

Laryngeal Chondroplasty an Update

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1. Abstract

Chondrolaryngoplasty, or “tracheal shave”, is a cosmetic procedure designed to reduce the prominence of the thyroid cartilage, which has gained prominence and relevance due to the demand of the population niche it serves. The procedure allows patient satisfaction in many aspects contributing for self-esteem, security and social interaction, in addition to have a strong impact on the quality of life of transgender patients. The procedure represents a challenge for the surgeon in balancing aesthetics and function, and it is important that communication preoperative is period so that established expectations are well aligned. The technique has been firstly described by Wolfort and Parry in 1975 1975 and modified by Wolfort in 1990, and it uses an open initial approach, with perichondrium flaps being performed under local anesthesia with sedation. More than 50% of patients reported that their neck / Adam's apple looked "nothing" prominent or masculine. In general, our patients are very satisfied with the results of this procedure.

2. Introduction

Chondrolaryngoplasty, or “tracheal shave”, is a cosmetic procedure designed to reduce the prominence of the thyroid cartilage. It was initially described by Wolfort and Parry in 1975 [1] and, later, other changes in the original technique were described by Wolfort et al in 1990 [2].

The technique is performed mainly on transgender women (male to female) in which the prominent “Adam's apple” is a marker of

masculine appearance. In recent years, gender-affirming surgery has expanded beyond its initial focus on genital conformation, and now includes other areas of the body as well [3]. As society reconsiders their interpretations of masculinity, femininity and gender definitions, transgender individuals have realized that they will only be able to make a real transition if they are recognized by the public in their chosen social role [4]. It is important that the surgeon has knowledge and practice in this procedure to better meet the needs of his transgender patients. It is important to note that this procedure is also performed on men and women who wish to reduce the prominent “Adam's apple” for aesthetic purposes.

The procedure represents a challenge for the surgeon in balancing aesthetics and function. Conservative cartilage resection can leave the patient dissatisfied with the result and frustrated with the surgeon, while excessive resection can destabilize the tendon of the anterior commissure and alter the patient's voice record, which can be emotionally distressing, especially in women and men. transgender. It is important that surgeons explain this to patients in the preoperative period so that established expectations are aligned, but it is equally important that surgeons are aware of patients' perception of post-operative results in order to modify their technique and advise patients better before surgery. Although the surgeon may be satisfied with the postoperative result, patient satisfaction is what will determine whether the operation is really a success or a failure to achieve the desired result [5].

The male larynx is indistinguishable from the female larynx until the pubertal growth of the thyroid cartilage in men. In addition to the size, the anterior edges of the thyroid cartilage also connect at a much more acute angle, accentuating the laryngeal prominence. Upon reaching puberty, the male larynx and, particularly, the thyroid cartilage increase in size [6, 7]. The antero-posterior dimension of the larynx almost doubles in size, resulting in greater projection and prominence in the midline, and in men it is much clearer than in women. The prominence of the larynx is more distinctly superior, while the insertions of the laryngeal muscles, the epiglottis and the vocal folds are all lower. This allows for the safe removal of the most prominent upper cartilage [8].

As already mentioned, the anterior commissure is at risk of rupture during this procedure, and destabilizing the tendon of the anterior commissure by aggressive resection can significantly and irreversibly affect the patient's voice. This is particularly devastating for transgender women, in which lowering their voices can be especially traumatic. Thus, the aesthetic result must be balanced in order to minimize the risk of excessive resection and voice alteration. In addition, the thyroepiglottic ligament must be considered during tracheal shaving, due to its insertion site close to the upper border of the thyroid cartilage. Although epiglottic destabilization is rare, it is a known risk that can theoretically result in dysphagia [9].

The technique described by Wolfort and Parry in 1975 and modified by Wolfort in 1990, uses an open initial approach, with perichondrium flaps raised from within the blade and careful excisions of the perichondrium on the outer edge of the thyroid cartilage. This was followed by the use of drilling, as needed to refine the contour. Since then, external surgical approaches guided by endoscopy have been performed, allowing better visualization of the anatomy, more aggressive reductions without damage to the vocal cords and potential for better aesthetic results. There are several techniques for performing chondrolaryngoplasty, but these techniques and their associated outcomes are still poorly described in the literature [1, 2, 8, 5].

