

### PASIG PRESIDENT'S MESSAGE

I want to take the opportunity to congratulate Amy Humphrey, DPT, OCS, MTC, Jeffrey Stenback, PT, OCS, and Jennifer Janowski, MPT, CSCS, on their recent exposure in the Advance for PT magazine article written by Jonathan Bassett entitled, "When the Show Must Go On." Please check out the following link. <http://physical-therapy.advanceweb.com/Archives/Article-Archives/Must-Go-On-When-the-Show.aspx>. The article showcases the work of performing arts physical therapists.

The PASIG is busy creating content for our resource page. It contains educational information related to dance, figure skating, gymnastics, musicians, and other performing artists. Please visit the Web site link for more information. [http://www.orthopt.org/content/special\\_interest\\_groups/performing\\_arts/pasig\\_resources](http://www.orthopt.org/content/special_interest_groups/performing_arts/pasig_resources). If you would like to contribute content to this Web site, please contact me at [joconnell@athletico.com](mailto:joconnell@athletico.com).

Our very active research committee sends out a monthly e-blast to the membership about helpful topics in the treatment of performing artists. We are always looking for contributors to these blasts. If you are interested in contributing, please contact Annette Karim, PT, DPT, OCS, at [akarim@evergreenpt.net](mailto:akarim@evergreenpt.net).

We are excited about our upcoming elections for the position of Nominating Committee member and Vice President of the PASIG. The candidates are preparing for the late fall election. Please keep alert for election reminders and remember to cast your vote. We appreciate your commitment to the PASIG.

Also be sure to update your PASIG membership profile at our Web site: [https://www.orthopt.org/surveys/membership\\_directory.php](https://www.orthopt.org/surveys/membership_directory.php)

*Sincerely,  
Julie O'Connell, PT, DPT, ATC  
PASIG President*

### PASIG NEWS: PASIG STUDENT SCHOLARSHIP

**Purpose:** To recognize students for their contribution to performing arts medicine and to assist in defraying the cost of attending the Combined Sections Meeting (CSM).

**Eligibility:**

1. You must be a member of the Performing Arts Special Interest Group (PASIG).
2. You must be a student in an accredited physical therapy program when the research was conducted.
3. Your abstract for a poster or platform presentation abstract has been submitted and accepted to CSM.
4. You must attend CSM.
5. You must be listed as an author on the presentation.
6. You must participate in presenting the poster/platform.
7. Deadline for submission of your abstract for consideration for the PASIG scholarship is November 15 of the year preceding the CSM for which the scholarship is being offered.

**Criteria for Selection:**

1. The importance of the contribution of the abstract to the physical therapy management of performing arts physical therapy.
2. The clinical implications derived or suggested from the abstract.
3. The quality of the writing.
4. The clarity of the clinical information / data presented.

**Award Committee:** The committee consists of:

1. The PASIG Student Scholarship Committee Chairperson.
2. The PASIG Research Committee Chairperson.
3. The PASIG Education Committee Chairperson.

**Notification of the Award:**

The recipient of the award will be notified in December (of the year preceding the CSM for which the scholarship is being offered) by the PASIG Scholarship Chairperson.

### CASE STUDY: Rehabilitation of an Orofacial Overuse Syndrome in a Brass Instrumentalist

Jeffrey Stenback, PT, OCS

While wind instrumentalists are not as frequently injured as a string or keyboard player, they can still experience an injury. When the younger (and often less experienced) musician lapses into an overuse injury, we can often look to the calendar and coordinate the timing of their injury with preparation for a competition, recital, audition, or jury. The likelihood of that overuse injury is potentially increased if other risk factors, such as stress, are present.<sup>1</sup> Additional risk factors might be rapid, repetitive or loud passages, difficult fingering, a perfectionist personality, playing multiple instruments, a new or advanced repertoire, or a change in pedagogy. Whatever the musician's diagnosis, a graded intervention that helps the musician understand proper pacing of their practice habits is critical to managing this patient subtype. In addition to the necessary flexibility, strengthening and endurance training for postural stability, education of the musician patient is within our venue as physical therapists. Better preparation regarding inherent risks is a necessary goal. This case study was chosen to illustrate a few of these issues.

