

A TECHNIQUE FOR MAKING DENTAL IMPRESSIONS AND CASTS OF IMMOBILISED BLACK RHINOCEROS (*Diceros bicornis*) AND WHITE RHINOCEROS (*Ceratotherium simum*)

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Abstract - A technique is described for taking dental impressions of immobilised black and white rhinoceros. The resulting casts can be used to assess accurately the age of animals by using existing criteria. The technique involves using a gag to gain access to the oral cavity, taking impressions of the left maxillary dental arch using dental alginate in a special tray, and then making casts of these impressions with Plaster of Paris.

INTRODUCTION

The molariform teeth of black (*Diceros bicornis*) and white rhinos (*Ceratotherium simum*) are difficult to see in immobilised animals. This makes it difficult to apply data available on eruption patterns and tooth wear in relation to age in black rhinos^{1 2 3 4 6} and white rhinos⁵. It is of great practical value to be able to age immobilised black and white rhinos accurately in the field. It is especially useful to be able to make the correct management decision for animals destined for translocation. The technique described is a quick and practical method to facilitate age assessment of rhinos in the field and at the same time obtain permanent records of that specific animal.

MATERIALS AND METHODS

The rhinos were immobilised using standard techniques. Once immobilised, they were kept in sternal recumbency while the dental casts were made. The head was rested on a box or log to have the maxilla more or less horizontal.

Access

The jaw of the rhino was opened using a special gag made of 2,5mm-thick galvanised steel, 700mm in length (200mm for the handles), and 80mm wide (Fig. 1). While an assistant opened the rhino's lips, the gag was gently inserted between the left row of teeth. The jaw was opened by pulling the handles of the gag apart. Once the jaw was sufficiently open, a soft wooden block was inserted between the right row of teeth. The whole process was repeated until enough space had been made available to apply the tray with dental alginate. The wooden block was left in place and the gag was removed. The maxillary teeth on the left side were thus accessible. The left side was used to standardise, and because most illustrations in publications on age assessment of black and white rhinos are of the left tooth row. A hard nylon brush mounted on a handle was used to brush the teeth and to free them from plant material. The mouth was not rinsed, however, to prevent inhalation of water or plant material.

Impression taking

After gagging and cleaning, alginate powder (ca. 2-3 full cups) was measured and put into a mixing bowl. The tray must be ready and clean. Water (ca. 2 cups) was added to the powder and mixed rapidly to a smooth "toothpaste-like" consistency. The paste was scraped into a special tray, which was then introduced into the mouth and pushed up onto the maxillary tooth row. The tray was held

in place until the alginate had set, after which it was removed. In a good impression, the gingiva should be visible all around the teeth. The whole impression was then put into a plastic bag with a small amount of wet cloth or paper to prevent desiccation.

Impression material

The impressions were taken with a dental alginate (PGS alginate^b). Alginate comes as a powder and is mixed with water at a specific ratio. It sets in 2-4 minutes to give a rubbery consistency. The colder the water the longer the working time. Under hot, field conditions it may be necessary to use iced water to get the required setting time. The less water used, the faster the setting time.

Note: The consistency of the alginate mix is of prime importance as it will influence setting times as well as the quality of the impression. It also influences the space available for removal of the special tray. Anyone attempting to use this technique should practise handling the alginate mix and varying the powder/water ratio as well as the water temperature.

Special trays

Once the dental alginate was properly mixed it was placed in a special tray (Fig. 2). These trays were used to carry the dental alginate and to support the impression. The trays were made from dental special tray acrylic (REDITRAY powder and liquid^b), and were perforated to improve the adhesion of the dental alginate to the tray. Special trays also prevented distortion of the alginate and facilitated transport of the impression once made. The tray should be large enough so that, once applied, there is a gap of ca. 2cm between the tray and the tooth row. A number of trays should be made for animals of different sizes. The edges of the tray should be rounded to prevent damage to the gingival tissue.

