

Dental Impact of Playing a Musical Instrument

ABSTRACT

Playing a musical instrument is an important part of a patient's dental history. The activity can adversely impact the oral cavity and orofacial structures. Many musicians and dental professionals remain unaware of the potential harmful effects of playing an instrument, or how to treat, manage, and/or prevent them. This pilot project highlights the need for increased awareness by musicians of where to seek help for play-related problems, and for increased awareness by dental professionals on the impact playing a musical instrument can have on the oral cavity and dental treatment.

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Introduction

Playing a musical instrument can adversely impact the oral cavity and supporting facial structures, and is an important part of the patient's dental social history. This is especially true for musicians playing wind and string instruments, where resulting dysfunction can have physical, emotional, and economic impact. For professional musicians such occupational injuries may adversely affect or even prematurely end a musical career. Both musicians and dental professionals play an important part in managing and preventing playing-related disorders. However, many musicians and dental professionals remain unaware of the potential harmful effects of playing an instrument, or how to treat, manage, and/or prevent them.

Studies have found that 60–80%

of professional musicians experience a playing-related disorder in their lifetime.^{1,2,3} Countless hours practicing to perfect technique and playing ability place musicians at higher risk for repetitive strain injuries and orofacial problems. This can result in musicians not performing at the level they desire, making them less competitive compared to musicians who do not have playing-related disorders. Severity of the disorders may increase with continued playing, further impacting musical ability. The initial goal of this study was to characterize play-related orofacial disorders, and examine the associated intervention experiences of musicians.

Methodology

The study utilized an anonymous questionnaire through the online survey website Qualtrics.⁴ Questions were developed after a thorough literature review of articles and existing surveys reporting on orofacial injuries and disorders linked to playing a musical instrument. The questionnaire and an accompanying letter describing the goal of the study to potential participants was submitted for University of Minnesota IRB Approval/Exemption and successfully approved. The link to the website survey remained open for two months, and was provided to 21 directors of music programs, bands, and orchestras in Minnesota and Wisconsin, to disseminate to musicians. Questions on musical experience, primary instrument played, problems

experienced, impact on instrument play, musician dental history, and interventions were included.

Results

One hundred twenty-six musicians (60% female; 40% male) responded to the survey and successfully completed the online questionnaire. Eighty-four percent (106) were aged 18–24 (Figure 1). Eighty-seven percent (109) self-identified as student musicians, and 64% (81) reported that music was not their major. Musical instruments reported as the primary instrument played are shown in Figure 2. Ninety-two percent indicated a wind instrument as the primary instrument played. Fifty-six percent (71) of musicians reported playing their primary instrument for 5–10 years (Figure 3). Forty-one percent (51) played or practiced 5–10 hours per week (Figure 4). 60% (76) were members of a marching band, excluding guard (Figure 5). Orofacial problems reported are presented in Table I. Seventy-three percent of 92 musicians reporting orofacial dysfunction did not consult anyone about their problem, and only 11% consulted a dental professional (Figure 6). Interventions to address the

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Playing a musical instrument is an important part of a patient's dental history.

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Figure 1 – Age of Survey Participants

