



Role of Voice Therapy in Patients with Mutational Falsetto

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ABSTRACT

Background: Mutational falsetto is the most common mutational voice disorder, found in all ages. Clinicians often miss this diagnosis due to unfamiliarity with the condition. The voice of a person with mutational falsetto is high pitched, weak, thin, breathy, hoarse and monopitched.

Objective: This study was carried out to evaluate the efficacy of voice therapy in persons with mutational falsetto.

Methods: Eleven male patients with ages between 18 and 26 years (mean age 22.18 years, SD 2.52) diagnosed with mutational falsetto underwent acoustical analysis using Praat Software, perceptual analysis using grade, roughness, breathiness, asthenia and strain (GRBAS) scale and psychosocial analysis using emotional component of voice handicap index (VHI). All the components were analyzed pre- and post-voice therapy.

Results: Improvement in acoustic analysis parameters was statistically significant with p-value less than 0.0001 (pre-therapy mean of fundamental frequency (F0) was 217.45 with SD 8.68, whereas post-therapy mean of F0 was 127.50 with SD 5.32). Significant improvement in perceptual analysis was seen post-therapy on GRBAS scale. Improvement in psychosocial aspect was also statistically significant with p-value less than 0.0001 (pre-therapy mean 26.18, SD 1.72 post-therapy mean 7, SD 1.15).

Conclusion: Voice therapy plays an important role in lowering F0 and alleviation mental agony of the patients with mutational falsetto.

Keywords: Fundamental frequency, Mutational falsetto, Voice therapy.

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INTRODUCTION

Mutational falsetto voice is conspicuously high pitched and casts doubt on the masculinity and maturity of speaker. It can result in severe psychological disturbance due to emotional, social and professional related difficulty in day to day life.

The mutational period of human development represents dramatic physical and emotional transformation of the individual. Principal changes that take place during puberty are as follows:

- Considerable increase in vital capacity secondary to increase in the size and strength of thoracic muscles.
- An increase in length and width of neck.
- A descent of larynx producing greater length and width of pharynx thus, enlarging the resonatory system.

The basic difference between the pubertal development of the male and female larynx has to do with direction of the growth. Until puberty, they are essentially the same in size and form; however, during pubertal development, male larynx grows especially in antero-posterior direction leading to protrusion of thyroid eminence also known as Adam's Apple.¹ The female larynx increases in height greater than width, the results in both sexes being a deepening of the voice and greater vocal power. The general trend of mutational voice changes is downward direction of pitch. Investigation of pubertal changes of singing voice have led to agreement that the lower limit of girl's voice descends one and two tones and the upper limit may gain the same. The lower limit of boy's voices descends a full octave. The transformation of the boys' voice during mutation seems to take following directions: a gradual lowering of the lower limit with steadiness of higher tones, then steadying of low notes (main phase), followed by stabilization of the low notes marking the end of the mutational period.

Symptoms of mutational falsetto voice are high pitched, weak, thin, breathy, hoarse and monopitched giving the overall impression of immaturity, effeminacy and passiveness. On laryngoscopic examination, the larynx is structurally normal.

MANAGEMENT

Mutational falsetto has been treated by the following methods:

- Voice therapy
- Laryngeal manipulation
- Laryngeal surgery

Voice therapy plays an important role in treatment of mutational falsetto. The aim of voice therapy is to lower the fundamental frequency (F0). Fundamental frequency corresponds with the rate of oscillation of vocal folds (expressed in Hz) and is a primary factor in perception of pitch.

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OBJECTIVE

To evaluate efficacy of voice therapy in person with mutational falsetto.

METHODS

The present study was carried out in ENT department of a tertiary care center and teaching institute from March 2012 to 2015. The subjects consisted of 11 male patients with age range 18 to 26 years (mean age 22.18 years) who reported to the department with complaint of feminine voice. This study was approved by ethical committee of institution and informed consent was obtained from all the participants.

Inclusion Criteria

- Male with feminine voice with high F0 as analyzed on Praat software.
- Normal larynx on laryngoscopy using 90° Karl Storz laryngoscope.

Exclusion Criteria

- Abnormal findings on laryngoscopy
- Transgender

Acoustic Analysis

All subjects' voice was recorded in an acoustically treated room as measured by sound level meter LUTRON SL4010 using Wave Pad Software from a distance of 15 cm from microphone both pre- and post-therapy. The subjects were asked to say the same phonetically balanced text in local language pre- and post-therapy in habitual voice. The mean F0 of each text, pre-therapy and post-therapy was analyzed using Praat Software.

