



## Research Article

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### EFFICACY OF AYURVEDIC MEDICINE ON THE VOICE OF INDIVIDUALS WITH HYPERFUNCTIONAL VOICE DISORDERS

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#### ABSTRACT

The Ayurvedic approach of treatment for voice disorders, as mentioned in classical texts of Ayurved, has been utilized effectively over the years. But limited research is available to validate it. Keeping all these facts in view, a clinical trial was planned to study the efficacy of an Ayurvedic formulation over hyperfunctional voice disorders. Eight females were selected and were randomly divided into two groups named as; experimental and control group. The experimental group was administered with the Ayurvedic formulation along with vocal hygiene program, while the control group was given only vocal hygiene program. A voice protocol was followed which included detailed case history, stroboscopic evaluation and acoustic and perceptual assessment for all the participants. Pre-post treatment design was used. Kruskal Wallis test was carried out to compare the variables between pre and post treatment. Significant improvement ( $p < 0.05$ ) was seen for f0, overall grade and also for stroboscopic parameters. Significant improvements in voice quality highlighted that the Ayurvedic formulation is proved to be effective on the participants of the present study and hence can be stated to be a probable treatment for hyperfunctional voice disorders.

**Keywords:** Efficacy, Ayurvedic medicine, Hyperfunctional voice disorders

#### INTRODUCTION

Voice is an integral part of the uniquely human attribute known as speech. It exemplifies parameters such as pitch, loudness, quality and variability, specific to each individual. In the presence of a laryngeal pathology, there occur changes in these parameters, which are termed as voice disorders. Voice disorders, caused due to chronic or intermittent, overuse or misuse of the vocal apparatus, are classified as hyperfunctional voice disorders<sup>1</sup>. Overuse or misuse can be a result of vocally abusive behaviors such as prolonged hours of speaking, frequent coughing or throat clearing, screaming, etc. Occupations that entail into occupational hazards mainly include teachers, actors and singers and also clergy, receptionists, sales personnel, physicians, and all those occupations in which voice plays a vital role to their occupation. In such occupations there is a demand for continuous utility of voice. This demand results into over use or misuse of voice; which eventually causes hyperfunctional voice disorders. Statistical studies of India reveal that 89 out of 1000 females and 83 out of 1000 males suffer from voice disorders<sup>2</sup>, while National Institutes of Health (United States of America), estimates 7.5 million individuals to have diseases or disorders of voice. In the Ayurvedic purview, hyperfunctional voice disorders can be correlated to "Swara Bhang/ Swara Bheda" as the causative factors hold similar<sup>3</sup>. Yashtimadhu (*Glycyrrhiza glabra*), Guduchi (*Tinospora cordifolia*), Bala (*Sida cordifolia*), Pipalli (*Piper longum*), Sunthi (*Zinziber officinale*), Marich (*Piper nigrum*) and Triphala (group of three drugs: Haritaki [*Terminalia chebula*], Amalaki [*Emblica officinale*], Bhibhitaki [*Terminalia belerica*]) in powdered form; mixed with Madhu or cow ghee have been traditionally administered to improve the quality of voice. However,

research studies have not been carried out to validate it in particular to hyperfunctional voice disorders. Researchers have studied the effect of Ayurvedic medicines on related inflammatory pathologies and found that these medicines were effective on various pathologies. The effects were significant on cough<sup>4,6</sup>, hyperacidity<sup>7</sup>, tonsillitis<sup>8</sup>, allergic rhinitis<sup>9, 10</sup>, vasomotor rhinitis<sup>11</sup>, upper respiratory tract disorders<sup>12</sup>; etc. Successful experimental studies on animal models have also been conducted in the past to check the effects of Ayurvedic medicines on vocal folds<sup>13</sup>. However, research studies conducted to assess the effect of Ayurvedic medicines on the vocal folds of humans are limited. Thus, there is need to explore the potential of an Ayurvedic medicine, when used along with vocal hygiene program in the treatment of hyperfunctional voice disorders. Therefore this study was designed to explore the effect of Ayurvedic medicine; "SWARA", on the voice of individuals with hyperfunctional voice disorders. SWARA is a polyherbal formulation and is under product patent. Thus the formula of the medicine is not disclosed.