Cleaning and casting

At the base station the impression was rinsed thoroughly under running water and freed from all plant material. Plaster of Paris or dental stone was mixed and carefully tapped into the impression. The remaining plaster was poured onto a flat surface which had been covered by a plastic bag. The filled impression was inverted onto the plaster, tapped down and left to set. When nearly set, the plaster could be trimmed by carefully using a sharp knife. After 30 minutes the tray could be removed and the cast could be studied. The sex and classification of the animal, as well as the date and locality, were scratched onto the bottom of the cast.

RESULTS

Good access to the teeth was obtained without traumatising the immobilised animals and accurate impressions were taken. The resulting casts were of good quality, showing details such as enamel lines on the occlusal surface, dentine wear patterns and even detailed gingival contours. Teeth were marked to identify premolars and molars and to show whether they were deciduous or permanent teeth. Age was assessed for each individual animal using the data given by Hitchins⁶. Details of leaves and seeds could sometimes be seen. The casts were available ca. 60 minutes after the animals had been darted. Costs per cast were less than R40-00, and all the required utensils could be carried in a small metal trunk.

DISCUSSION

The method described to make tooth impressions of immobilised black and white rhinos proved to be quick and easy to apply under field conditions, and resulted in casts of a high definition. It is

^b Supplier: Millner's Dental Suppliers, P O Box 1467, Cape Town, 8000. Tel: (021)930-5940

an atraumatic way of obtaining permanent dental records from live animals which can be used for accurate age assessment. This is valuable for making the correct management decisions with animals destined for translocation. For valuable animals sold at auctions, it is proof of age of a specific animal for potential buyers.

There is a need to improve our data on eruption patterns and tooth wear of both species. The existing data have been obtained from the skulls of a small number of known-age individuals. If known-age rhinos are immobilised at regular intervals over their lifespans and accurate details are obtained of eruption patterns and tooth wear, we will be able to improve our existing age assessment techniques. Correlating wear patterns with cementum lines of sectioned teeth (M1) would further enhance age assessment methods.

Work should be done on making tooth impressions of other valuable species for providing a proof of age for animals sold at auctions.

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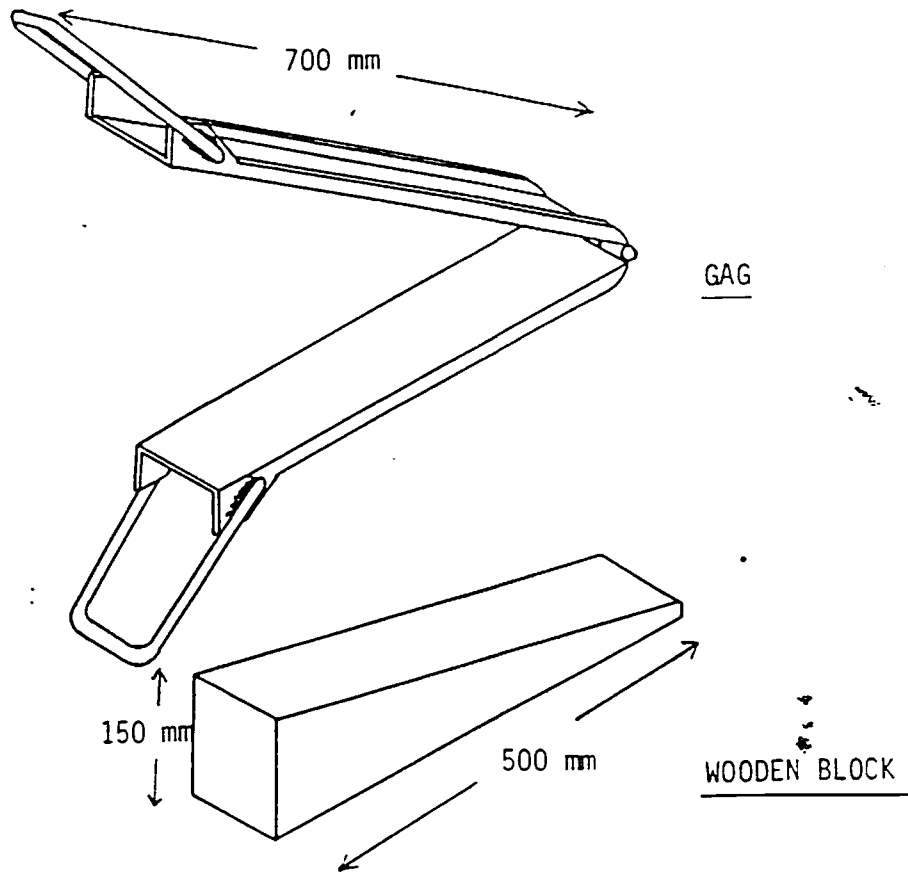


