



CASE STUDY

Type III thyroplasty for the treatment of high-pitched voice disorder

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PALABRAS CLAVE

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Abstract

Type III thyroplasty is a surgical technique which diminishes the fundamental frequency of the voice. We present the case of a patient with dysphonia by tone elevation in relation to gender, treated by type III thyroplasty and an updated review of the surgical technique and its outcome.

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Tiroplastia tipo III para el tratamiento de la disfonía por elevación del tono

Resumen

La tiroplastia tipo III es una técnica quirúrgica que disminuye la frecuencia fundamental de la voz. Presentamos el caso de un paciente con disfonía por elevación del tono en relación con el sexo tratado mediante tiroplastia tipo III, y se realiza una revisión actualizada de la técnica quirúrgica y sus resultados.

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Introduction

In 1974, Isshiki et al¹ described four surgical procedures (thyroplasty types I, II, III and IV) that modified the laryngeal skeleton and, as a consequence, the voice. These procedures shortened or elongated the vocal cords and compressed or expanded the interior of the larynx.²

Type III thyroplasty seeks to reduce the voice tone or fundamental frequency without affecting the way in which the vocal cords vibrate.³

We present a case of type III thyroplasty carried out to treat a dysphonia caused by tone elevation. According to our references, it is the first case published in Spain.

Case study

A 28-year-old male presenting dysphonia caused by the elevation of his tone of voice in relation to his gender. He

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works as a teacher. He has undergone speech therapy for six months with no result. His voice causes him increasingly serious problems, of a personal, social and work-related nature, that have led to an important psychological affliction with a severe loss of self-esteem.

He presented a 72/120 dysphonia severity index. The voice was totally normal from the acoustic point of view, except for a fundamental frequency of 170 Hz (corresponding to the voice of a woman). Laryngeal stroboscopic exploration revealed a larynx with normal morphology with a symmetrical mucus wave present; no defects in glottic closure or supraglottic contraction were evident in the exploration.

After a diagnosis of dysphonia due to gender-related tone elevation, which did not respond to speech therapy, he was proposed for surgical treatment by a type III thyroplasty with the aim of deepening his voice.

The surgery was carried out under general anaesthesia, at the express desire of the patient. Approach was through

anterior cervicotomy, dissection by planes until the thyroid cartilage was reached and a thyroid perichondrium flap could be created. A section of the longitudinal cartilage band was carried out on each side, with a width of 2 mm (Figure 1) and the thyroid keel was taken backwards (Figure 2). The perichondrium flap was stitched and closure was by planes.

After the surgery, a significant deepening of the fundamental frequency was achieved, going from 170 Hz to 98 Hz. The dysphonia severity index lowered to 19/120. All parameters of frequency, intensity and noise stability were maintained within normal limits.

Discussion

Dysphonia caused by the elevation of the tone in relation to gender is characterised by a high-pitched voice (female) in a male. The causes behind it are diverse: congenital vocal cord atrophy, extensive scars that produce rigidity of the cord or the voices of transsexuals from female to male.

However, in other occasions they are cases of non-transsexual males who do not present any morphological alteration of the larynx; these are known as disorders of pubescent voice change. These can, in turn, be divided in two groups: those with dysphonia caused by severe muscular tension (also called *puberphonia*) objectified through exploration and those that do not have a hyperfunctional vocal behaviour.⁴ The latter, in the world of lyrical voices, are called “soprano males” and do not present any strictly pathological vocal processes, other than the social, work-related and psychological repercussions that take place in some cases.

Type III thyroplasty was described by Isshiki in 1974. It consists of shortening the vocal cords through incision of the anterior segment of the thyroid cartilage, which also results in a greater laxity of the cords. This technique achieves very notable reductions of the fundamental frequency,⁵ without significantly modifying other acoustic parameters.⁶ It can be combined with intercordsal injection to increase the vocal cord mass, which further reduces the fundamental frequency.⁷ Nevertheless, results are more predictable when surgery is limited to within the laryngeal frame.⁸ Likewise, there are other variations of the original technique called laryngoplasties of the anterior commissure.⁹⁻¹²

In our case, the first to be published in Spain as far as we are aware, we carried out the original technique described by Isshiki with the variation (conceived by our team and not described in previous publications) of obtaining a flap of external perichondrium, which allowed a better fixing of the thyroid keel.

