

Performance Training:

Preventing Playing-Related Injuries in Amateur Instrumentalists

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### Abstract

Concerning levels of playing-related musculoskeletal disorders (PRMDs) among student to professional instrumental musicians have been reported over the past several decades. From minor aches and pains to serious disorders threatening the capability to play, PRMDs are seemingly becoming an inevitable part of the instrumentalist's future if actions are not taken against this fate. Significant concern for the musician's physical well-being signals an urgent need for preventative training. The purpose of this research is to address the leading injury prevention strategies for amateur instrumentalists. This study examines major global research conducted in the field of performance health. The sources covered are not exhaustive, rather the focus is on select studies that address the most prominent injury-prevention strategies. This research identifies several health-risk factors associated with music performance as leading to alarming rates of injuries in performing artists. These findings indicate a lack of education received by instrumentalists on their risk of performance-related injury. Poor maintenance of physical and emotional wellness in musicians, improper body alignment while playing an instrument, and an excessive practice schedule are found to be the prominent causes of PRMDs. This research concludes that in order to reduce the prevalence of injuries among musicians, these factors must be eliminated through preventative training. At the onset of their playing, musicians need to be informed of healthy performance habits that include physical fitness, ergonomic playing postures, and a balanced practice schedule. Future research must target the role of the music teacher in implementing these strategies into the music classroom in order to reduce the risk of PRMDs and allow all instrumentalists from now on the opportunity to sustain a lifelong future in the arts without the limitations of pain.

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### Performance Training:

#### Preventing Playing-Related Injuries in Amateur Instrumentalists

“No pain, no gain.” This notion that progress is made through pain-staking practice silently plagues driven musicians of all backgrounds. Research over the past three decades indicates that the prevalence of musicians encountering playing-related musculoskeletal disorders (PRMDs) is exceedingly common (Jacukowicz, 2016, p. 658). Injury rates reported among childhood learners to professional adult musicians are alarmingly high, as great as 67- 84% of instrumentalists (Wijsman & Ackermann, 2019, p. 870). Without proper injury prevention awareness it is unlikely an artist will surpass pain or injury in his or her career (Horvath, 2014, p. 26), but through the application of several preventative strategies playing can be pain-free. This research aims to shine light on the best practices for preventing playing related injuries in amateur instrumentalists. Through health education, physical wellness, proper body alignment, and a balanced practice schedule musicians can embark on a life-long career playing without pain.

#### **Playing-Related Musculoskeletal Disorders**

The most common playing-related health problems for musicians are musculoskeletal (Ajidahun, Myezwa, Mudzi, & Wood, 2019, p. 8). Playing-related musculoskeletal disorders (PRMDs) are described as “any pain, weakness, numbness, tingling or other symptom that interfere with the ability to play your instrument at the level you are accustomed,” and include symptoms ranging from “minor pain, burning or muscle tiredness up to serious disorders and chronic, severe pain debilitating the capability to play” (Jacukowicz, 2016, p. 658).

Among other risk factors, musicians are particularly susceptible to PRMD’s due to the

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physical demands of playing an instrument. The type of pain experienced and the area of the body most affected is oftentimes specific to the instrument being played. Each instrument demands something different of its player based on how it is held, how sound is produced, and the type of musical passages typically played. For example, violinists and violists most often experience shoulder injuries because when holding a violin or viola the arms are in an unnatural position away from the body, at or above shoulder level, and are required to extend in a back and forth motion to glide the bow across the strings while holding this position (Chan & Ackermann, 2014, p. 1). On the other hand, brass players commonly suffer from orofacial and embouchure problems because of the pressure put on their facial muscles to buzz through their mouthpiece (Chan & Ackermann, 2014, p. 1). That being said, across all instrument families it is the upper extremities and trunk that musicians most often injure (Ajidahun et al., 2019, p. 8).

Despite the increased risks musicians face and the prevalence of PRMDs among them today, playing-related pain is not an inevitable part of an instrumentalist's future. With the right efforts taken toward a healthy career, musicians can exceed these expectations.