The treatment of the performing artist begins with the initial evaluation. A 24-year-old male trumpet player was sent to my orthopaedic physical therapy practice on referral from a local maxillofacial surgeon with whom I regularly work. The diagnosis was right temporomandibular (TMJ) arthralgia with no prior history and negative testing for internal derangement. The patient was a music major in a 4-year university program and a senior in the midst of preparing for his juries. Juries are a required practical exam whereby an individual demonstrates

their skill level after culmination of 4 years of academic and performance studies. It is a requirement in order to graduate. The student spends a good portion of their last year preparing for this final program and then presents to a group of professors who determine whether or not the student has demonstrated enough advanced skills and knowledge of his instrument to merit the granting of his music degree. Long hours of practice and a great deal of stress are part of this process.

### Case in Point

This young man's initial complaints were of facial soreness [right greater than left; numeric pain rating scale (NPRS) level of 6/10] approximately 5 minutes into playing his instrument. His symptoms worsened as he continued playing to the point that he was no longer able to practice without facial pain. His symptoms were noted with chewing firmer foods, but not to the extent noted when playing the trumpet. He began to experience a loss of muscular control in the facial muscles and some minor facial swelling, right greater than left. This loss of muscular control in the facial muscles of a musician necessarily involves their "embouchure," defined by Merriam-Webster as: "the purposeful arrangement of the facial muscles and the shaping of the lips to the mouthpiece on woodwind or brass instruments in order to produce sound." An embouchure collapse is the loss of this muscular control and is combined with strength deficits in the orofacial muscles. This collapse is often due to too much playing or excessive pressure on the mouthpiece.<sup>1</sup> He also complained of frontal and retro-orbital headaches, and more recently, some difficulty swallowing. He was very concerned about having to stop practicing and fearful of returning to play.

Upon further questioning, the patient related that he was definitely under a great deal of stress as he prepared for his juries. He admitted that he was a "clencher" and stated that he was averaging only about 4 to 5 hours of sleep at night. He had gotten to the point where he was unable to play his instrument without pain and had decided to stop playing entirely to see if his symptoms would resolve. A critical component of the patient history is inquiring about practice habits. In this case, his practice habits were enlightening as to the cause of his problems. Typically, he would practice about two hours per day on his primary instrument (trumpet) and reported practicing with a band that played locally for another 2 to 3 hours per week. As part of his schooling and for theory classes/composition purposes, he also played the piano. However, as he returned from a school break about half way through the school year, he had dramatically increased his practice time to approximately 9 hours per day in an attempt to prepare for his senior juries.

The young man's mother (a physical therapy assistant herself) had accompanied him to his evaluation. She voiced concern about how her son's symptoms had escalated and had insisted that he take a leave from school, come home, and be evaluated by professionals with whom she was familiar. She stated that since her son had returned home, he was somewhat withdrawn, had very low energy and was sleeping a great deal, sometimes 11 to 12 hours per day.

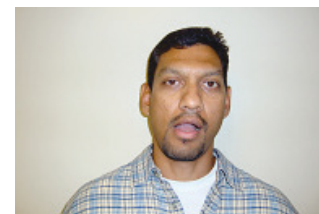
### The Initial Evaluation

The young man's posture demonstrated a moderate forward head posture with rounded shoulders, slightly protracted scapulae, and an increased kyphosis (Figure 1). He demonstrated a 1

mm right mandibular resting deviation and had minimal swelling over the right TMJ. His jaw opening demonstrated a slight right deviation, although his opening excursion was within functional limits at approximately 40 mm (Figure 2). Lateral excursion was 5 mm to the left and 3 mm to the right. Normal excursion is considered 10 mm to each side. Protrusion was past neutral, but with a slight right deviation as well. All motions were with complaints of discomfort in the right greater than left facial muscles.