#### MATERIALS AND METHODS

##### Preparation of Ayurvedic medicine

Pharmaceutical study was carried out in an Ayurvedic Pharmacy unit using standard protocol of preparation of the powder.

##### Ingredients

- Four herbal drugs in equal quantity.
- Honey, four times of powder.

### Pharmacological Action

Ayurvedic classics have explained properties and pharmacological actions of the four herbal drugs used in SWARA. It is well documented that all the four herbal drugs have antimicrobial, anti-oxidants, immunostimulant, anti-inflammatory and analgesic activities<sup>14</sup>. One of the four drugs also shows demulcent properties, antiulcer and spasmolytic activities. These four drugs have been used in Ayurved as "Rasayan drugs" and strengthen tissue and a specific system. Thus the combination of these four drugs facilitates to act as anti-inflammatory, antibacterial, immune stimulant agent. Names of the drugs in SWARA cannot be revealed as further research is still going on, and will be disclosed at official launch in department. This paper is preliminary part of the ongoing project.

Honey stimulates the growth of tissues and acts as an anti-inflammatory agent. Honey has been reported clinically to reduce wound inflammation, when applied on wounds. It has also been proven for its antibacterial effect<sup>15</sup>.

Thus, considering the data and researches, it is hypothesized that SWARA formulation prepared with the combination ingredients, may have anti-inflammatory, immunostimulant, demulcent and antibacterial activity on the tissues of the vocal folds.

### Procedure

Four herbal drugs were procured from an authentic source and were identified by Ayurvedic experts. Dry form of each drug was reduced to fine particle size using pulverizer and sieved through mesh size 80, until they were reduced to powdered form. Powders of each drug were mixed with each other to formulate a compound mixture. This mixture was then mixed with honey to formulate a homogenous mixture, and was stored in air tight glass containers. The formulation was then analyzed for organoleptic test. The evaluation of the resultant homogenous mixture is given in Table 1.

### Administration of the medicine

Subsequent to the preparation of the medicine, subjects were chosen based on the following inclusion criteria. Only females were included in the study. Participants below 24 and above 52 were not included to rule out maturity and/or age related changes. Participants with a complaint of hoarseness of voice since at least more than 180 days, and with vocal load of more than 7-8 hours per day were included in the study. Participants with vocal pathologies of any type other than hyperfunctional voice disorder were not included in the study. Participants that had undergone previous laryngeal surgery, neurological condition and/or taken any previous treatment from any speech language pathologist were not included in the study. Based on the above criteria, eight subjects were chosen with the mean age of 38 years. The participants were priorly informed and explained that there were no side effects of the medicine used in the study. The consent of all the participants was taken before initiating the study. Ethical clearance was taken from the Clinical Research Ethics Committee of Bharati Vidyapeeth University, with approval number: MN/OS/2/14-15. All the participants underwent a pre-medicine voice protocol

which included detailed case history, acoustical and perceptual analysis of voice, along with the stroboscopic evaluations. Detailed history was taken of all the participants of the study which included information about vocal load, voice care, professional status etc. Acoustic and perceptual voice analysis was done by CSL-4500 Multi-Dimensional Voice Program (MDVP) Advanced and GRBAS rating scale (Grade, Roughness, Breathiness, Asthenic, Strained Rating Scale)<sup>16</sup>, respectively. Stroboscopic evaluation was carried out with the instrument (Maxer, Germany) by an ENT professional to confirm the diagnosis of hyperfunctional voice disorders. After confirming the diagnosis, the participants were randomly divided into two groups: experimental group (included four participants) and the control group (included four participants); pre-post medicine design was used. The experimental group was administered with Ayurvedic medicine SWARA formulation. As per the guidelines for administration of a medicine in Ayurved, in the present study SWARA was administered to the participants for seven days. It was taken by the participants at a dose of 1/4<sup>th</sup> of a teaspoon, four times a day at 5 hours interval. It was taken daily for one week along with vocal hygiene program. The control group was given only vocal hygiene program for seven days. After the medication of one week, post-medicine evaluations were done on all the participants. In addition to the protocol used for pre-medicine evaluations, perceptual rating of stroboscopic results for pre and post-treatment was done for all participants.