### **Health Education**

First and foremost, performance health and wellness literacy needs to be integrated into a musician's education from the beginning. Most musicians lack the proper awareness and understanding of their heightened risk of injury, nonetheless the knowledge of pain prevention strategies. Due to this foundation of ignorance, "the seeds for health problems encountered by adult musicians are sown early in their lives" (Wijsman & Ackermann, 2019, p. 870). It begins with the instrumentalist's lack of understanding of injury causes, leading to the development of poor habits, and resulting in varying degrees of performance pain. From there, musicians may

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seek unreliable sources for health advice, therefore inadequately managing their injury and potentially putting themselves at risk of increasing their pain (Chan & Ackermann, 2014, p. 3).

Without addressing the source of the problem, this cycle will never cease to exist. The ideal time to attend to the prevention of musicians' injuries is at the beginning of their musical training.

This will ensure that appropriate performance techniques and postural habits, a positive attitude, and a healthy lifestyle will be the foundation of their playing (Pierce, 2012, p. 163). By starting here, performance wellness becomes a regular aspect of playing an instrument, and musicians are allowed the opportunity to develop these skills and competencies over a lifetime, rather than seeking this understanding partially through their established career in a desperate plea for pain relief (Wijsman & Ackermann, 2019, p. 872).

### **The Role of the Music Teacher**

Most beginning instrumentalists learn how to play their instrument while in school. Thus, the music teacher plays a vital role in establishing his or her students' performance health and wellness into the future. According to the National Association of Schools of Music (NASM), it is the responsibility of these institutions to "assist students to acquire knowledge from qualified professionals and authoritative medical sources regarding the maintenance of professional health and the prevention of performance injuries" (Guptill & Zaza, 2010, p. 28). During a musician's training, students should receive wellness information with applicable materials introduced at the appropriate levels and reinforced based on learning goals set throughout the educational process (Pierce, 2012, p. 169).

Although prevention education programs are not widely available, several have been developed and implemented in the classroom. For instance, in 2014 the National Association of

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Schools of Music (NASM) partnered with the Performing Arts Medicine Association (PAMA) to advocate for the importance of musicians taking steps to protect their neuromusculoskeletal health (p. I-15). Together they developed a set of advisory documents on neuromusculoskeletal and vocal health for musicians, designed for the purpose of institutions to use as a practical approach for promoting performance wellness in their schools. These papers provide a necessary guide for the uninformed teacher of how to educate his or her students on a topic he or she most likely has never learned.

To address today's music teachers' lack of health education, it is recommended that a performance wellness program be integrated at the college-level as an essential component of the musician's training (Montello, 2010, p. 110). In 2001, the Performance Wellness Seminar was developed as a collegiate course offering "musicians, music students, and educators a clinically proven systematic approach to diagnosing, treating, and preventing performance-related disorders" (Montello, 2010, p. 110). Through topics such as breath awareness, joint and gland exercises, relaxation techniques, and numerous approaches used in music therapy, by the end of the course musicians were well-versed in methods to prevent themselves and their future students from playing-related injuries (Montello, 2010, pp. 111-113). The idea behind this is that as more teachers become trained in wellness in the earlier stages of their musicianship, music students will view wellness as a natural part of their education, and wellness and injury prevention training will be an expected part of their curriculum (Pierce, 2012, p. 169).

### **Physical Wellness**

A healthy body is the basis of a healthy musician. Just as important as taking care of the musician's instrument, is taking care of the musician's body. Since the act of simply playing an

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instrument already puts the musician at a higher risk of injury, it is crucial to establish a solid foundation of a healthy body before playing can be safely introduced. There are many elements that make up physical wellness. These include getting adequate sleep, eating a nutritious diet, exercising regularly, socializing with family and friends, refraining from hazardous or recreational drug use, and maintaining positive mental health (NASM-PAMA, 2014, p. I-15). If one of these elements is missing, it can have profound effects on the body, let alone put the musician at a greater risk of injuring him or herself.

### **Exercise**

In many ways, a musician is like an athlete. Just as an athlete needs to continually condition his body to handle the demands of his sport, so does a musician. It is extremely important for instrumentalists to maintain regular physical activity (Loria, 2016, p. 31). Although any movement is better than none, there are specific exercises a musician should target to achieve and maintain optimal performance. Weekly participation in cardiovascular fitness and resistance training is an important element in leading a long, healthy career as a performing artist (Chan & Ackermann, 2014, p. 5). Recommended cardiovascular fitness exercises include “brisk walking, cycling at an easy pace, swimming leisurely, or jogging,” while resistance training exercises consist of shoulder rotators, low back and hip extensions, leg presses, squats, lunges, and pushups (Chan & Ackermann, 2014, p. 6). These exercises, completed over a period of time, can reduce musculoskeletal problems and perceived exertion in instrumentalists (Ajidahun et al., 2019, pp. 21-23). By targeting the muscles that support instrumental playing demands, regular physical exercise can aid in the prevention of PRMD’s (Chan & Ackermann, 2014, p. 7).

