

Pharyngeal Flap Construction in Canines Following Teflon Pharyngoplasty

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Velopharyngeal closure is essential for normal speech and deglutition. The separation of the nasal pharynx from the oral pharynx is accomplished through several complex mechanisms. The soft palate moves upwards and backwards by contracture of the levator palatine muscle. The pharynx is narrowed and the posterior pharyngeal wall moved somewhat anteriorly by contraction of the superior constrictor muscles.

Failure to close off this area properly results in the nasal emission of air with resultant hypernasal speech, and decrease in the volume and intelligibility of the speech produced.

Velopharyngeal inadequacy has been a subject of great interest to plastic surgeons managing cleft palate patients. Often children with an adequate palate repair become social and physiological cripples, due to their inability to communicate with intelligible speech. Accordingly, cleft palate repairs have become more sophisticated in recent years with particular attention being paid to palatal length and lining.

Many procedures have been utilized in trying to correct velopharyngeal insufficiency, including palatal obturators, posterior pharyngeal flaps, pharyngoplasties, and nasal pharyngeal implants. Recently, Teflon powder mixed with glycerine has been injected into the pharyngeal wall to correct the problem. The use of injectable Teflon in the pharynx followed its use in the treatment of paralyzed vocal cords (1, 3). In 1964, Lewy injected Teflon into one patient with neurogenic velopharyngeal incompetence and obtained improved speech (4). Since that time Teflon has been used in several centers with excellent results being obtained in carefully selected cases (2, 5, 6, 7, 8).

The question has been raised as to whether injections of Teflon into the posterior pharyngeal wall would subsequently preclude the construction of a posterior pharyngeal flap if this procedure was later felt necessary.

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Teflon was generously supplied by the Ethicon Company, Somerville, New Jersey.

Methods

Moderate sized mongrel dogs were used in our experiments. Twelve preparations were studied. All dogs had a Teflon pharyngoplasty performed under general anesthesia. 10 cc of Ethicon PTFE paste was injected into the pharyngeal wall. The dogs were then divided into three groups, consisting of four dogs each. The first group had an inferiorly based pharyngeal flap constructed under general anesthesia, two months following the Teflon pharyngoplasty. The second group had an inferiorly based pharyngeal flap, four months following the Teflon pharyngoplasty. The third group had an inferiorly based pharyngeal flap, six months following the Teflon pharyngoplasty. A biopsy was taken of the posterior pharyngeal wall at the time of the construction of the pharyngeal flap for histological examination.

Subsequent to the surgical procedure, the dogs were examined under general anesthesia at weekly intervals for six weeks to determine the viability of the pharyngeal flap.

Results

All animals were found to have difficulty swallowing for forty-eight hours following their Teflon pharyngoplasty. A change in the pitch of the dog's bark was noted following the procedure. In all groups, the pharyngeal flaps were noted to be of good color and to be viable with each inspection (Figures 1, 2).

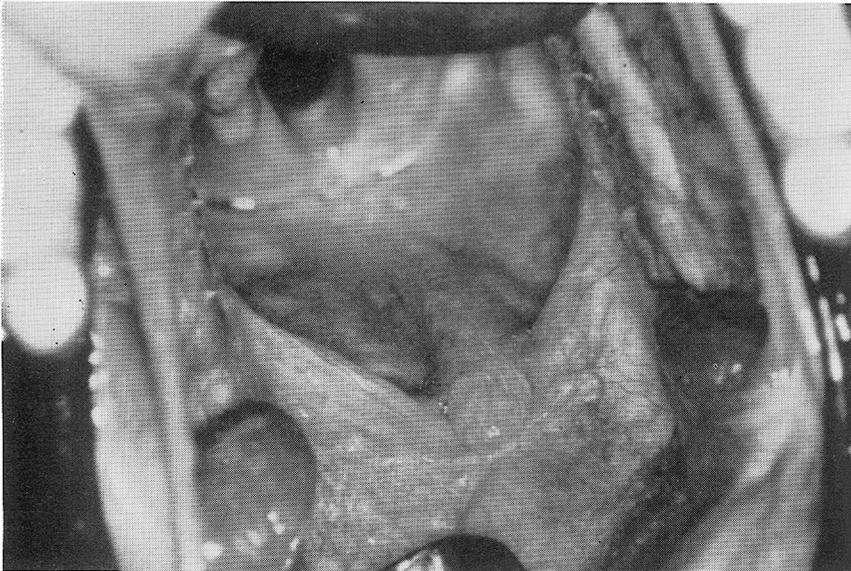


FIGURE 1. Inferiorly based pharyngeal flap constructed in a canine two months following Teflon pharyngoplasty. The dog is on his back, and the palate is at the bottom of the picture.

