

# Functional disorders of the upper airway associated with playing wind instruments<sup>1</sup>

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Several known functional disorders of the upper airway are associated with playing wind instruments. Some of these problems have been known for hundreds of years. Subcutaneous emphysema of the head and neck and parotid, palate paralysis, patulous eustachian tubes, laryngocele, and pharyngocele are some of the more common problems. In evaluating disorders of wind instrumentalists, it is important to obtain a history that is unique to the individual, including information about the work environment, playing technique, and length of time playing. Physicians should understand the differences in wind instruments, mouthpieces, and reeds to understand the pathologic problems that occur in wind instrumentalists. This paper serves as an introduction to some of the signs and symptoms of these problems and how they are unique in wind instrumentalists.

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Whether physicians have a casual or a sophisticated appreciation of music, it is helpful for them to understand the effects that playing wind instruments have on musicians. Some of the abnormalities of the function and structure of the upper airway that may arise from or be associated with playing wind instruments will be discussed.

When treating the musician, physicians must consider the patient's age, musical experience and training, and work environment such as a theater, auditorium, concert hall, or practice area. The location of the performance, whether in an enclosed orchestra pit, open stage, or open-air pavilion, determines the different environmental con-

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ditions (such as humidity or temperature extremes) or pollutants (such as dust that may get kicked about) to which the musician is exposed.

Wind instrumentalists include both woodwind and brass players. The techniques of playing the instruments in each of these categories affect the physiology of the aerodigestive tract. Air blown across a hole, as in a flute; across a single reed, as in a clarinet; across two vibrating reeds, as in an oboe; or into a brass mouthpiece produce different physiologic changes, not only between different instruments, but also within a single type of instrument.

More information about medical problems of wind-instrument players exists in music history than in medical literature. Problems of the aerodigestive tract in wind-instrument players have been passed on anecdotally from musician to musician, from teacher to student, and student to student. Homemade remedies have been created for many individual problems, allowing musicians to continue to play and perform and care for themselves as a group. Much of the medical knowledge comes from information about glass-blowers with laryngoceles, but even this only describes treatment, rather than pathophysiology.

Brass players use mouthpieces of different sizes, both in diameter and depth of the cup, which can create various lip and dental problems. How the mouthpiece is held against the lips, tongue, and teeth can create lip-oral problems. The material from which the mouthpiece is made, how that material wears, and what type of metal is underlying the metal plating can affect the lips, oral mucosa, and teeth. Dermatitis and mucositis can result from contact with the plating or the metal underneath.

Knowledge of the differences in reeds, mouthpieces, and playing techniques necessitates the cooperation of the physician and the music teacher in trying to determine whether or not the medical problem is instrument related. As for vocal instrumentalists, playing position and breathing techniques can also be critical factors. Here too, music teachers and coaches are much more knowledgeable than physicians. Anecdotal reports of pathologic entities of the ear, nose, and throat are also currently being gathered. These problems are directly related to wind instrumentalists, and dissemination of this information will help to generate more knowledge and interest in this new specialty.

*Interstitial emphysema* or *subcutaneous emphy-*

*sema* can occur in shofar blowers. The shofar is the ram's horn that has been used since biblical times to call across great distances and for religious ceremonies. The music literature and religious literature discuss the interstitial emphysema that has been seen in shofar blowers. Interstitial emphysema can be located in the face, neck, and even extend down to the upper chest and mediastinum. It is not known why it occurs and what is unique about this instrument. The long-term effects of playing such an instrument also need to be determined.

*Pneumoparotitis* is a similar entity that has been known for several hundred years and occurs in clarinet and trumpet players.<sup>1-5</sup> Air forced through the parotid ducts from the mouth causes swelling of the face because of the air trapped under the parotid fascia. The immediate swelling, produced as air is forced into the parotid gland, gradually resolves in several days. It was common in medieval coronet players and among French Foreign Legionnaires.<sup>6</sup> Legionnaires who wished to avoid duty in the Legion would simulate what was thought to be "mumps," but in reality was a swelling in the parotid gland caused by trapped air. Physicians thought these individuals had an infectious disease or tumor and removed them from active duty. This became known as the French Foreign Legion "mumps."