**Figure 1. Posture at initial visit.**



**Figure 2. Mandibular opening, but with right deviation.**

Cervical movements were limited bilaterally and all motions were with discomfort reported at end range (forward bending ~ 75%, backwards bending and bilateral rotation ~ 50%). For manual muscle testing he demonstrated a 4- out of 5 in the lateral mandibular movers and protrusors through his available range. His cervical extensors and lateral cervical flexors were also 4- out of 5 through their available range, but also included the bilateral rotator cuff and mid-scapular musculature with the same muscle grade. Full range of motion was noted in the upper extremities. Palpation revealed multiple active trigger points in the right greater than left temporalis muscles, medial greater than lateral pterygoids, masseters, and hyoid groups (all muscles responsible for clenching and lateral mandibular movement). He also had notable shortening of his cervical extensors and anterior chest/shoulder musculature. Trigger points continued into his right greater than left suboccipital muscles, longus colli (often involved with complaints of difficulty swallowing), sternocleidomastoid, middle scalenes, upper trapezius, midscapular, and pectoral muscles.

End feels were capsular in the temporomandibular joints with pain on right mandibular long axis distraction; cervical end feels were also capsular with right cervical discomfort in the mid-cervical spine (grade 2/3 with passive intervertebral motion (PIVM) testing in sidebending). Assessment of respiration, demonstrated shallow upper chest breathing, with slightly less excursion in the left lateral chest wall.

The problem list for this patient was as follows:

1. Loss of neuromuscular control in the orofacial musculature for his activities of daily living (ie, playing the trumpet).
2. Poor posture with altered TMJ/cervical spine/upper quarter function.
3. Inefficient respiratory pattern with decreased chest expansion left greater than right.
4. Not currently playing the trumpet. When possible after an injury, it is best to avoid complete cessation of playing an instrument as it helps the musician maintain their "chops." In this case, the patient had already ceased playing and it was felt that getting further along

in treatment prior to restarting play was advisable.

5. Fear of returning to the instrument; possible depression.

At this point it is important to point out that while this young man's primary complaint was of loss of his embouchure, we have also identified problems relating to his symptoms that are outside of his initial diagnosis of TMJ arthralgia. The minor swelling noted in his right TMJ is probably secondary to inflammation in the area and this accounts for pain noted during right long axis distraction of his mandible. He demonstrated poor, though not atypical posture with altered biomechanics throughout the orofacial region, cervical spine, and bilateral upper quarters. We can theorize a possible progression of symptoms that is helpful in understanding how the patient arrived at this point: As he increased his practice hours, he experienced more pain while playing and progressively lost control of his orofacial musculature (his embouchure). His postural support deteriorated further. This progressive loss of muscular control fostered increased anxiety, which may have added to his pain complaints and tension within the involved muscles. It was not known whether or not his recent swallowing difficulties were solely due to his overuse syndrome. We agreed that we would try to address this area within his treatment and seek further professional intervention if his symptoms of difficulty swallowing did not respond. His current upper chest respiratory pattern was probably more recent, as it is difficult to play a wind or brass instrument without diaphragmatic breathing. Using upper chest and accessory muscles is inefficient and only adds more strain to the overtaxed postural muscles. Ongoing attempts to play probably aggravated existing trigger points, further deteriorating his muscular control and posture. Finally, he also demonstrated possible signs of depression. This is perhaps not a surprise when one considers what the patient could stand to lose if he was unable to return to playing his instrument. The lack of energy, excessive sleep, and fear of returning to his instrument are all indications of concern. A referral to a psychologist was considered.

The working diagnoses with this patient were:

1. Right greater than left TMJ arthralgia. This diagnosis infers a more gradual onset of symptoms as opposed to a traumatic event, with altered TMJ mechanics.
2. Embouchure overuse syndrome. This term is applicable due to the rapid increase in playing time and the resultant loss of control in the orofacial musculature.
3. Postural dysfunction.

### Treatment

There were several areas to address in this patient, beginning with respiration and teaching the patient to use diaphragmatic breathing. A progression from supine and sidelying postures to sitting and standing with increasingly challenging tasks (in terms of both body posturing and duration of exercise) was helpful. He performed lateral chest expansion exercises in sidelying and in sitting/standing to incorporate trunk rotation (Figures 3 and 4).

Measurements of progress included an ability to demonstrate proper breathing patterns in various postures and voicing/phonation for progressively longer periods. During this time the patient was also referred back to a former local mentor and brass teacher who started him on basic trumpet warm-up prac-



**Figure 3. Sidelying stretch for left lateral chest expansion coordinated with breathing.**



**Figure 4. Sidelying stretch for left lateral chest expansion with trunk and cervical rotation coordinated with breathing.**

tice drills for very short (5-10 minute) periods and progressed him from elementary to more skilled musical material. He was initially limited to practicing his instrument with familiar pieces and for only 10 minute intervals as long as they were pain-free. Examples of embouchure exercises will be discussed later.

