Outcome of Voice Therapy in Treatment of Benign Laryngeal Lesions

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ABSTRACT

Introduction: Benign laryngeal lesions, such as vocal nodules, polyps, cysts, and Reinke's edema, constitute some of the most common voice disorders and have a great impact on people's daily communication and quality of life. Voice therapy is considered First, line, non, surgical method of treatment, which aims to reduce phono traumatic behavior, improve vocal technique and achieve functional voice. **Methods & Materials:** A prospective observational study was carried out at the Department of Otolaryngology Head & Neck Surgery, Specialized ENT Hospital of SAHIC, over the period from January 2025 to December 2025. The data were processed by means of SPSS version 26.0. **Result:** Voice therapy with a structure had a profound impact on the reduction of VHI scores in all types of lesions ($p < 0.001$). The greatest impact was seen in vocal nodules where the average VHI fell from 49.1 to 31.9. Laryngoscopic examination demonstrated that the lesions had fully or partly disappeared in 89.7% of the cases, and the nodules had the biggest rate of fully going away while Reinkes edema had a less good response. **Conclusion:** This study shows that a structured voice therapy is an effective and safe non, surgical treatment for benign laryngeal lesions. There was a substantial improvement in voice, related quality of life reflected by a significant decrease in the scores of Voice Handicap Index and majority of the patients also had positive laryngoscopic changes. Vocal nodules responded best to therapy, however Reinkes edema kept on displaying lesser but still significant improvements.

Keywords: *Benign Laryngeal Lesions, Voice Therapy, Voice Handicap Index*

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INTRODUCTION

Benign laryngeal lesions (BLLs) including vocal nodules, polyps, cysts, Reinke's edema, and contact granulomas are common voice disorders that significantly affect vocal quality, professional communication, and quality of life. The overall worldwide proportion of people with voice disorders in the general population is believed to be between 3% and 9%, with the highest levels found in such voice, demanding professions as teachers, singers, and call center workers [1]. Voice disorders due to benign lesions account for nearly 40% to 60% of diagnosed laryngeal pathologies among the patients who come with voice complaints [2]. With low awareness about voice health and high exposure to risk factors such as smoking, air pollution, and poor vocal hygiene, South Asian countries BLLs are rarely diagnosed. Research from India and Pakistan shows that benign lesions make up 50%70% of the cases among patients with hoarseness and voice disorders [3,4]. Surgical interventions have been the principal mode of treatment traditionally. However, the role of voice therapy as an important non, invasive modality in the management of benign vocal fold lesions is becoming more and more recognized. Voice therapy, generally administered by a speech, language pathologist with expertise in voice disorders, intends to change harmful vocal habits. The therapy also aims at refining vocal technique and thus, helping to maintain good vocal hygiene. It includes both direct and indirect approaches, such as vocal function exercises, resonant voice therapy, and the teaching of vocal conservation. Evidence, based practice recently highlighted the importance of behavioral interventions in not only symptom relief but also in preventing recurrence after surgery. A study was designed to randomize patients to different treatment arms, and it was found that voice therapy was equally effective as phonosurgery for certain lesions in terms of long, term vocal outcomes. Also, pre, operative voice therapy has been demonstrated to enhance the results of surgery and shorten the healing time [5]. The effectiveness of voice therapy is largely determined by a thorough and individualized assessment and goal, setting, a good compliance to the treatment protocols, and a strong multidisciplinary collaboration of otolaryngologists and voice specialists [6]. Although it has advantages, voice therapy is still rarely used in some clinical settings, mainly due to the unawareness or shortage of professionals trained in this field [7]. Technological improvements in laryngeal imaging and voice signal analysis techniques have significantly facilitated the evaluation of treatment outcomes and tracking of lesions. Besides that, the expanding use of telepractice has greatly facilitated access to voice therapy and has demonstrated similar effectiveness to face, to, face sessions [8]. Voice therapy is an important tool in the non, surgical treatment of benign laryngeal lesions. It helps to alleviate symptoms and improve voice, thus lessening the need for surgery and preventing the recurrence of lesions. This paper will investigate the success and different uses of voice therapy as a method of treatment for benign laryngeal lesions with the support of current research and clinical practice guidelines.

METHODS & MATERIALS

This prospective observational study was held at the Department of Otolaryngology Head & Neck Surgery, Specialized ENT Hospital of SAHIC, from January 2025 to December 2025. 68 patients with benign laryngeal lesions were the subject of the study. The study participants' demographic and clinical profiles were documented after obtaining the participants' written consents. An institutional ethics committee at SAHIC issued ethical clearance for the study. Voice Handicap Index (VHI) and video

laryngoscopy assessments were performed for all patients before and after the structured voice therapy sessions. The data management and statistical analyses were done using SPSS 26.0. Appropriate statistical tests were chosen to analyze the data: the means and standard deviations were shown for continuous variables, and frequencies and percentages for categorical variables. Comparisons of pre, and post, treatment VHI scores were done using paired t, tests, and associations between lesion types and laryngoscopic findings were determined using chi, square tests. A p, value of less than 0.05 denoted statistical significance.