Figure 1: Gag and wooden block used to gain proper access to the mouth of an immobilized rhino

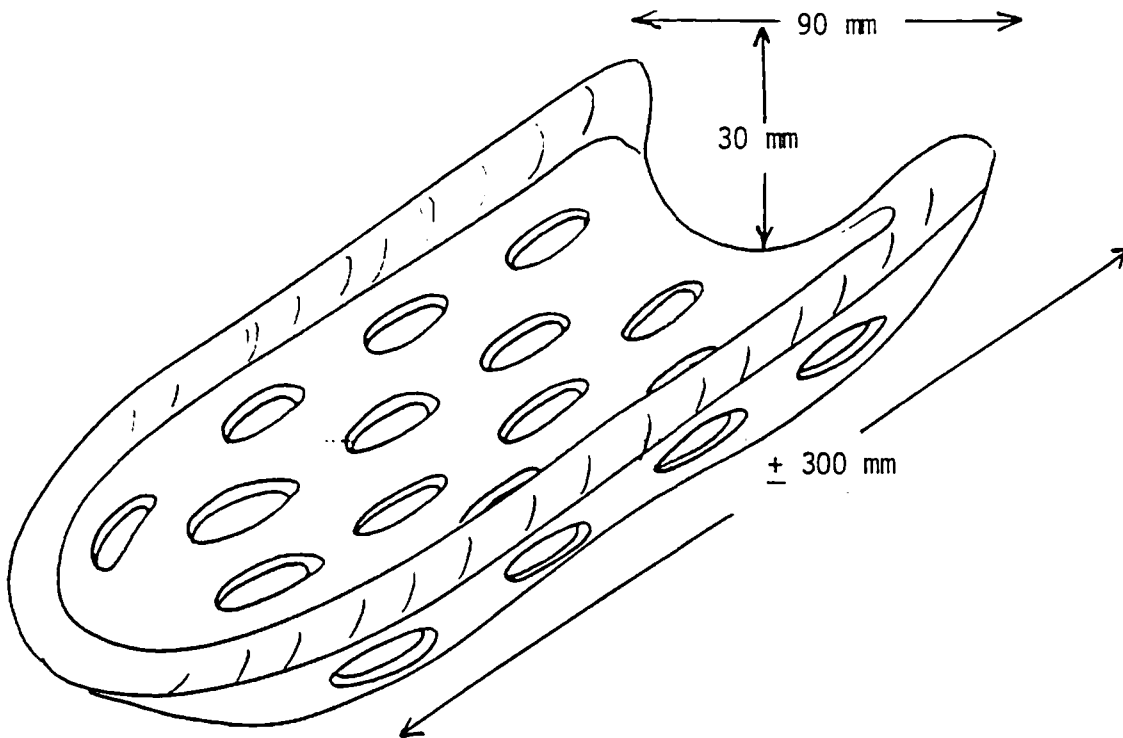


Figure 2: Special tray made from REDITRAY acrylic. This is used to carry the impression material.