Musician Health and Safety

Preventing Playing-Related Musculoskeletal Disorders

by Irina Foxman, MS, RN, ANP, and Barbara J. Burgel, MS, RN, COHN-S, FAAN

Due to the high physical and psychological demands of their work, musicians are at risk for developing a variety of health problems. They are often exposed to environmental hazards such as tobacco, noise, and alcohol. Those who sing may have vocal problems, those who play wind or brass instruments can have dental stress, those who play brass instruments may have increased intraocular pressure, and those who play string instruments can have skin dermatitis (Gambichler, Boms, & Freitag, 2004). Musicians may experience performance anxiety, tinnitus and noise-induced hearing loss (Hagberg, Thiringer, & Brandstrom, 2005), and fatigue and circadian rhythm disruption from altered sleep cycles. Playing-related musculoskeletal disorders arise from repetitive, awkward postures while playing, and postural stress from prolonged sitting or standing and transporting instruments, music stands, microphones, speakers, and other equipment. Some musicians actually accept musculoskeletal pain as a normal and necessary side effect of practice and musical improvement (Markison, Johnson, & Kasdan, 1998).

In 2003, a pilot project exploring occupational health concerns of musicians was implemented in a university–community agency partnership. Goals of the project included the evaluation, treatment, and ongoing education of the uninsured musician community. Musicians who volunteered were assessed and treated, primarily for musculoskeletal health complaints, in a university grant-funded occupational health clinic.

This article reviews the literature documenting playing-related musculoskeletal disorders of musicians. It also describes the health and safety educational outreach and clinical services provided to a small group of musicians. The clinical findings of 10 musicians are summarized, focusing on playing-related musculoskeletal disorders. Tendon gliding exercises and other preventive measures used in the educational intervention are summarized for use by occupational health nurses.

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INDUSTRY PROFILE

According to the Bureau of Labor Statistics (2005), musicians, singers, and related workers held approximately 249,000 jobs in 2004, with 40% working part-time and almost half self-employed. Many of these jobs are in New York, Los Angeles, and Nashville, where entertainment and recording activities are concentrated. In 2004, median hourly earnings of musicians and singers were $17.85, ranging from $12.17 an hour in religious organizations to $20.70 an hour in performing arts companies (Bureau of Labor Statistics, 2005).

Musicians, singers, and related workers are employed in a variety of settings. Approximately 66% of those who earn a wage or salary are employed by religious organizations (Bureau of Labor Statistics, 2005). Classical musicians may perform with professional orchestras or in small chamber music groups. Musicians may work in opera, musical theater, and ballet productions. They also perform in nightclubs and restaurants and at weddings and other events. The U.S. military offers careers in bands and smaller musical groups. Musicians generally perform at night and on weekends and spend extensive time practicing and rehearsing. Performances often require travel. Many musicians supplement their incomes with other types of jobs.

RISK FACTORS FOR AND PREVENTION OF PLAYING-RELATED MUSCULOSKELETAL DISORDERS

The repetition, hours of exposure, and awkward postures associated with playing instruments often result in playing-related musculoskeletal disorders (Toledo et al., 2004). Because most musicians earn less than $20,000 per year, they often hold other jobs that can exacerbate playing-related musculoskeletal disorders or cause disability (Zaza & Farewell, 1997). Playing-related musculoskeletal disorders can be painful and disabling, leading to financial hardships for musicians. Because most musicians work part-time, have intermittent periods of

unemployment, or are self-employed, they lack health coverage and are underserved in primary care (Bureau of Labor Statistics, 2005). Thus, early access to care, adequate follow-up, and comprehensive treatment for health problems may not be possible. Untreated or incompletely treated conditions can lead to social and psychological stress, the inability to play music, permanent disability, and the inability to earn an income.

