Does tension matter? A comparison of genioglossus advancement using tensiometry to predict successful outcomes

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ABSTRACT

Objective: To evaluate the role of tension on the genioglossus muscle in the performance of genioglossus advancement on sleep disordered breathing in patients undergoing multilevel obstructive sleep apnea surgery. Methods: Fourteen (14) patients underwent genioglossus advancement for obstructive sleep apnea. Patients underwent pre- and postoperative polysomnography, cephalometric analysis, and subjective assessment questionnaires. Our study results based on successful outcomes are consistent with previous publications thus far. We have noted that decreased tension and increased mandibular width are positive predictive factors for postoperative success. Conversely, increased tension and narrow mandibular width are negative predictive factors for postoperative success.

INTRODUCTION

Genioglossus advancement for obstructive sleep apnea with or without a palatal procedure is a proven technique for relieving airway obstruction. It has been well established that genioglossus advancement procedures typically accomplish a goal of 8- to 14-mm of advancement thus increasing the posterior airway space with the goal of reducing the severity of sleep apnea. The aim of this study is to compare intraoperative and postoperative outcomes variables to assess the importance of force applied to the genioglossus muscle during advancement and correlate this information with postoperative outcomes.

Methods

Fourteen (14) patients have been enrolled in the study from the general otolaryngology clinic. Patients are eligible for the study if they require genioglossus advancement with or without a palatal procedure. Patients underwent preoperative and postoperative polysomnography, cephalometric analysis, and nasal endoscopy. Panorex and lateral cephalograms were obtained both pre- and postoperatively in order to obtain cephalometric data and assess the posterior airway space. Subjective assessment questionnaires will be attained both pre- and postoperatively (i.e. Epworth sleepiness scale, and the functional outcome sleep quality survey). This data was then compared against the tension force required to pull the window osteotomy forward and reposition this segment along the anterior native mandible.

Intraoperatively, the force required to pull the window osteotomy forward was measured with a tensiometer. A total of 3 measurements were attained. This data was then averaged in order to obtain an accurate assessment of the tension force required for adequate genioglossus advancement. Patients then underwent postoperative polysomnography at three months, and repeat nasal endoscopy. Data collected from the sleep study and nasal endoscopy was then compared against the preoperative data and the intraoperative tensiometry measurements.

Results

Our study results based on successful outcomes are consistent with previous publications thus far. We have noted that decreased tension and increased mandibular width are positive predictive factors for postoperative success. Conversely, increased tension and narrow mandibular width are negative predictive factors for postoperative success. In fact, all patients with a tension to width ratio of less than sixty were responders. Conversely, all patients with a tension to width ratio of greater than sixty were considered non-responders.

Conclusion: Decreased tension and increased mandibular width are positive predictive factors for postoperative success. Increased tension and narrow mandibular width are negative predictive factors for postoperative success.

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REFERENCES


Figure 1: All patients with a tension to bicortical width ratio of less than sixty were considered responders. Conversely, all patients with a tension to width ratio of greater than sixty were considered non-responders.

Figure 2: Pre- and Post genioglossus advancement lateral cephalometric radiographs

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