

# Efficacy of direct laryngeal manipulation in the treatment of puberphonia: A prospective clinical study at tertiary care centre

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## Abstract

Puberphonia or Mutational Falsetto is the persistence of high pitched voice after puberty in the presence of a structurally normal larynx. The voice of a puberphonic is high pitched, breathy and hoarse sometimes associated with pitch breaks. This prospective clinical study was carried out from 2007 to 2014 at Dr D Y Patil Medical College Hospital, a tertiary care centre with the aim to achieve better voice quality and improvement of pitch range, by direct laryngeal manipulation in puberphonic males. After laryngeal stretching with intubation laryngoscope there was immediate improvement in voice quality and permanent change in voice to low pitch. 30 males in the age group of 16 to 25 years diagnosed clinically as cases of puberphonia, without any secondary causes of voice change were subjected to direct laryngeal manipulation under xylocaine spray anaesthesia. A long bladed anaesthesiologist Macintosh intubation laryngoscope was used to stretch the vocal cords by applying pressure over valleculae. 25 patients had immediate and permanent change in voice from high pitch to low pitch in first sitting, while 3 had satisfactory improvement after 2 sittings and 2 had no improvement in voice. The results of the technique were grouped into excellent, satisfactory and poor. The success rate of direct laryngeal manipulation in first sitting was 83%. Thus we conclude that in peripheral rural set ups where the facility of a speech therapist is not available or in places where there are few speech therapists, this office procedure can be done by ENT surgeons. Direct laryngeal manipulation in the treatment of puberphonia is cost effective, less time consuming procedure, with no complication and gives excellent results.

**Keywords:** Puberphonia, Laryngoscopy, speech therapy.

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## INTRODUCTION

Voice embodies parameters as pitch, loudness, quality and variability. It is an indicator of a speaker's physical health, emotional health, personality, identity, and aesthetic orientation<sup>1</sup>. Puberphonia is defined as the persistence of adolescent voice after puberty in the

absence of any organic cause. This condition is seen more commonly in males and occasionally in females who use high pitched voice. There are very few documented studies on puberphonia. Grouped under psychogenic voice disorders, the incidence is reported as 1 in 9 lakh Indian population<sup>2</sup>. Adolescence is a period of conflict, an age of transition between childhood and adulthood, a stage of search for identity, the most critical in human life. It coincides with change in personality, vocal and physical change and the discovery of morality. The voice changes in adolescence between 12 to 15 years of age. In infants the larynx lies at higher level and gradually descends throughout life. At puberty there is rapid lowering of the larynx with sudden increase in size under the influence of testosterone. Adams apple becomes prominent indicating sexual maturation of larynx. This is the time when there is mutation of tonal range and voice quality from a 'LIGHT BOY VOICE' to a 'HEAVY

MAN VOICE'. The boy may continue to use his high pitched voice or it may break into higher and lower pitch. The larynx is large and unstable and the brain accustomed to infant voice. At puberty it will need to retrain in order to cope with the larger larynx. Most of the adolescent males adjust to this new change but for reasons like emotional stress, delayed development of secondary sexual characters, psychogenic hero worship of the elder boy, excessive maternal protection, strong feelings of feminine attachment etc, a few of them do not make the transition into using their deeper voice which their larger vocal cords would normally produce<sup>3</sup>. Puberphonia may also be because of non fusion of the thyroid laminae and in these cases hypogonadism may be the cause and it has to be ruled out<sup>1</sup>. Puberphonia has a serious psychological and social impact. Males with puberphonia are thought of as being effeminate, passive and immature. They frequently face teasing from peers and when they speak on phones it is often difficult to identify the speakers sex<sup>4</sup>. The voice of an adolescent with puberphonia is unusual high pitched, hoarse, breathy and fatigable. Pitch breaks are also present in most puberphonic patients. The larynx in them is structurally normal. The different treatment modalities of puberphonia include voice therapy, laryngeal manipulation and surgery. Presently we treat these patients by sending them to speech therapist for repeated voice therapy and psychological counselling<sup>5-11</sup>. This modality of treatment is time consuming, needs multiple sittings and lots of patient compliance and encouragement. Many a times the patients are lost for follow up to us. At rural areas where we have very few or no speech therapist it becomes even more difficult to treat these patients. Hence we decided to treat our puberphonic patients with direct laryngeal manipulation technique. This method is quiet recent and was first reported by Vaidya *et al* in 1995<sup>12</sup>.

## MATERIALS AND METHODS

The prospective clinical study was carried out at Dr D Y Patil Medical College Hospital which provides tertiary care facilities. 30 puberphonics in age group 14 to 25 years, referred from nearby rural centres, by ENT surgeons and general practitioners, from 2006 to 2014 were included in the study. The aim of our study was, to evaluate the efficacy of direct laryngeal manipulation technique in puberphonia patients and to give them a satisfactory low pitched voice. Those having secondary causes of voice change were excluded from the study. All patients had complaints of persistence of high pitched voice, vocal fatigue, and 24 had inability to raise voice. All patients felt depressed due to social embarrassment. All patients underwent a complete physical examination followed by 45 degree endoscopic examination of larynx.