An estimated 65% of professional musicians experience overuse injuries (Hoppmann & Patrone, 1989). Prevalence rates ranged from 26% to 93% in a recent systematic review of playing-related musculoskeletal disorders in pianists; however, the authors identified research design limitations (e.g., a lack of consistent case definitions of playing-related musculoskeletal disorders) in the 12 studies reviewed (Bragge, Bialocerkowski, & McMeeken, 2006). The prevalence of playing-related musculoskeletal disorders was 43% in professional adult musicians and 17% in adolescent music students in one review (Zaza, 1998). In a cohort study of music students, 4.4 cases of neck pain and 4.6 cases of left shoulder pain per 1,000 years of instrumental practice were calculated (Hagberg, Thiringer, & Brandstrom, 2005).

Three major classes of performance-related problems are observed in instrumentalists: musculoskeletal overuse (more than 50% of all problems), nerve entrapment or thoracic outlet syndrome (20% of all problems), and focal dystonia, which can be disabling and is defined as an involuntary motor movement or occupational cramp limited to an activity such as playing an instrument (10% of all problems) (Hoppmann & Reid, 1995). Pain is the major symptom of overuse among instrumentalists, and string players are most commonly affected (Hoppmann & Reid, 1995). Music students playing the violin or viola had a fourfold increase in right forearm pain and twice the risk for neck pain, right shoulder pain, and left forearm pain compared with pianists (Hagberg, Thiringer, & Brandstrom, 2005). Percussionists were found to be the least affected by playing-related musculoskeletal disorders (Hoppmann, 2001). Most musicians report symptoms lasting more than 1 year and many report symptoms lasting more than 5 years. Approximately 50% of overuse cases involve the hands and wrists (Fry, 1987). The piano, guitar, and harp are associated with high rates of playing-related musculoskeletal disorders (Hoppmann, 2001). Wrist postures during piano playing include more bilateral ulnar deviation than those during the playing of other instruments (Sugawara, 1999). In a study describing median and ulnar neuropathies among 24 guitarists, 4 had nerve conduction evidence of median nerve compression (carpal tunnel syndrome) (Kennedy et al., 2006).

Playing-related musculoskeletal disorders are caused by many factors involved in the interface between instruments and musicians (Winspur, 2003). Intrinsic risk factors for playing-related musculoskeletal disorders include the musician's size, strength, muscle tone, and flexibility and the presence of an underlying disease (Markison, 1990; Markison, Johnson, & Kasdan, 1998). Physical conditioning is not emphasized in schools and conservatories. Music students often spend more hours practicing than athletes and forego conditioning and rest intervals (Pascarelli, 1999).

Extrinsic factors include musician technique and playing environment. Technique involves the way the instrument is held, the force used to play, and the frequency of awkward and static or dynamic loading postures (Ackermann & Adams, 2004; Zaza & Farewell, 1997). A neutral working posture is recommended for musicians (Pascarelli, 1999). However, most musical instruments require awkward postures that may be difficult to minimize (Markison, 1990). Static load is prolonged muscle contraction and stress across a joint and supporting soft tissue and bony structures. It occurs when an instrument or upper extremity is held in a relatively fixed position. In contrast, dynamic load is the force on the muscles, joints, and supporting structures occurring with movement. An optimum balance needs to exist between static and dynamic loads, with the overall goal of reducing static load and increasing dynamic load to joints and associated structures while playing (Hoppmann, 2001).

Playing environment includes the organization of the practice and break schedule. An abrupt increase in practice time is the most important risk factor for playing-related musculoskeletal disorders (Hoppmann, 2001). Music students who practiced more than 20 hours per week were found to have a higher incidence of playing-related musculoskeletal disorders (Hagberg, Thiringer, & Brandstrom, 2005). All of the violin and viola players with playing-related musculoskeletal disorders in a small study had played for 10 years or more and practiced an average of 3 hours per day (Ackermann & Adams, 2004). Risk factors perceived by these string players and their health care providers included awkward playing postures, flaws in technique, and the manner in which they practiced (Ackermann & Adams, 2004). The type of music selected for practice or performance and a second job, an additional instrument, or a hobby may increase the risk of playing-related musculoskeletal disorders (Markison, Johnson, & Kasdan, 1998). Neck, back, and trunk pain may result from prolonged carrying of heavy instruments, adverse performance conditions (e.g., cramped quarters or poorly designed chairs), and improperly placed music stands (Markison, Johnson, & Kasdan, 1998).