The technique can be carried out under local anaesthesia, monitoring the voice during the surgical procedure. This thus allows the patient to select the preferred voice.⁵

Type III thyroplasty is indicated for dysphonia caused by gender-related tone elevation that has not responded to speech therapy rehabilitation treatment or hormone treatment in the cases of female to male transsexuals.⁴ In cases of tone elevation, along with vocal atrophy produced by a glottic closure defect, the combination of type I and III thyroplasties has been described by Isshiki himself.¹³

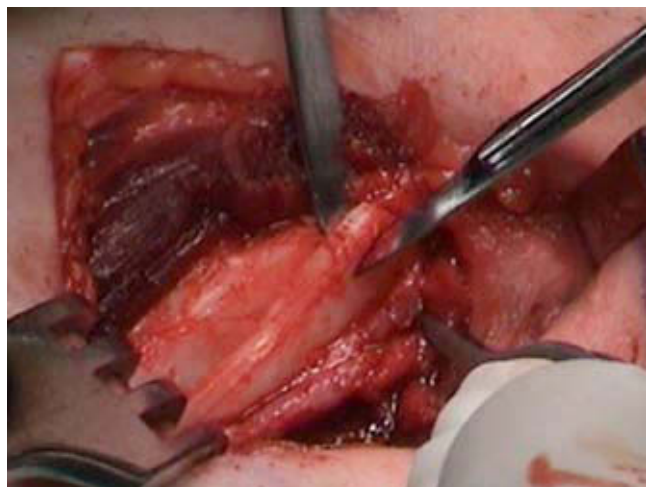


Figure 1 Thyroid cartilage band section.

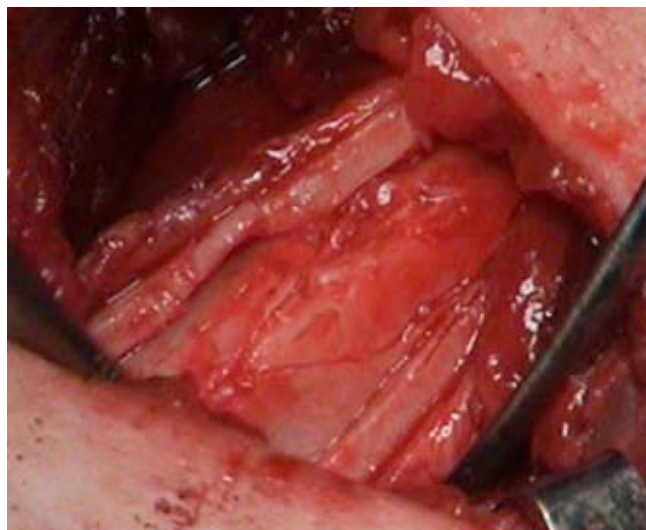


Figure 2 Repositioning of the thyroid keel.

In short, type III thyroplasty is an effective technique for reducing fundamental voice frequency in dysphonias caused by gender-related elevation of the tone, achieving the change, as in our case, from a female voice in a male to a male voice in a male.

Conflict of interests

The authors declare no conflict of interests.

References

1. Isshiki N, Morita H, Okamura H. Thyroplasty as a new phonosurgical technique. *Acta Otolaryngol.* 1974;78:451-7.
2. Von Leden H. The evolution of phonosurgery. In: Sataloff RT, editor. *Professional voice. The science and art of clinical care.* San Diego: Plural Publishing; 2005. p. 1095-114.
3. Savit DH, Maragos NE, Lipton RJ. Physiologic assessment of Isshiki type III thyroplasty. *Laryngoscope.* 1990;100:844-8.
4. Mahieu HF. Practical applications of laryngeal framework surgery. *Otolaryngol Clin North Am.* 2006;39:55-75.
5. Isshiki N, Taira T, Tanabe M. Surgical alteration of the vocal pitch. *J Otolaryngol.* 1983;12:335-40.
6. Li GD, Mu L, Yang S. Acoustic evaluation of Isshiki type III thyroplasty for treatment of mutational voice disorders. *J Laryngol Otol.* 1999;113:31-4.
7. Sataloff RT. Voice surgery. In: Sataloff RT, editor. *Professional voice. The science and art of clinical care.* San Diego: Plural Publishing; 2005. p. 1137-214.
8. Mahieu HF, Norbart T, Shel F. Laryngeal framework surgery for voice improvement. *Rev Laryngol Otol Rhinol.* 1996;117:189-97.
9. Mahieu H.F., Schutte H.K. New surgical techniques for voice improvement. *Arch Otorhinolaryngol.* 1989;246:397-402.
10. Tucker HM. Anterior commissure laryngoplasty for adjustment of vocal fold tension. *Ann Otol Rhinol Laryngol.* 1985;94:547-9.
11. Kocak I, Dogan M, Tadihan E, Cakir ZA, Bengisu S, Akpinar M. Window anterior commissure relaxation laryngoplasty in the management of high-pitched voice disorders. *Arch Otolaryngol Head Neck Surg.* 2008;134:1263-9.
12. Cobeta I, Guerrero J. Tiroplastia. In: García-Tapia R, Cobeta I, editors. *Diagnóstico y tratamiento de los trastornos de la voz.* Madrid: Garsi; 1996. p. 313-22.
13. Isshiki N, Kojima H, Shoji K, Hirano S. Vocal fold atrophy and its surgical treatment. *Ann Otol Rhinol Laryngol.* 1996;105:182-8.