Stress Velopharyngeal Incompetence in an Oboe Player

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Velopharyngeal incompetence is usually manifest in speech and is seen in patients with cleft palates, submucous clefts, trauma, tumors, surgical resections and neuro-muscular disorders (*1, 3, 5, 7*). Patients with velopharyngeal incompetence are unable to generate high intra-oral pressures needed for playing wind instruments. The purpose of this article is to present a case of velopharyngeal incompetence which does not fit into the above categories and which occurs while playing the oboe. To our knowledge this type of velopharyngeal incompetence has not been previously reported.

Methods

The patient was seen in the Stanford Cleft Palate Clinic. The evaluation consisted of a history and physical, an endoscopic examination, a speech evaluation by speech pathologists, respiratory studies, a voice ciné radiography, and cephalometric films.

Results

Case presentation: The patient is a 23 year old white female graduate student in music with a 6 year history of nasal snorting while playing the oboe. The snorting begins after 10 minutes of continued playing. There is no history of nasal emission with speech, no cleft palate or previous surgery. The patient had the usual childhood illnesses with no serious sequelae. There are no cases of cleft palate or problems of hypernasal speech in her family.

Physical examination revealed a healthy young female with no neurological abnormalities. Oral examination showed a high arched palate of average length and thickness. The posterior edge of the hard palate was felt to be normal, and the uvula was not notched. Palatal motion appeared to be normal with average quickness and amplitude. Endoscopic examination with the Taub panendoscope revealed velopharyngeal closure with a sustained "ah." After ten minutes of playing the oboe a continuous nasal

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snorting was noted. This was completely obliterated by pinching the nares closed.

Evaluation by speech pathologists revealed normal articulation while counting and normal response to a stimulus picture with no evidence of hypernasality.

Respiratory studies obtained showed the following:

1. Vital capacity ratio	1.00	Ratio of values with nose open vs. nose closed.
2. Positive pressure ratio	0.81	
3. Negative pressure ratio	0.83	
Resting minute volume difference		150 cc
Maximum breathing capacity difference		13 cc

(Number represents the difference in values obtained with the nose open vs. nose closed over a 12 second interval.)

These values are within the normal range for this laboratory.

Voice ciné radiography demonstrated normal quickness and amplitude of palatal motion with pharyngeal closure in the lateral projection during speech.

While she played the oboe, the palate was continuously held in the position of velopharyngeal closure. The knee of the palate was in contact with the posterior pharyngeal wall just above the level of the tubercle of the atlas. No noticeable change occurred in the position or configuration of the palate over a wide range of notes and sound intensity even when obvious nasal snorting was present.

Cephalometric films were taken and measurements made in the manner described by Owsley (*6*). These were as follows (Figure 1)

Soft palate length	31 mm
Depth of nasopharynx	30 mm
Hard palate length	52 mm

These values fall into the normal range and suggest no anatomic abnormality.

Discussion

This represents a clinical situation of velopharyngeal incompetence manifested only under conditions of extreme palatal stress. The usual studies to detect and quantitate velopharyngeal incompetence, physical examination, panendoscopic examination, speech evaluation, respiratory studies and ciné, revealed normal function. Cephalometric measurements of palatal relationship were also within the normal range. Velopharyngeal incompetence was present only while the patient was playing the oboe. The ciné demonstration of normal closure in the lateral projection during the nasal snort suggests that the nasal leak occurred in the pharyngeal space lateral to the palate.

Playing wind instruments is one of the most strenuous of musical feats.

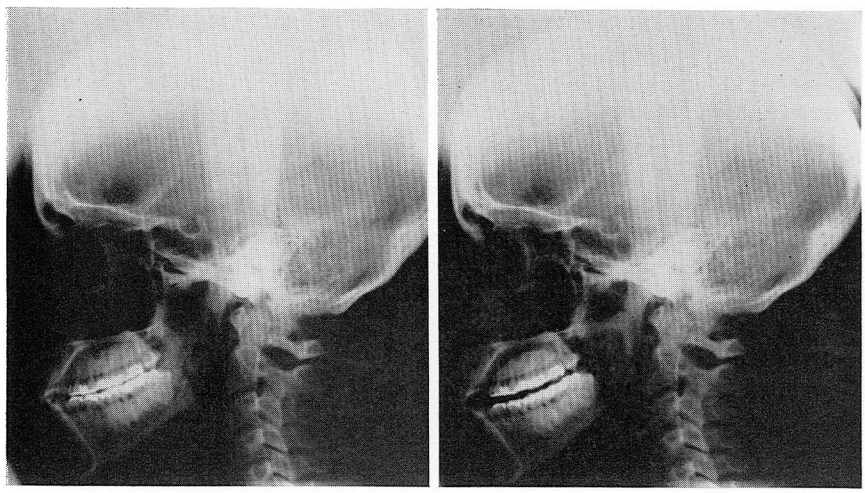

Figure 1. Cephalometric photos of the oboe player
a. at rest
b. phonating "ah"

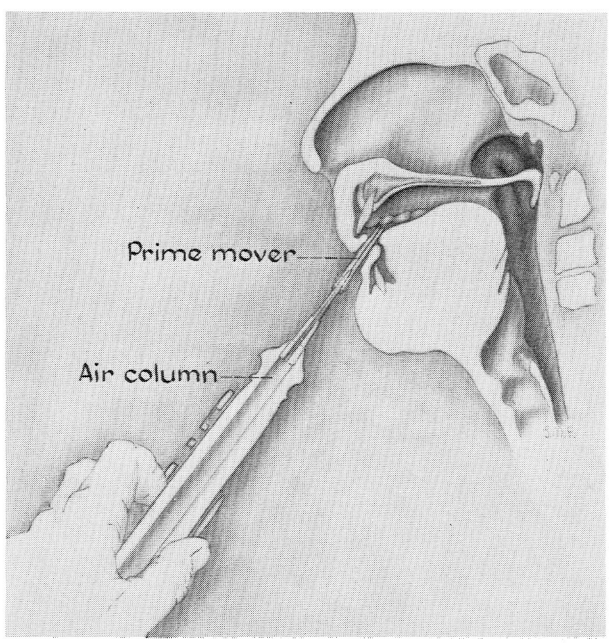

Figure 2. Illustration of the cross sectional anatomy of the oboe and palate while playing this wind instrument.

It involves driving a regular flow of air at a given pressure through a modified organ pipe. The pipe is equipped with a device called a prime mover to initiate vibrations in the air column. This requires precise control of the entire respiratory system. With the various wind instruments

the velopharyngeal mechanism must be capable of withstanding intra-oral pressures ranging from 5–155 mm/mercury (*2*) (Figure 2). In contrast to wind instruments peak intra-oral pressures with "P" and "B" sounds in speech are reported to be in the range of 5–10 mm/Hg (*4*).

The oboe is distinct in that it requires the maintenance of a minimum of 25 mm/Hg intra-oral pressure over periods of time ranging from thirty seconds to two minutes for continuous playing. Actual air flow is low in comparison to other wind instruments. In order to increase the loudness of an oboe, intra-oral pressure must be raised at a much higher rate than the air flow. The inverse is true for instruments such as the flute and the bassoon. It is not known what segment of the population has the ability to meet the physiological demands of playing wind instruments such as the oboe. Such activity certainly represents a rigorous test of velopharyngeal competence.

Summary

A patient is presented with velopharyngeal incompetence which occurs only when playing the oboe. Results of standard test of velopharyngeal competence are given, and the physiological demands involved in playing wind instruments is discussed.

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