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Nota científica

Modifications to the restriction method of Gentry and Casanas for otariid pups

Modificaciones al método de restricción de Gentry y Casanas para crías de otáridos

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Abstract. To avoid risky and expensive chemical immobilization of otariid pups, physical restriction is a better option. For this reason we constructed a stretcher that permits wide liberty to interact with the pup and take a variety of samples in a safe, comfortable and easy way, for both the pup and the researcher.

Key words: physical restriction, stretcher, sea lion health, Gulf of California.

Resumen. Para evitar el uso de la riesgosa y cara restricción química en crías de otáridos la mejor opción es la restricción física. Por lo anterior construimos una camilla que permite amplia libertad para la toma de diferentes tipos de muestras de manera segura, cómoda y fácil tanto para la cría como para el investigador.

Palabras clave: restricción física, camilla, salud de lobos marinos, Golfo de California.

Most studies in physiology, health and morphometry in otariids require the manipulation or the instrumentation of the animal to acquire data about it or its environment, e.g. time depth recorders, satellite tags, etc. Manipulation of an otariid requires effective restriction, both for the safety of the animal and the researcher. The most commonly used technique for restraining otariids is chemical immobilization (Trillmich, 1983; Bester, 1988; Stirling and Sjare, 1988; Boyd, et al., 1990; Mitchell and Burton, 1991; Griffiths, et al., 1993), mostly used for large and heavy individuals. Nevertheless, there are some cases in which this kind of restriction method is not convenient. During our work with California sea lion pups (*Zalophus californianus*) at Isla San Pedro Nolasco, where the terrain is rocky, steep, and without beaches, it would have been difficult to care for the pups during anesthesia and their total recovery from it. Therefore, chemical immobilization could endanger the pups if they were returned to the rookery and reached the water before being completely recuperated.

We needed to restrict the pups to take blood and smear samples, as well as measure and weigh them. Due to the limitations of chemical restrictions mentioned above, we

decided to use physical restriction which, in addition, is less expensive and risky for the pups integrity. Moreover, according to Gentry & Casanas (1997), it is a good idea to take into account the behavior of animals to improve their manipulation. However, the method of Gentry and Casanas (1977) presents certain disadvantages, which include closed ends that prevent observation of the animal as well as sampling cranial and caudal regions. That also represents the possibility of restricting the breathing of the pup. The opening of the stretcher is difficult and it is almost impossible to pour water directly on the animal to cool it. The handling is uncomfortable being a single heavy piece of wood in just one end of the fabric. In addition the full load of the pup falls on one person.

In this regard, Lynch *et al.* (1999) mention in their review on pinniped immobilization methods that existing methods of physical restriction had the disadvantage of not allowing the supervision of the physiological state of the animal, e.g. checking the state of mucous in animals with covered heads, as in the method of Gentry and Casanas (1997).

For these reasons we modified the stretcher proposed by Gentry & Casanas (1997) with the purpose of obtaining a structure that allowed a more effective interaction with the animal, that is more practical, manageable and easy

to transport. One of these modifications is the size of the holes which were of 7 x 13 cm for fore limbs and 5 x 10 cm for hind limbs (see Fig 1a) contrasting the 5 x 10 cm in all the holes for *Callorhynchus ursinus* used by those authors.

The stretcher was constructed with cotton canvas because of its durability and to be “friendly” with the animal, avoiding injuries by rubbing with the fabric. The fabric was folded on each side and sewn to form a passage for each one of the handlers, leaving sufficient space in such a way that the wood was surrounded and could be inserted and removed easily (see below). The seams were made by hand using heavy cotton thread.

The handles were made out of two thin pieces of solid pine wood (approximately 2 cm X 5 cm by 212 cm long) instead of one single thick piece, each piece attached to an edge of the fabric. This modification allows wrapping the fabric quickly around both pieces of wood, closing the stretcher to the body of the pup (Fig 1b), restricting it, but permitting opening of the stretcher (Fig 2) to take measurements such as total length and thoracic perimeter. It is also possible to cool the pup by pouring water on it to avoid hyperthermia. Using two pieces of wood improves handling, making it comfortable, because the total width of the handles is smaller than one made of a thick piece of wood.

This stretcher features open forward and back ends to permit access to the head, to take nasal smears, and to the caudal region to take fecal smears and rectal temperature. The design allows taking of blood samples or measurements from any of the four limbs, because all of them hang free through their respective holes (Fig. 3). It is also possible to take cardiac and respiratory frequencies with stethoscope throughout the fabric.

The stretcher was upheld by two “X” shaped wood stands (Fig. 1b, 4), that helped researchers to pick it up. These supports were useful in rocky terrain where we worked, because they can be opened widely. These stands consist of two strip sections of pine (approximately 2 cm X 5 cm by 103 cm long). They are attached at 20 cm of their upper end by means of a screw (in an orifice of greater diameter), that allows a free turn of both parts. The opening is limited by means of a nylon cord whose ends are fixed to each one of strips at their lower end.

