

# An Esophageal Fistula Dilator

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**An esophageal fistula dilator is described. The tool can be used to exert an even pressure around the fistula perimeter to stretch a shrunken fistula and allow the successful insertion of a closure device larger in diameter than that of the original fistula. With this instrument the process of enlarging the esophageal fistula is accomplished immediately in a time-saving, efficient manner compared to increasing the diameter of the fistula gradually by periodically increasing the diameter of the closure device.**

In the event of loss or removal of an esophageal plug or cannula, the fistula diameter will begin to shrink. The amount of closure will depend upon the length of time the plug or cannula has been out of the fistula and the length of time since the fistula was established. Newly established esophageal fistulas will close at a faster rate than those fistulas that are well established. Thus, fistula closure is more of a problem when animals with recently established fistulas have their plugs or cannulas removed for extended periods of time. Once the fistula diameter has decreased in size, reinserting the original plug or cannula may be impossible without cutting or tearing tissue. This process can produce much stress to the animal besides inducing scar tissue formation around the fistula, thus reducing the efficiency of the animal for future diet collections.

One method to reduce animal stress when closing a shrunken fistula is to have available a range of plug or cannula sizes. By starting with a small size diameter plug or cannula and daily expanding the diameter size, eventually the original device can be used. An alternative method, which is less time consuming, involves enlarging the fistula diameter by applying a continuous pressure on the fistula wall, thus stretching the fistula before inserting the original diameter closure device.

This paper describes an esophageal fistula dilator that exerts an even pressure around the fistula perimeter using eight fingers.

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Since there is no cutting or tearing of tissue when using the esophageal fistula dilator the animal can be restrained with just a halter and lead rope using the same procedure as when cannulas or plugs are being inserted or removed. The fistula diameter can be enlarged immediately by turning a threaded ring. Once the original fistula diameter has been established with the dilator, the closure device can be put in place with minimal effort followed by the removal of the dilator.

## The Dilator

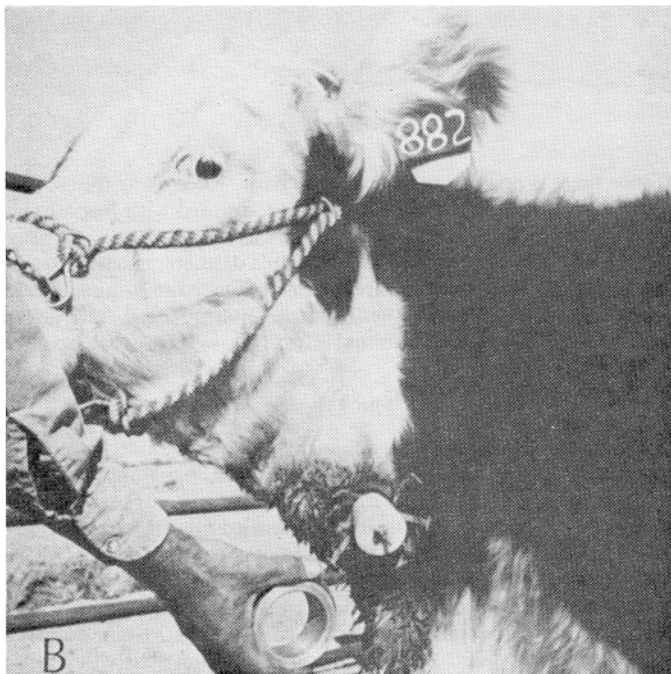
Enlarging the shrunken esophageal fistula immediately followed by inserting the closure device should take place in an orderly manner (Fig. 1; a, b, and c). The dilator is composed of four components (Fig. 2). By turning the knurled dilator barrel [A] in a clockwise direction while holding the finger captivator ring [B] and dilator body [C] stationary, the eight dilator fingers [D] can be forced open. Depending on the number of turns given to the knurled dilator barrel [A], a shrunken fistula of 19-mm diameter can be expanded 200% to a diameter of 57-mm. This will allow a 52-mm diameter closure device to be inserted into the fistula. Lesperance et al. (1974) report that a minimum size esophageal fistula opening in cattle would be 50-mm. With this tool, an esophageal fistula closure device that maintains at least a 50-mm diameter size, can be established.

Once the fistula closure device has been inserted through the 57-mm hole in the dilator and secured, the tool can be removed. By turning the finger captivator ring [B] counter clockwise, the dilator fingers are released and the dilator components [A], [B], and [C] (Fig 2) can be removed leaving the fingers [D] to be removed individually. The result will be a properly inserted fistula closure device (Fig. 1c).

