The Laryngoscope
Lippincott Williams & Wilkins, Inc.

Staging of Obstructive Sleep Apnea/Hypopnea Syndrome: A Guide to Appropriate Treatment

Michael Friedman, MD; Hani Ibrahim, MD; Ninos J. Joseph, BS

Objective: **Early studies by Friedman et al. have demonstrated the value of staging obstructive sleep apnea/hypopnea syndrome (OSAHS) patients for the prediction of success for uvulopalatopharyngoplasty (UPPP) on the basis of short-term follow up. The goal of this study is to test the value of this staging system in a prospective study.** ***Study Design:*** **This is a prospective study of two cohorts of patients: one was treated with the benefit of a clinical staging system and the other without.** ***Methods:*** **Patients with symptoms of OSAHS were assessed by polysomnography and were staged according to a previously described staging system. The staging system is based on palate position, tonsil size, and body mass index (BMI). The control group was treated without the benefit of staging. All patients in the control group were treated with UPPP only. Patients in the experimental group were treated based on their clinical stage. Patients with stage I disease, regardless of the severity of disease, were treated with UPPP only. Selected patients with stage II and stage III disease were treated with UPPP in addition to a staged tongue-base reduction using a radiofrequency technique (TBRF).** ***Results:*** **Follow-up at 6 months showed significant improvement compared with a group of patients treated without the benefit of a staging system. Successful treatment of patients with stage II disease improved from 37.9% to 74.0%. The overall success rate improved from 40% to 59.1%.** ***Conclusion:*** **Clearly, patients with stage I disease had the best success rate, but a selective protocol based on clinical staging improves the overall success rate. In addition, it can eliminate as surgical candidates those patients with whom the procedure is likely to fail.** ***Key Words:*** **Sleep-disordered breathing, uvulopalatopharyngoplasty, palatal surgery, obstructive sleep apnea/hypopnea syndrome.**

Laryngoscope, **114:454–459, 2004**

Presented at the Middle Section Meeting of The Triological Society, January, 17-19, 2003, Indianapolis, Indiana.

From the Department of Otolaryngology and Bronchoesophagology (M.F., H.I.), Rush–Presbyterian–St. Luke's Medical Center, Chicago, Illinois; and the Division of Otolaryngology (M.F., H.I., N.J.J.), Advocate Illinois Masonic Medical Center, Chicago, Illinois, U.S.A.

Editor's Note: This Manuscript was accepted for publication September 15, 2003.

Send Correspondence to Dr. Michael Friedman, 30 N. Michigan, Suite 1107, Chicago, IL 60602, U.S.A. E-mail: njoseph@pentechassociates.com

INTRODUCTION

Uvulopalatopharyngoplasty (UPPP) remains the most commonly performed surgical procedure as treatment for obstructive sleep apnea/hypopnea syndrome (OSAHS). Many patients are not capable or willing to tolerate continuous positive airway pressure (CPAP) therapy and, therefore, seek surgical correction to alleviate the symptoms and sequelae of the disease. Although curative for many patients, the procedure has an extremely high overall failure rate, causing many to question its validity. The single study by Sher et al.[1] reviewing a meta-analysis of reported UPPP procedures revealed a success rate of only 40%. In an attempt to improve their surgical success rate, many clinicians limited the application of UPPP to patients with mild to moderate disease. Clinical experience, however, has shown that severity of disease cannot be used as a guide to select patients likely to succeed. In fact, Senior et al.[2] have shown that by using mild disease as a criteria, the success rate remains only 40%. We have shown in previous studies that a staging system based on palate position, tonsil size, and body mass index (BMI) is highly accurate in predicting success or failure of UPPP on the basis of a retrospective study.[3,4] Stage I patients have an 80% success rate, stage II have a 40% success rate, and stage III patients have only an 8% success rate.[4]

The purpose of the present study was to validate this staging system in a prospective study. A valid staging system should direct treatment to those patients most likely to benefit and, therefore, improve overall success rates for surgical treatment. The subjective and objective results of the prospective group of patients were then compared with similar data collected in a previous study where patients with OSAHS were retrospectively staged after undergoing UPPP as a single corrective procedure.[4]

MATERIALS AND METHODS

Staging System

Earlier studies by Friedman et al.[3–5] proposed a staging system based on three physical findings and unrelated to severity of disease. The staging system is based on Friedman Palate Position score, tonsil size, and BMI (Table I).[3] The key points of the system are illustrated in Figures 1 and 2 and Table I. The staging system has been modified, and the number of stages has

TABLE I.
Modified Friedman Staging System for Patients with Obstructive Sleep Apnea/Hypopnea Syndrome.

	Friedman Palate Position	Tonsil Size	BMI
Stage I	1	3, 4	<40
	2	3, 4	<40
Stage II	1, 2	1, 2	<40
	3, 4	3, 4	<40
Stage III	3	0, 1, 2	<40
	4	0, 1, 2	<40
Stage IV	1, 2, 3, 4	0, 1, 2, 3, 4	>40

All patients with significant craniofacial or other anatomic deformities.