### Perceptual Analysis

The pre and post-medicine evaluation of stroboscopic videos were rated by two Speech Language Pathologists and two ENT specialists on a five point Visual Analogue Scale. The perceptual analysis of the stroboscopic videos was done on seven parameters, namely: pathology, closure pattern, symmetry, periodicity, amplitude, mucosal wave and non-vibratory portion. The ratings 1 to 5 were used; 1 being normal and 5 being abnormal. GRBAS (perceptual rating scale) was also considered as a perceptual parameter for rating the changes in acoustic quality of voice.

### Acoustic Analysis

The pre and post-medicine evaluation of MDVP results were compared considering four parameters, namely: Fundamental Frequency (F0), Jitter (Jitt), Shimmer (Shim) and Soft Phonation Index (SPI).

### RESULTS AND DISCUSSION

The case history revealed that most of the subjects were aware of their voice problem. Most of them had a history of irregular food/ diets schedules and a few also encountered hyperacidity problems. No medication had been taken for hyperacidity. Data analysis included analysis of the mentioned parameters across the experimental and the control group. Statistical comparison was done between the two groups by using the Kruskal Willis test.

**Acoustic Analysis**

**Jitter and Shimmer (Jitt and Shim)**

Graph 1 shows reduction in the average jitter and shimmer percentage in both groups, which implies to an overall improvement of the pathology. Though the difference is not statistically significant, the difference between the experimental group (2.83) is greater than that of control group (1.58) for jitter values and a similar trend is observed in the shimmer values. This improvement can be attributed and correlated with the improvement of mucosal wave and closure pattern, as confirmed by stroboscopic evaluation.

**Soft Phonation Index (SPI)**

Graph 2 shows SPI values in experimental as well as control group, before and after treatment. Since perceptually all the participants were showing reduction in hoarseness, the results also showed reduction in the SPI values post treatment. But the results were not statistically significant. This might have happened due to a small sample size.

**Fundamental Frequency (f0)**

Since the pathology had caused a reduction in pitch, considerable increment was observed in pitch, post-treatment as seen in Graph 3. Acoustic analysis showed improvement in all the considered parameters; although, statistically significant improvement (F = 4.251, (1) p < 0.05) was seen only in f0. This can be attributed to the

anti-inflammatory effects of SWARA formulation, which might have reduced the edema, thus showing significant improvement in f0.

**Perceptual Analysis**

**Perceptual rating scale**

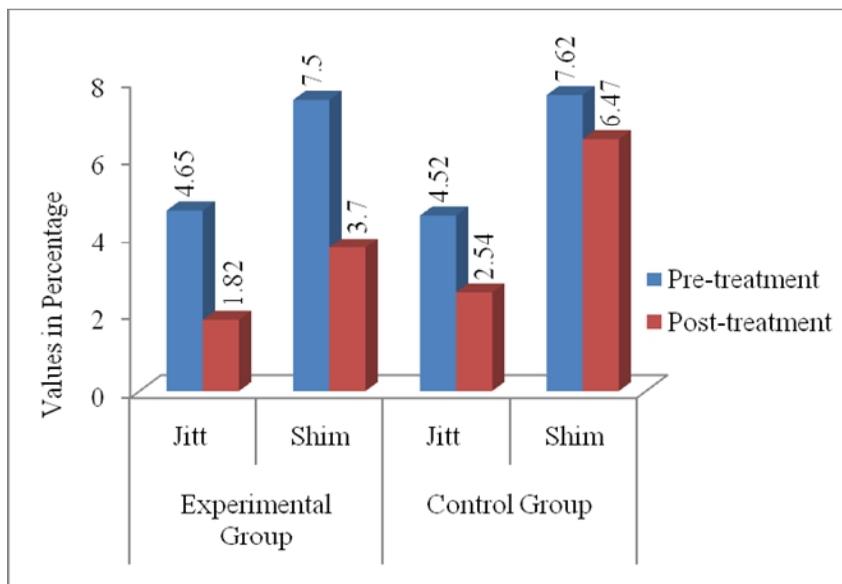
Graph 4 shows reduction of grade values in both groups, implying to an improvement in the pathology. Significant improvement (F = 19.20, (1), p < 0.05) was seen in experimental group. The improvement in grade can be correlated with the reduction in the severity of the pathology, which was confirmed with stroboscopic evaluation.

