How to identify and manage stress VPI: Recommendations for wind instrumental teachers and students

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Stress velopharyngeal insufficiency (stress VPI) is frustrating and potentially career threatening to a wind instrumentalist. The prevalence among student musicians is as high as 39%. Most students seek advice primarily from their instrumental teacher, who is responsible for their technique development, and few students seek professional medical advice. Despite the high prevalence rate, anecdotal evidence suggests that many students and teachers are unaware of the symptoms of stress VPI and factors that may lead to this condition. A lack of knowledge may lead to insufficient advice from most woodwind and brass teachers, and many students may then experience prolonged recovery times due to their failure to respond to early warning signs. This paper aims to outline the symptoms and causes of stress VPI and attempts to recommend commonly used management methods.

Keywords: stress velopharyngeal insufficiency; woodwind; brass; diagnosis; management

The performance-related disorder Stress Velopharyngeal Insufficiency (stress VPI) occurs in musicians when the soft palate fails to close the oral cavity to separate it from the nasal cavity, which results in air leaking out through the nose while attempting to blow air out through the mouth. Previous published papers have reported prevalence rates between 17 and 34% (Malick et al. 2007, Schwab and Schultze-Florey 2004, Ingrams et al. 2000). Stress VPI is more likely to occur to players of wind and brass instruments that require a high intraoral pressure to generate a note, such as oboe, bassoon, clarinet, trumpet, or French horn (Malick et al. 2007). The amount of
pressure required to play a wind or brass instrument has been quoted as thirty times greater than the amount needed for speech (Schwab and Schultze-Florey 2004, Malick et al. 2007). It has been observed that stress VPI commonly occurs in young adults aspiring for professional careers, due to the physiologically demanding practice required to achieve excellence at an elite and competitive level (Schwab and Schultze-Florey 2004).

In a small online Delphi survey of speech-language pathologists and otolaryngologists, only four out of fourteen respondents reported they had seen five or more wind instrumentalists with stress VPI (Evans et al. in press). Malick and co-workers (2007) reported that out of 160 plastic surgeons and otolaryngologists 45% had knowledge of stress VPI but only 27% had seen cases with the disorder in their clinics. In our recent survey (Evans et al. 2011) 39% of students reported experiencing symptoms of stress VPI during their studies. Out of 30 musicians with self-reported symptoms of stress VPI only three sought medical advice from a health practitioner while the majority (21) reported seeking advice primarily from their instrumental teachers. Consequently for many young instrumentalists stress VPI can be left untreated resulting in delayed recovery, which may also adversely affect their course of studies. Teachers may perceive symptoms occurring to their students but remain unaware of possible risk factors—or know how to advise their students—which may potentially exacerbate the problem. These reports imply that a lack of knowledge and understanding of stress VPI causes and its management exists for students and music teachers.

Literature on stress VPI in wind players is limited to only a small number of case reports. The most recent article included a literature review and two case reports of successful surgical treatment for stress VPI in clarinet players (Visser and van der Biezen 2012). Some pedagogical texts have briefly mentioned the phenomenon and advocate exhalation through the nose while playing as a practice strategy, but contain limited information on relieving symptoms if the problem is more debilitating (Sprenkle and Ledet 1961, Stein 1958). In only one pedagogical text was research evidence provided of successful treatment for severe stress VPI cases (Hickman 2006). Other practical advice aimed at instrumental musicians has been published in music journals (Wolff 1995, Gibson 2008).

Some published injury prevention guidelines for musicians (Llobet and Odam 2007, Klickstein 2009) include tips that are easily transferrable when symptoms of stress VPI occur. These include increasing practice time gradually, incorporating an adequate warm-up and cool-down as well as sufficient rest breaks, minimizing tension by employing good posture and breathing habits, stress management, and general health maintenance. All these
measures are suggested to be beneficial to overall well-being. As with other more severe health conditions, when symptoms of stress VPI persist the student may need further evaluation from a trained health professional.

The main aim of this research is to present the known causes and management options available for students with stress VPI. This work described here will contribute to raising awareness of the disorder among wind instrumentalist students and teachers, as well as among health practitioners that consult with these musicians.

**MAIN CONTRIBUTION**

Symptoms of stress VPI include audible air emission from the nasal cavity and the inability to maintain soft palate closure, affecting the player’s ability to practice or perform on their instrument for an extended length of time.

**What to listen for?**

If nasal air leak is appearing while the student is playing their instrument it will sound like a “hiss” or a “snorting” rustle. This is the sound of air escaping from the oral cavity via the nasal cavity and exiting out through the nose.

