



## Puberphonia Conservative approach A review

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### Abstract:

Puberphonia is persistence of adolescent voice after puberty in the absence of organic cause. This common condition is seen in males. These patients have a high pitched voice. This article attempts to review published literature on this topic with specific focus on conservative management. This condition is also considered to be a psychogenic voice disorder. Conservative management has met with excellent success. Conservative management modalities for this condition ranges from voice therapy to laryngeal manipulation.

### Introduction:

The persistence of adolescent voice even after puberty in the absence of organic cause is known as Puberphonia<sup>1</sup>. This condition is commonly seen in males. This is uncommon in females because laryngeal growth spurt occurs commonly only in males. According to Banerjee the incidence of Puberphonia in India is about 1 in 900,000 population<sup>2</sup>. In females this condition is known as "Juvenile Resonance Disorder" or a "Little Girl's Voice". This condition is characterised by vocal instability with extensive frequency swing.

### Pathophysiology:

In infants the laryngotracheal complex lies at a higher level. It gradually descends. During puberty in males this descent is rapid, the larynx becoming larger and unstable and on top of it the brain is more accustomed to infant voice. The boy may hence continue to use a high pitched voice or it may break into higher and lower pitches<sup>3</sup>.

### Etiology: include

1. Emotional stress
2. Delayed development of secondary sexual characters
3. Psychogenic
4. Hero worship of older boy or sibling
5. Excessive maternal protection
6. Non fusion of thyroid laminae
7. Increased laryngeal muscle tension causing laryngeal elevation

### Complaints:

1. Unusual high pitched voice persisting beyond puberty
2. Hoarseness of voice
3. Breathy voice
4. Inability to shout



5. Vocal fatigue

The typical fundamental frequency of adult male voice ranges between 85-180 Hz and that of a typical adult female is about 165-255 Hz

4. In Puberphonia the boy continues to use a higher pitch which stresses the laryngeal musculature.

Examination of these patients should include a complete physical examination including a genital examination also. Secondary sexual characters should be assessed, hypogonadism should be ruled out. A complete psychological profile of the patient in question should be built to rule out psychological causes. If psychological causes could be identified they treating it should take precedence over other modalities.

These patients speak in a double voice, both in high pitch and low pitch.

The impact of this voice disorder varies from person to person. This depends on the following variables:

1. Occupation 5
2. Environment
3. Family members
4. Personality

Goals of treatment of Puberphonia:

1. The patient should be taught to phonate at a low pitch
2. The patient should be taught to fully utilise the Phonatory and Respiratory musculature

3. The patient must be convinced that the new low pitch should be used instead of the old high pitch voice

Treatment modalities available:

1. Voice therapy
2. Larynx manipulation
3. Surgery

Voice Handicap Index (VHI):

In order to clinically access the impact of the voice disorder and effect of treatment Voice Handicap Index developed and validated by Jacobson and Johnson is commonly utilised 6. The first version of Voice Handicap Index had 85 items, which was later pruned down to 30 item list. This index has 3 subsections, each of which has a weightage of 40 points making the total score of 120.

The impact of VHI score is:

1. 0-30 – Minimal handicap / normal score
2. 31-60 – Moderate handicap associated with the voice disorder
3. 60-120 – Serious amount of handicap associated with the voice disorder

This scoring is useful in:

1. Assessing the degree of disability associated with the voice disorder
2. Assessing and monitoring the treatment efficacy 7
3. Assessing the impact of voice disorder in patient's daily living



VOICE HANDICAP INDEX

Name: \_\_\_\_\_ Date: \_\_\_\_\_

These are statements that many people have used to describe their voices and the effects of their voices on their lives. Circle the response that indicates how frequently you have the same experience.