As in the case of Gentry & Casanas (1997) the pups that we worked with were quiet during manipulation. Some pups, feeling themselves suspended, displayed swimming movements, and few individuals defecated or urinated on the stretcher (4 of 40). The stretcher was able to restrain five month old pups (about 30 kg); in fact, it worked well with pups weighing from 7 to 30 kg, with a total range

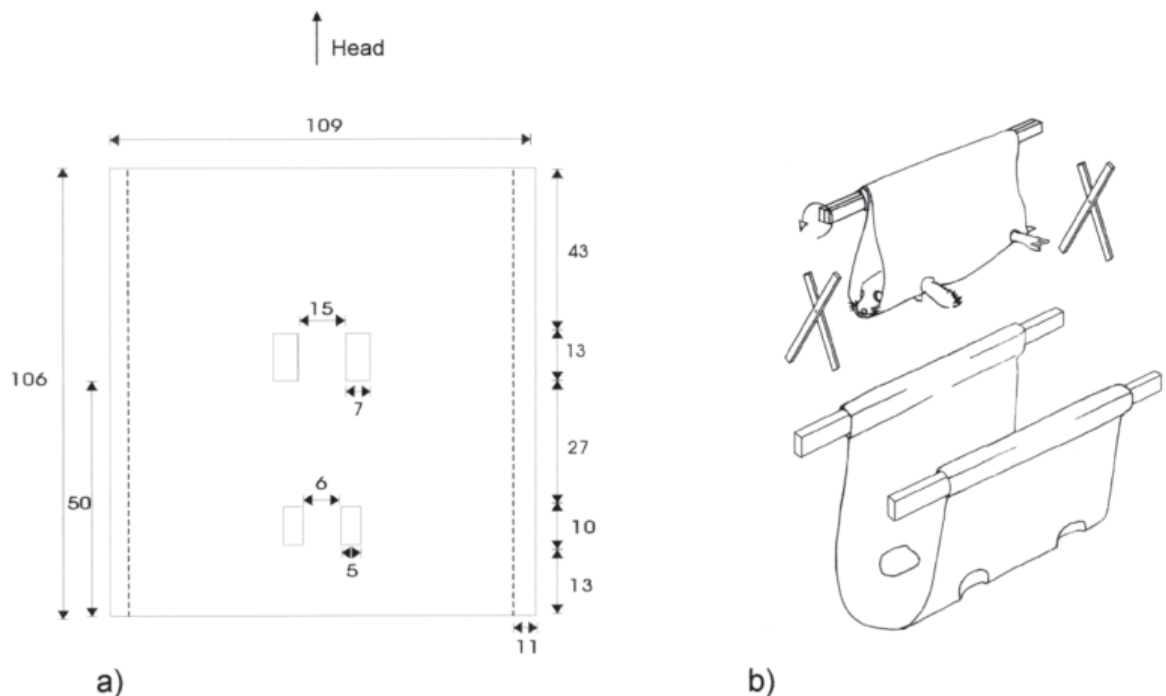


Figure 1. a) Stretcher dimensions in cm (not to scale) and, b) the way the stretcher is wrapped around the pup and positioned on the “X” stand.



Figure 2. Sea lion pup inside the open stretcher, prior to wrapping.



Figure 3. General view of the stretcher during blood sampling from the left hind limb.

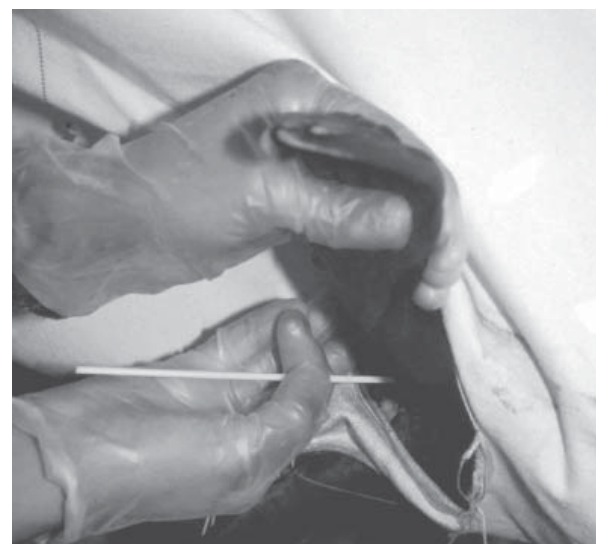


Figure 4. Close up of a smear sampling through a rear hole of the stretcher.

in length from 69 to 100 cm. We believe that it could be used to restrain older and heavier individuals due to the robustness and length of the stretcher. After working with 40 pups, we verified that handling, transport, storage and cleaning of this stretcher is easy, and allows for excellent interaction with the restrained individuals.

To summarize, the modifications presented in this work allow greater control of the conditions of the pup. In this new stretcher, the fact that the front and back ends are open, allows access to diverse mucous sampling, like oral, nasal, conjunctival, anal and prepuccial or vaginal, for monitoring the physiological state of the animal (including the rectal

temperature). In addition, the possibility of observing the opening and closing of the nostrils during breathing allows the determination of the respiratory frequency. The obstruction of nasal openings is also avoided.

An additional advantage with respect to the method proposed by Gentry and Casanas (1997) is the possibility of opening the stretcher separating the handles which allows wetting the animal, as well as to measure and to review the body of the pup. An added improvement concerns the user. This new stretcher has more comfortable handles, which are at the same time that lighter and easy to transport. In addition, the "X" stands avoid loading all the weight on one person as in the Gentry and Casanas (1997) stretcher. These stands make it possible to use the stretcher in places with irregular topography.

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