

CLINICAL NOTE

The Fate of Medialized Cartilage in Thyroplasty Type I

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Thyroplasty type I is rapidly emerging as the preferred means of medializing a paralyzed vocal fold. We discuss our experience with the fate of a medialized cartilage window 9 months after an otherwise successful operation. Cartilage resorption over time resulted in degeneration of voice and in progressive aspiration. We recommend removing the cartilage window rather than medializing it, in the interest of stabilizing the degree of long-term vocal fold medialization. (*Arch Otolaryngol Head Neck Surg.* 1994;120:1398-1399)

Thyroplasty type I is an excellent method of medializing the vocal fold in patients with unilateral paralysis. The reported advantages over Teflon augmentation include (1) patient cooperation with local anesthesia without the need for topical direct laryngoscopy^{1,2}; (2) maintenance of neutral head position to better judge voice quality at the time of surgery¹; (3) ability to adjust the medializing force, thus "fine tuning" the final position of the paralyzed vocal fold^{1,2}; (4) preservation of the mucosal wave¹; (5) potential reversibility of the procedure^{1,2}; and most importantly (6) the allowance for future neuromuscular recovery.

The thyroplasty technique used by one of us (C.T.S.) and based on that advocated by Isshiki et al³ has been well described previously.¹ An inferiorly based perichondrial flap is raised over the proposed window site. A window is then cut in the thyroid cartilage using a fine-side cutting dental bur. After the inner perichondrium is raised, a snugly fit Silastic block is used to depress the thyroid cartilage window, thus medializing the vocal fold. Minor dimensional adjustments in the block are executed to produce the best maximum phonation time (MPT). The perichondrial flap is then returned to its position and sutured, thus anchoring the block medially. The wound is closed in layers.

That the Silastic block is well tolerated is demonstrated by the following ob-

servations. In one of the few animal studies, Escajadillo⁴ reported that Silastic blocks produced minimal fibrotic reactions and were easily removed from dogs after a 2-month period. Isaacson et al⁵, in a histologic examination of the larynx of a patient who died 1 month after undergoing thyroplasty, found no evidence of intralaryngeal hemorrhage or scarring and noted a lack of scarring around the Silastic implant. Little is known concerning the fate of the medialized cartilage window.

Stability of the structure of the window is critical to the stability of operative results. The following case report describes cartilage resorption with subsequent degradation of voice quality and, therefore, suggests a revised operative technique be used in the future.

REPORT OF A CASE

A 64-year-old man presented in January 1991 with prostate cancer that had metastasized to the right side of the neck, above the clavicle, and to the mediastinal lymph nodes, resulting in left vocal fold paralysis. The patient complained of aspiration and dysphonia. On endoscopic examination, excessive pooling of secretions in the piriform sinuses and consistent aspiration on adductory postures were apparent. Breathless vocal quality was characterized by reduced pitch and intensity range and marked reduction in MPT. Maximum phonation time measured at 3 seconds during normal effort levels. A left thyroplasty type I was performed according to

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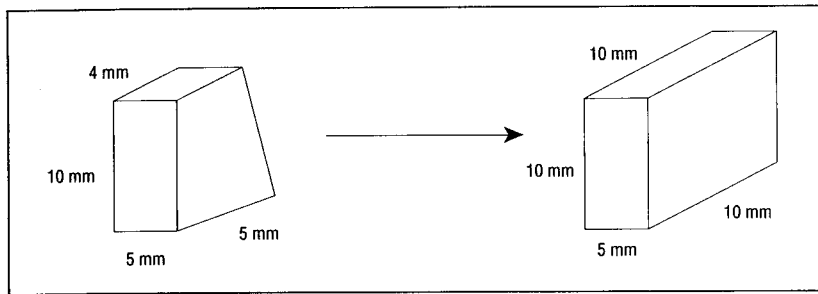


Figure 1. Left, Block represents the Silastic block used in the first operation. Right, Block was used in the second operation. Note the six additional millimeters in depth required to produce the same maximum phonation time achieved in the first operation.

