The Snake Box: A novel approach for safely restraining venomous snakes

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Physical examination of venomous snakes is sometimes required for veterinary treatment, sex determination, assisted feeding and various research applications (e.g., scale counts, blood or tissue sampling, etc.). However, this is a dangerous task; 87.5% of snakebite incidents in academic institutions with venomous snakes resulted from suboptimal techniques in capturing and restraining methods (Ivanyi & Altimari, 2004).

A standard technique for close examination of snakes is tubing, which consists of restraining the snake in a clear acrylic tube (Murphy, 1971). To place the snake into the tube, the animal is usually first moved to a low table or to the ground, and its head is gently guided into the tube with a snake hook. After the snake has entered the tube ca. one third of its body length, it is restrained by grasping the posterior body and the tube. In this way, the head of the snake is safely in the tube and the body is held so that the snake cannot move forward or backwards out of the tube. To gain better control of the snake, the other hand is used to restrain the rest of the body. The tube must be of adequate diameter to prevent the snake from turning around once inside.

Guiding aroused snakes into the restraint tube is a difficult and time-consuming task. In our experience *Crotalus atrox* (Western Diamondback Rattlesnake) tends to strike and bite the tube when it is placed in front of the snake's head, increasing the risk of teeth injuries and subsequent infections.

We developed a new method to easily and safely guide snakes into the restraint tube. The technique utilizes a rectangular box with internal angled walls, which create a V-shaped channel along the length of the box. The internal lateral walls have smooth surfaces which prevent the snake from crawling out (Fig. 1). One end of the box (in the longest dimension) has an opening in which a sliding door can be fitted. Alternatively, a door with porthole can be placed in the fitted brackets (Fig. 2). Several doors were manufactured, each with a porthole of different diameter. The diameter of the porthole is chosen according to the diameter of the tube to be used (based on the size of the snake being handled). Once the tube of adequate diameter is inserted into the porthole fitted in the box, the snake is placed into the box. We noticed that when the tube is covered with a dark fabric sleeve, the snake tends to enter more readily into the tube. After the snake has entered sufficiently, the tube and snake can be held in one hand and slid out of the box from the outside.

Our snake box consisted of an open-top 30.5 x 122 x 91.5 cm (width x length x height) box made of medium density fibreboard and roof decking plywood (1.6 cm thickness). The internal lateral walls are 0.3 cm panel boards, and the sliding doors are of wood 2.54 x 15.2 x 20.3 cm. To facilitate safe monitoring of the snake when inside the box, the anterior part of the box has a 15.2 x 20.3 cm plexiglass window. Rubber wheels (7.6 cm) with locks were added to facilitate easy transportation.

The introduction of the snake box into our laboratory protocols has made the handling of venomous snakes considerably safer and less stressful for both our research staff and the animals. The snakes crawl into the tube within a few minutes, allowing us to restrain several snakes in less time than would be required using traditional approaches.

Figure 1. *Crotalus atrox* contained within the snake box for observation. Note the following components of the snake box design: V-shaped channel, monitoring window and solid sliding door.

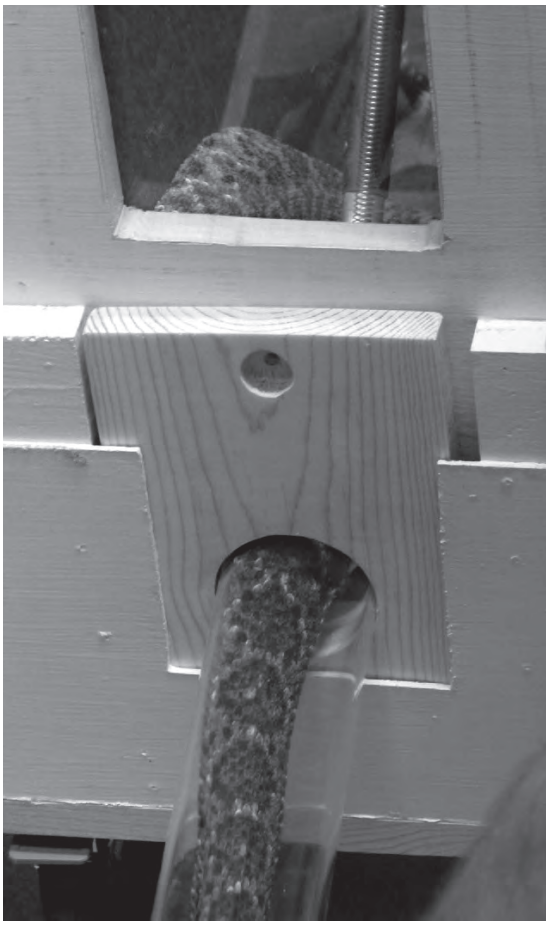

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Figure 2. View from the outside of the porthole end of the snake box with acrylic tube inserted through one of the porthole doors. The door has a circular recession (visible above the tube) allowing the tip of a snake hook to manipulate the door. The trunk of a *Crotalus atrox* is visible through the plexiglas monitoring window and inside the acrylic tube. Also visible is the snake tong used by an assisting researcher (cylinder behind Plexiglas).