### **Stretching**

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Incorporating stretching exercises within the musician's fitness program can also reduce the risk of musculoskeletal injury (Ajdahun & Phillips, 2013, p. 2074). In one study, simple stretches to the muscles in the shoulder and forearms during breaks in practice greatly reduced discomfort and exertion among string instrumentalists (Ajdahun et al., 2019, p. 23). The most beneficial stretches are ones that adopt different postures from those used in playing (Guptill & Zaza, 2010, pp. 29-30). For a pianist, standing, lifting the head and chin, and extending backward, along with lengthening the wrists and fingers is a way to relieve the stress put on the muscles held in playing position (Guptill & Zaza, 2010, p. 30). When stretching, the safest approach is slow and gentle movements that relieve pain, not add to it (Guptill & Zaza, 2010, p. 29). It is important to note that it is not how far the muscle stretches that counts, it is the duration of time the stretch is held for. Therefore, stretching should not be forceful, rather it should be relaxed and purposeful (Guptill & Zaza, 2010, p. 30).

### **Warm-ups and Cool-downs**

With the knowledge of how to stretch and condition the body outside of rehearsal, musicians should apply these exercises toward preparing the body before and after practice through warm-ups and cool-downs. Muscles that are warmed-up are more efficient, strong, and resilient, while overused, fatigued, and under-conditioned muscles are tense and demand more work for the completion of a task (Horvath, 2014, p. 29). Musicians should be provided with enough time to physically and mentally warm-up before playing. Especially if practice is to be done in a cold environment, time to warm-up the hands and instrument is necessary for injury prevention (Guptill & Zaza, 2010, p. 29). Warm-ups to the whole body, not only the common affected areas of PRMDs, should be completed over the duration of five to fifteen minutes prior

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to rehearsal (Ajidahun & Phillips, 2013, p. 2074). In this time, the muscles and joints should be mobilized to increase blood flow throughout the body and prepare them for the physical demands of playing (NASM-PAMA, 2014, p. I-15). Warm-up exercises can consist of various stretches, deep-breathing techniques, and slow, comfortable playing, such as long tones and moderately paced scales and arpeggios (Guptill & Zaza, 2010, p. 29). It is standard practice for the cool down exercises after playing to directly reflect that of the warm-ups.

### **Nutritional needs**

Outside of various performance exercises, another integral element of physical wellness is nutrition. Due to the physicality of playing an instrument and the long hours dedicated toward it, it is likely that a musician's nutritional needs are above that of the average person, therefore proper nutritional education can help prevent PRMD's (Chan & Ackermann, 2014, p. 4). Eating a healthy, well-balanced diet is of utmost importance, but taking additional efforts toward fulfilling nutritional needs specific to the musician can be helpful, as well. Musicians also need to be aware of their water intake. Even a slight case of dehydration can affect cognitive and physical functioning, leading to "tiredness, muscular weakness, dry and sticky mouth and tongue, headaches, dizziness or lightheadedness" (Chan & Ackermann, 2014, p. 4). This weakened state makes the instrumentalist prone to greater risk of injury, so it is vital that the musician stays hydrated throughout the day, and especially while playing.

### **Stress Management**

It is not enough for the musician to solely be physically fit; he or she should be psychologically fit, as well. Injuries are much less likely for the instrumentalist who manages stress and allows for relaxation (NASM-PAMA, 2014, p. I-15). Stressors can come from many

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areas of one's life, both related to playing and not. There are psychological stressors that plague the mind, and physical stressors that create tension in the body. However, stress is a part of everyday living, therefore it needs to be regularly attended to. When stress is brought into the practice room, whether mentally or physically, it heightens the musician's risk of injury.

Relaxation from stress is an essential aspect of preventing PRMDs.

