Clinical Technique: Handling and Treating Venomous Snakes

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Abstract

This article describes safe handling techniques for venomous snakes in the consulting room. Practical information is presented for clinicians who treat venomous snakes to reduce the risk of injury to the handler as well as the animal being treated.

Key words: **elapid; heading; tubing; venomoid; venomous**

Veterinarians who treat reptiles, and in particular snakes, will be asked to examine venomous snakes. It is important for clinicians to first determine if they want to treat venomous snakes. If the answer is yes, start with a thorough education that includes venomous snake identification, safe capture, and handling practices in the consulting room. The educational process also includes learning about the proper equipment needed for optimum safety and protection of both the handler and patient. The required equipment must be available before the first venomous snake is presented to the clinic. The author practices in Australia and sees Australian venomous species (most of which are elapids) in his veterinary hospital. Basic principles for the handling of venomous snakes are similar for all venomous snake families, requiring the same high standard of care, knowledge of ophidian behavior, and attention to detail. The focus of this article will be safe handling and examination of venomous snakes with an emphasis on elapids. Taxonomy, venomous snake identification, and emergency protocols for the treatment of snake bite are well covered in the literature.[1-4] Readers should note that the treatment of a snake bite, particularly the administration of first aid, varies depending on the species of snake involved with the injury.

Common Species

Venomous snakes are frequently classified into 3 groups based on their dentition: proteroglyphs, solenoglyphs, and opisthoglyphs. Aglyphous snakes are not venomous and do not have fangs (e.g., pythons).

Proteroglyphs

Proteroglyphous snakes (elapids) are characterized in part by a complex venom production and delivery system.[5] The system consists of a large venom gland in the temporal region of the head connected by a duct to the base of a large syringe-like fang on the rostral end of the maxilla. Because the entire venom production and delivery system is enclosed, except for the small opening at the tip of the fang, the secretion can be delivered quickly and under pressure when the snake bites. The word *proteroglyph*

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(Greek) refers to the rostral position of the fang in relation to the other maxillary teeth.

Solenoglyphs

Solenoglyphous snakes include vipers and pit vipers, which have large, mobile fangs that fold caudally along the upper jaw when not in use.[6]

Opisthoglyphs

Opisthoglyphous snakes comprise several groups of colubrid snakes (e.g., brown tree snake, *Boiga irregularis*) that have enlarged fangs at the rear of the mouth.

Elapids and Envenomation

The Fang

"Fang, n. 1, any long, sharp, pointed tooth with which prey is seized and held. 2, a tooth in the upper jaw which is recurved, conical, and elongate, and contains a lumen running along the anterior margin with orifices near the base and slightly proximally from the tip, through which the venom passes."[7]

Elapidae

The elapids, belonging to the proteroglyph group of snakes, are the largest family of snakes in Australia. [5] There are 75 recognized species of elapidae compared with the other 92 species in the other 7 families of Australian snakes.

Elapid fangs have an enclosed venom duct that opens in proximity to the distal tip. The main venom glands are modified parotid glands situated on each side of the head behind and below the eye that extend caudally beyond the corner of the mouth. These exocrine venom glands are enveloped by a fibrous capsule from which the fibers of the mandibular muscle arise.[1] When an elapid snake prepares to strike, the fangs rotate in a rostral direction; this allows for a more vertical strike as the fang enters the skin of the victim. The degree of rotation is much more pronounced in solenoglyphous snakes (e.g., vipers) because of the length of their fangs. The muscle surrounding the venom gland contracts as the fang enters the skin, forcing the venom out of the opening of the venom duct at the proximal distal tip of the fang similar to a hypodermic injection. Except for the genus *Pseudonaja*, which strikes with an open mouth, Australian snakes insert their fangs into the skin of the victim with their mouth closed.

Handling

Venomous snakes should be skillfully restrained for the physical examination, preferably by the keeper or owner and not the veterinarian. ***It is recommended that only experienced reptile veterinarians examine and treat venomous species.***

Equipment

Equipment required for the safe handling of venomous snakes includes the following: jiggers, hooks, pinning sticks, hoop bags with sewn corners, clear plastic tubes, pads (foam rubber), secure containers and holding facilities.[2]

"Tubing"

Tubing is a safer and less stressful snake capture technique for both the patient and handler compared with tailing, pinning, and heading. Clear plastic tubes are selected based on the size and length of the snake. The snake is initially coaxed into the tube (Fig 1), and once the snake has entered the tube with a significant percentage of the body, the body and the tube are grasped firmly together to prevent escape (Fig 2). A snug-fitting tube will prevent the snake from turning around. Snakes may become "tube shy" after repeated use of this handling technique. For the "tube shy" snakes it is recommended that the end of the tube be marked or painted in a dark color to encourage the snake to enter. Certain snake groups such as crotalids (e.g., rattlesnakes) and vipers exhibit different behaviors and

Figure 1. Tubing a mainland tiger snake, *Notechis scutatus*.