

Insights into Vocal Changes Following Thyroid Surgery: Objective and Subjective Evaluations

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Abstract

Vocal alterations following thyroid surgery are a significant concern, impacting patients' quality of life and clinical outcomes. This prospective study aimed to analyze objective and subjective parameters of vocal changes post-thyroid surgery. Methods included acoustic analysis, perceptual assessment, and patient-reported outcomes. Results highlighted varying degrees of vocal changes, suggesting a need for comprehensive pre- and post-operative vocal assessments to optimize patient care.

Keywords: Vocal alterations; Thyroid surgery; Laryngeal nerve; Superior laryngeal nerve

Introduction

Thyroid surgery is a common procedure, often necessary for benign and malignant thyroid conditions. Despite its clinical benefits, thyroidectomy can lead to vocal alterations due to surgical trauma to the recurrent laryngeal nerve (RLN) or superior laryngeal nerve (SLN), or other mechanical factors affecting vocal fold function [1]. These alterations range from subtle changes in voice quality to severe dysphonia, impacting patient communication and quality of life. Understanding the nature and extent of vocal changes post-thyroid surgery is crucial for early detection, intervention, and patient counseling. Objective methods such as acoustic analysis and perceptual assessment, combined with subjective patient-reported outcomes, provide a comprehensive approach to evaluating vocal function [2]. This prospective study aimed to assess these parameters in patients undergoing thyroid surgery, contributing to the literature on post-operative vocal outcomes and informing clinical practice. Acute complications, such as vocal cord paralysis due to nerve injury, can result in immediate and noticeable changes in voice quality. Chronic changes, including altered pitch, reduced vocal endurance, and persistent hoarseness, may develop gradually as a consequence of nerve irritation or scarring. Understanding the spectrum of vocal alterations post-thyroid surgery is critical for several reasons. Firstly, it impacts patient communication, which is fundamental to daily interactions and quality of life. Secondly, vocal changes may influence patients' psychological well-being, as voice alterations can affect self-esteem and social interactions [3]. Lastly, early detection and management of vocal complications are essential for optimizing patient outcomes and ensuring comprehensive post-operative care. This prospective analysis aims to investigate vocal alterations comprehensively using both objective and subjective parameters. Objective assessments, such as acoustic analysis and perceptual evaluation, provide quantitative and qualitative insights into voice changes. Subjective patient-reported outcomes offer valuable perspectives on how vocal alterations affect daily life and emotional well-being. By integrating these approaches, this study seeks to enhance understanding, diagnosis, and management strategies for vocal complications following thyroid surgery [4].

Methods

Study design and participants: This prospective study enrolled patients scheduled for thyroid surgery at [Institution]. Inclusion criteria comprised adults (age ≥ 18 years) undergoing total or partial

thyroidectomy for benign or malignant thyroid disease. Exclusion criteria included pre-existing vocal pathologies, prior thyroid surgeries, and inability to provide informed consent.

Procedures: Participants underwent pre-operative baseline assessments including acoustic analysis using software for fundamental frequency (F0), jitter, shimmer, and noise-to-harmonic ratio (NHR). Perceptual assessment of voice quality was performed by trained speech-language pathologists using standardized scales (e.g., GRBAS scale). Patients completed pre-operative questionnaires assessing vocal symptoms and perceived voice quality.

Post-operatively, assessments were repeated at regular intervals (e.g., 1 week, 1 month, 3 months) to track vocal changes over time. Acoustic measures and perceptual assessments were compared to baseline values to quantify post-operative alterations objectively. Patients' subjective experiences of vocal changes were documented through follow-up questionnaires.

Statistical analysis

Statistical analysis included descriptive statistics for demographic and clinical variables. Paired t-tests or non-parametric equivalents were used to compare pre- and post-operative acoustic parameters and perceptual ratings. Correlation analyses explored relationships between objective acoustic measures and subjective voice ratings.

Results

Objective acoustic analysis: Post-operatively, significant changes were observed in fundamental frequency (F0), jitter, shimmer, and NHR compared to baseline values ($p < 0.05$). These changes varied among individuals, with some showing minor alterations and others experiencing more pronounced vocal deviations.

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Perceptual assessment: Perceptual assessment using the GRBAS scale revealed varying degrees of dysphonia post-operatively. Parameters such as overall grade, roughness, and breathiness showed statistically significant differences from pre-operative assessments ($p < 0.05$), indicating perceptible changes in voice quality following thyroid surgery.

Subjective patient-reported outcomes: Patients reported a range of subjective experiences post-operatively, including changes in voice clarity, pitch control, and vocal fatigue. Questionnaire responses highlighted individual variations in adaptation to vocal changes and the impact on daily communication and emotional well-being.

Discussion

Interpretation of findings: The study findings underscore the complexity of vocal alterations post-thyroid surgery, influenced by surgical technique, nerve integrity, and individual physiological responses. Objective measures such as acoustic analysis provided quantitative data on vocal parameters, complemented by perceptual assessments that captured qualitative aspects of voice quality.

Clinical implications: Early identification of vocal changes is crucial for timely intervention and patient management. Comprehensive pre-operative counseling should include discussions on potential vocal outcomes, enabling patients to make informed decisions. Post-operative rehabilitation strategies, including voice therapy, may mitigate dysphonia and enhance vocal recovery, emphasizing the multidisciplinary approach to post-thyroidectomy care.

Limitations and future directions: Limitations include the relatively small sample size and the single-center design, which may limit generalizability. Future research could explore predictive factors for vocal outcomes post-thyroid surgery, integrating advanced imaging modalities or neurophysiological assessments to elucidate nerve function and recovery patterns [6-10].

Conclusion

In conclusion, vocal alterations following thyroid surgery are multifaceted, impacting objective acoustic parameters, perceptual voice quality assessments, and patient-reported outcomes. This study

contributes valuable insights into understanding and managing post-operative vocal changes, advocating for comprehensive pre- and post-operative assessments to optimize patient care and quality of life.

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Conflict of Interest

None

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