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Role of absolute versus relative voice rest in postoperative management of benign vocal fold lesions

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Introduction

Vocal fold pathologies are very common in otorhinolaryngology practice. Vocal cords are sensitive anatomical sites for injury especially in patients with history of voice abuse, overuse and misuse.

Benign lesions are non-malignant growths of abnormal tissue on the vocal cords.

The common benign lesions of vocal cord are singer's nodule, polyps, papilloma, polypoidal degeneration (Reinke's oedema) and cysts[1].

Vibration of vocal folds due to regulated air passing through the larynx allows humans the ability to phonate. This is regulated through a complex neuromuscular, membranous and cartilaginous framework.

Vocal folds abnormality, including masses, hamper the normal vibration. Scarring can occur after injury, inflammation or surgical interventions[2]

Vocal fold scarring causes disruption of the well-structured lamina propria and patients present with significant hoarseness of voice[3].

Therefore, it is of paramount importance to avoid scarring due to trauma and inflammation, voice rest being one of the important suggestions to avoid this. This is advocated by otolaryngologists all over the world aiming at appropriate post-operative healing, but a review of literature shows a lack of uniformity in the advice given to patients regarding voice rest and very few studies have been done to establish a fixed protocol. There is a challenge in making the patient complaint with duration and type of voice rest especially after an established diagnosis of benign histopathology.

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Through this study, we will be addressing this controversy and compare our findings with the studies worldwide and evaluate the role of voice rest in post-operative management of benign lesions of the vocal cords.

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Materials and Methods

Study Design: Observational cohort study

Study Setting: This study was carried out in the Department of ENT in a tertiary care centre in South India in the span of 2 years between the year 2020 to 2022.

Study population: Forty patients with benign vocal cord lesions were recruited.
Patients with history of change of voice, confirmed to have a vocal cord lesion by rigid video-laryngoscopy, not benefitting from standard voice rest were included in the study.

Inclusion and exclusion criteria:

Inclusion criteria- All patients with benign vocal cord lesion undergoing Micro -laryngeal Surgery

Exclusion criteria-

- Patients with history of previous surgery on vocal cord
- Patients with history of previous Head and neck radiation
- Patients whose post-operative histopathology report came as malignant
- Patients lost to follow-up within the follow up duration

The patients matching the inclusion criteria underwent surgical intervention in the form of excision under general anaesthesia by microlaryngoscopy (MLS).

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Sampling technique: The consultant of the treating unit will decide whether absolute or relative voice rest is given (unit I consultants prescribed absolute voice rest and unit II consultant prescribed relative voice rest)

Data Collection and outcome analysis: The patients were subjected to pre-operative analysis in the department of speech and hearing by a speech pathologist and pre-operative voice analysis in the form of measurement of fundamental frequency, shimmer, jitter, and number of voice breaks (NVB)

They were also requested to fill VHI (Voice handicap index) and VRQOL (Voice related quality of life scale) to assess the perception of their voice and its effect on their quality of life.

The patients were categorised into the two groups of AVR (absolute voice rest) and RVR (Relative voice rest), based on the choice of the treating consultant.

The patients underwent microlaryngoscopic surgery after confirming the intraoperative findings, (Figure I), with cold steel instruments and specimens were sent for histopathology studies.

The patients were discharged one day after surgery on proton pump inhibitors (pantoprazole) and with a pamphlet (made by the authors as shown in Figure II) mentioning the prescription of voice rest and instructions on general voice hygiene.

The patients were post operatively assessed at one week and one-month intervals with post-operative voice analysis along with VHI, VRQOL and compliance of the prescribed voice rest

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on a 5-point Likert scale. Primary outcome measurement was in form of voice analysis parameters (Jitter, Shimmer, frequency, number of voice breaks)

Secondary outcome measures included Voice handicap index (VHI), Voice related quality of life scale (VRQOL), voice rest instruction proforma and compliance in 5-point Likert scale.

Statistical analysis: Statistical analysis was performed using SPSS Version 22 in order to detect the difference between the two groups. Repeated measures of ANOVA using PASS software was used keeping 90% power and 5% levels of significance and a standard deviation of 31 between the groups.