Perceptual Analysis

Perceptual analysis was done using GRBAS scale by another speech language therapist with voice expertise other than the therapist who conducted voice therapy. The age and gender of the subjects were informed to the therapist. The pre- and post- pre-recorded voices were presented to the therapist in random order. GRBAS scale measures grade, roughness, breathiness, asthenia and strain of the voice. Each of the five categories is graded from 0 (no perceived abnormality) to 3 (severe abnormality).²

Psychosocial Analysis

This was done using emotional section of the voice handicap index (VHI) questionnaires pre- and post-

therapy. Voice handicap index was developed and validated by Jacobson, Johnson, Gergnlski, Silbergleit and Beginner in 1997. First version of VHI had 85 items, which was reduced to 30 items scale as VHI-30. It consists of functional, physical and emotional sections. Each section of VHI weighs a score of 40, which gives total of 120. Voice handicap index score of 0 to 30 represents low score indicating minimal amount of handicap associated with the voice disorders. A score of 31 to 60 denotes moderate amount of handicap due to voice problem. A VHI score is 61 to 120 represents significant and serious amount of voice handicap due to voice disorders, often seen in patients with new onset vocal fold paralysis or severe vocal fold scarring.³

Voice Therapy Protocol used for the Study

All patients underwent voice therapy schedule with following technique:

- Glottal attack—phonation of vowel sounds with glottal attack, i.e. forceful initiation of voice during production of vowels
- Humming while gliding down the pitch scale
- Production of glottal fry, i.e. lowest possible pitch which patients can produce
- Use of vegetative sounds
- Digital manipulation of thyroid cartilage during vowel production—patients are taught to apply a gentle inward push on the anterior aspect of thyroid cartilage while sustaining a vowel.
- Inspiratory phonation

The frequency of therapy consisted of two sessions per week of half an hour duration each. The patients were allowed to note the difference between habitual pitch and new pitch and were counseled to accept 'new voice' as their own voice. The lower pitch was stabilized using standard therapy. Once the newly acquired pitch had stabilized, the patients were re-evaluated for acoustic, perceptual and psychosocial improvement.

RESULTS

The number of sessions required to achieve desired results varied depending on the patient's F0, compliance and motivation during therapy. Out of our 11 patients, two could achieve pitch level in two sessions; five needed four sessions; four patients needed five sessions.

Acoustic Analysis

Mean F0 was assessed pre- and post-therapy for all patients. The average pre-therapy mean F0 was 217.45 Hz, SD 8.68 and the post-therapy mean F0 was 127.50 Hz, SD 5.32. The two-tailed p-value was found to be less than 0.0001 which is statistically significant.

Perceptual Analysis

On the GRBAS scale, all the patients had abnormal scoring pre-voice therapy while post-voice therapy all the patients showed normal scoring that is G0 R0 B0 A0 S0.

Psychosocial Analysis

The mean of emotional component of VHI pre-therapy was 26.18, SD 1.72, whereas post-therapy, it was 7, SD 1.15. The two-tailed p-value was calculated to be less than 0.0001 which is statistically significant.

DISCUSSION

Mutational falsetto is found in patients of all ages, some as young as 14 or 15 years. They are either brought by parents or later in life volunteering themselves for help after long struggle with the social and psychological handicap of voice that does not match gender or sounds infantile. Clinicians often miss the diagnosis of mutational falsetto because of unfamiliarity with the syndrome. Yet it is one of the easiest and most rewarding disorders to treat.¹

In this study, two of 11 patients could achieve satisfactory frequency level in two sessions while five needed four sessions and four patients needed five sessions to lower the frequency to conversational level. These variations in the number of sessions might be due to the patients showing different level of vocal plasticity. These findings are almost similar to Desai V et al.⁴

As for the results obtained, they show that mean F0 of the patients with mutational falsetto can be reduced to a significant level using voice therapy.

According to the results of our study, all patients obtained a better voice after therapy. This is in corroboration with the study previously carried by Dagli M et al,⁵ Alam N et al.⁶

A study done by Hammarberg B et al⁷ which consisted of 10 patients of mutational falsetto, in pre- and post-therapy condition showed mean F0 values of 221 Hz and 119 Hz respectively, which is similar to our study.

Another study done by Cassol M et al⁸ consisting of 45 subjects of mutational falsetto showed significant decrease I F0 after 6 months of voice therapy.

In our study, GRBAS score significantly improved in all the participants after the intervention, corroborating other studies.^{5,7,8}

In this study, voice therapy also helped to enhance confidence and self image of the speaker due to psychosocial improvement which is confirmed by decrease in emotional component of VHI score. These findings are similar to a study done by Alam N et al.⁶

Further studies consisting of larger group of patients are needed with newer techniques of acoustic analysis and quality of life measures to confirm the results and to improve our understanding about mutational falsetto.

CONCLUSION

Voice therapy plays an important role in treatment of patients with mutational falsetto by lowering F0, and thereby alleviating the psychological agony these patients face in their life.

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