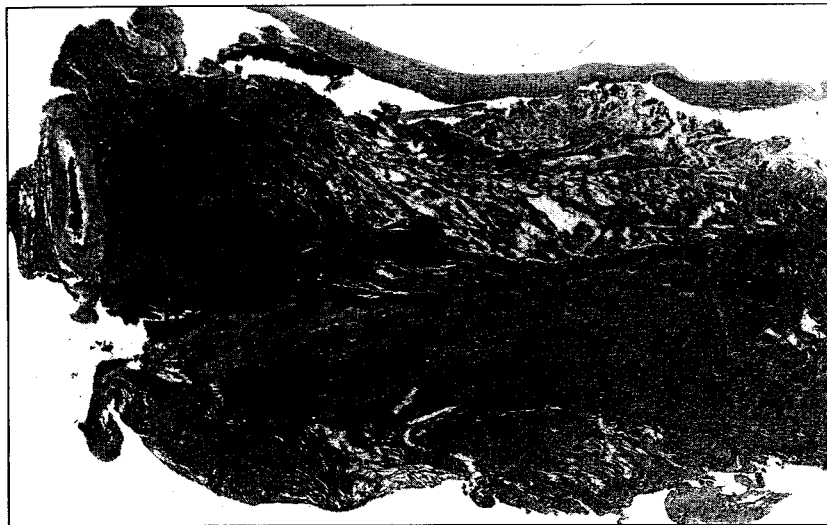


Figure 2. Section as seen through the thyroid cartilage window (hematoxylin-eosin, original magnification $\times 20$). FT indicates fibrous tissue; B, bone; and SM, skeletal muscle. Note the absence of hyaline cartilage and the abundant fibrous tissue.

the method described earlier. A 5×10 -mm window was cut from the thyroid ala and then depressed with a Silastic block measuring $5 \times 10 \times 4 \times 5$ mm (**Figure 1**, left). Glottic closure was complete, resulting in reduced aspiration and improved vocal quality. Maximum phonation time obtained during normal pitch and loudness levels was 10 seconds.

Nine months later, the patient was readmitted to the hospital for aspiration pneumonia and breathy voice. Glottic gap was apparent on endoscopic examination with a recurrence of aspiration. Maximum phonation time was reduced to 2 seconds. The patient underwent a revision thyroplasty. After explanting the Silastic block, a white rectangular object, thought to be the previously compressed thyroid cartilage window, was removed. A larger Silastic block measuring $5 \times 10 \times 10 \times 10$ mm (**Figure 1**, right) was placed in the window, the peri-

chondrial flap was returned to its position, and the wound was closed. Complete glottic closure was restored, resulting in a reduction of aspiration and an increase in MPT to 9 seconds. Gross examination of the thyroid cartilage window revealed a firm, rubbery, rectangular tissue measuring $5 \times 3 \times 2$ mm thick. Histologically hyaline cartilage replaced fibrous tissue and a few areas were ossified (**Figure 2**).

COMMENT

Although Isaacson et al⁵ demonstrated no change in the histologic appearance of the medialized cartilage window 1 month after undergoing thyroplasty, we report dramatic changes 9 months postoperatively. In our patient, degeneration of cartilage produced degradation in glottic competence. Restoring complete glottic closure, vocal quality, and MPT to previous values required increasing the depth of the

revised Silastic block by 6 mm, the approximate thickness of an adult male thyroid ala. That most patients who have undergone thyroplasty type I remain stable long term⁶ strongly suggests that the medialized cartilage windows remain structurally stable. However, we suggest that cartilage degeneration may result from inadvertent separation from the supporting inner perichondrium, postoperative wound infection, or excessive pressure of an oversized Silastic block against the medialized cartilage window. Although not yet substantiated, we believe that ossified windows may be more vulnerable to such forces than cartilaginous ones.

This case report provides the basis for our recommendation to remove the cartilage window to improve the long-term stability of vocal fold medialization. Although removing cartilage theoretically increases the possibility of airway penetration and extrusion of Silastic, such an event has not occurred in our series to date.

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