**Stroboscopic evaluation**

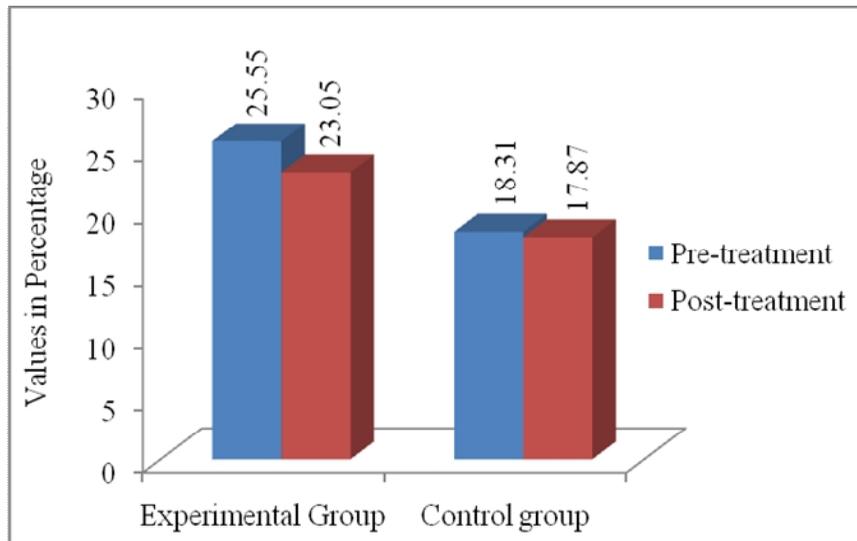
Graph 5 shows the ratings of the Visual Analog Scale on the y axis and the stroboscopic parameters on the x axis. The first set of parameters represents the experimental group, while the second set represents the control group. As seen in the diagram, there was a reduction in all the parameters of both the groups, although, significantly greater difference was seen in the experimental group than the control group. This reduction of values implies to an improvement of the overall pathology. Significant improvement (p < 0.05) was observed in each stroboscopic parameter. The inter-examiner reliability for pre-treatment was r = 0.86 and for post-treatment was r = 0.72 for stroboscopy and perceptual parameters of voice.

Table 1: Organoleptic evaluation of medicine

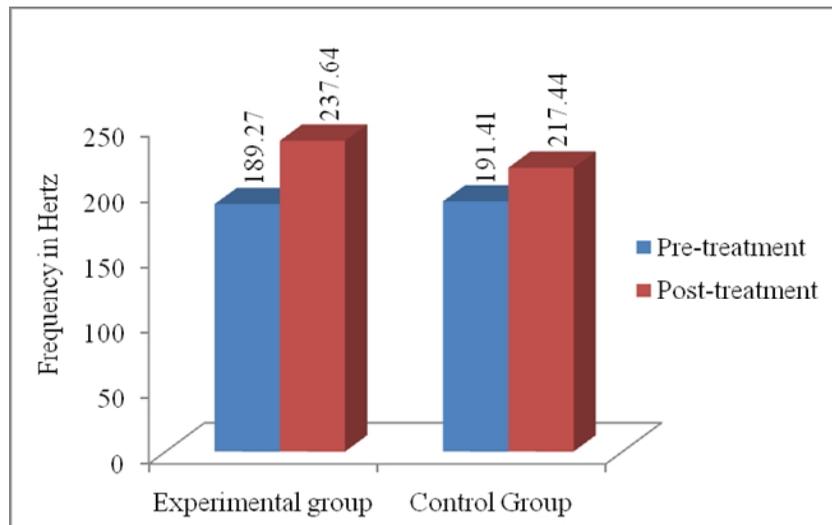
S. No.	Parameter	Observation
1.	Color	Brown
2.	Odor	Aromatic/Agreeable
3.	Taste	Sweet and astringent
4.	Consistency	Nectar consistency