### **Tension and Relaxation**

Stress management begins with a release of built-up tension. When the mind is tense, the body is tense, and vice-versa (Cornett-Murtada, 2012, p. 16). The existence of undue tension can lead to long-term pain and injury (Guptill & Zaza, 2010, p. 31). In order to avoid unnecessary tension, "stability, control and correct technique should be prioritized," no matter what level the player is at (Lonsdale & Laakso, 2014, p. 75). The existence of good technique not only reinforces safe practice habits, but it reduces the amount of repetition and time spent learning new passages, and allows the musician to perform more comfortably, bringing less tension into the rehearsal (Guptill & Zaza, 2010, p. 31). Additionally, physical fitness should be reinforced to reduce tension from building up in the muscles. Tight, weak, and untuned muscles, compared to strong, flexible, and resilient muscles are more prone to injury (Horvath, 2014, p. 29). Activities such as yoga, stretching, swimming, Alexander Technique, and massages are helpful in relaxing muscle tension (Horvath, 2014, p. 29).

When working to relax the muscles, it is important to recognize that relaxation does not mean letting the muscles naturally collapse. This results in "flimsy fingers or floppy hands, a lack of wrist and elbow support or an overall weak technical approach" (Wan, 2016, p. 8). Inevitably, some degree of tension in the muscles is required in order to simply hold the instrument up. An

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effective approach to relaxation comes with the knowledge and awareness of which muscles should be firing while others are relaxing in any particular movement (Wan, 2016, p. 8).

Unnatural tension causes discomfort and pain in the body, but when the right muscles are contracting, the tension resulting is not a technical barrier (Wan, 2016, p. 8).

In her article “What Relaxation Means for Musicians,” Agnes Wan discusses a number of factors that determine the degree of muscular relaxation experienced by music students. She begins by saying that in order to eliminate or reduce tension, one must first be aware of it, not only in the areas of the body most affected by playing, but throughout every part, seeing that tension can manifest itself anywhere. While taking breaks during a practice session, musicians should recognize where they hold their tension, whether it be hiking their shoulders up or clenching their jaw, and take this time to return back to a relaxed position (Guptill & Zaza, 2010, p. 31). According to Wan, progressive muscle relaxation techniques can help musicians raise their bodily awareness and learn to keep their muscles in a relaxed state for a longer time period. Effective breathing techniques are another way to relax the body. Nervousness can lead to shallow breathing, or lack thereof, restricting the muscles from getting the oxygen they need (Horvath, 2014, p. 29). Breathing deeply works to calm the muscles, among providing the body and mind with a multitude of other benefits.

Yet, despite these efforts taken to promote relaxation, Wan recognizes that the musician inevitably has to deal with a degree of unavoidable tension due to the technical and physical demands of his or her instrument. Rather than trying to fight it all off at once, which can bring forth more tension than beginning with, it is about gradually reducing unnecessary tension and moving toward relaxation one step at a time. Therefore, during times of heightened stress, it is

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recommended to take more breaks, increase warm-up time, do more stretches, and practice more mindfully, rather than overworking the body while it is down (Horvath, 2014, p. 29).

Nonetheless, even with inevitable tension present, musicians can take steps toward playing with a healthy, relaxed physical disposition, enough to yield the onset of PRMDs.

### **Proper Body Alignment**

A critical step in not only reducing physical tension, but lowering the likelihood of performance pain and injuries is proper body alignment. Due to the shape and weight of the instrument and technical difficulty of the music, instrumentalists develop awkward body positions to simply perform their craft (Guptill & Zaza, 2010, p. 29). This misalignment, however, disrupts the natural balance of weight, causing the muscles to work harder and produce greater tension to support the body from collapsing (Wan, 2016, p. 10). On the other hand, when the body is aligned, the bones can support the weight of the muscles, and without muscular discomfort, stiffness, or pain, minimal effort is required to hold the body up (Wan, 2016, p. 10). As this is the ideal posture, musicians should strive for proper body alignment and technique in both seated and standing positions. Although it is hardly possible to maintain a fully neutral position with the demands every instrument asks of the body, it is feasible to avoid superfluous postures and exaggerated positions while playing (Lonsdale & Laakso, 2014, p. 74). Allowing the body to move freely during practice, providing adequate postural support, and being mindful of balance and weight delivery are all ways to combat the effects of misalignment and reduce the risk of PRMDs (NASM-PAMA, 2014, p. I-15).

