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Equipment for placing a sustained release bolus in the rumen of reindeer

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Abstract: A pair of pliers were developed to place sustained release boli with a diameter of 18-20 mm and a length of 50-60 mm safely into the rumen of reindeer. The pliers are connected to a flexible, plastic coated steel tube terminating in a bronze headpiece. Inside this tube a polyfilament, stainless steel wire connects the pliers to an attachment screw in the headpiece. Before treatment the bolus is screwed on to this screw. After the bolus has been guided through the pharynx and oesophagus into the rumen, it is released by squeezing the pair of pliers which then retracts the attachment screw and allows the bolus to drop off. Spring loading of the attachment screw ensures retraction of the screw into the headpiece if the bolus is lost during the operation. The equipment has been used for treatment of more than 1000 reindeer.

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Key words: sustained release bolus, reindeer, oral treatment, rumen sonde, radiocaesium, decontamination.

Hove, K., Staaland, H., Pedersen, Ø., Ensby, T. & Sæther, O. 1991. Utstyr for nedføring av tabletter i vomma på rein.

Sammendrag: Et nedleggingsutstyr for innføring av vomtabletter i vomma på rein blir beskrevet. Vomtablettene har en diameter på 18-20 mm og en lengde på 50-60 mm. Utstyret består av en tang som via en bøyelig, plastbelagt spiralwire er forbundet med et hodestykke i bronse. En polyfilament stålwire går inne i spiralwiren fra tangen til hodestykket hvor den ender i en festeskrue. For behandling skrues festeskruen inn i et hull i bakflaten av vomtabletten. Etter nedføring i vomma frigjøres tabletten ved at festeskruen med kraft fra tanga trekkes ut av tabletten. Fjærbelastning av festeskruen sikrer at skruen trekkes inn og beskyttes i hodestykket dersom tabletten mistes under behandling av urolige dyr. Det er behandlet ca 1000 rein med nedleggingsutstyret. En behandling med to tabletter tar 2-5 min. pr. dyr inkludert nedlegging og fiksering av dyret.

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Introduction

A sustained release bolus intended for slow release of the caesium binder Prussian blue into the rumen of reindeer and other ruminants was developed in Norway after the Chernobyl accident. The boli have a bullet-like shape with diameters of 18 or 20 mm, a length of 50-60 mm and a weight of 40-50 g. In initial trials with unstressed reindeer, the boli were swallowed easily when placed by hand or by an ordinary oral applicator at the base of the tongue. Difficulties arose when this method was applied to semi-domestic reindeer which had been

corralled after several hours of chasing. A very large proportion of both calves and adults appeared to swallow the bolus. When released, the animals ran for a distance of 20-50 m, started to chew, and spat out the boli. In order to secure the treatment to be effective it was considered necessary to place the bolus in the rumen. This paper describes an instrument which allow the introduction of boli into the rumen of reindeer in a safe way.

Description of instrument

The instrument consists of 3 pieces: a headpiece, a push-pull cable and a pair of pliers (Fig 1). The headpiece is made of bronze (diameter 12 mm, length 27 mm) with rounded edges on the front and a tapering end towards the cable. To accommodate the screw used for bolus attachment a 8 mm square hole was made in the front end of the headpiece. The attachment screw has a square head to prevent rotation when the bolus is screwed onto it. The screw is a stainless steel machine screw with a M5 thread, coarse, slightly oversize 10 mm long. A 110 cm length of flexible, plastic coated steel tube (5 mm outside diameter) connects the headpiece to the pliers (Fig. 1). Inside this cable a polyfilament stainless steel wire (2 mm diameter) is soldered to the inner end of the attachment screw in the headpiece. This wire runs freely through the tube and is attached to the active arm of the pliers.

The pliers were made from 1 mm stainless steel sheet. The active wire was connected to a thumb screw in the pliers which allows adjustment in the length of the attachment screw protruding from the headpiece (Fig 1). In addition it was necessary to include a spring mechanism that could apply a load to the wire and the attachment screw in the headpiece. By moving a lever in the pliers tension is applied to the wire and retraction of the screw into the headpiece was ensured in case the bolus was inadvertently lost during placement in a struggling animal.

Apart from the outer tube, which had to be replaced when chewed on for prolonged periods, all parts were durable. Lubrication of the active wire inside the tube was important during use of the instrument at low temperatures.