Ethical approval: The study was approved by the institute's ethical committee prior to commencing the study (IEC number- 77) and was also registered with clinical trials registry of India (REF/2021/06/034257)

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Results

A total of 40 patients were followed up for one-month analysis with 20 in Relative voice rest group and 20 in Absolute voice rest group.

Primary Outcomes

JITTER-

While there was a significant difference in one-week values after surgery between the groups (p=0.035), no such significant difference was shown in the one-month values following surgery between the groups (p=0.512).

SHIMMER-

There was a significant difference in one-month post-surgical values between the groups (p=0.020) but no such significant difference was shown in one-week post-surgical values between the groups (p=0.289).

NUMBER OF VOICE BREAKS (NVB)-

Mann-Whitney U tests showed no significant differences shown in 1week post op and 1 month postop between the groups in NVB as p values were 0.841 and 0.565 respectively.

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FUNDAMENTAL FREQUENCY-

Results revealed that there were no statistically significant differences between the groups as p values were greater than 0.05

Secondary Outcomes

VHI, VRQOL and compliance were the secondary outcomes of this study.

VHI (Voice Handicap Index)-

Results revealed that there were statistically significant differences between the groups as p values were 0.005 and <0.001 and the improvement in scores were found to be better in RVR group.

VRQOL (Voice related quality of life scale) -

Mann-Whitney U tests revealed no statistically significant differences were shown between the groups as p values were 0.547 and 0.314 in 1 week postop and 1 month postop values respectively.

COMPLIANCE-

The Box-and-Whisker plot (Figure III) depicts the distribution of compliance between the Absolute and Relative groups of voice test and as shown compliance was found to be more in RVR group than AVR group

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Discussion

DEFINITION OF VOICE REST-

There is no internationally accepted definition of what is meant by "Relative voice rest" nor is there a standardized protocol for the parameters of RVR.

Most of these prescriptions depends on the choice of the operating surgeon or is institution based.

In this study, the term relative voice rest was defined as follows:

"Along with the generalized voice hygiene instructions mentioned in the pamphlet given to each patient, the patient can use the voice for 5-10 mins per hour with 45-50 mins of voice rest and not more than 1-2 mins at a stretch."

There is no standardized definition of what is meant by "relative voice rest", therefore it has been described differently by different authors.

Whitling et al[4] allowed RVR group to use voice for 7 days post-operative in a gentle, comfortable way and to avoid whispering and shouting while Kaneko M et al[2] described relative voice rest as 3 days voice rest period and compared the results to a complete 7 days voice rest group and Kiagiadaki D et al[5] have described relative voice rest as 5 days of voice rest.

Another survey done by Coombs A C et al[6] revealed that "complete voice rest" meant no voice production as per 86.5 % of respondents while there was no constant response as to how they described 'relative voice rest', and eight physicians were not aware of the term or have not put it to use in their clinical practice. There was a general agreement that 'relative voice rest' group should be given general instructions of "no shouting, no singing, or whispering";

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however, several respondents also mentioned that they had their own "relative voice rest" regimes.

COMPARISON OF VOICE PARAMETRS BETWEEN THE TWO GROUPS -

Our study evaluated Jitter changes from pre-op values to 1 week postsurgical and 1 month postsurgical periods. This has been recorded in both the groups, the Absolute and Relative groups and there was a significant difference in 1- week postop period values in case and control subjects (p=0.035). There was no such significant difference in 1 month post op values between the cases and controls (p=0.512)

Raju et al[7] conducted a prospective randomised control trial which was single-blinded involving 35 patients and categorised the patients into 5 and 2 days voice rest groups and revealed no statistically significant difference between the two groups with the exception of jitter, where the 5 day voice rest group showed a significant improvement over the 2 day voice rest group statistically and found compliance was 43 % in absolute voice rest group of patients.

In a systematic review and meta-analysis done by Chi HW et al[8] which compared four RCTs comprising of 112 patients, he found comparable VHI and acoustic variables in the form of jitter, shimmer and maximum phonation time in short and longer duration of voice rest groups and unfavourable outcome on quality of life and compliance in the longer-term voice rest group.

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Whereas Cohen JT et al[9] work on 167 patients, in a cohort study done both prospectively and retrospectively in a combined way, and equally divided into two groups of standard and no voice rest group, on evaluation of VHI scores and acoustic variables showed no difference between the voice rest and no-voice rest groups in shimmer (P = 0.9590), jitter (P = 0.5692) or harmonic-to-noise ratio (P = 0.1871) which was statistically significant and concluded that quality of voice and healing of wound post operatively were similar in both the groups and that " No voice rest " gave equally good results.