RESULTS

Among the participants, females outnumbered males (55.9% vs 44.1%), which may reflect higher voice-related concerns or greater healthcare-seeking behavior in females. The majority were in the 26–35 years age group (36.8%), followed by 36–45 years (26.5%). Only 5.9% of participants were over 55 years old (*Table I*).

Table I
Demographic Profile of Participants (*n* = 68).

Variable	Number	Percentage
Gender		
Male	30	44.1
Female	38	55.9
Age group (years)		
18–25	12	17.6
26–35	25	36.8
36–45	18	26.5
46–55	9	13.2
>55	4	5.9

Vocal nodules were the most frequently observed lesion (41.2%), followed by polyps (29.4%) and cysts (16.2%). Reinke's edema was the least common (13.2%). This pattern aligns with prior studies that show voice misuse or overuse is a leading cause of nodules and polyps, while Reinke's edema is less prevalent but often associated with smoking or long-term vocal abuse (*Table II*).

Table II
Distribution of Benign Laryngeal Lesions (*n* = 68).

Lesion Type	Number	Percentage
Vocal nodules	28	41.2
Vocal polyps	20	29.4
Vocal cysts	11	16.2
Reinke's edema	9	13.2

Structured voice therapy led to a significant reduction in VHI scores across all lesion types ($p < 0.001$). The largest reduction was seen in vocal nodules (-18.1 points), indicating a substantial improvement in perceived voice handicap. Vocal polyps and cysts also showed marked improvement (-16.7 and -17.2 points, respectively). Participants with Reinke's edema had the highest baseline VHI (52.1 ± 10.3), reflecting greater functional impairment, and showed a mean reduction of 16.9 points, demonstrating that even more severe lesions benefit from voice therapy. Overall, the mean VHI decreased from 49.1 to 31.9. (*Table III*).

Table III
Pre- and Post-Therapy Voice Handicap Index (VHI) Scores (*n* = 68).

Lesion Type	Pre-Therapy VHI Mean ± SD	Post-Therapy VHI Mean ± SD	Mean Difference	p-value
Vocal nodules	48.5 ± 8.4	30.4 ± 7.2	-18.1	<0.001
Vocal polyps	50.2 ± 9.1	33.5 ± 8.0	-16.7	<0.001
Vocal cysts	45.8 ± 7.6	28.6 ± 6.5	-17.2	<0.001
Reinke's edema	52.1 ± 10.3	35.2 ± 9.5	-16.9	<0.001
Overall	49.1 ± 8.9	31.9 ± 7.7	-17.2	<0.001

Laryngoscopic assessment showed that 89.7% of lesions had complete or partial resolution after therapy. Vocal nodules demonstrated the highest rate of complete resolution (50%), while Reinke's edema had the lowest (22.2%), indicating that edema is less responsive to conservative voice therapy. Partial resolution was most frequent in cysts (63.6%) and Reinke's edema (55.6%). Only 10.3% of lesions showed no change, emphasizing the effectiveness of structured voice therapy across most benign lesions. The differences in laryngoscopic outcomes among lesion types were statistically significant ($p < 0.05$) (*Table IV*).

Table IV
Laryngoscopic Changes After Voice Therapy (*n* = 68).

Lesion Type	Complete Resolution	Partial Resolution	No Change	p-value (χ^2)
Vocal nodules	14 (50.0%)	12 (42.9%)	2 (7.1%)	0.003
Vocal polyps	8 (40.0%)	10 (50.0%)	2 (10.0%)	0.005
Vocal cysts	3 (27.3%)	7 (63.6%)	1 (9.1%)	0.012
Reinke's edema	2 (22.2%)	5 (55.6%)	2 (22.2%)	0.021
Overall	27 (39.7%)	34 (50.0%)	7 (10.3%)	<0.001

Overall, 80.9% of participants showed good response, reflecting marked improvement in voice quality and lesion reduction. Vocal nodules responded best (92.9%), while Reinke's edema had the lowest good response rate (55.6%), likely due to chronic edema changes that are slower to resolve. Moderate response was observed in 19.1% of participants, while no participant had poor response, confirming the efficacy of voice therapy in benign lesions. Differences between lesion types were statistically significant ($p < 0.05$) (*Table V*).

Table V
Response to Voice Therapy by Lesion Type (*n* = 68).