Secondary sexual characters were assessed to rule out hypogonadism. Consent was obtained from patient/guardian before the procedure. On counselling, most of the patients were anxious to get the normal adult voice. Patient was called nil by mouth six hours before the procedure in ENT OPD. Procedure was done in the supine position under xylocaine spray anaesthesia by same surgeon in all patients. The long bladed Macintosh laryngoscope which is routinely used by anaesthesiologists for intubation was used in our patients for manipulation of larynx. Long blade of the laryngoscope was put in valleculae and patient was asked to phonate a long eeee. Pressure over the valleculae stretched the vocal cords. Simultaneously external digital pressure in an antero-posterior direction over the thyroid cartilage facilitated in improving the voice quality. (Figure 1) The procedure was repeated 3-4 times in a single sitting. Immediate dramatic improvement in voice quality was noted on the table. Most of the patients were completely happy with their new voice. The patients who did not show significant improvement in voice after the second sitting, were referred to speech therapist and psychological evaluation.



Figure 1

Direct laryngeal manipulation in progress using Macintosh intubation. Laryngoscope and simultaneous external digital pressure over thyroid cartilage.

## OBSERVATION AND RESULTS

This prospective clinical study carried out at D.Y.Patil Medical College Hospital, Kolhapur included 30 puberphonic males in the age group of 14 to 25 years referred by nearby rural centres, ENT surgeons and general practitioners. In all 30 patients procedure was done under local anaesthesia. Secondary causes of voice change including hypogonadism were excluded from the study. After laryngeal stretching with the Macintosh long bladed laryngoscope there was immediate improvement in voice from high pitch to low pitch. Patients were called for follow up every 15 days for 3 months. The results of this technique were grouped into:

1. Excellent: Immediate improvement in voice quality after 1 sitting of laryngeal manipulation.

2. Satisfactory: Improvement in voice quality after 2 sittings of laryngeal manipulation.
3. Poor: No improvement in voice quality even after 3 sittings of laryngeal manipulation.

Of 30 patients in our study, 25 patients (83.3%) had immediate improvement in voice quality and were grouped as excellent, 3 patients (10%) had satisfactory improvement in voice quality after 2 sittings of the procedure and were grouped as satisfactory while 2 patients (6.7%) had no improvement in voice even after 3 sittings of laryngeal manipulation and were grouped as poor response. (Table 1). Those 2 patients who had no improvement in voice were sent to speech therapist and psychological evaluation.

**Table 1: Results of Direct Laryngeal Manipulation**

Response	No. of Cases	No. of sittings of manipulation	%
Excellent	25	1	83.3
Satisfactory	3	2	10
Poor	2	3	6.7
<b>Total</b>	<b>30</b>		<b>100</b>

## DISCUSSION

Puberphonia also known as mutational falsetto is the habitual use of high pitched voice beyond puberty. This is seen in males more often than in females. It is uncommon in females because their vocal folds do not show a sudden increase in size at puberty<sup>13</sup>. The reason why it is more noticeable in men than women is because men are expected to speak much lower than women, and it is less noticeable in women because women typically speak much higher than men.

Presently the treatment modalities available for puberphonia are:

1. Speech therapy
2. Laryngeal manipulation
3. Surgery

Speech therapy requires a consultation with speech therapist. Voice therapy includes coughing with pressure over Adams apple, speech range masking, glottal attack before a vowel, relaxation techniques to relax the laryngeal musculature, Visi pitch, lowering of larynx to appropriate position, humming while sliding down the scale and half swallow Boom technique. At rural areas where we have very few or no speech therapist it becomes difficult to treat these patients. Speech therapy is time consuming, needs multiple sittings and lots of patient compliance and encouragement. Many a times the patients are lost for follow up. The next modality of treating puberphonia is laryngeal manipulation. This may be digital laryngeal manipulation or direct laryngeal manipulation. In digital manipulation the thyroid cartilage is compressed and patient is asked to speak. Later on patient is taught to repeat this procedure at home to sustain a male voice<sup>14</sup>. This again needs a lot of patient encouragement and follow up. Direct laryngeal manipulation is a quite recent method in the treatment of puberphonia. It was first reported by Sudhakar Vaidya *et al* in 1995<sup>12</sup>. In their study of 26 patients, 23 had excellent response, 2 had satisfactory response and 1 had poor response after direct laryngeal manipulation. The success rate of their study was 88.4%. In our study of 30 patients, 25 had excellent response, 3 had satisfactory response and 1 had poor response after direct laryngeal manipulation. The success rate of our study was 83.3%. Our results are comparable with Sudhakar *et al* study. (Table 2.). M Kumerasan in 1992 used Rush-Miller laryngoscope and treated 11 patients<sup>15</sup>.

**Table 2: Results in comparison to Sudhakar *et al* study:**

Response	No. of patients in Sudhakar <i>et al</i> study	No. of patients in our study	No. of sittings of manipulation	% in Sudhakar <i>et al</i> study	% in our study
Excellent	23	25	1	88.4	83.3
Satisfactory	2	3	2	7.6	10
Poor	1	2	3	3.8	6.7
<b>Total</b>	<b>26</b>	<b>30</b>	<b>6</b>	<b>100</b>	<b>100</b>

The surgical treatment for puberphonia was first reported by Pau and Murty in 2001 by mobilizing the hyoid and superior halves of thyroid cartilage and reducing cricothyroid distance by apposing mobile hyoid to fixed cricoid cartilage by 2 non-absorbable figure of 8 sutures<sup>16</sup>. Lettre *et al* have surgically managed puberphonia by doing modified Ishiki thyroplasty type III, wherein shortening and relaxation of vocal cords was done<sup>17</sup>. The success rate of direct laryngeal manipulation

in first sitting in our study was 83%. Thus we conclude that in peripheral rural set ups where the facilities of trained speech therapist are not available, or where there is scarcity of a speech therapist, this office procedure which is cost effective and less time consuming, gives excellent and rewarding results.

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