A prospective study of 55 patients by Singh A et al[10] concluded that 40% of the patients were between the age of 30–40 years of age while 34% were between 40–50 years of age and histopathologically the most common lesions were vocal fold cyst (20) vocal fold polyp(17), papilloma (6) and vocal nodules (7) . We found most of our study population to be between the age of 40-50 years of age and vocal cord polyp (28) to be the most common histopathology diagnosis.

Pre-surgically the mean VHI scores was 88.15 which reduced to 26.5 after 3 months post-surgically, showing a statistically significant (< 0.001) improvement similar to our study where statistically significant differences were found between the VHI scores of various sessions in Absolute and Relative groups separately ($p<0.001$).

Sandeep S. Dhaliwal et al[11] conducted a randomized controlled trial with 30 patients (15 in each arm) and found that postoperative VHI-10 scores and secondary outcomes were not significantly different in the two groups and ultimately argued that there is no advantage of

voice rest on postoperative voice measurements and parameters as determined by patient self-perception, acoustic variables, and auditory-perceptual analysis whereas our findings in this study found statistically significant differences in the AVR and RVR groups when it came to certain primary outcomes like shimmer, jitter and secondary outcomes like VHI and compliance making relative voice rest a preferred prescription.

Owing to the fact that some amount of mechanical stimulation in the early stages helps in functional recovery of the vocal folds 31 patients were recruited and were divided into two groups of 3 day and 7 day voice rest in a randomized controlled trial done by Kaeneko et al[2] They found that voice analysis parameters like Jitter, shimmer, and VHI-10 were significantly better in the 3-day group at 1 month post-surgical intervention and the data suggest that subjects who were in relative voice rest category i.e. 3 days of voice rest followed by voice therapy did better in terms of wound healing of the vocal fold and general post-operative outcome as compared to patients put on seven days of absolute voice rest therapy.

Out of the 43 patients analysed in the retrospective study done by King RE et al[12], 13 patients were put in the 7 days absolute voice rest group, 15 were put in less than 7 days voice rest group and VHI scores were noted during the pre-operative period once and twice in the post-operative phase and they found an improvement in VHI scores post operatively amongst all patients and VHI outcome did not change with the change in the voice rest recommendation in different groups. This is similar to our study in which VHI improvement was observed in all cases post operatively in both the groups and significant differences in VHI Scores were noted from pre-op to 1 week postsurgical and 1 month postsurgical values in AVR and RVR

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groups with statistically significant difference between the two groups,(p values were 0.005 and <0.001).

COMPLIANCE

A 5-point Likert scale was used to study the compliance of the patients in the two groups. This Likert scale was developed by the authors (Figure IV) as per the input of the ENT surgeons and speech and hearing pathologists and included factors like whether the voice rest hindered their occupation, social life and if they would have preferred an alternate way of prescription. The patients were made to fill the scale at the first follow up post-surgically.

As per our study, compliance, as noted at the end of one week on the Likert scale, there were statistically significant differences found in compliance between the Absolute and Relative groups of voice test ($p<0.001$).

Rousseau B et al[13] determined compliance in their study by having the patient answer "never" to whether "I used my voice while on voice rest" and found that only 34.5% of patients were compliant with voice rest, 25.5% of noncompliant patients using their voice sometimes and 5.5% did not comply to the voice rest at all and self-reported compliance was found to be low.

Twenty patients were analysed by Whitling S et al[4] for their compliance in a preliminary randomized, prospective ,blind clinical trial after surgery for benign vocal fold lesions after categorization into AVR and RVR groups. They found that patients in AVR group found it

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more difficult to comply with the voice rest instructions than the RVR group. Compliance was more in the RVR group as measured by 5-point Likert scale than in the AVR group.

