AN EFFICIENT LOWER JAW REMOVAL TECHNIQUE FOR LARGE MAMMALS

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INTRODUCTION

Knowledge of age-structure of wildlife populations is invaluable to management. State agencies estimate ages of harvested deer at registration stations for use in population modeling (Rupp et al. 2000, Grund 2001). Methods have been developed to age white-tailed deer *(Odocoileus virginianus)* by tooth wear and replacement (Severinghaus 1949) and examining the cementum annuli of front incisors (Sergeant and Pimlot 1959, McEwan 1963, Low and Cowan 1963) or molars (Ransom 1965, Gilbert 1966). Although many studies have examined aging techniques, an efficient technique for removing the lower jaw of a deer has not been described.

By removing the lower jaw of a white-tailed deer, tooth wear (Severinghaus 1949) can be examined and an incisor can easily be removed to determine age using cementum annuli. These two estimates can then be compared and increase the ability to accurately estimate age. We describe an efficient lower jaw removal technique for large mammals.

METHODS

During a radio telemetry study of white-tailed deer in southeast Minnesota, we developed a technique to efficiently remove the lower jaw, while minimizing care and cleaning of the jaw. A scalpel is required to complete the procedure.

The removal technique begins by narrowly spreading the upper and lower jaws enough to slide a scalpel into the mouth. The skin is then cut (Fig. 1) between the upper and lower jaw towards the posterior portion of the head until the blade reaches the posterior portion of the mandible. Once the posterior portion of the mandible is reached, the blade should angle and cut toward the ear (Fig. 2). The skin and muscle tissue should then be cut along both sections of the jawbone to completely expose the bone. At this point, most of the mandible on both sides should be exposed.

The jaw is now spread by placing one hand over the incisors and anterior portion of the lower jaw and placing the other hand over the nose and anterior portion of the upper jaw. The upper and lower jaws should be spread until the coronoid process separates from the temporal fossa and the mandibular condyle separates at the mandibular fossa (Fig. 3). The mandible can now be held by the coronoid process and pulled forward away from the skull (Fig. 4). To prevent cracking the jaw, it is important to not squeeze together the two sides of the lower jaw while pulling the jaw away from the head. The skin will pull away from the bone to where it connects with the jaw just below the base of the lower incisors. The skin can then be cut and the lower jaw removed from the head (Fig. 5). Using this method, the jaw will be relatively clean of tissue once removed (Fig. 6). Some minor trimming may be necessary if muscle tissue remains on the jaw. Alternative methods of removing excessive tissue such as cleaning by beetles (Hall and Russel 1933, Borell 1938, Russell 1947), chemicals (e.g. Alconox, Aloconox, Inc.), or boiling is not required.

DISCUSSION

This method is simple and efficient. Once the jaw is removed little or no work is required to prepare the jaw for aging or as a lab specimen. This technique worked well for our study because it could be accomplished in the field at the site of the carcass, thus the entire deer carcass or head does not need to be collected. Our study area contained rugged terrain and removing the whole carcass was not practical.

Also, having known-age jaw specimens can have great value in an academic or management setting. Students can learn to estimate age of big game by looking at the teeth of known-age specimens. Managers can use known age jaws to review characteristics prior to hunting season. Universites are still instructing undergraduate and graduate students on the Severinghaus (1949) method, although tooth wear may not be the most reliable aging method (Gee et al. 2002).

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Figure 1. Cutting skin between the upper and lower jaw of a white-tailed deer to prepare the jaw for aging or lab specimen.

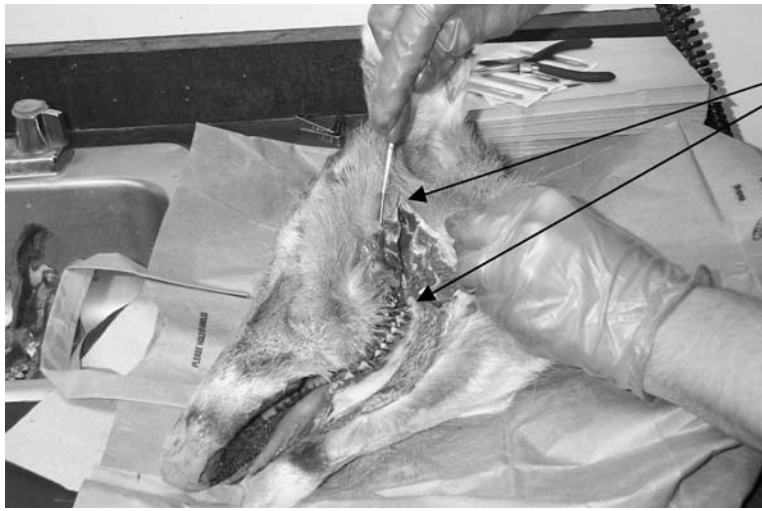

Figure 2. Continuing to cut along lower jaw to the temporal fossa of a white-tailed deer to prepare the jaw for aging or lab specimen.

Figure 3. Spreading upper and lower jaws exposing the coronoid process of a white-tailed deer to prepare jaw for aging or lab specimen.

Figure 4. Removing lower jaw of a white-tailed deer by pulling from back to front to use jaw for aging or lab specimen.

Figure 5. Cutting skin at base of lower incisors of a white tailed deer for aging or lab specimen.

Figure 6. Completely removed lower jaw of a white-tailed deer.

LITERATURE CITED

Borell, A. E. 1938. Cleaning small collections of skulls and skeletons with dermestid beetles. Journal of Mammalogy. 19:102-103.

Gee, K. L., J. H. Holman, M. K. Causey, A. N. Rossi, and J. B. Armstrong. 2002. Aging white-tailed deer by tooth replacement and wear: a critical valuation of a time-honored technique. Wildlife Society Bulletin. 30(2):387-393.

Gilbert, F. F. 1966. Aging white-tailed deer by annuli in the cementum of the first incisor. Journal of Wildlife Management. 30(1):200-202.

Grund, M. D. 2001. Options for monitoring white-tailed deer populations in Minnesota. Dissertation, Southern Illinois University, Carbondale, Illinois.

Hall, E. R., and W. C. Russel. 1933. Dermestid beetles as an aid in cleaning bones. Journal of Mammalogy. 14:372-374.

Low, W. A., and I. McT. Cowan. 1963. Age determination of deer by annular structure of dental cementum. Journal of Wildlife Management. 27(3):466-471.

McEwan, E. H. 1963. Seasonal annuli in the cementum of the teeth of barren ground caribou. Canadian Journal of Zoology. 41(1):111-113.

Ransom, A. B. 1966. Determining age of white-tailed deer from layers of cementum of molars. Journal of Wildlife Management. 30(1):197-199.

Rupp, S. P., W. B. Ballard, and M. C. Wallace. 2000. A nationwide evaluation of deer hunter harvest survey techniques. Wildlife Society Bulletin. 28(3):570-578.

Russel, W. C. 1947. Biology of the dermestid beetle with reference to skull cleaning. Journal of Mammology. 28:284-287.

Sergeant, D. E., and D. H. Pimlot. 1959. Age determination in moose from sectioned incisor teeth. Journal of Wildlife Management. 23(3):315-321.

Severinghaus, C. W. 1949. Tooth development and wear as criteria of age in white-tailed deer. Journal of Wildlife Management. 13(1):195-216.