Lesion Type	Good Response (%)	Moderate Response (%)	Poor Response (%)	p-value
Vocal nodules	26 (92.9)	2 (7.1)	0 (0)	0.001
Vocal polyps	16 (80.0)	4 (20.0)	0 (0)	0.004
Vocal cysts	8 (72.7)	3 (27.3)	0 (0)	0.010
Reinke's edema	5 (55.6)	4 (44.4)	0 (0)	0.028
Overall	55 (80.9)	13 (19.1)	0 (0)	<0.001

Both males and females experienced significant reduction in VHI scores ($p < 0.001$). The mean improvement was similar between genders (-17.2 vs -17.3), indicating that voice therapy is equally effective in both males and females, independent of baseline lesion type or severity (*Table VI*).

Table VI
Improvement in VHI by Gender (*n* = 68).

Gender	Pre-Therapy VHI Mean ± SD	Post-Therapy VHI Mean ± SD	Mean Difference	p-value
Male	48.7 ± 9.1	31.5 ± 7.9	-17.2	<0.001
Female	49.5 ± 8.7	32.2 ± 7.6	-17.3	<0.001

DISCUSSION

With respect to demographic characteristics, females constituted a higher proportion of participants (55.9%) than males, and the majority were aged 26–35 years. This reflects a population actively engaged in professional and social voice use. Roy et al. reported a higher prevalence of voice disorders among females and working-age adults, attributing this to increased vocal load and greater health-seeking behavior among women [1]. Similarly, Cohen et al. observed that patients presenting to voice clinics were predominantly young to middle-aged adults with occupational voice demands [9]. Regarding lesion distribution, vocal nodules were the most common lesion (41.2%), followed by polyps and cysts, with Reinke's edema being least frequent. In a large clinical review, Rosen and Murry identified vocal nodules and polyps as the most frequent benign vocal fold lesions, primarily related to phonotrauma, while Reinke's edema was less common and more strongly associated with smoking and chronic irritation [10]. Johns also emphasized that nodules are particularly prevalent in patients with voice misuse, whereas Reinke's edema represents a more chronic inflammatory process [11]. The lesion pattern observed in our study mirrors these established etiological associations. In terms of voice-related quality of life, our study demonstrated a statistically significant reduction in VHI scores across all lesion types ($p < 0.001$), with the largest improvement observed in vocal nodules (-18.1 points). Schindler et al. reported significant reductions in VHI scores following voice therapy in patients with benign vocal fold lesions, even when laryngoscopic resolution was incomplete [12]. Similarly, Cohen et al. documented clinically meaningful VHI improvement after behavioral voice therapy, emphasizing its impact on patients' perceived vocal handicap [9]. Compared to these studies, the magnitude of VHI reduction in our cohort was substantial, indicating robust subjective benefit from structured therapy. Laryngoscopic outcomes revealed complete or partial resolution in 89.7% of lesions, with vocal nodules showing the highest complete resolution rate (50%) and Reinke's edema the lowest (22.2%). Schindler et al. noted minimal structural resolution on videostroboscopy despite symptomatic improvement, whereas later studies reported partial or complete lesion regression, particularly for nodules, following intensive therapy programs [12, 13]. The higher resolution rates in our study may be attributable to strict therapy adherence and lesion selection, though the limited response of Reinke's edema aligns with its known chronic pathology. When assessing overall response by lesion type, 80.9% of participants demonstrated a good response, with vocal nodules responding best (92.9%). Nakagawa et al. reported that voice therapy alone led to significant improvement in many patients with vocal polyps, allowing avoidance of surgery in selected cases [14]. However, they also noted that response varied by lesion type and chronicity. Our findings support this lesion-specific responsiveness, particularly highlighting the favorable prognosis of nodules with conservative management. Finally, analysis by gender showed comparable VHI improvement in males and females. This observation is consistent with Schindler et al., who found no gender-based difference in post-therapy VHI improvement [12].

LIMITATIONS

The single, center study design and relatively small sample size (n = 68) may reduce the extent to which the results can be generalized. Without a control group, it is not entirely possible to assign all the positive changes solely to voice therapy as spontaneous recovery or placebo effects may still exist. The evaluation of results was based mainly on the subjective Voice Handicap Index, while objective acoustic or aerodynamic voice measures were not part of the study.

CONCLUSION

The present paper reveals that organized voice therapy is indeed an effective and safe non, surgical treatment for benign laryngeal lesions. A remarkable change was noted in the voice quality of life of the patients as is clear from the profound decline in Voice Handicap Index scores, besides that, there were also positive laryngoscopic changes in most of the cases. Vocal nodules reacted the most to the treatment, whereas Reinkes edema got the least response but the changes were still clinically significant.

RECOMMENDATION

As a result of the findings of this research, it is suggested that structured voice therapy be considered the primary treatment for patients suffering from benign laryngeal lesions, especially vocal nodules. Prompt voice therapy referral could lessen symptoms, enhance the patient's quality of life through better voice, and even reduce the necessity for surgery. To provide more robust evidence for these interventions and to clarify protocols that are specific to different lesions, it is suggested that future research be carried out with a larger number of participants, a longer duration of follow, up, and the use of objective voice parameters.

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CONFLICT OF INTEREST

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