complete piece?**
   a. Ball python
   b. Leopard tortoise
   c. Bearded dragon
   d. Box turtle

4. **In reptiles, the heart rate and rhythm, but not the presence of murmurs, can be evaluated using a Doppler ultrasonography probe.**
   a. True
   b. False

5. **Which of the following species would not be at risk for retained spectacles?**
   a. Tokay gecko
   b. Ball python
   c. Corn snake
   d. Russian tortoise