

First case of surgically corrected puberphonia

H. PAU, F.R.C.S.(ED.), G. E. MURTY, M.D., F.R.C.S.

Abstract

Puberphonia is predominantly a male condition which, normally affecting teenagers, may present in later life. It is defined as the failure to change from the high-pitched voice of the pre-adolescence to the lower pitched voice of adulthood. Patient previously reported have responded to voice therapy alone. We report the first surgically corrected case.

Key words: Dysphonia; Puberty; Surgical Procedures, Operative

Introduction

Puberphonia is an ill-understood and rarely reported condition. Patients previously reported have responded to voice therapy alone.^{1–3} We report the first surgically corrected case.

Case report

A 24-year old male presented with an ‘unbroken voice’. There were no predisposing factors to dysphonia in his history. Full clinical examination including fibre-optic endoscopy showed normal male secondary sexual characteristics, and a normal mobile larynx of adult dimensions. Bimanual cervical manipulation to depress the laryngotracheal segment lowered voice pitch. Laryngoscopy[®] demonstrated a mean speaking fundamental frequency (SFF) of 204 Hz.

Puberphonia was diagnosed and speech therapy including adjunctive laryngeal manipulation commenced. After six sessions, the SFF plateaued at 175 Hz. The patient was discharged satisfied but returned two years later seeking further reduction. Further speech therapy was ineffective. Psychological counselling was also considered at this point but the patient declined. Innovative surgery was therefore performed.

A modified Gluck-Sorensen incision centred over the cricoid was made and a superior flap raised. The superior laryngeal pedicles were identified and preserved. The hyoid bone was identified and the hypoglossal nerves were preserved. The suprahyoid muscles were divided and the hyoid was mobilized superiorly and bilaterally. The superior halves of the lateral borders of the thyroid cartilage were also mobilized. The hyoid was lowered in the neck by reducing the cricothyroid distance with two non-absorbable figure of eight sutures placed laterally around the bodies of the hyoid and the cricoid but avoiding reduction of the cricothyroid space (Figure 1).

Post-operatively, he made an uneventful recovery and at review six weeks later, his voice pitch had subjectively reduced and mean SFF on Laryngography[®] was 142 Hz. Further speech therapy was offered to the patient but was declined. He was seen again at six months and his voice pitch had remained at this lower level.

*Laryngography[®]-Laryngograph Ltd, 1 Foundry Mews, Tolmer Square, London NW1 2PE.

Discussion

Puberphonia is defined as the failure to change from the high-pitched voice of the pre-adolescence to the lower pitched voice of adulthood. It is predominantly a male condition which, normally affecting teenagers, may present in later life. The overall incidence is 1 per 900 000 per year.³

In the infant larynx, the laryngotracheal complex lies at a higher level than in adulthood. The tip of the epiglottis is at the level of the upper portion of the body of the second cervical vertebra; whereas in the adult, it may be as low as

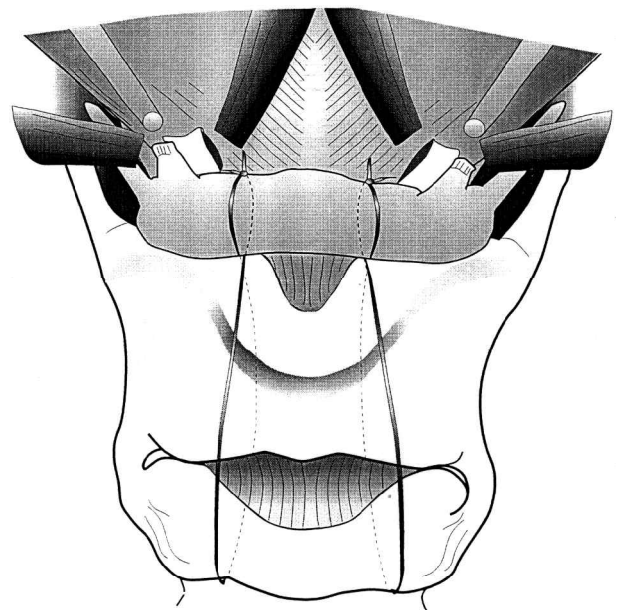


FIG. 1

Two non-absorbable figure of eight sutures reducing the cricothyroid distance.

the sixth. The laryngotracheal complex 'descends' continuously throughout life but not gradually. At puberty, there is a rapid lowering of the larynx relative to the base of the tongue which corresponds to the voice change that occurs at the same time.⁴ In the normal adult male, the mean SFV is in the region of 115 Hz.⁵

Normal voice breaking occurs in two phases.² During the phase of instability, the voice drops from octave three to octave two. The larynx is larger and more unstable and the infant 'head voice' is constantly competing with the adult 'chest voice'. Since the brain is more familiar with the infant 'head voice' at this stage, it will need to 'retrain' in order to cope with the larger larynx. The control of the sensorimotor function of the adult larynx develops gradually.