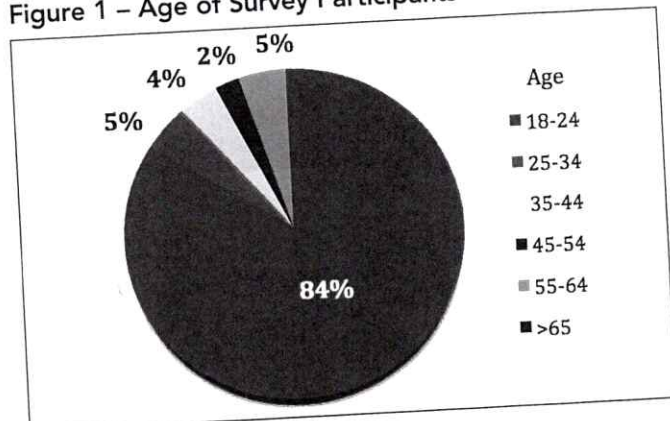


Figure 3 – Length of Time Playing Primary Instrument

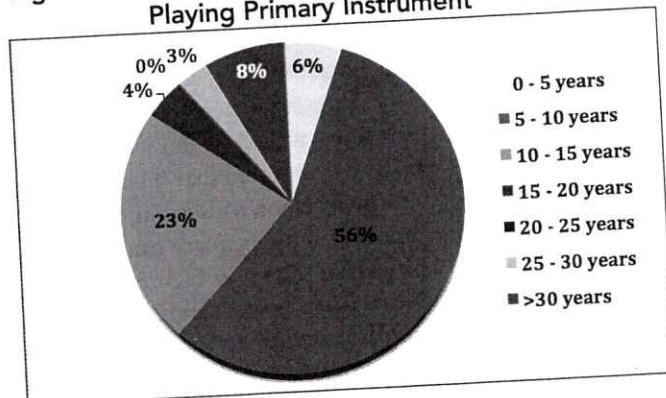


Figure 5 – Associated Music Group

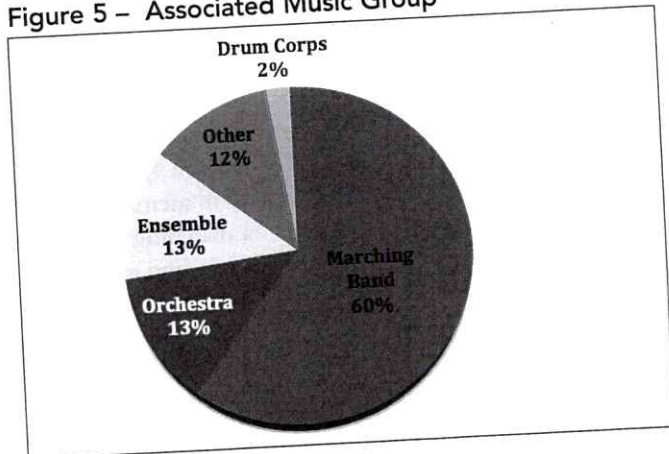


Table I. Orofacial Problem(s) Associated With Playing Instrument

Orofacial Problem	Number Reporting
Jaw Click/Popping	52
Dry Mouth	17
Cold Sores	16
Pain While Playing	11
Other	8
Restricted Mouth Opening	7
Soft Tissue Lesions	5
Chipped Teeth	4
Fiddler's Neck	4
Total	124

Figure 2 – Primary Instrument Played

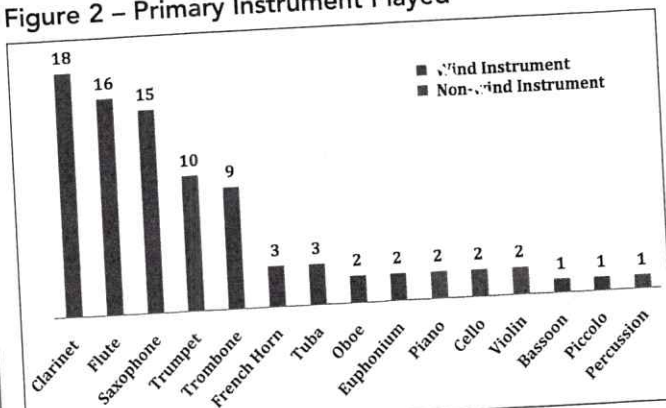


Figure 4 – Hours Per Week Playing Primary Instrument

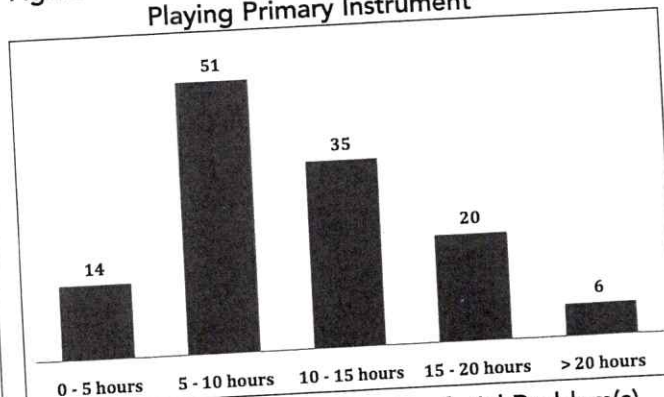


Figure 6 – Contact Regarding Orofacial Problem(s)