BMI = Body Mass Index.

been expanded from three to four. The need for the expansion became evident once the system was used in a prospective manner because some patients should not be candidates for pharyngeal surgery.

Exclusion Criteria

For this study, 140 patients were selected for combined treatment with UPPP + tongue-base reduction using a radiofrequency technique (TBRF). In theory, most of this group would have been treated by only classical UPPP in the past. Only patients who were willing to actually use CPAP at home for a reasonable trial were considered for surgery. Patients with stage I disease were excluded from combined treatment because our earlier study[4] had demonstrated that UPPP alone offers greater than 80% success for these patients. Therefore, only stage II and stage III patients were included for combined treatment. Some patients with stage II or III disease had thin, small palates and were judged to have neither palatal snoring nor a palatal source of obstruction on classical clinical examination, nasopharyngoscopy, and hypopharyngoscopy with Müller maneuver. Included in this examination was observation of the palate with the patient recreating a snoring sound. These patients consisted of a very small group of patients, and no rigid criteria were created to incorporate them into the staging system. Patients who had previous UPPP were excluded from combined treatment. These patients were treated with TBRF alone. The goal of this staging system was to target those patients who need treatment directed to the tongue base with or without palatal surgery. Stage IV patients were excluded on the basis of two criteria. Exclusion of patients with BMI > 40 kg/m^2 was based on a clinical sense that these patients cannot be treated with localized enlargement of the airway but must have either bariatric treatment or tracheotomy. The BMI of 40 kg/m^2 was a somewhat arbitrary limit and has not been studied or proven. Finally, several patients that were defined as having "obvious micrognathia" were excluded. This is not a precise description, but the clinical assessment of the patient should always take precedence over a staging system that offers a broad guideline to treatment. Over the course of the study period, only two to three patients were excluded on the basis of this finding. They were referred to the oral surgeon for mandibular or bimaxillary advancement surgery. Institutional review board approval and informed consents were obtained.

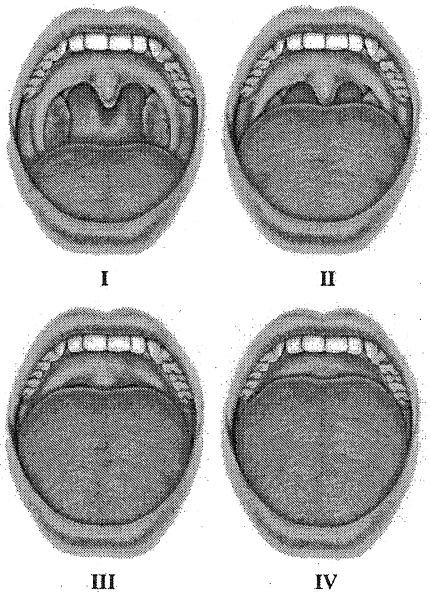

Fig. 1. The Friedman Palate Position is based on visualization of structures in the mouth with the mouth open widely without protrusion of the tongue. Palate grade I allows the observer to visualize the entire uvula and tonsils. Grade II allows visualization of the uvula but not the tonsils. Grade III allows visualization of the soft palate but not the uvula. Grade IV allows visualization of the hard palate only.

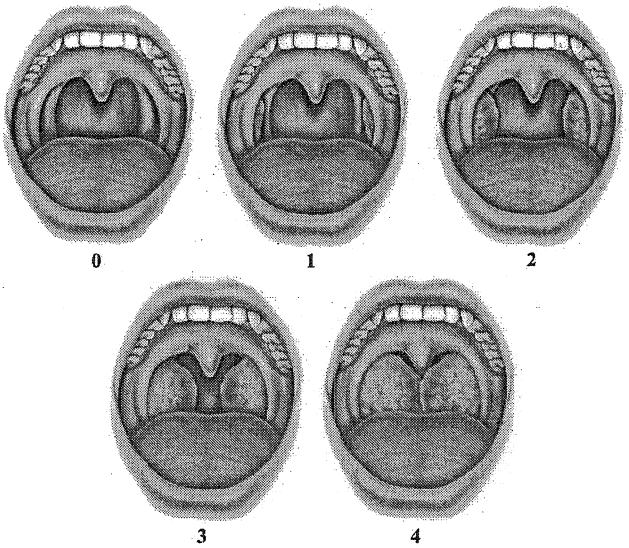

Fig. 2. Tonsil size is graded from 0 to 4. Tonsil size 0 denotes surgically removed tonsils. Size 1 implies tonsils hidden within the pillars. Tonsil size 2 implies the tonsils extending to the pillars. Size 3 tonsils are beyond the pillars but not to the midline. Tonsil size 4 implies tonsils extend to the midline.

Data Collection

Subjective data were obtained by interviewing the patient and bed partner before and at least 6 months after treatment. Key factors studied were snoring level (visual analogue scale 0–10) and Epworth Sleepiness Scale (ESS). Objective data were preoperative and postoperative (at least 6 months after operation) polysomnographic data. The results of this group were com-