During the phase of stability, the individual will begin to gain control of the adult voice.

Three types of this disorder have been described.⁶ With mutational falsetto, although the larynx has grown and is capable of producing the lower pitch of the adult male larynx, only the higher-pitched voice of the male child is used. This is clinically the commonest presentation of the disorder. Since the larynx has grown to its full adult size, the high-pitched voice is produced by a falsetto position of the vocal folds. With this disorder, the adolescent only uses a falsetto voice, although he is capable of a lower-pitched voice. The voice is thin, weak and breathy. The cause may be psychogenic, severe hearing disorder, neurological weakness of the vocal folds, weak respiratory drive, neurological disease, or debilitating illness during puberty.

Voice change in the adolescent male usually occurs over a six-month period. When the voice change is prolonged for more than six months, this is called prolonged mutation. Usually both the higher registers of the child's voice and the lower registers of the young adult male voice are present.

Incomplete mutation is similar to prolonged mutation in that both higher and lower registers are present in the same voice and it is difficult to distinguish between the two. This can be seen as an arrest in development of the voice change that occurs during puberty. As such, it is usually seen along with other illness, such as asthma or any other serious illness during puberty.

The aetiology of puberphonia is probably mainly psychogenic, but its dynamics have not been investigated in detail. The prevailing opinion is that the pubescent or adolescent acquired a stronger feminine than masculine attachment and self-identification, and a neurotic need to resist the normal transition into adulthood. Variations along these themes include embarrassment about an excessively low-pitched voice developing earlier than the patient's contemporaries, forcing the pubescent to retain the high pitched, or the unconscious or conscious needs to maintain a higher pitched singing voice because of the rewards attendant upon their skill. Persistence of a high pitched voice can also be caused by non-fusion of the thyroid laminae. In all these disorders, hypogonadism must be ruled out.⁷

Puberphonic patients generally respond to voice therapy alone. The patient's voice will be recorded and then played back to him. The purpose of this exercise is to make him aware of the problem and hence to motivate him to correct it.

Manipulation of the larynx is carried out to manually lower its position. The therapist will stand behind the patient and try to lower the patient's larynx by compressing on the thyroid or cricoid cartilage using the fingertips. In the meantime, the patient will be asked to speak in the manually lowered pitch and later, to try and sustain a low pitch without the therapist's help.

The subject may sometimes be asked to read a paragraph and to increase the voice intensity in certain parts of the paragraph without interruptions. Low frequencies can be achieved during these high intensity intervals and the patient will hopefully be made aware of his potential in producing a low-pitched voice.

Further therapy involves critical listening. Both the therapist's and the patient's voices are recorded and then played back. The patient will then be asked to listen and compare the two, and hopefully to improve his own voice.²

No corrective surgical procedure has been reported in the past. The key manoeuvres of this new operation are fully mobilizing the hyoid and the superior halves of the thyroid cartilage and apposing the mobile hyoid to the fixed cricoid cartilage by two non-absorbable figure of eight sutures. It must be emphasized that, in contrast to anterior fixation of the cricoid against the thyroid lamina as used in pitch raising procedure,⁸ the cricothyroid distance must be maintained by placing the sutures laterally since shortening of this space can raise the pitch of the voice, that would obviously be disastrous in puberphonic cases.

Acknowledgements

The authors thank Dr Bruno Goulesque for the translation of the two French references (Nos. 1 and 2).

References

- 1 Pomme J. Functional disorders of voice changing. *Rev Laryngol Otol Rhinol* 1971;**23**:137-56
- 2 de la Breteque BA. Rehabilitation of disorders on breaking of the voice. *Rev Laryngol Otol Rhinol* 1995;**116**:271-2
- 3 Banerjee AB, Eajlen D, Meohurst R, Murty GE. Puberphonia-A Treatable Entity (Abstract). 1st World Voice Congress, Oporto, Portugal, 1995
- 4 Tucker HM. *The Larynx* 2nd edn. New York: Thieme, 1992
- 5 Baken RJ. *Clinical Measurement of Speech and Voice*. Massachusetts: Little, Brown and Company, 1987
- 6 Rubin JS, Korovin GS, Gould WJ, Sataloft RT. *Diagnosis and Treatment of Voice Disorders*. Tokyo: Igaku-Shoin Ltd, 1985
- 7 Aronson AE. *Clinical Voice Disorders*. 2nd edn. New York: Thieme Stratton, 1985
- 8 Zeitels SM, Hillman RE, Desloge RB, Bunting GA. Cricothyroid subluxation: a new innovation for enhancing the voice with laryngoplastic phonosurgery. *Ann Otol Rhinol Laryngol* 1999;**108**:1126-31

Address for correspondence:

Mr Henry Pau,
Department of Otolaryngology
The Countess of Chester, Health Park,
Liverpool Road,
Chester, CH2 1QB, UK
E-mail: hpau@globalnet.co.uk

Mr H Pau takes responsibility for the integrity of the content of the paper.

Competing interests: None declared