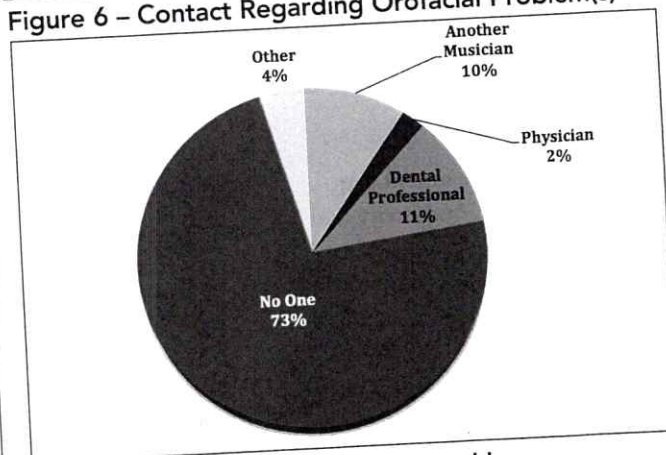


Table II – Interventions Implemented by Musician to Address Orofacial Problem(s).

Interventions	Number Reporting
None	16
Tooth Pad/Mouthguard	7
Professional Help	7
Adjust Embouchure	5
Mouth Stretches/Exercises	4
Massage	3
Mouth Rinses	3
Rest from Playing	3
Medications	2

Figure 7A – Embouchure with Wind Instrument

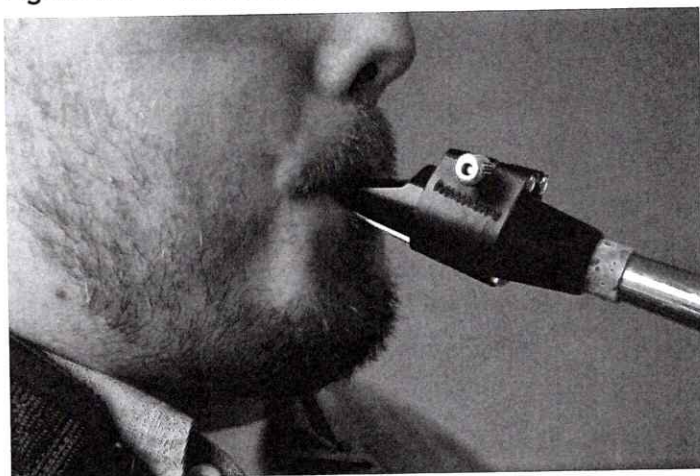
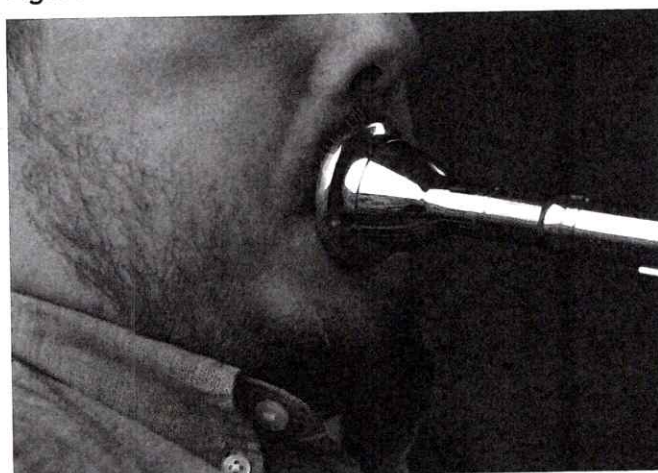


Figure 7B – Embouchure with Brass Instrument



orofacial problem ranged from mouth stretches/exercises to tooth pads and mouthguards (Table II). Ninety-one percent (114) of musicians reported regular dental visits, and 64% (81) indicated their dental provider had knowledge they played a musical instrument.

Discussion

Americans love music, whether it is passively listening or actively playing a musical instrument. A survey conducted by the Gallup organization and commissioned by the International Music Products Association found that slightly more than half of American households in 2003 had at least one person who played a musical instrument.⁵ According to Statista, in 2014 there were close to 28 million musicians in the US,⁶ with most Americans already playing an instrument before age 18. Statista for 2018 reported 10.1% of respondents in the U.S. aged 18-29 played a musical instrument, compared to 9.6% for those aged 20-49 years, and 5.8% for those 50-64.⁷ Those who play instruments regularly and over a prolonged period of time put themselves at a higher risk for developing play-related injuries. Instruments that make contact with the mouth, jaws, face, and neck especially increase the risk for orofacial

injury, dysfunction, and pathology.