We will now describe the surgical technique used in our service.

Chondrolaryngoplasty can be performed under local anesthesia with sedation or general anesthesia with endotracheal intubation. We generally choose the first option. General anesthesia is used for uncooperative patients.

After the skin incision is made, the flat subcutaneous tissue is dissected. The anterior cervical vessels are identified and preserved, if possible, by lateral retraction; and if necessary, they are connected and sectioned. The lining layer of the deep cervical fascia is divided vertically and then the middle cervical fascia. The paired sternothyroid and thyrohyoid muscles are retracted laterally through a midline dissection plane. The upper third of the thyroid

cartilage is exposed. The perichondrium is then incised along the upper border of the thyroid laminae, with lateral dissection starting at the midpoint between the upper thyroid and the oblique line that goes medially to the thyroid. A lateral dissection along the upper border can injure the upper laryngeal nerve, and care must also be taken to remain on the border with the incision, to prevent entry into the thyroid-hyoid membrane and preserve its attachment to the perichondrium of the thyroid cartilage later.

A subperichondrial dissection is performed internally and externally using a Cottle elevator to reflect the perichondrium and expose the cartilage. The inner surface of the upper thyroid notch does not rise further down than the thyroepiglottic ligament; dissection beyond that point can destabilize the epiglottis and damage the insertion of the vocal cords. A curved hook can be used on the posterior edge of the thyroid cartilage in the midline at the base of the notch to give superior-anterior retraction to perform the subperichondrial dissection of the anterior surface. Then, the upper notch of the thyroid, the upper part of the laryngeal prominence and the upper prominent part of the lateral laminae are excised by a scalpel. The surgeon should keep in mind that the procedure can become more challenging as people age and the cartilage ossifies by requiring a saw or burr. The internal structures are protected with an instrument such as a thin and malleable retractor. The thyroid-hyoid membrane must be preserved, as damage can endanger the upper laryngeal nerve, causing anesthesia of the larynx and possible bronchoaspiration. The removal of the thyroid cartilage must be performed incrementally to achieve the appropriate contour. If using a rongeur, use extremely small bites to avoid fracturing the thyroid cartilage, especially if there is ossification. However, the safety of making small holes in the laryngeal cartilage has been established. The edges can be smoothed with a drill to refine the contour, if necessary. Then, the perichondrium is sutured over the dried cartilage with a Vicryl 5-0 suture. The neck fascia is re-approximated and the skin incision closed in layers. The incision can be covered with a small adhesive pad or a compressive dressing at night.

We approached the prominence of the thyroid cartilage with a high cervical incision at the cervicomental junction. The strap muscles are identified on each side of the thyroid cartilage, dissected and gently retracted laterally. Hemostatic control must be strict. An incision is made through the perichondrium and blunt dissection is performed anteriorly and posteriorly to lift the perichondrial flaps. Dissections made along the edges of the upper thyroid notch should not extend much further (> 2.5 cm) to avoid damage to the superior laryngeal nerve. Blade 11 is used to incise and remove excess cartilage. Once the appropriate volume has been removed, a diamond bur is used to smooth and contour the edges of the thyroid cartilage (Figure 1).

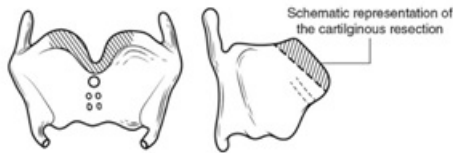


Figure 1: Schematic representation of the cartilaginous resection. According to Sturm & Chalet [3]

In older patients, the cartilage is usually calcified, making the incision difficult. In this situation, we chose to perform the entire drill procedure. The skin is re-approximated to confirm that a good contour has been achieved and that no additional resection is necessary. Perichondrial flaps are sutured over the prominence of the thyroid cartilage. We usually suture the right infrahyoid muscle on the left, this forms a small cushion that helps with the aesthetic result. After a new revision of hemostasis, the skin is then sutured. Drains are not necessary. Compressive dressing is then performed on the operating table.