**When is nasal air leak likely to occur?**

Case reports and discussions with other musicians reveal that stress VPI commonly occurs to students of 17 to 20 years of age or during a period of advanced instrumental study. The onset of symptoms is possibly due to a sudden increase of physiologically demanding practice, such as preparing for auditions or recital examinations. Students further report that symptoms usually appear when fatigued or during times of stress.

**What can you do?**

Firstly it is important to exclude any incorrect habits in instrumental technique through an assessment by either the student’s teacher or another instrumental specialist. If general playing set-up (including posture, breath support, and embouchure) is considered appropriate and the problem persists then further investigation may be needed to ascertain possible anatomical causes of the disorder. In particular, the student may need to consult their usual general practitioner to obtain a referral to see an otolaryngologist (ear, nose, and throat specialist) for detailed assessment. The assessment of velopharyngeal closure is either done through video nasendoscopy (or fluoroscopy) and can determine the most appropriate type of medical intervention.
(Brigger et al. 2010). This examination would normally involve either the student playing their instrument while the ENT inserts a flexible video camera into the nose to view the nasal and oral cavities (nasendoscopy) or an x-ray of the velopharyngeal mechanism (fluoroscopy). From this examination the specialist can ascertain the anatomical position where nasal air leak is occurring. This may be important when determining appropriate management.

Treatment and management

Previous case reports have reported the use of both non-surgical and surgical interventions to improve symptoms of stress VPI. It has been suggested that speech-language pathology intervention (or speech therapy) and other conservative methods be attempted for at least six months and if symptoms persist it is advisable to consult a specialist for surgical treatment options (Gibson 2008). Speech therapy may consist of palatal exercises (such as blowing, swallowing, and sucking) designed to increase the awareness of soft palate closure. Although speech therapy may be useful for patients with other speech disorders, some research suggests that muscle exercises may not be effective in improving velopharyngeal closure (Shprintzen et al. 1975). Another suggested vocal technique to increase the student’s awareness of the oropharynx is playing with an “inner smile” whereby the oropharynx is broadened and the soft palate is elevated by attempting to smile without moving the outer corners of the mouth (Gibson 2008). The functional mechanics necessary for instrument playing however, are different from the velopharyngeal movements used for speech or singing, and further research in the efficacy of speech therapy is needed.

If surgical intervention is appropriate, there are three procedures commonly used to correct structural VPI that have been successfully used in treating cases of musicians with stress VPI. The least invasive is injection augmentation where injectable material is administered to the posterior pharyngeal wall. Surgical procedures are pharyngeal flap (inferior or superior based), and sphincter pharyngoplasty.

When is too much practice too much?

Despite the old maxim “practice makes perfect” there are arguments to suggest that over-practicing may cause more harm than good. Misconceptions still exist such that when problems appear in a student’s playing they are accused of “not practicing enough.” Well-meaning teachers and colleagues may even erroneously suggest to the instrumentalist experiencing symptoms of
stress VPI that there is a “weakness” (either physiologic or psychological) that they have to overcome. The student consequently increases their practice load, unaware of potential harm they may be causing to themselves.

**Recommendations**

Previous guidelines have recommended a short period of rest (or reduced playing) be taken. However, current research suggests that muscle fatigue or overuse is not the only factor leading to stress VPI. While a period of rest may relieve symptoms temporarily it is advised to seek immediate help if symptoms persist. If a structural deficiency exists an evaluation is needed by a health professional to determine individual-specific treatment options. Some cases may benefit from employing specific exercises done away from the instrument and by using a structured practice plan upon returning to playing activities. A guided rehabilitation program can be designed with advice from a health professional in collaboration with both music teacher and student. This may involve teachers and students dividing their practice sessions into shorter sessions, including rest breaks, and gradually increasing the level of physically demanding repertoire and including an adequate warm-up and a cool-down before and after practice.

**IMPLICATIONS**

Advanced student instrumentalists may have already spent many years of deliberate practice at their instrument, and stress VPI may produce unwanted setbacks to their career development. Both students and teachers need to be aware of the symptoms of stress VPI and know what options are available for diagnosis and management. Further research currently being undertaken, investigating the velopharyngeal mechanism when playing a woodwind instrument will provide more evidence on the anatomical causes of stress VPI. Due to the small number of case reports published it is difficult to assess the most appropriate treatment method. Therefore if a student who suspects stress VPI in their playing or has persisting symptoms, it is advisable they seek assessment by a trained health professional in order to determine appropriate rehabilitation and/or treatment suited to the individual.

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