Musicians playing wind instruments are the most prone to develop orofacial problems, since these instruments utilize a mouthpiece that is either placed within the player's mouth or immediately adjacent to the lips (Figures 7A and 7B). The way in which the musician adapts the mouth to a mouthpiece is known as the embouchure. This is instrument-specific and requires complex coordination of the lips, teeth, tongue, and facial muscles in order to channel air into and through the instrument.

Intimate and repetitive contact between the instrument and orofacial structures can result in orofacial problems. Another contributing factor is the force required to inject air into an instrument.

This averages around 500 grams when playing a brass instrument such as trumpet or trombone, and is higher than the average 100 grams force required to move teeth orthodontically.⁸

Wind instruments are divided into two main groups: brass instruments and woodwind instruments. Brass instruments, such as the trumpet,

trombone, and tuba, are played extraorally, with the lips and underlying incisors pressed firmly against a cup-shaped mouthpiece.⁴ Woodwind instruments are played intraorally. For single-reed instruments, such as the saxophone and clarinet, the maxillary incisors rest on the sloping upper surface of the wedge-shaped mouthpiece, while the lower lip is placed between the lower surface of the mouthpiece and the mandibular incisal edges.⁸ For double-reed instruments, such as the oboe and

bassoon, a contoured bamboo mouthpiece is placed between the upper and lower lips. The upper lips cover the incisal edges on the maxillary anterior teeth, and the lower lips cover the incisal edges of the mandibular anterior teeth.⁸ Orofacial

Another contributing factor is the force required to inject air into an instrument.

problems reported by musicians playing brass or woodwind instruments include oral soft tissue lesions such as ulcers and herpes labialis, wear or chipping of the teeth, tooth mobility, dry mouth, and temporomandibular joint disorders (TMJD).

Other musical instruments can also result in play-related orofacial

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problems. One prominent group involves musicians playing string instruments, such as the viola and violin. Problems arise due to instrument positioning, since the violin and viola involve bracing the instrument between the left shoulder and the inferior border of the mandible. The teeth are clenched in order to stabilize the mandible and prevent deviation to the right.⁸ Pressures on the mandible and clenching of adjacent musculature may result in TMJD. In addition, a condition called "Fiddler's neck" can develop. This is a skin condition on the left side of the neck below the angle of the mandible where the instrument is held. Friction and pressure on skin results in cutaneous lesions, ranging from erythema (redness) to acne-like and cystic lesions.⁸ In some cases, poor hygiene and/or hypersensitivity linked to components of the chin rest or wooden surface may be implicated.

Musician sampling was a limitation of this study and influenced the results, since play-related injuries are associated with the duration of time an instrument is played and instrument categories (e.g., wind versus string). The majority of musicians surveyed were young (18-24 years, Figure 1), student musicians in a marching band (60%, Figure 5), with a history of playing a wind instrument for less than 10 years (62%, Figure 3). Play-related pathology may not have fully developed or been evident in many of these young, healthy musicians with low durations of play. Future research, surveying a greater age span including older musicians with longer durations of play, is needed to elucidate play-related pathology and/or chronic conditions. The online nature of this self-report study is also a limitation, since it relied on participant willingness and ability to access the Qualtrics survey and candidly complete the online questionnaire.

Musician Survey

Today's Date: _____

1. What is your gender? ☐ Male ☐ Female
2. What is your age?
☐ 18-24 ☐ 25-34 ☐ 35-44 ☐ 45-54 ☐ 55-64 ☐ 65 & older
3. What is your musician level?
☐ Student Musician ☐ Professional Musician
☐ Undergraduate ☐ Band Director - Degree level: _____
☐ Graduate ☐ Doctorate

4. Are you now or did you major in music? ☐ Yes ☐ No

5. What instrument(s) do you play? _____

If you play more than one instrument, what is your *primary* instrument?