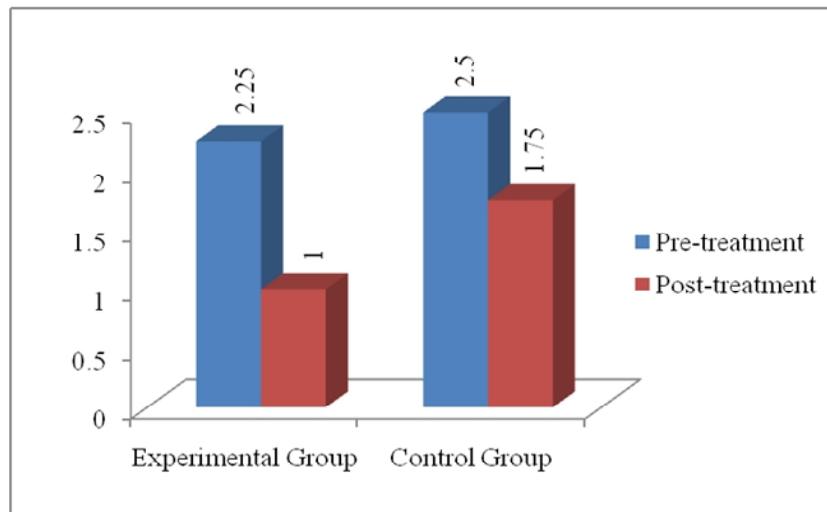
Graph 1: Comparison of Jitter and Shimmer across groups



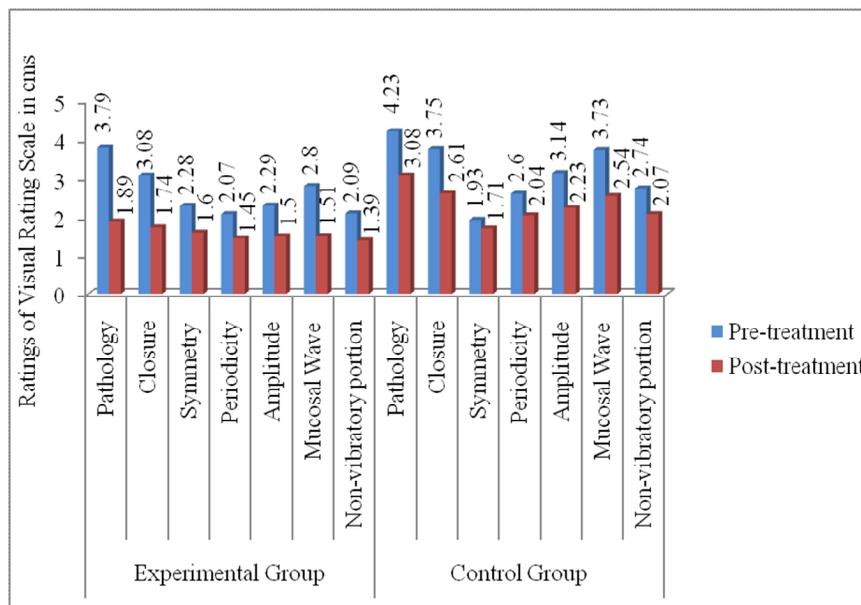
Graph 2: Comparison of SPI across groups



Graph 3: Comparison of F0 across groups



Graph 4: Comparison of Grade across groups



Graph 5: Comparison of Stroboscopic Results across groups

## CONCLUSION

Significant improvements in f<sub>0</sub>, s/z ratio, overall grade and all the stroboscopic parameters were observed. The results confirm the reduction of the severity of the problem. This reveals that the SWARA formulation posses the potential to provide tonic effect to specific muscles and soothes the inflamed mucous membranes of the vocal fold, thus protecting it from irritation. Hence, it is confirmed to have anti-inflammatory, immunostimulant, demulcent and antibacterial activity on the tissues of the vocal folds. Consequently, it is disclosed that SWARA formulation, along with vocal hygiene program, forms a potential management option for the treatment of hyperfunctional voice disorders. Due to the lack of time, the study could be carried out only on females. In order to generalize the results, further studies need to be done across genders and on a larger population. Thus, we can utilize and rejuvenate the Ayurvedic system for the cure of voice disorders.