0-never 1-almost never 2-sometimes 3-almost always 4-always

Part I-F

My voice makes it difficult for people to hear me.	0	1	2	3	4
People have difficulty understanding me in a noisy room.	0	1	2	3	4
My family has difficulty hearing me when I call them throughout the house.	0	1	2	3	4
I use the phone less often than I would like to.	0	1	2	3	4
I tend to avoid groups of people because of my voice.	0	1	2	3	4
I speak with friends, neighbors, or relatives less often because of my voice.	0	1	2	3	4
People ask me to repeat myself when speaking face-to-face.	0	1	2	3	4
My voice difficulties restrict my personal and social life.	0	1	2	3	4
I feel left out of conversations because of my voice.	0	1	2	3	4
My voice problem causes me to lose income.	0	1	2	3	4

SUBTOTAL \_\_\_\_\_

Part II-P

I run out of air when I talk.	0	1	2	3	4
The sound of my voice varies throughout the day.	0	1	2	3	4
People ask, "What's wrong with your voice?"	0	1	2	3	4
My voice sounds creaky and dry.	0	1	2	3	4
I feel as though I have to strain to produce voice.	0	1	2	3	4
The clarity of my voice is unpredictable.	0	1	2	3	4
I try to change my voice to sound different.	0	1	2	3	4
I use a great deal of effort to speak.	0	1	2	3	4
My voice is worse in the evening.	0	1	2	3	4
My voice "gives out" on me in the middle of speaking.	0	1	2	3	4

SUBTOTAL \_\_\_\_\_

Part III-E

I am tense when talking to others because of my voice.	0	1	2	3	4
People seem irritated with my voice.	0	1	2	3	4
I find other people don't understand my voice problem.	0	1	2	3	4
My voice problem upsets me.	0	1	2	3	4
I am less outgoing because of my voice problem.	0	1	2	3	4
My voice makes me feels handicapped.	0	1	2	3	4
I feel annoyed when people ask me to repeat.	0	1	2	3	4
I feel embarrassed when people ask me to repeat.	0	1	2	3	4
My voice makes me feel incompetent.	0	1	2	3	4
I am ashamed of my voice problem.	0	1	2	3	4

SUBTOTAL \_\_\_\_\_



Voice characteristics of a patient with Puberphonia:

1. Abnormally high pitched voice for the patient's age and expected norms
2. Pitch breaks
3. Vocal instability
4. Poor voice control
5. Complaints of lack of power in voice
6. Phonation is effortful
7. Supralaryngeal pain because larynx is held abnormally high
8. Patient may be distressed by the voice generated

Voice therapy includes:

1. Cough
2. Speech range masking
3. Glottal attack before a vowel
4. Relaxation techniques to relax the laryngeal musculature
5. Visi pitch
6. Lowering of larynx to appropriate position
7. Humming while sliding down the scale
8. Half swallow Boom technique

Before subjecting the patient to voice therapy patient should be properly counselled on the basics of voice anatomy, human growth and voice generation. This will help in alleviating patient's anxiety before the actual therapy.

Biofeedback:

This is aimed at gauging patient's response to voice changes. This should be undertaken during the initial stages of voice therapy.

- a. Audio recording of male voice should be played and the patient's response is judged
- b. The patient should hear the difference between a mature male voice and the voice generated in mutational falsetto
- c. Headphones are ideally used

In addition to auditory feedback visual feedback should also be used. These include digital pitch scales and electroglottography.

Vegetative tasks:

Performing the following vegetative tasks would alleviate the symptom in a significant number of patients.

Cough:

Patient is taught to cough and clear the throat before initiating voice. Patient's deep voice is heard spontaneously during coughing and laughing. In the next phase patient should initiate cough while applying pressure over the Adam's apple. Pressure over Adam's apple reduces the length of the vocal fold and causes a reduction in the pitch of the voice generated. This helps the patient to get used to lower basic frequency.

Vocalizing a deep sigh:

Patient is asked to take a deep breath and sigh out loud.

Tongue depressor manoeuvre:

A tongue depressor is used to depress the posterior portion of the tongue, while asking the patient to groan. This manoeuvre lowers the hyoid bone and larynx causing relaxation of the vocal folds.

Patient positioning:

Patient is made to sit with the head tipping slightly forwards and shoulders relaxed. Patient is instructed to vocalise "MM" while placing thumb and forefinger on the thyroid laminae so that the tendency to elevate the larynx is monitored.

Patient is asked to hold arms horizontally and drop them heavily to the side while saying "ah". The arms should be brought down with the force of gravity.



Establishing diaphragmatic breathing:

Patients should lie on their back.

A book is placed over the diaphragm.

Patient is asked to place one hand over the book and the other over the chest.

Patient should be instructed to raise the book up while breathing without raising the chest.

After diaphragmatic breathing is established, patient is asked to vocalise a deep sigh on their expiratory stream.