### **Posture**

Proper body alignment is a result of proper posture. Poor posture stresses the muscles,

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ligaments, and joints, resulting in physical pain (Lonsdale & Laakso, 2014, p. 74). While playing an instrument, higher levels of muscle activation are required to support the musician and compensate for reduced balance and control, and adding improper posture on top of this increases the stress of neuromusculoskeletal structures and can lead to muscle fatigue and tension, increasing the risk of developing PRMD's (Chan & Ackermann, 2014, p. 7). Therefore, musicians need to constantly be aware of the postures they are holding to ensure they are ones that will help the body perform most efficiently.

It should be known that correct posture does not necessarily mean sitting or standing up “straight,” as this may unknowingly lead to overextending the spine and back muscles or pulling the chest upward, which can result in more stiffness (Wan, 2016, p. 10). Rather, upright posture should be thought of as allowing the joints to relax and letting the bones support the muscles (Wan, 2016, p. 10). This allows “supportive muscles to sustain efficient static or dynamic movements and stability of the joints during performance actions” (Chan & Ackermann, 2014, p. 7). Altogether, proper posture provides a strong, stable foundation in which playing an instrument can be introduced in a way that supports the natural alignment of the body without compensating for the added pressures of the instrument. In this case, the instrument is brought to the body, rather than bringing the body to the instrument.

Healthy posture is also directly related to healthy breathing. Wind instrumentalists are aware that in order to achieve full volume and a pure quality of sound, they need to have adequate breath support. This support comes from an appropriate posture that allows the ribcage to fully and freely expand. Slouched postures increase respiratory effort, as well as considerably decrease breathing capacity and control (Chan & Ackermann, 2014, p. 7). Not only does this

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negatively impact breathing, but it increases tension in the abdominal muscles. To avoid unnecessary tension and allow for full breath support, musicians need to maintain postural alignment.

When working to achieve a balanced posture, it is important to always consider the particular anatomy of the student and make adjustments off the individual. Based on unique characteristics such as height, weight, bone structure, and instrument, proper body alignment will look slightly different for everyone. It is encouraged to work with the individual to find the particular posture that works best for him or her.

That being said, there are several overarching components that yield postural alignment. All instrumentalists should aim for neutral or natural positions (Horvath, 2014, p. 27). This takes an awareness of the natural curves of the spine and working to maintain these curves when sitting or standing (Guptill & Zaza, 2010, p. 30). In general, the “head, thorax and pelvis should always be arranged in the body’s longitudinal axis as this results in a natural flexion of the spine,” and protects the musculoskeletal system from the stress of holding instrument-specific postures (Ohlendorf, Wanke, Filmann, Groneberg, & Gerber, 2017, p. 2). Additionally, all joints should be softened, balanced, and naturally curved when possible. Maintaining these elements of posture while playing will safely align the body into a healthy playing position.

### **Alexander Technique**

For support in achieving individualized proper body alignment, musicians may benefit from the Alexander Technique. The Alexander Technique (AT) is “an educational method that addresses how we coordinate our whole selves in activity” (p. 78), for the purpose of bringing “conscious awareness to habitual patterns of movement that were previously unconscious”

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(Wolf, Thurmer, Berg, Cook, Smart, 2017, p. 81). It is centered around creating efficiency in the work environment, called ergonomics. When AT concepts are incorporated into practice, playing tension can be reduced, lowering the risk of injury, and improving performance quality (Wolf et al., 2017, p. 78).

### **Tension-Free Set-Up**

Altogether, these principles can be applied to creating a practice environment free of tension, the foundation of safely playing an instrument. Along with proper postural alignment comes proper seating position. Musicians spend most of their rehearsal time in chairs, which can have a profound effect on their posture. Ideally, the musician deserves to spend his or her time in a good chair that promotes optimal body alignment. Characteristics of favorable chairs include a seat that is relatively flat and lightly padded, as well as a supportive backrest (Guptill & Zaza, 2010, p. 31). Accommodations can be made to inadequate chairs by using seat cushions and footstools to satisfy individual seating preferences.

In a seated position, musicians should sit tall and evenly distribute their body weight through their buttocks, legs, and feet (Guptill & Zaza, 2010, p. 31). They should be sitting far enough forward on the seat so that their feet comfortably rest flat on the floor. Crossing the legs or curling the feet under or around the chair should be avoided while playing (Horvath, 2014, p. 29). Additionally, their music stand should be at eye level to encourage a tall posture, allow for a neutral head position, and avoid neck strain (Horvath, 2014, p. 27). This correct stand height should not only be implemented while sitting, but musicians should also raise their music stands while practicing standing.