*Palate paralysis and/or paresis* is occasionally seen in woodwind players. The woodwind players refer to this as a "loss of seal." This is a devastating problem because it allows air to escape through the nose, making the musician unable to sustain the necessary intraoral pressure while playing. Although it is unclear why this occurs, it may happen as the nerves and muscles of the palate become stretched from constant pressure, creating loss of muscle tone and/or nerve weakness. This has been treated by placing an obturator or a palatal lift-type prosthesis in the mouth clasped onto the teeth to literally close off the velopharyngeal port, allowing these wind instrumentalists to continue to play. Players who have had a loss of seal of the palate have had resolution of the problem in time.

*Patulous eustachian tube* is a known otolaryngologic entity of woodwind and brass players. The eustachian tube, for the most part, remains closed except during swallowing, yawning, and certain other mouth and neck maneuvers. It is the click heard as we swallow that is the quick opening and closing of the eustachian tube. Per-

sons with a patulous eustachian tube have an abnormally open eustachian tube that may remain constantly open. This probably is related to tensor veli palatini muscle dysfunction. Wind-instrument players may have constant pressure on the eustachian tube that can cause a loss of muscle tone and/or paresis much like the pathophysiology of the palate paresis. Persons with patulous eustachian tube usually complain of autophony—the sensation of talking in an echo chamber or with their head in a barrel. This is a serious problem, since the musician must listen not only to his own playing but also to that of those around him. When looking at the tympanic membrane, the examiner occasionally can see the tympanic membrane moving in and out with quiet respiration because the inspiratory and expiratory efforts are transmitted from the airway through the open eustachian tube. This condition is alleviated by lying down because the eustachian tube will close when dependent.

*Laryngocele* has been described in glassblowers and in various wind-instrument players.<sup>7</sup> Laryngocele is an enlargement of the ventricle or sacculus of the larynx, which is the space between the true and false cords. It probably results from sustained intrathoracic pressure, but can occur when there is sustained pressure above the vocal cords in a wind instrumentalist. Persons who have a laryngocele may present with hoarseness because of either pressure on the vocal cords, dysfunction of the muscles of vocal cord motion, or pressure upon the nerve, such as the superior laryngeal nerve. In persons with a laryngocele, dyspnea may develop as the swollen air-filled sac becomes enlarged. Cough or throat clearing can occur because of the sensation of something within the throat. All of these symptoms can become distressing and debilitating for the wind instrumentalist. Laryngoceles must be treated surgically, and the method of removal depends upon whether they are confined to the larynx itself or have grown large enough to extend outside the larynx.

*Pharyngocele* is an expansion of the pharynx with enlargement of the entire common conduit of the air passageway and food passageway. Persons who have a pharyngocele may complain of a neck mass or neck enlargement, which may be asymmetrical. They may complain of dysphagia, or difficulty in swallowing, because of the large expansion of the neck and retain secretions and bits of food within the redundant mucosal folds.

Some of these individuals will regurgitate their food hours after they have eaten. Some will even regurgitate undigested food a day or two later because of the massive dilatation and retention of food within mucosal folds. This especially occurs with grains, nuts, and leafy vegetables. This can affect wind-instrument players as they attempt to perform and find they have bits of food or debris trapped within their mouthpiece, reeds, or musical instrument. Massive dilatation of the pharynx has been known by musicians for hundreds of years. Many musicians will not button the top button on their shirt collar when performing because of the dilatation. Others wear shirts a neck size larger than normal for performing. In the past, musicians have literally wrapped their necks with leather strapping to maintain tone and rigidity in the neck. We have created neck collars in our physical therapy department to support the neck in the few individuals we have seen with this disorder and have had patients undergo an intensive course of physical therapy to strengthen the neck muscles.

These are a few of the more common problems seen in wind instrumentalists. As more musicians feel comfortable about coming to physicians for treatment, I am certain that more disorders will be discovered and better treatment developed that is individualized to the musician and specific musical instrument. Through increased knowledge of etiology, efforts can be directed toward prevention as well as treatment.

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