Musculoskeletal issues in this patient involved both local and more global groups. Basic rest position of the tongue and cervical neutral positioning, along with neutral trunk/pelvic neutral positioning were addressed. He was taught a supine sleep position with multiple pillows (Figure 5) and proper sitting posture for use with all static ADL.



**Figure 5. Supine position for sleep. Includes ramped pillows under head and shoulders, a pillow under head and shoulders, a pillow under either forearm and pillows (or their equivalent) under knees.**

He already had a night-guard splint that he was encouraged to begin using again to help manage his clenching behavior. Manual techniques were employed to address flexibility needs throughout both extraoral and intraoral regions of his orofacial muscles. He was given a home exercise program for the mandible, cervical spine, and upper quarters for reinforcement.

This program was progressed during his treatment and he was responsible for continuing independently after treatment was completed. Measurement of progress constituted his ability to demonstrate improved postural awareness with an increase in pain-free range of motion and successful demonstration of his home exercises. Interventions included neuromuscular exercises to teach basic rotation versus translation exercises for the TMJ, isometric exercises for the mandible, orofacial strengthening to address his deviations, along with clearing of the cervical spine and strengthening of the cervical spine and upper quarters. Measurement of neuromuscular progress included improvement in manual muscle testing, functional outcome improvements, and an increase in orofacial muscular control. Trigger points were addressed in all areas at each session, beginning with the cervical spine and upper trapezius and progressively including the pectoral/anterior shoulder, thoracic and orofacial muscles. Measurement of progress with trigger points included an ongoing assessment of active trigger points with a decrease in their excitability. A psychological referral was made near the end of the second week of treatment and the patient was followed through most of his physical therapy treatment. Both the



**Figure 6. Proprioceptive cueing with resistance to left side of mandible. Used to help correct right deviation on opening.**



**Figure 7. Isometric resistance exercise around head to facilitate cervical stabilizers.**

patient and his mother agreed that in order to move forward, a psychological assessment and treatment plan was a necessary component of his treatment to help him address his fears and rebuild his confidence. His mentor addressed basic embouchure skills specific to his instrument and helped with his return-to-play progression.

This young man's prognosis was good as long as he was compliant, completed the prescribed therapy, and was able to pace his return to the trumpet. Making sure all variables were considered were critical to the success of this case (ie, respiratory pattern, musculoskeletal and neuromuscular issues, active trigger points, altered ADL/posture, return to play considerations, and psychological components). The initially identified loss of embouchure had to be expanded to address dysfunction in several regions. His treatment therefore required an approach that addressed each of these areas.

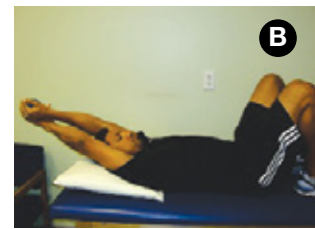
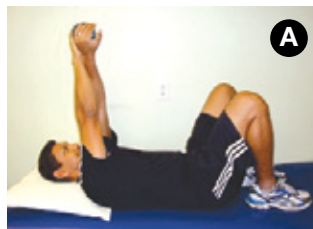
#### Exercise for stabilization and function

As noted already, the patient was started on diaphragmatic breathing exercises, lateral chest expansion exercises (as noted in Figures 3 and 4), cervical/pelvic neutral and rotation versus translation exercises for the mandible. Proprioceptive exercises for the jaw and cervical spine were included early on with light isometrics (Figures 6 and 7).

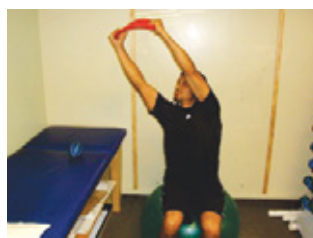
Basic postural strengthening and stability needed to include not just his orofacial region, but also his cervical spine and upper quarters. These issues were challenged with progressively weighted balls or cables or resistance bands in various positions and progressed through increasingly more demanding posturing for increased durations (Figures 8A, B, 9, 10).