In order to comfortably support proper seating posture, it is the responsibility of the

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ensemble director to avoid seating and visibility issues within the ensemble (NASM-PAMA, 2014, p. II-18). Oftentimes, an instrumentalist's posture is compromised in rehearsal due to a crowded set-up. Adequate space should be provided between ensemble seating to allow for optimal playing positions (Lonsdale & Laakso, 2014, p. 76).

### **Ergonomic instrument modifications**

Sometimes it is not only the rehearsal set-up that restricts the instrumentalist, but also the instrument set-up. Rather than adjusting the body to fit the instrument, the instrument can be adjusted to fit the needs of the player. String instruments are available in many different sizes, and can be modified with various types of chin and shoulder rests. Although most wind instruments only come in "one size fits all," modifications can be added for these instruments, as well. Tools such as key extensions, neck straps, and thumb rests are just a few of the many resources available for musicians to tailor their instrument to their needs. A personalized set-up is not only more comfortable for the player, but it reduces the strain of the physical demands put on the instrumentalist, making it effective in injury reduction.

### **Balanced Practice Schedule**

Since the musician spends most of his or her musical career in the practice room, it is imperative to discuss healthy practice habits. If these endless hours dedicated toward perfecting their craft is not done so with utmost care, musicians substantially increase their risk of developing PRMDs, potentially ending their journey as an instrumentalist altogether. To avoid this fate, there are several guidelines musicians should follow when safely determining their practice schedule.

### **Avoid Excessive Practicing**

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For starters, musicians need to monitor their practice by setting limits on the amount of time spent playing daily. This will vary by instrumentalist, for the duration of time spent practicing should be tailored to the individual, as there is no standardized schedule common for every player (Lonsdale & Laasko, 2014, p. 76). As a reminder, the quality of practice is more beneficial than the quantity of time practiced. Therefore, a rapid increase in playing hours can do more harm than help by predisposing musicians to injury (Guptill & Zaza, 2010, p. 29). Rather than dramatically raising the time spent in a practice room, musicians are encouraged to gradually increase their time in smaller increments of ten to twenty minutes (Guptill & Zaza, 2010, p. 31). It is also helpful to distribute one's practice schedule throughout the day, instead of in one long session. This allows the body adequate rest and recovery time and supports better skill refinement and consolidation (Chan & Ackermann, 2014, p. 3).

It is also important for musicians to carefully plan their practice schedule around their rehearsals and performances to monitor their full load. When there is a higher number of playing requirements outside of individual practice, instrumentalists need to reduce the amount of time spent practicing, as opposed to after periods of minimal playing, it is just as necessary for musicians to increase their practice time to prepare the body for a return in workload (Chan & Ackermann, 2014, pp. 3-4).

While in the practice room, if possible, the musician should avoid repertoire that is beyond his or her physical or technical reach, as this greatens the muscular strain on the body (NASM-PAMA, 2014, p. I-15). If playing challenging or high intensity music is unavoidable, it should be practiced for shorter durations of time with easier repertoire in between to prevent

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muscle fatigue (Chan & Ackermann, 2014, p. 3). When approaching practicing difficult music, one should slowly play a few bars or phrases at a time until accurate, avoiding excessive repetition, and then work to gradually increase the tempo without sacrificing the integrity of the sound and technique (Guptill & Zaza, 2010, p. 31). Not only is this practice method safer on the body, but it is an effective technique for learning new repertoire, as well.

### **Move**

Another way to guard the body against injury is adding movement to one's playing. Oftentimes, instrumentalists, especially amateurs, tend to play sitting very still. Holding a static posture for long hours builds up tension and should be refrained from (Horvath, 2014, p. 29). Students should be encouraged to move with the music as far as their instrument allows (Guptill & Zaza, 2010, p. 30). If anything, at least pausing during long practice sessions to move, shake out built-up tension, and stretch can help reduce the effects of static posture. Allowing for fluidity of motion is good for the body, especially with how restraining playing can be.

