



## Case Report, Case Reports

## Stress velopharyngeal incompetence: Two case reports and options for diagnosis and management

Nikhila Raol<sup>a</sup>, Gillian Diercks<sup>a</sup>, Cheryl Hersh<sup>b</sup>, Christopher J. Hartnick<sup>a,\*</sup><sup>a</sup> Department of Otolaryngology, Massachusetts Eye and Ear Infirmary, Harvard Medical School, Boston, MA 02114, USA<sup>b</sup> Department of Speech Language Pathology, Massachusetts General Hospital, Harvard Medical School, Boston, MA, USA

## ARTICLE INFO

## Article history:

Received 5 June 2015

Received in revised form 11 October 2015

Accepted 13 October 2015

Available online 21 October 2015

## Keywords:

Velopharyngeal incompetence

VPI

Stress VPI

Speech disorder

## ABSTRACT

Stress velopharyngeal incompetence (SVPI) commonly affects brass and wind musicians. We present a series of two patients who presented with nasal air emission following prolonged woodwind instrument practice. Neither patient demonstrated audible nasal air emission during speech, but endoscopy revealed localized air escape/bubbling from different sites for each patient with instrument playing only. Both underwent tailored surgical treatment with resolution of symptoms during performance. Diagnosis of SVPI requires examination during the action that induces VPI to allow for directed management. Treatment should be targeted based on nasopharyngoscopy findings.

© 2015 Elsevier Ireland Ltd. All rights reserved.

## 1. Introduction

First described by Weber and Chase in 1970 [1], stress velopharyngeal incompetence (VPI) is a unique type of velopharyngeal dysfunction that occurs due to high intraoral pressures that may occur while playing brass or woodwind instruments. The pressures generated can be as high as 30-times as those generated with normal speech production [2], resulting in the undesired audible nasal escape. For these musicians who participate in competitive or very high-level performance, particularly for many years, considerable strength and stamina of the muscles of the velopharyngeal closure mechanism is imperative. When these muscles are unable to meet those demands, stress VPI may result.

Symptoms of stress VPI include nasal air leak or audible nasal air emission heard while playing. Those symptoms most often arise after extended periods of play, which can cause velar fatigue. The most common instruments which have been noted to be associated with stress VPI include oboe, trumpet, tuba, clarinet, bassoon, and French horn [2].

Multiple surveys have demonstrated the frequency of this problem among musicians based on symptoms alone. A 2007 survey by Malick et al. reported a 34% rate of previous or currently

existing stress VPI amongst college musicians [2]. In addition, a 2011 survey of collegiate level musicians by Evans et al., 39% of respondents reported that they had personally previously experienced or were experiencing stress VPI, and 30% reported knowing another musician who had personally experienced stress VPI [3]. However, the number of reported cases in the literature of treatment for this condition is low [1,4–10], suggesting that despite knowledge of this entity, a small number actually seek medical attention.

While awareness of the problem exists among woodwind musicians, it is still a problem that can be difficult to identify unless the precise circumstances under which it occurs are reproduced. If the patient can be examined while stress VPI is present, the source of insufficiency can be identified to guide treatment planning. Here, we describe two woodwind instrument players who experienced stress VPI after long periods of playing. We will demonstrate appropriate exam technique and nasopharyngoscopy findings necessary to diagnose stress VPI as well as present management options.

## 2. Case no. 1

A 15-year old male saxophone and clarinet player with no past medical history presented to the speech-language pathologist (SLP) with sudden onset of nasal air emission (NAE) during clarinet playing only, which began following a prolonged period of clarinet practice (9 h/d preparing for an audition). Subsequently, his

\* Corresponding author at: Massachusetts Eye and Ear Infirmary, 243 Charles St., Boston, MA 02114, USA.

E-mail address: [Christopher\\_hartnick@meei.harvard.edu](mailto:Christopher_hartnick@meei.harvard.edu) (C.J. Hartnick).

practice time decreased to 2 h per day; however, he continued to have distracting and bothersome NAE, which seemed to be becoming more pronounced. Interestingly, he reported normal speech with no audible air escape during regular conversation, and he had no significant NAE while playing the saxophone. On SLP evaluation, the patient demonstrated mild hypernasality with connected speech, but emission was undetectable during conversational speech. During performance on the clarinet, audible, distracting NAE with fogging of a mirror at the left nostril was noted. Nasometry revealed a nasalance score of 51–53% during clarinet playing, in contrast to normal nasalance scores of 10–15% during speech production efforts (Table 1). Nasalance is defined as the following:

$$\frac{\text{Nasal acoustic energy}}{\text{Total acoustic energy}}$$

where the total acoustic energy is the combination of the nasal and oral acoustic energy. Of note, no normative values currently exist for nasalance scores while playing an instrument. Normative values for speech production are about 10–14%.