Speech range masking:

This procedure is known to improve the quality of voice. The use of auditory masking to produce reflexive vocal response was first introduced in 1911 by Lombard 8. This effect also known as Lombard effect has been used to identify auditory malingers. It has been established that speaking in a noisy background has profound effects on how an individual speaks. It can alter the quality of speech of an individual. This procedure also makes the voice clearer and louder. For this purpose an instrument known as the facilitator is used. The masking bandwidth is between 100 - 8000 Hz. The advantage of using this frequency is that it covers the speech range and masking is possible at much lower sound levels when compared to a white or pink noise which are commonly used for purposes of masking. A tape recording of the voice of the patient during and after masking is provided to the patient and the patient should try to match the voice generated during masking on a consistent basis.

Glottal attack before a vowel:

Vowel is a very important sound in speech. It is also easily amenable to therapy / change. Glottal attack involves bringing both vocal cords into close approximation. The patient is asked to breathe in, build air pressure in the subglottic area.

This causes increased muscular tension in the laryngeal area. The vowel is uttered as the air is breathed out. This procedure enables a patient with Puberphonia to settle down to their basic fundamental frequency of voice.

Relaxation techniques to relax laryngeal musculature:

Laryngeal muscles can be relaxed using the following relaxing procedures:

Yawn technique: The patient is advised to practise yawning, followed by generation of a sighing sound. This procedure reduces the tension on the vocal folds.

Chewing technique: First the act of chewing in an exaggerated manner is practised. Then gradually random sounds, words and sentences are added to this task. This act reduces the tension of the laryngeal muscles.

/M/ warm up: To warm up the vocal cords the consonant M is spoken or sung before the words. This helps to produce a gentle air flow through the larynx as phonation begins.

Visipitch:

This instrument is commonly used by speech pathologists to treat various speech disorders. This machine helps in extraction of Critical speech and voice parameters and displays them in true real-time to help clients achieve therapy goals with visual feedback. This machine helps in training the patient in nuances of normal speech production.



Boone's technique of larynx lowering:

This method is also known as "Yawn - sigh" method. The patient is asked to simulate a yawn and while yawning is in progress asked to sigh. This manoeuvre not only lowers the larynx it also relaxes it.

Humming while sliding down the scale:

In this exercise the patient is taught to hum in the highest pitch possible and the humming is continued by lowering the pitch. This exercise helps not only in tuning the vocal cords it also relaxes the laryngeal muscles.

Half swallow Boom technique 9:

In this technique the patient is asked to swallow. While swallowing is in progress the patient is asked to say "Boom". Then the patient is asked to turn to one side and say "BOOM". The same exercise is repeated by turning the head to the opposite side. The patient is then asked to lower the chin, and say Boom. The patient is taught to add words to the BOOM.

The swallow procedure is known to maximise the closure of larynx. The sound Boom is produced by posterior pressure to the larynx. The patient gradually learns to lower the pitch of his voice.

Antero posterior compression of thyroid cartilage:

Compression is applied to the Adam's apple area in the neck using the thumb and the patient is asked to speak. This procedure relaxes the vocal cord and lowers its basic pitch. The patient is instructed to repeat this exercise frequently while attempting to speak. This helps in reducing the basic pitch of the patient's vocal cord.

Laryngeal manipulation 10:

This is a quite recent method in the treatment of Puberphonia. This was first reported by Sudhakar vaidya in Laryngoscope journal in 1995.

Patient was asked to come nil by mouth for six hours before the procedure in the ENT outdoor. Patient was examined under xylocaine spray anesthesia by anesthesiologist's intubation laryngoscope (Macintosh). Long blade of laryngoscope was put in valleculae and patient was asked to speak a long eeeee. Pressure over the vallecula stretched the vocal cords. Sometimes-additional pressure was applied by a laryngeal biopsy forceps over the anterior commissure. The external digital pressure over the thyroid cartilage also helped in improvement of the voice quality. The procedure was repeated 3-4 times in a single sitting.

Conclusion:

Conservative management of Puberphonia involves speech therapist, voice analyst and otolaryngologist. A motivated patient and a dedicated team of therapists would succeed in managing these patients. Conservative management of Puberphonia is very successful in a majority of patients. Surgical option is reserved only for those rare patients who does not benefit from conservative speech therapy procedures.



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