### **Take Breaks**

To combat the muscular strain of practice, it is vital that musicians take breaks throughout rehearsing. Instrument-playing puts the body at an elevated state of physical stress, which is damaging to musculoskeletal structures, and can lead to the breakdown of tissues, causing injury if adequate rest is not taken (Chan & Ackermann, 2014, p. 4). Frequently and regularly taking time to pause from practicing assists in “reducing the constant strain and load bearing on the joints, as well as allowing recovery of supporting musculature and fine-control muscles of the fingers and lips” (Chan & Ackermann, 2014, p. 4).

To reap these benefits, musicians should incorporate both short and long breaks into their

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practice routine (Guptill & Zaza, 2010, p. 30). Short breaks in playing are not meant to be longer than thirty seconds. It is a quick way to reset the body and briefly release sustained muscle tension. These breaks can be as simple as counting rests when practicing a piece with accompaniment, but the advantages are great in preventing injuries and increasing perceived stamina (Guptill & Zaza, 2010, p. 30). In addition to these brief pauses, it is a good guide to take a longer break of about ten minutes for every hour of practicing (Horvath, 2014, p. 29). During this time, the musician should change position, stretch out, and do an activity which does not incorporate the muscles and postures used while playing (Guptill & Zaza, 2010, p. 30). Although this time does not need to be spent forgetting about music, it should not involve fingering parts, since this does not give the muscles in the fingers, hands, arms, and body a break from holding these postures (Guptill & Zaza, 2010, p. 30).

Breaks from playing not only apply to individual practice sessions, but also to ensemble rehearsals. Directors should provide their students with breaks during rehearsals exceeding the duration of an hour (NASM-PAMA, 2014, p. II-18). These breaks can come in several different forms, many in which do not need to disrupt the educational process. As long as the musicians are receiving an adequate pause from playing, it is up to the ensemble director's discretion to determine what that time consists of.

### **Practice Away from the Instrument**

One method of pausing from practice without deterring the performer's musical focus is through mental practicing. Mental practicing is defined as "a technique by which someone with the intent to practice creates a mental representation of a preconceived idea or action in order to enhance performance" (p. 275) through approaches such as "conducting a formal analysis of the

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score, listening to a recording of the piece, forming auditory imagery of the pitches, imagining movement (visually and/or kinesthetically) and using visual imagery of the score” (Bernardi, Schories, Jabusch, Colombo, & Altenmüller, 2013, p. 276).

These ways of cognitive practicing not only put no harm or strain on the body, but they are especially helpful for memorization and performance anxiety (Horvath, 2014, p. 29).

Research indicates that imagining a successful performance helps increase the musician’s self efficacy and often improves his or her performance outcome (Guptill & Zaza, 2010, p. 31).

Taking the time to mentally prepare the repertoire, while silencing any doubts and fears, can calm the subconscious and help the musician prepare for a performance in a way physical playing cannot achieve. It is a safe and productive strategy to protect the body from injuries caused by over practicing.

### **Conclusion**

When it comes down to it, the pursuit of performance injury prevention strategies is truly a search for lifelong musical enjoyment. Music has the power to change lives, and the thought that this capability could be taken away through pain and injury does not sit well with instrumentalists. PRMDs have plagued dedicated musicians for too long. But through health education, physical wellness, proper body alignment, and a balanced practice schedule, this no longer has to be the case. The future of the healthy musician is in the hands of music teachers. The only way this problem can be reversed is to start at the beginning with amateur instrumentalists. When performing artists are informed of ways to sustain a happy and healthy career from the onset of their playing, they are empowered with a bright future ahead, guarded against the agony of pain and filled with the joy of music. Only then can musicians truly know

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gain with no pain.

### **Implications for Further Research**

The past three decades have seen an emergence in research regarding the prevalence of playing-related pain in instrumentalists. While there is an abundance of information promoting awareness to this issue, there is less knowledge available concerning evidence-based practices preventing the development of PRMDs. As a continuation of this research, further studies should be generated investigating a practical and specific approach to integrating pain-prevention methods into the music classroom. This paper introduced an overarching review of the necessary elements of injury reduction for amateur instrumentalists. From here, a more detailed breakdown of each aspect on what this specifically looks like for the music teacher is warranted. Topics such as a thorough design for a health education program in the classroom, definitive stretches to be done before and after rehearsal, an instrument-specific postural analysis, and a medically-driven practice schedule should be explored into the future. Once this research is further developed and implemented, a reduction in playing-related injuries should result.

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