

# Prevalence of velopharyngeal insufficiency in woodwind and brass students

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<b>Background</b>	Velopharyngeal insufficiency (VPI) is a disorder in which air leaks out through the nose, reducing performance quality and capacity in wind and brass players. There have been limited studies on the prevalence of this potentially career-threatening disorder.
<b>Aims</b>	To identify the prevalence of VPI in a sample of conservatorium level woodwind and brass student instrumentalists in Australia.
<b>Methods</b>	Wind and brass students from four music institutions were recruited by email invitation to complete an online survey. Results from 77 musicians were analysed for their knowledge and experience of VPI. Musicians who had experienced VPI provided information on the characteristics, symptoms and treatment or advice sought for the disorder.
<b>Results</b>	Of the 77 musicians included in the analysis, 44% had heard of VPI, 30% were aware of other musicians who had experienced VPI and 39% had personally experienced VPI.
<b>Conclusions</b>	The results suggest that VPI may be a common occurrence in wind and brass players. Informal discussions with colleagues and music teachers also suggest that VPI is a frequent phenomenon. This group of musicians represents the largest sample surveyed about VPI to date.
<b>Key words</b>	Musicians; prevalence; survey; velopharyngeal insufficiency; woodwind and brass.

## Introduction

Velopharyngeal insufficiency (VPI) occurs when the soft palate fails to close the oro-nasal cavity, resulting in air escaping from the nose when attempting to blow out through the mouth. In wind musicians, this has been termed 'Stress VPI' due to physical stresses imposed upon the soft palate by high intraoral pressures associated with playing a wind instrument [1]. It has been observed that VPI usually occurs in advanced students pursuing a professional career due to an increase in physically demanding practice or a high-intensity performance regimen sustained over a prolonged period of time [2]. This disorder can be a significant problem to those who suffer VPI as it may potentially limit students' opportunities for a performing career. The true prevalence of this condition is not clear due to the limited research. Estimated prevalence rates between 7 and 34% were found in three questionnaire studies conducted in the UK [3], in Germany [2] and in the USA [4]. The aim of this study was to identify the prevalence of VPI in a sample of conservatorium level woodwind and brass student instrumentalists in Australia.

## Methods

The online survey asked students whether they had heard of VPI, were they aware of other student musicians with the disorder or had personally experienced VPI while playing a wind instrument. Students with experience of VPI were asked to describe the symptoms and characteristics of the problem. These questions are outlined in Appendix 1 (available as Supplementary data at *Occupational Medicine* Online). Ethics approval to conduct this study was received from the University of Sydney Human Research Ethics Committee. The analysis was conducted using SPSS 17.0.0 (2008).

## Results

Emails were sent to 506 undergraduate and postgraduate woodwind and brass students enrolled at the four participating music institutions. Ninety-eight responses were received (19% of the total number of students). Twenty-one responders were excluded because they were under the eligible age of 18 years and over (2 subjects) or were incomplete (19). The

final analysis is based on data from 77 respondents (15% of the total). Comparison of the proportion of students playing particular instruments showed that the respondents were very similar to the overall music student population, the one minor exception being a slightly higher proportion of students playing clarinets among the respondents. Of the 77 respondents, 44% had heard of VPI. Thirty per cent of the respondents were aware of other musicians who had experienced VPI and 39% (30 respondents) had personally experienced VPI. The instrumentalists with the highest prevalence of reported VPI played the clarinet, oboe, saxophone, bassoon, French horn or trumpet as their main instrument. In this sample, males (44%) had a slightly higher prevalence of reported VPI than females (36%).

For the 30 respondents who had experienced VPI (cases), the most commonly reported causes were related to muscular fatigue and stress. These details are shown in Table 1. Other specific causes reported included increased practice, using a larger mouthpiece and playing extreme loud dynamics. The most common characteristics of VPI reported were noise in the back of the throat and air escaping from the nose while blowing out through the mouth as detailed in Table 2. Cases reported that VPI most commonly occurred during stressful conditions, such as during solo performances, in exams, auditions or during long periods of playing.

## Discussion

The prevalence rate of VPI in this sample of musicians (39%) is slightly higher than reported rates in previous literature, although the characteristics of VPI reported by respondents were similar to those reported in previous studies. Of the 30 self-reported cases, only 7 cases had gained control over the disorder, while 20 still had symptoms of VPI. No data were recorded for the remaining three cases. Most students had sought advice from their teachers; very few sought medical treatment. It is not clear whether this was because VPI was of minor inconvenience to these students or students were unaware of available treatment. To treat VPI an ear, nose and throat surgeon may recommend referral to a speech therapist while a plastic and

**Table 1.** Reported possible causes associated with the onset of VPI (number and per cent)

Characteristics	With VPI ( <i>n</i> )	Total (%)
Muscular fatigue	14	47
Performance-related stress	12	40
Stress (other)	5	17
During intensive music-making activities; e.g. music camp	9	30
Illness	6	20
Returning to practice after holiday	4	13
Other	8	27

reconstructive surgeon may recommend either sphincter pharyngoplasty or pharyngeal flap surgery [4]. Other case reports describe the injection of Teflon [5] or autologous fat [1] into the soft palate or the posterior pharyngeal wall to provide sufficient soft palate closure.

The results from this study must be interpreted with caution due to the low response rate with potential sample bias and the small sample size. As musicians who had heard of or personally experienced VPI may have been more likely to answer the survey, the results might provide an overestimate of the true prevalence of VPI. The comparison of instrument type between respondents and all eligible students suggests that the respondents were probably reasonably representative of all eligible students, but the respondents could nevertheless contain a higher proportion of students with VPI than in the entire student group. The potential sample bias should be less of a problem for the information on VPI characteristics.

Case studies from the literature suggest that VPI is commonly seen in young players due to the increasingly demanding practice required to become a professional musician [2]. The finding in this study that VPI first occurred in students from 17 years of age may similarly be due to an increased practice regimen. The most common causes of VPI noted by respondents in this study are similar to observations made by other authors [6], and this study found similar results to previous studies in terms of instrument played—that VPI commonly occurs in players of clarinet and oboe and with less frequency and lower prevalence in bass trombone, tuba, bassoon, trumpet and French horn [2]. It is known that high intraoral pressures associated with playing some wind and brass instruments may cause VPI due to the pressures applied to the soft palate apparatus [7].

VPI is an important potential problem for wind and brass student instrumentalists. The factors that may prevent VPI

**Table 2.** Characteristics of VPI (number and per cent)

	With VPI <i>n</i> (%) <sup>a</sup>
Playing duration before onset	
<10 min	1 (3)
10–30 min	5 (17)
30–60 min	4 (13)
Between 1 and 2 h	7 (23)
>2 h	2 (7)
Symptoms	
Noise in the back of the throat	25 (83)
Air escape from the nose	22 (73)
No control of air stream	15 (50)
Straining of the throat	10 (33)
Fatigue	19 (63)
Other	6 (19)

<sup>a</sup>Per cent of all VPI cases who reported this characteristic.

are not well understood and further research is therefore needed. A pilot study will be conducted in the future in order to design an effective treatment and management protocol.

### Key points

- Muscular fatigue and performance-related stress are commonly associated with the onset of velopharyngeal insufficiency in wind musicians.
- Velopharyngeal insufficiency occurs in advanced wind and brass instrumentalists due to the stresses imposed upon the soft palate caused by high intraloral pressures associated with playing these instruments.
- This is the first survey of Australian wind and brass musicians' knowledge and experience of velopharyngeal insufficiency.

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### Conflicts of interest

None declared.

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