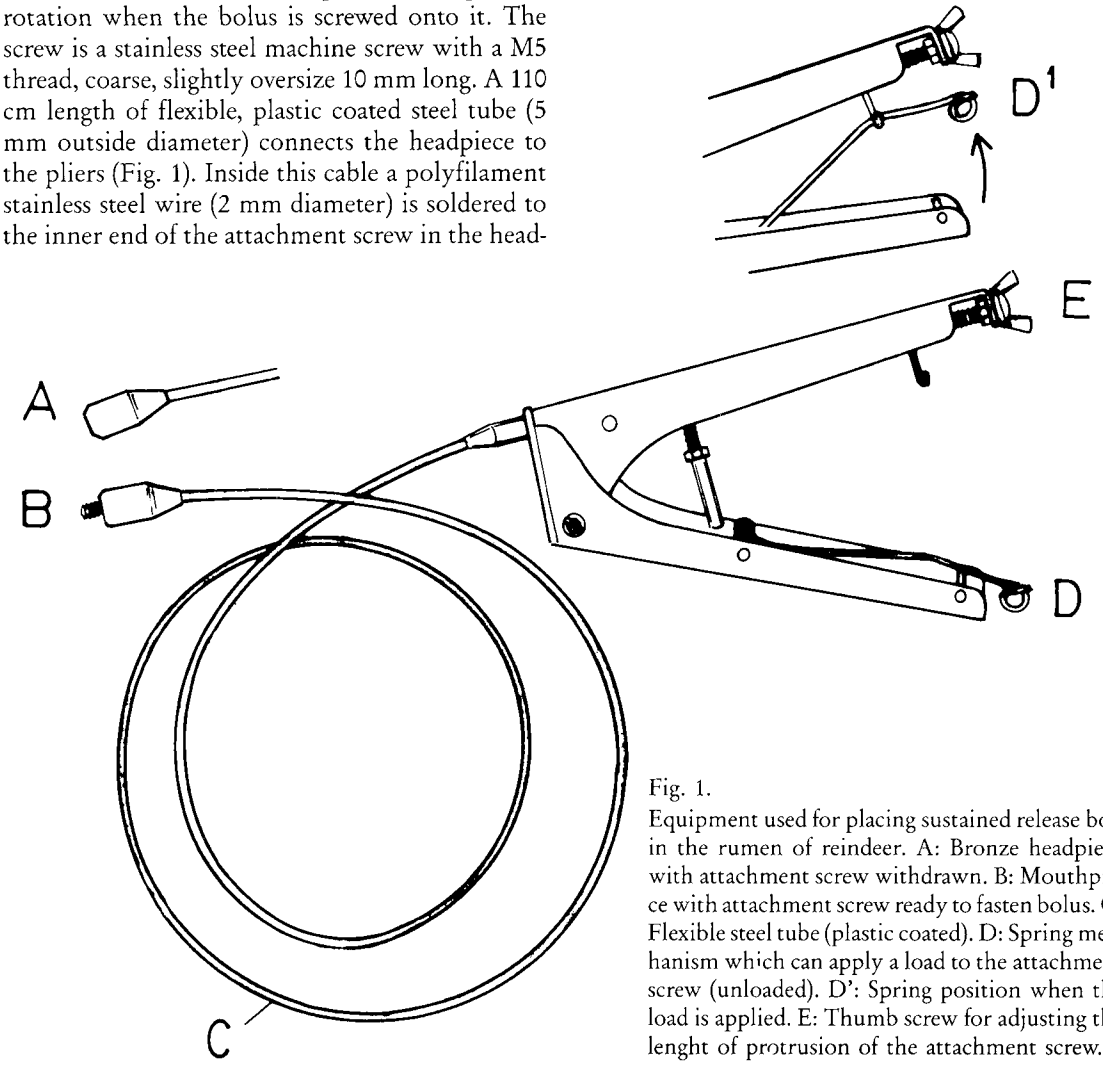

Fig. 1.
Equipment used for placing sustained release boli in the rumen of reindeer. A: Bronze headpiece with attachment screw withdrawn. B: Mouthpiece with attachment screw ready to fasten bolus. C: Flexible steel tube (plastic coated). D: Spring mechanism which can apply a load to the attachment screw (unloaded). D': Spring position when the load is applied. E: Thumb screw for adjusting the lenght of protrusion of the attachment screw.

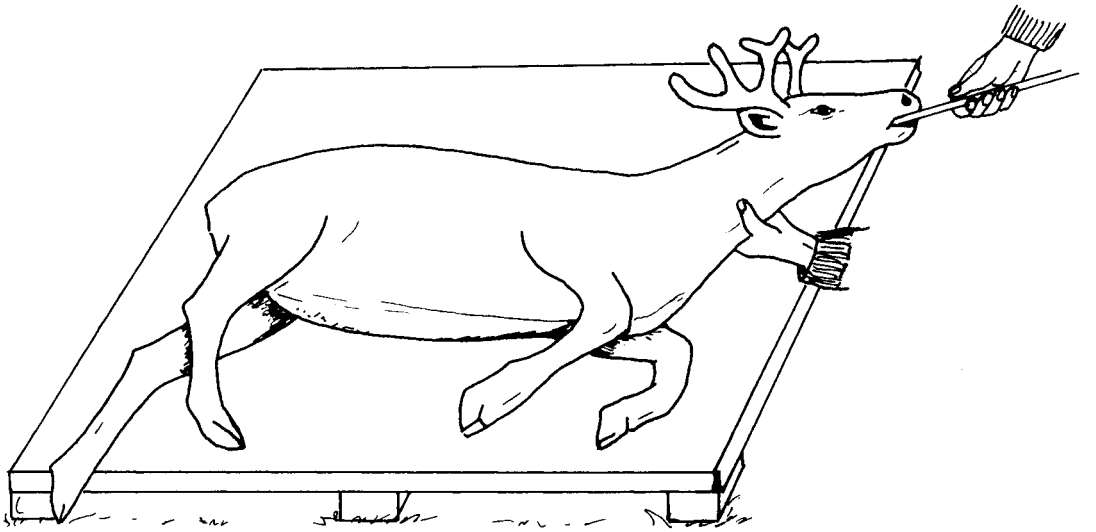

Fig. 2. Positions of operator and reindeer during treatment. The operator inserts the bolus with the right hand. The left hand controls that the bolus is passing down the oesophagus behind the large trachea of the reindeer.