Demonstration of an awareness of stability with increased muscular control in the cervical spine and upper quarter and lumbopelvic region was required before progressing either his resistance or physical challenge (ie, maintenance of cervical, jaw and pelvic positions during performance of exercises). Focused diaphragmatic breathing or active phonation was included with all activity (ie, counting out loud, controlled forceful blowing out during movement). As he reintroduced his instrument into his exercise routine, a degree of fine motor control in the upper quarters was incorporated in various upper quarter ranges, both in and out of postures that mimicked his trumpet playing position (Figures 11A, B).

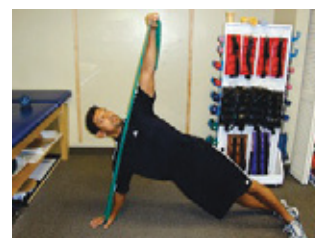
Initially, the patient was seen 3 times per week and progressively weaned from care over two months for a total of 20 visits. He gradually noted increased muscular control throughout the cervical spine, upper quarters, and orofacial region with



**Figures 8A. Starting position for overhead clasp exercise with a weighted ball. Focus on scapular control throughout range of motion, cervical and mandibular neutral posturing without clenching. All exercises were coordinated with breathing. B. End position for overhead clasp exercise with a weighted ball. Exercises were progressed through various postures, durations and resistance.**



**Figure 9. Diagonal weighted lift on gymnastic ball for upper quarter stability, cervical/trunk rotation and balance.**



**Figure 10. Side planks with rotation and resistance band for more advanced stability with rotation.**

decreased pain complaints and greater ease of movement. His sleep returned to normal (approximately 7-8 hours a night) and he exhibited less clenching behavior.

#### Embouchure Skills

When dealing with wind and brass instrumentalists, a basic awareness of embouchure skills is helpful. Each person's embouchure is individualized, but still demonstrates a pattern as well. A correct embouchure as described by Farkas is as follows: (1) not puckered, (2) not smiling, (3) should not be "bunched up," (4) should have a flat chin, (5) jaw should be thrust forward slightly, (6) lips should be even, (7) teeth should provide support for the pressure placed on the lips.<sup>2</sup> An incorrect embouchure allows air to escape from the sides of the mouth, incorporates a "smiling" embouchure or demonstrates some kind of muscular collapse. The "smiling" embouchure is inefficient and considered incorrect by most teachers. How the embouchure position sounds is also important. A correct embouchure sounds like a mosquito (called "buzzing"), while an incorrect embouchure is uncontrolled with a loss of breath control.<sup>3-6</sup> (Note: these references are hyperlinks to YouTube videos and a good starting point for understanding embouchures)

"Slurring" and "bending" are two exercises that are useful in building a musician's "chops." They are performed with subtle changes in the embouchure and require muscular control to perform correctly. Slurring is a lip exercise where the musician is required to "slur" one note to another in a smooth or "legato" fashion, either up or down in a continuous unbroken sound. This exercise helps to develop flexibility and endurance of the embouchure muscles. Bending is a lip exercise where the musi-



**Figure 11A. Fine motor exercise for fingers/hand combined with proximal stabilization using resistance web for progressively longer durations. B. Fine motor exercise for fingers/hand combined with proximal stabilization using resistance web in playing posture for progressively longer durations.**

cian “bends” the note by 1/2 to 1/4 inch pitch in a continuous sound which helps to develop strength.

In producing higher and lower tones, the embouchure changes slightly. Higher tones require greater muscular control than lower tones. Often, these skills can be practiced with only the mouthpiece before attaching the rest of the instrument. Scales are typically familiar to most musicians and are usually a good starting point as they return to their instrument or as they begin their warm-up. The embouchure should be maintained throughout the entire scale and scales should be begun in the more comfortable mid-range, rather than at a very high or low pitch.