The patient was subsequently referred to pediatric otolaryngology. Nasopharyngoscopy was performed to evaluate velopharyngeal closure during normal speech and with clarinet performance (Fig. 1). Exam demonstrated complete velopharyngeal closure with a coronal closure pattern with speech. On the Golding-Kushner scale [11], right and left palate movement ratings of 1.0 were noted, left and right lateral wall movement of 0.3 and 0.2 were noted, and no significant posterior pharyngeal wall movement was noted. However, nasopharyngoscopy while playing the clarinet demonstrated constant air escape and bubbling on the left, with decreased left lateral pharyngeal wall movement (Golding-Kushner rating of 0.2) [11]. Closure decreased from 100% to approximately 80% with clarinet playing. The patient attempted a 16-month trial of modifications including a period of clarinet rest with transition to the saxophone, which required lower intraoral pressure. In addition, he participated in intermittent treatment sessions to modify oral nasal balance at an outside facility without success. These sessions focused on the use of discrimination,

biofeedback for airflow, facilitation of phonemes and phoneme contrasts, nose-pinch techniques, increased volume, and attention to oral articulators [12,13]. Based on the location of the air escape, he underwent left unilateral sphincter pharyngoplasty. Repeat exam four weeks after surgery demonstrated a decrease in nasalance score while playing to 40%, with no appreciable change in nasalance during speech production. While 40% is typically considered mild VPI when referring to speech production, given the lack of normative data for stress VPI, the significant improvement in the nasalance score was regarded as an indicator of successful treatment. Most importantly, audible nasal emission was no longer perceptible with playing. Given the significant improvement on the first musical task (Chromatic scale), the patient was not tested on the longer piece of music postoperatively (see Table 1).

### 3. Case no. 2

A 16-year old female oboe player with no past medical history presented to the SLP with a history of intermittent nasal air emission while playing long musical compositions. The problem primarily began during a music camp, where she was practicing 7 h/d for several consecutive days. Symptoms did not resolve when her practice patterns returned to normal upon returning home. The patient demonstrated no problems with speech intelligibility but did report hypernasal speech for several minutes following clarinet playing when NAE were induced. SLP exam revealed nasalance scores during speech for both single utterances and connected speech within normal limits: marginally higher than the mean values, but below the first standard deviation from the mean. There was no NAE detected via nasal mirror exam during production of pressure dependent consonants in connected speech (Rainbow passage [14]). However, with oboe playing, increased nasalance of up to 43% was noted with longer musical compositions (New World passage, see Table 1); these were not present with short scale work, consistent with the patient's experience. She was subsequently examined by a pediatric otolaryngologist, who performed nasopharyngoscopy during normal speech and during oboe performance. During normal speech, complete closure was

**Table 1**  
Nasalance score before and after treatment of stress velopharyngeal incompetence (VPI).

Case 1	Preoperative nasalance score	Postoperative nasalance score	Normal values (SD)
Normal speech			
Bilabials (p, b) <sup>*</sup>	13	13	11 (5)
Alveolar sounds (t, d) <sup>*</sup>	11.5	10	11 (5)
Velar sounds (k, g) <sup>*</sup>	13.5	13	13 (6)
Sibilant sounds (s, sh) <sup>*</sup>	11.5	11	12 (5)
Rainbow passage no. 1 <sup>**</sup>	20	Not performed	35.7 (5.2)
Performance			
Scale no. 1: "Chromatic Scale" <sup>***</sup>	<b>53</b>	<b>40</b>	N/A
Waber no. 2 <sup>****</sup>	46.5	Not performed	N/A
Case 2	Preoperative percent nasal leakage	postoperative percent nasal leakage	
Normal speech			
Bilabials (p, b) <sup>*</sup>	<1 SD above the mean	Not performed	11 (5)
Alveolar sounds (t, d) <sup>*</sup>	<1 SD above the mean	Not performed	11 (5)
Velar sounds (k, g) <sup>*</sup>	<1 SD above the mean	Not performed	13 (6)
Sibilant sounds <sup>*</sup>	<1 SD above the mean	Not performed	12 (5)
Rainbow passage no. 1 <sup>**</sup>	<1 SD above the mean	Not performed	35.7 (5.2)
Performance			
C-major scale	38	36	N/A
New world piece <sup>^</sup>	<b>43</b>	<b>29</b>	N/A

<sup>\*</sup> Mackay-Kummer SNAP test [18].

<sup>\*\*</sup> Represents connected speech, contains 11% normally nasal phonemes [14].

<sup>\*\*\*</sup> A musical scale with 12 pitches, each a semitone above or below another.

<sup>\*\*\*\*</sup> Clarinet Concerto No. 2 in E flat major, Op. 74, 1811, by Carl Maria von Weber.

<sup>^</sup> Excerpt from new world symphony, formally known as the symphony no. 9 in E minor, "From the New World," Op. 95, 1893, by Antonín Dvořák.

Download English Version:

<https://daneshyari.com/en/article/4111635>

Download Persian Version:

<https://daneshyari.com/article/4111635>

[Daneshyari.com](https://daneshyari.com)