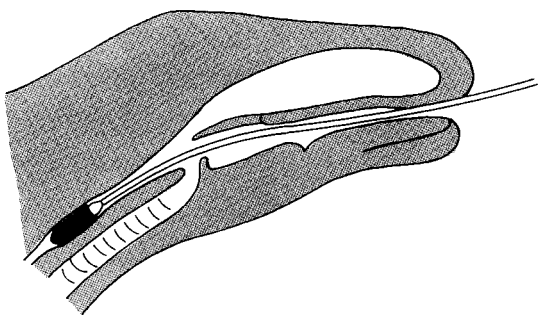

Fig. 3. Position of bolus, headpiece and steel tube in the upper part of the oesophagus.

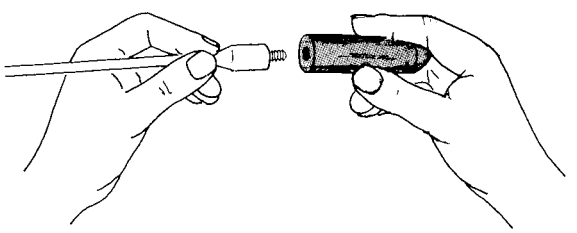

Fig. 4. Bolus ready to be fastend to the attatchment screw.

Results and discussion

The sustained release bolus presently used to treat reindeer is a compressed matrix of wax, Prussian blue and barium sulphate which delivers sufficient amounts of Prussian blue to reduce radiocaesium content of animals grazing contaminated pastures (Hove et al 1988, 1990). During the processing a slightly conical hole fitting the attachment screw is made in the rear end of the bolus. The threads of the screw hold the bolus so well that it can hardly be pulled off by hand. A lateral pressure can however cause cracking. A strong fastening of the bolus to the headpiece is required to prevent its breaking off and being lost when strong, struggling reindeer are being treated, and to enable withdrawal of the bolus in cases where the animal refuses to swallow or when the bolus has entered the trachea.

The following procedure is recommended for the treatment: The animal is placed on its left side (operator right handed), on a smooth, clean surface designed to prevent injuries (Fig 2). In addition to the operator, one person is required to hold a calf while two or three persons are required for large males. The angle between the head and the neck and the neck and the thoracal part of the oesophagus should be straigthened out as much as possible before the bolus is introduced into the mouth (Fig. 3). After the bolus has been fastened to the attachment screw (Fig 4), it should be lubricated by a dip in liquid paraffin before it is placed in the medial angle between the upper and lower lip and quickly pushed in beyond the reach of the molars. The mouth cavity of the reindeer is long, and there will be ample space for the bolus even in calves.

The reindeer is made to swallow by carefully pushing and moving the bolus in the rear of the throat with the right hand. Simultaneously the left hand compresses the neck tissues dorsal to the trachaea to verify that the bolus is located in the oesophagus when it passes down. In adult animals the peristal-

tic movements in the oesophagus may be sufficiently strong to pull the bolus down, in other animals the bolus must be pushed gently down to the rumen. A slight resistance may be felt as the bolus passes through the ruminal sphincter of the oesophagus. When the bolus has entered the rumen it is released by squeezing the pair of pliers. The attachment screw pulls out of the bolus, and the bolus sinks to the bottom of the rumen. The method is safe and rapid to use by trained personel. In our treatments we have used two boli per animal, and the time required for the whole procedure, including immobilization of the animal, is usually 2-5 minutes.

Problems encountered during the development included losses of the boli in the mouth during the introduction. The hole in the bolus must accurately match the threads of the screw to prevent the screw from cracking the bolus. Before the spring loaded retraction of the attachment screw was developed, accidents involving perforation of the eosophagus occurred. These animals had to be slaughtered. After the introduction of this mechanism perforations have never occurred.

When treating animals which have been chased or are overheated and pant heavily, it may be very difficult to elicit swallowing of the bolus. In such reindeer the larynx is wide open and bolus and cable may accidentally be introduced through the larynx into the trachea without any sign of the severe coughing and struggling which usually is observed in other species. This condition can however easily be diagnosed by loss of the resistance which is ordinarily felt in the oesophagus, and by a special feeling originating from the bolus which is bumping along the cartilage rings of the trachea (washboard feeling).

After final development of the instrument over 100 animals with boli inserted were slaughtered for careful examination of the epithelium and the muscular layers of the oesophageal wall. No signs of scars or wounds were discovered.

References

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