Summary

1. Benign vocal cord lesions are common in ENT practice but a standardised mode of post-operative voice rest schedule is not yet devised
2. When one week of absolute voice rest instead of relative voice rest was advised after surgery, there was no discernible improvement in the quality of the voice as determined by acoustic variables and auditory analysis.
3. Poor adherence to lengthy and stringent voice rest recommendations was observed.
4. Speech management needs to be revaluated and a relative voice rest recommendation might increase compliance and produce better outcomes

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Conclusion

The results of this prospective study, in which the quality of the voice was assessed in relation to the duration and type of voice rest following micro laryngeal surgery for benign vocal cord lesions suggest:

1. When one week of absolute voice rest instead of relative voice rest was advised after surgery, there was no discernible improvement in the quality of the voice as determined by acoustic variables and auditory analysis.

2. Poor adherence to lengthy and stringent voice rest recommendations was observed.

3. Acoustic factors and auditory analysis were used to establish the results, and they concluded that the timing of post-operative rest and speech management needed to be revaluated and that a relative voice rest recommendation might increase compliance and produce better outcomes.

Through this study we have tried to re-evaluate the practice of absolute voice rest and emphasis was on less debilitating methods for post-operative voice recovery.

Hence, we need to reconsider post-operative speech management and switch over to relative voice rest which yields better or similar results.

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Ethical standards: We obtained ethical clearance before starting the research project and the authors assert that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional guidelines.

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FIGURE I- Intraoperative findings seen during microlaryngoscopy.

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Relative voice Rest	Absolute Voice rest for 7 days
WEEK1- Can use voice for 5-10 mins per hour, 45-50 mins of voice rest and not more than 1-2 mins at a stretch	**WEEK1-** Complete voice rest for 7 days Instructions to avoid coughing, whispering will be given (a pamphlet explaining this will be given)

YOUR VOICE IS IMPORTANT

GENERAL VOICE CARE INSTRUCTIONS
For the first 24 hours, soft food to be consumed
Avoid talking loud ,yelling screaming, throat clearing
Drink at least 8-10 glasses of water
Avoid Alcohol and Smoking
Avoid Coffee, Tea, Soda
Avoid Hot and Spicy food
Avoid frequent clearing your throat, whispering

FIGURE II- Pamphlet with instructions given to patients in relative and absolute voice rest groups along with general voice hygiene instructions.

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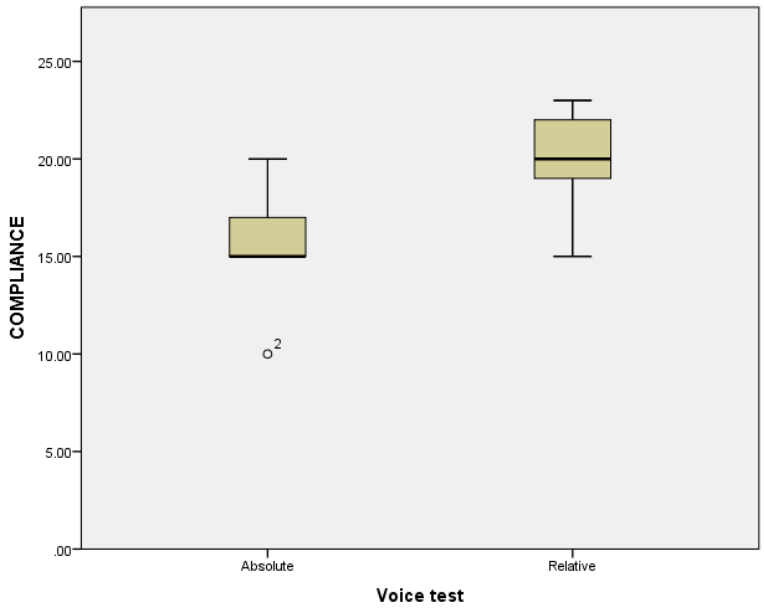

FIGURE III- Box and Whisker plot showing compliance in absolute and relative voice rest group.

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Statement	Strongly disagree 5	Disagree 4	Neither Agree or Disagree 3	Agree 2	Strongly Agree 1
I found the voice rest prescribed to me was very difficult to comply to.	○	○	○	○	○
The voice rest prescribed hindered in my daily occupation.	○	○	○	○	○
The voice rest prescribed hindered in my social life.	○	○	○	○	○
I would have preferred an alternative way of recovery.	○	○	○	○	○
I have not strictly adhered to the voice rest prescribed to me as per the instructions mentioned in the pamphlet	○	○	○	○	○

FIGURE IV- 5 point Likert scale developed by the authors to study the compliance of the patients

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