## Application

The esophageal dilator described in this paper represents an improvement over the spatula dilator described by Bredon and

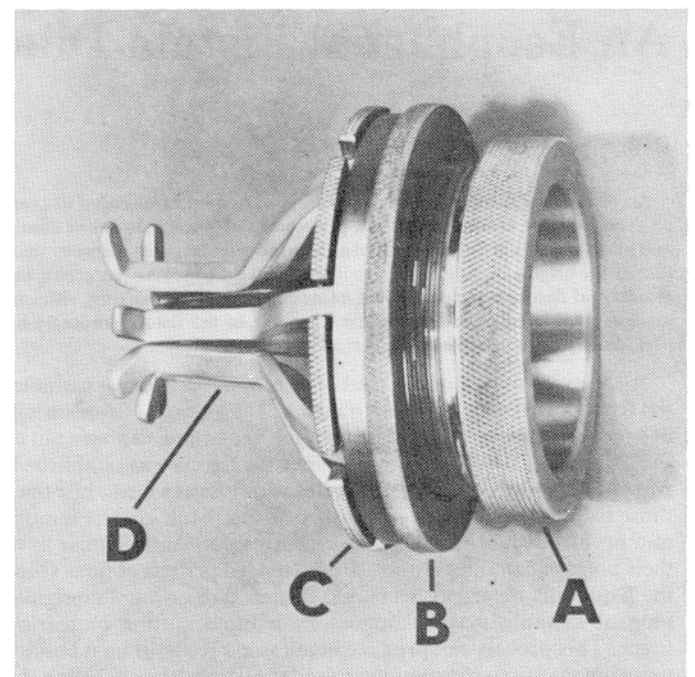
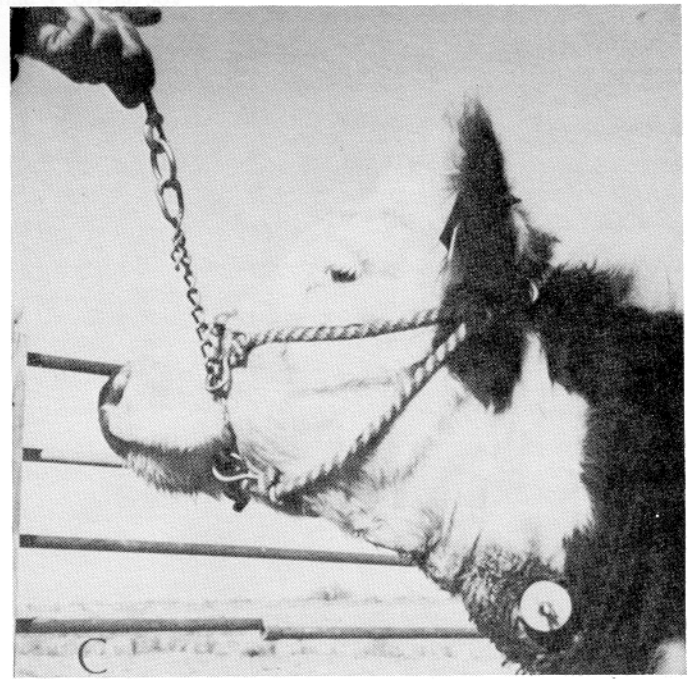
<sup>1</sup>Letters in brackets refer to material in Figure 2.



**Fig. 1.** Stretching an esophageal fistula with the dilator (A), separation of the dilator body components from the eight expansion fingers (B), and a properly inserted esophageal plug (C).

Short (1971). With the spatula dilator there is a possibility of catching a portion of the esophagus within the closure device. However, with the esophageal fistula dilator described in this paper, the entire perimeter of the fistula wall can be expanded to a larger diameter than that of the closure device. A prototype model of the fistula dilator has been used with success on esophageally fistulated steers and heifers being using in diet studies on the Jornada experimental Range.

To meet individual fistula differences, the angle of the dilator fingers [D] can be modified by adjusting the angle of the fingers with pliers. Machine drawings (PSL No. 013321) of the esophageal fistula dilator, designed to be used with cattle, are available at the nominal cost from the Physical Science Laboratory, New Mexico State University, P.O. Box 3548, Las Cruces, New Mexico 88003.



**Fig. 2.** Esophageal fistula dilator, letters refer to the four components: dilator barrel [A], finger captivator ring [B], dilator body [C], and dilator fingers [D].

To accommodate esophageal fistulas of smaller diameters (sheep and goats), or rumen cannulas of larger diameter, it should be possible to modify the machine drawings accordingly; however, this has not been tried.

#### Literature Cited

- Bredon, R.M., and A.M. Short.** 1971. Oesophageal fistulation of cattle for pasture utilization studies, post-fistulation care and use of animals and sampling procedures. *Agroanimalia* 3:141-144.
- Lesperance, A.L., D.C. Clanton, A.B. Nelson, and C.B. Theurer.** 1974. Factors affecting the apparent chemical composition of fistula samples. West. Reg. Coord. Comm. No. 8. Univ. of Nevada, Reno. Agr. Exp. Sta. Western Regional Coordinating Committee #8, Bull. T18.