6. How long have you been playing your primary instrument? _____ years

7. On average, how many *days* per week do you play? _____ days

8. On average, how many *hours* per day do you play?

Hours per day: ☐ 0-1 ☐ 1-2 ☐ 2-3 ☐ 3-4 ☐ 4+

Hours per week: ☐ 0-5 ☐ 5-10 ☐ 10-15 ☐ 15-20 ☐ 20+

9. What music groups are you associated with? (check all that apply)

☐ Orchestra ☐ Marching Band (exclude guard, instrument only)

☐ Ensemble ☐ Drum Corps. (exclude guard, instrument only)

☐ None ☐ Other (please specify) _____

10. Have you had any trauma to your head, neck, or jaw? (Trauma: any injury to the head, neck or jaw that resulted in inability to continue playing or altered ability to play instrument) ☐ Yes ☐ No

If yes, what kind of trauma? _____

11. Do you have any of the following problems? (Check all that apply.)

☐ Clicking or popping of jaw ☐ Chipping of teeth

☐ Pain while playing ☐ Cold sores

☐ Dry mouth ☐ Fiddler's Neck

☐ Mouth opening limitations ☐ Other (please specify): _____

☐ Soft tissue lesions: _____
(ulcers/cuts etc. on gums, tongue, inside of cheeks or lips)

☐ None

12. If you checked yes for any of the above, do you believe these are associated with playing an instrument? ☐ Yes ☐ No

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Musician Survey continued

13. Do you experience any pain while playing your instrument? _____
 0 = no pain (can play as normal)
 1 = a little pain (slight discomfort while playing)
 2 = mild pain (discomfort while playing)
 3 = moderate pain (discomfort, playing is slightly limited)
 4 = moderate-severe pain (playing is limited)
 5 = severe pain (cannot play instrument)
14. If you answered yes to pain, what kind of pain?
☐ dull & achy ☐ sharp ☐ constant ☐ intermittent
15. Rate the impact of the problem on your ability to practice or perform.

 0 = no impact
 1 = little impact
 2 = moderate impact
 3 = high impact
16. Who did you contact first about your problem?
☐ Band Director ☐ Doctor
☐ Dental Professional ☐ No one
☐ Other: _____
17. What interventions did you try, if any? _____

 Did it help? ☐ YES ☐ NO
18. Do you have any devices to aid in the playing/comfort/protection of your playing?
 If so, please list. (examples: lip shields, performance dentures)

19. Do you visit the dentist regularly? (every 6 months) ☐ YES ☐ NO
20. Have you told your dentist you are a musician? ☐ YES ☐ NO
21. Have you had orthodontics? (Example: braces, space maintainers)
☐ YES ☐ NO
 If yes, did they affect your playing? ☐ YES ☐ NO
22. Did this irritate your lips, cheek, or tongue, or make them sore?
☐ YES ☐ NO

One hundred twenty-four respondents reported orofacial problems (Table I), the most frequent being popping of the jaw (42%), dry mouth (14%), and cold sores (13%). The study findings were consistent with play-related injuries reported throughout the literature for musicians playing instruments similar to those in our study.⁹ Interestingly, only 11% of the survey respondents consulted a dental professional regarding their play-related orofacial problem(s) (Figure. 6). This was in spite of the fact that 91% reported regular dental visits, and 64% reported their dentist had knowledge of their musician status. An impressive 73% of respondents not did consult anyone regarding their orofacial problem. Only thirty-four interventions in eight categories were recorded and ranged from the use of a tooth pad or mouthguard to adjusting the embouchure, and mouth stretches or exercises. Sixty-three percent of respondents reported a history of orthodontic treatment, with 55% reporting this interfered with ability to play their musical instrument. Participants were not questioned on whether they reported this to their orthodontist, or on the impact of prior dental treatment on playing ability.

Educating musicians that dental professionals are a resource for providing help with play-related orofacial problems, as well as education of dental professionals on the play-related orofacial problems faced by musicians is needed. Dental professionals are experts in the orofacial area, and in a unique position to provide valuable assistance to musicians. In addition, they must also recognize and plan for potential impact all types of dental treatment can have on a musician's ability to play. Alterations of the embouchure in musicians that play wind instruments

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can profoundly alter playing ability. This can be equally devastating for professional and amateur musicians.

Conclusions

Music directors and instructors and dental professionals can partner to help musicians prevent, detect, and treat play-related orofacial problems. The vast majority of musicians in this study with play-related oral dysfunction consulted no one, and only very a small percentage consulted a dental professional. This points to the need for an increased awareness by musicians of where to seek help for play-related problems, and for an increased awareness by dental professionals on the impact playing a musical instrument

can have on the oral cavity. Education, prevention, and early detection are key elements in managing play-related disorders for both musicians and dental professionals. ■

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SUGGESTION BOX

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