Anatomy and Disorders of the Oral Cavity of Reptiles and Amphibians

Joanna Hedley, BVM&S, DZooMed (Reptilian), DECZM (Herpetology)

KEYWORDS

• Reptile • Amphibian • Oral • Stomatitis • Neoplasia

KEY POINTS

- A wide variety of disorders may be seen affecting the reptile and amphibian oral cavity.
- Problems can be easily missed by owners until they are at an advanced stage because of the difficulty of examining the oral cavity at home.
- Many problems are secondary to an inappropriate environment or diet and may be related to systemic disease, so a full history and clinical examination are always required.
- Treatment of oral disorders requires a holistic approach including correction of any predisposing factors in order for long-term successful resolution of the problem.

ANATOMY AND PHYSIOLOGY OF THE ORAL CAVITY

The oral cavity in reptiles and amphibians can vary significantly between the different orders and even between species. A clear understanding of the normal anatomy is, therefore, important in order to be able to identify and understand abnormalities that may occur.

The Reptile Oral Cavity

Reptiles are usually divided by their skull structures into 2 groups: either anapsids or diapsids.[1] Anapsids have a simple skull structure lacking true temporal openings, and chelonians are the only extant members of this group. Other reptiles have a diapsid or modified diapsid skull structure with temporal openings, which are particularly well developed in lizards and snakes.

Dentition varies among different families; but if present, teeth are composed of enamel, dentine, and cement similar to those of other vertebrates.[2] However, teeth are typically homodont (the same shape) and lack a periodontal membrane, so instead are directly ankylosed to the surrounding bone. In many species, teeth are reabsorbed and replaced multiple times throughout their life, a process known as polyphyodonty.

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RVC Exotics Service, Royal Veterinary College, Royal College Street, London NW1 0TU, UK
E-mail address: jhedley@rvc.ac.uk

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A new tooth generally appears lingually to the older tooth, which is subsequently shed. Usually this process occurs in waves starting at the back of the oral cavity and progressing to the front. Those snakes and lizards hatching from eggs also possess an egg tooth modified from the premaxillary teeth in order to rupture the shell. Chelonians, crocodilians, and tuatara instead possess an egg caruncle composed of horny tissue, which serves the same purpose. This egg caruncle is lost or reabsorbed soon after hatching.

Skin folds or lips seal the oral cavity in squamates but are absent in chelonians and crocodilians. The oral cavity itself is lined by a mucous membrane consisting of squamous nonkeratinized epithelial cells, ciliated epithelial cells, columnar epithelial cells, and mucous glands.[3] Mucous membranes can vary in color and may be pigmented but should normally be moist. Salivary glands are present but vary between groups of reptiles, and tongue morphology is also variable depending on species. The glottis is located at the base of the tongue in chelonians and most lizards, whereas in snakes it can be easily visualized further rostrally. The palate is incomplete in all reptiles except crocodilians, which have evolved their own unique adaptations to separate the oral and respiratory systems and allow them to hunt underwater. The oral cavity and nasal cavity in other reptiles are linked by a pair of recesses (choanal openings). Eustachian tubes connect the oral cavity to the middle ear in those species in which a middle ear is present.

Chelonians

Chelonians have a relatively simple yet sturdy skull structure and, unlike other reptiles, can only open their mouth by lowering the mandible. They also lack teeth, so cannot chew their food. Instead, they have a keratinized horny beak (rhamphotheca) similar to that of birds, which overlies the osseous jaws. This beak is used for prehension, and ridges in the hard palate are also present in herbivores to help them grip and tear pieces of food. Despite their lack of teeth, the bite of a chelonian can be strong because of the adductor muscles running through a trochlear pulley system increasing their force.[1] Some species, such as snapping turtles (*Chelydra* spp), also have very sharp cutting edges to their jaws, so bites can cause significant damage.

Within the oral cavity, a short fleshy tongue is present with the glottis at its base (**Fig. 1**). The tongue aids with swallowing food, and numerous taste buds are present both on the tongue and elsewhere in the oral epithelium. Simple salivary glands are present, which produce mucus but no digestive enzymes.

Fig. 1. The normal oral cavity of a tortoise showing the horny beak and short fleshy tongue.