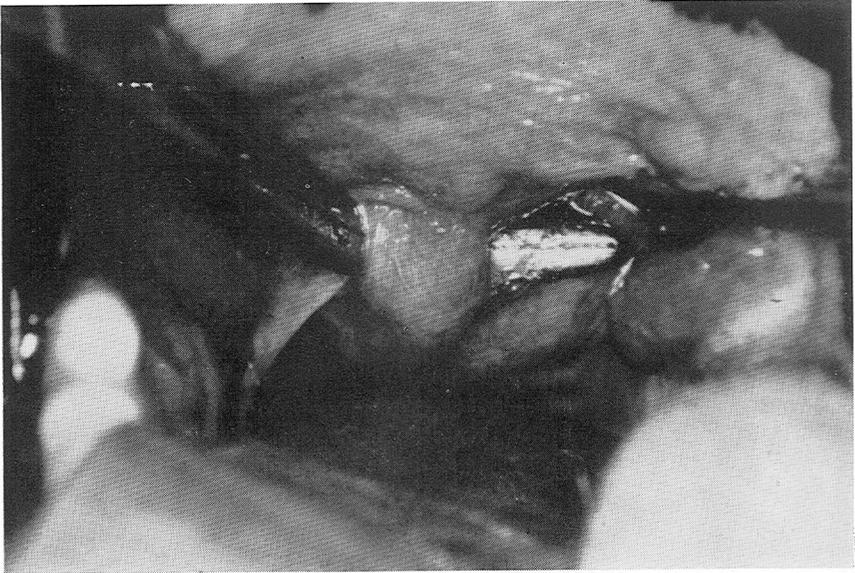


FIGURE 2. Inferiorly based pharyngeal flap constructed in a canine four months following Teflon pharyngoplasty. The dog is on his back, and the palate is at the bottom of the picture.

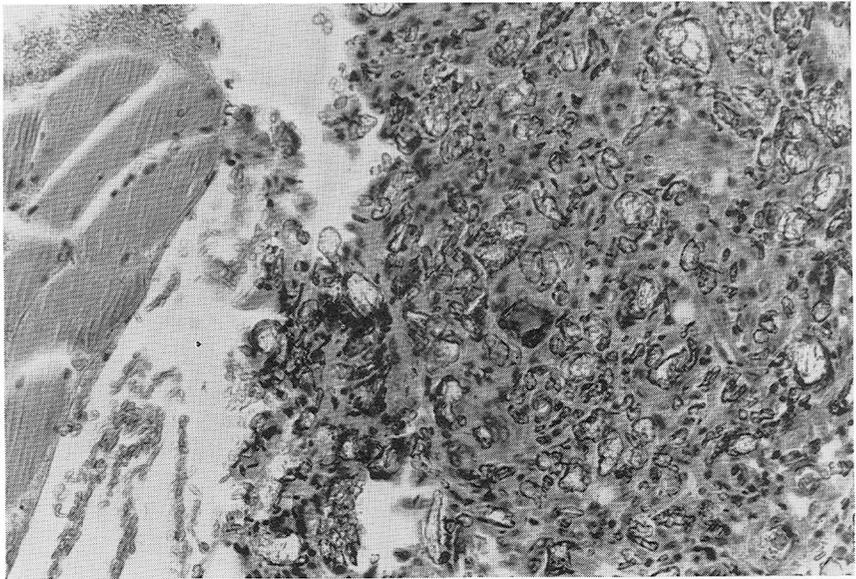


FIGURE 3. Photomicrograph of a section of the pharynx taken at the time of construction of a pharyngeal flap. This animal had undergone Teflon pharyngoplasty four months prior to this biopsy. There is a granuloma composed of refractile particles of Teflon surrounded by giant cells and fibroblasts. Striated muscle is noted in a deeper plane (original magnification $\times 400$).

Histological examination of sections taken from the posterior pharyngeal wall at the time of construction of the pharyngeal flaps demonstrated giant cell granulomas. There was no true encapsulation of the Teflon which presented as refractile particles surrounded by giant cells and fibroblasts (Figure 3).

Summary

The experimental design in these studies permitted the observation of pharyngeal flaps in canines constructed at two, four, and six month intervals following Teflon pharyngoplasty. There appeared to be no difficulty with the viability of pharyngeal flaps in these animals despite the presence of a giant cell foreign body reaction in the posterior pharyngeal wall. We conclude from these experiments that Teflon pharyngoplasty does not preclude subsequent construction of a pharyngeal flap in dogs.

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