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## REFERENCES

- Aronson AE and Bless DM. Introduction to Clinical Voice Disorders. Clinical Voice Disorders (4<sup>th</sup>ed.). New York: Thieme Medical; 2009. p. 232.
- National Sample Survey Organization. Summary of Findings. Disabled Persons in India. (Report No. 485). Ministry of Statistics and Programme Implementation, Government of India; 2003. p. 41.
- Lakshmpatishastri. Yogaratnakar (6<sup>th</sup>ed.). Varanasi: Chaukhamba Sanskrit Sansthan; 1997. p. 436-438.
- Rangesh P. Maintaining the quality of life using Diakof in symptomatic relief of persistent cough. Indian Journal of Clinical Practice 2001; 12(3): 97-100.

- Nesari T, Bhagwat B, Jhonson J, Bhatt N and Chitre D. Clinical validation of efficacy and safety of herbal cough formula: study of herbal cough syrup. Journal of Herb Pharmacotherapy 2004; 4(4): 1-12. [http://dx.doi.org/10.1080/J157v04n04\\_01](http://dx.doi.org/10.1080/J157v04n04_01)
- Kashikar V and Patkar P. Formulation and evaluation of taste masked chewable herbal tablet for cough remedy. Int. J. Res. Ayurveda Pharm 2011; 2(3): 880-883.
- Prashanth B, Krishnamurthy M, Rao R, Bhat S and Shreevatsa. Experimental evaluation of Guduchi-satwa, Gharita and Kashaya with special reference to hyperacidity. Int. J. Res. Ayurveda Pharm 2011; 2(5): 1435-1437.
- Shailaja U, Rao P, Arun R and Mallannavar V. Effect of Kumarbharana rasa on chronic tonsillitis in children: A pilot clinical study. Int. J. Res. Ayurveda Pharm 2013; 4(2): 153-157.
- Verma S. Role of Katphaldi Kwatha and Anu Taila Nasya in the management of Vataja Pratishyaya (Allergic Rhinitis). International Ayurvedic Medical Journal 2013; 1(3): 1-7.
- Bhaskaran A, Rao S, Subrahmanya P, Mahesh T and Krishnamurthy M. Clinical evaluation of Amragandha Haridra (*Curcuma amada* Roxby) in Pratisyaya W.S.R. to allergic rhinitis: A folklore claim. Int. J. Res. Ayurveda Pharm 2012; 3(1): 85-89.
- Khan N and Patil S. Treatment of Vasomotor Rhinitis with Shunthyadi Taila Nasya. Int. J. Res. Ayurveda Pharm 2013; 4(2): 216-218 <http://dx.doi.org/10.7897/2277-4343.04225>
- Andhikari A, Sen K, Biswas S, Sengupta M and Debnath P. Role of Immunet in upper respiratory tract disorder: A randomized double blind placebo controlled clinical trial. Int. J. Res. Ayurveda Pharm 2012; 3(4): 505-507.
- Rousseau B, Tateya I, Lim X, Munoz Del Rio A and Bless D. Investigation of anti-hyaluronidase treatment on vocal fold wound healing. Journal of Voice 2006; 20(3): 443-451. <http://dx.doi.org/10.1016/j.jvoice.2005.06.002>
- Database on medicinal plants used in Ayurveda CCRAS, Dept. of ISM and H Govt. of India, New Delhi, Vol. 1, 3, 8; 2001.
- Mandal M and Mandal S. Honey: Its medicinal properties and antibacterial activities, Asian Pac J. Trop, Biomed 2011; 1(2): 154-16. [http://dx.doi.org/10.1016/S2221-1691\(11\)60016-6](http://dx.doi.org/10.1016/S2221-1691(11)60016-6)
- Hirano M. Clinical examination of Voice, NY: Springer Wien; 1981.

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