## DISCUSSION

This case study discusses a musician with an embouchure problem. But we would have failed in his treatment had we only treated this orofacial region. An approach that addressed his inefficient respiration, cervical and upper quarter involvement, and a psychological component helped round out his program. Our primary goals were accomplished through progressive specific physical demands, specific trigger point management, and controlled biomechanics that were applicable to his activities of daily living. Ultimately, this patient learned to avoid posturing that was detrimental to his art form, decreased his clenching behavior, and focused on a return to more basic playing technique. Once he was able to re-establish a solid foundation, he was able to start progressing to more advanced skills with his instrument. As his function improved, his level of anxiety about playing his instrument decreased and his confidence appeared to grow. He gradually noted increased muscular control throughout the cervical spine, upper quarters, and orofacial region with decreased pain complaints and greater ease of movement. His mentor guided him through embouchure skills and a graded repertoire as he continued his physical therapy treatment. At one month follow-up he had returned to school and was managing his remaining symptoms independently. He was successfully able to complete preparations for his senior juries.

This case study illustrates several risk factors that are unique to musicians and demonstrates how a graded return to activity and playing can lead to a successful outcome.

## REFERENCES

1. Tubiana R, Amadio P. *Medical Problems of the Instrumentalist Musician* (Chapters 8, 12). London: Informa Healthcare; 2000.

2. Farkas P. *The Art of Brass Playing: A Treatise on the Formation and Use of the Brass Player's Embouchure*. Atlanta, GA: Wind Music/TAP Publications; 1962.
3. Wilken D. Brass Embouchures, A Guide for Teachers and Players (6 Chapters). [http://www.youtube.com/results?search\\_query=wilken%2C+embouchure&oq=wilken%2C+embouchure&gs\\_l=youtube.12...29985.33402.0.35610.2.2.0.0.0.0.96.189.2.2.0...0.0...1ac.Y\\_TnI\\_BvkEs](http://www.youtube.com/results?search_query=wilken%2C+embouchure&oq=wilken%2C+embouchure&gs_l=youtube.12...29985.33402.0.35610.2.2.0.0.0.0.96.189.2.2.0...0.0...1ac.Y_TnI_BvkEs). Accessed August 10, 2012.
4. Wilken D. Embouchure Dysfunction, Part I. <http://www.YouTube.com> <http://www.youtube.com/watch?v=tyeF6O9oXXk&feature=relmfu> and Part II. <http://www.YouTube.com> <http://www.youtube.com/watch?v=nAELJiAYfCo&feature=relmfu>. Accessed August 10, 2012.
5. Wilken D. Embouchure Misconceptions-Five Myths About Brass Embouchures <http://www.youtube.com/watch?v=uc4jS2-tF8s>. Accessed August 10, 2012.
6. Wilken D. Embouchure Questions and Comments. <http://www.youtube.com/watch?v=0AicWyTP6Xc&feature=relmfu>. Accessed August 10, 2012.

## PERFORMING ARTS CONTINUING EDUCATION

### Performing Arts Independent Study Courses

Orthopaedic Section Independent Study Course.

#### *20.3 Physical Therapy for the Performing Artist*

Monographs are available for:

- Figure Skating (J. Flug, J. Schneider, E. Greenberg)
- Artistic Gymnastics (A. Hunter-Giordano, Pongetti-Angeletti, S. Voelker, TJ Manal)
- Instrumentalist Musicians (J. Dommerholt, B. Collier)

Orthopaedic Section Independent Study Course.

#### *Dance Medicine: Strategies for the Prevention and Care of Injuries to Dancers*

This is a 6-monograph course and includes many PASIG members as authors.

- Epidemiology of Dance Injuries: Biopsychosocial Considerations in the Management of Dancer Health (MJ Liederbach)
- Nutrition, Hydration, Metabolism, and Thinness (B Glace)
- The Dancer's Hip: Anatomic, Biomechanical, and Rehabilitation Considerations (G. Grossman)
- Common Knee Injuries in Dance (MJ Liederbach)
- Foot and Ankle Injuries in the Dancer: Examination and Treatment Strategies (M. Molnar, R. Bernstein, M. Hartog, L. Henry, M. Rodriguez, J. Smith, A. Zujko)
- Developing Expert Physical Therapy Practice in Dance Medicine – (J. Gamboa, S. Bronner, TJ Manal)

Contact the Orthopaedic Section at:

[www.orthopt.org](http://www.orthopt.org)

Or call 1-800-444-3982