Patients are discharged on the same day with a prescription for analgesia, antibiotics and corticosteroids. Relative rest is recommended, avoiding heavy physical exercise and the suture is then removed on the seventh day.

The most common complications after chondrolaryngoplasty are odynophagia in 20.3% of patients, hoarseness in 36.2% of patients and laryngospasm in 1.4% of patients. Of the patients who presented postoperative hoarseness, 96% had resolution within 20 days [5]. The current literature does not provide us with much information regarding the safety of performing vocal pitch surgery concurrently with chondrolaryngoplasty.

Regardless of the technique used, the tendon of the anterior commissure must be protected throughout the procedure, as damage to this structure would result in a lower tone of voice, which would be an unwanted male characteristic in a trans woman [3, 8]. Removal of tracheal cartilage prominence is performed above the level of the anterior commissure until the ideal cosmetic objective is achieved, or more importantly, until there is concern about the damage to the true vocal cords. Care should also be taken to stay along the edge of the thyroid cartilage to avoid damage to the thyroid-hyoid membrane and, in turn, to the upper laryngeal nerve and cause laryngeal anesthesia and / or aspiration. Likewise, injury to the thyroepiglottic ligament can make the epiglottis unstable and requires the reconstruction of its fixation sites in the thyroid cartilage.

In general, patients are very satisfied with the results of this procedure. According to Cohen et al. more than 50% of patients reported that their neck / Adam's apple looked "nothing" prominent or masculine, and only 15% reported that it was still "very" or "completely" prominent or masculine. Many of the 30% intermediaries were satisfied with their results, but still reported a small notable high-

light, although in some cases admittedly only noticeable to them, and not an obstacle. Equally important to our aesthetic results, no patient reported a permanent change in voice, and more than 90% noticed no change [6].

Although much less common, the reverse path can also be taken. It is possible to perform augmentation chondroplasty, that is, the creation of an "Adam's apple" in transsexual men. The technique described by Deschamps-Braly and collaborators.

The harvested rib must be fully thick and 3 cm long to have a sufficient amount of cartilage for the graft. One notch block and one not; 11-blade scalpels were used to shape the cartilage into anatomically correct male thyroid cartilage. The shape should be a narrow oblique pyramid with the base approximately three-quarters the width of the existing thyroid cartilage. This dimension is mainly for cartilage stability, since it will be adapted to the native cartilage. We evaluated the height of the cartilage by placing the cartilage structure over the existing thyroid cartilage and palpating and visualizing the result.

It is best to create the initial cartilage structure slightly larger than expected and to reduce the size incrementally until the ideal configuration is achieved. After the cartilage graft was performed satisfactorily, we fixed it to the existing cartilage with permanent suture. Depending on the height of the patient's native larynx, one can choose to increase or decrease the position of the graft to appear appropriate when viewed in profile. Then, we close the platysma on the cartilage and close the skin. It is not possible to obtain perichondral closure over the cartilage and no attempt has been made [10, 11] (Figure 2).

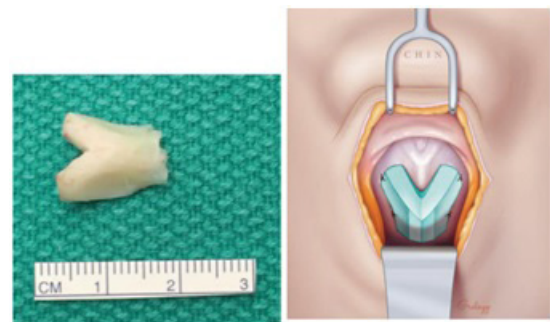


Figure 2: Technique described by Deschamps-Braly and collaborators [11]

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