Primary prevention of playing-related musculoskeletal disorders, through identification of intrinsic and extrinsic risk factors, should be initiated at the beginning of music education. The interface between musicians and their instruments is the focus of ergonomic and biomechanical training (Pascarelli, 1999). Ergonomics studies how equipment can be fitted to users to promote efficiency and reduce injury. Biomechanics studies how the body interacts with machines or equipment. Neutral postures of the hands and digits, forearms, shoulders, and back should be emphasized. The entire body should perform synchronously with as little isolation of specific muscle groups as possible (Pascarelli, 1999). Postural alignment is essential, focusing on the appropriate placement and relaxation of the hands and neck. Videotaping a typical practice session can assist with biomechanical training.

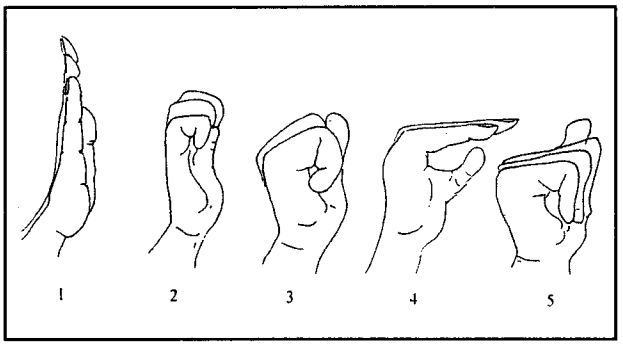

Figure 1. The five discrete positions in which the fingers are placed during tendon gliding exercises: (1) straight; (2) hook; (3) fist; (4) tabletop; and (5) straight fist. Reprinted from *Hand Clinics*, 7(3), Totten, P. A., & Hunter, J. M., Therapeutic techniques to enhance nerve gliding in thoracic outlet syndrome and carpal tunnel syndrome, 505–520, copyright 1991, with permission from Elsevier.

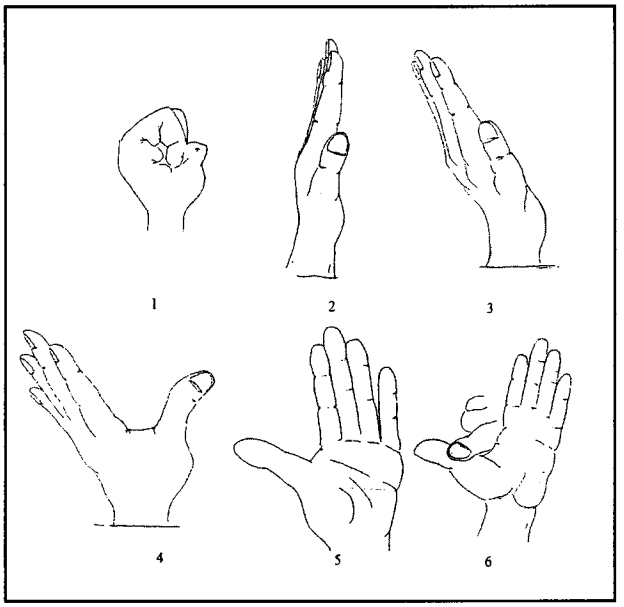

Figure 2. The median nerve gliding program: (1) wrist in neutral position with fingers and thumb in flexion; (2) wrist in neutral position with fingers and thumb extended; (3) wrist and fingers extended with thumb in neutral position; (4) wrist, fingers, and thumb extended; (5) forearm in supination; and (6) the opposite hand applies a gentle stretch to the thumb. Reprinted from *Hand Clinics*, 7(3), Totten, P. A., & Hunter, J. M., Therapeutic techniques to enhance nerve gliding in thoracic outlet syndrome and carpal tunnel syndrome, 505–520, copyright 1991, with permission from Elsevier.

Little research exists supporting warm-up exercises prior to repetitive activities preventing musculoskeletal injuries. Warm-up exercises increase blood flow, improving nutrition and oxygenation of the nerves and soft tissues (Hansford, Blood, Kent, & Lutz, 1986), and gently stretch nerves and soft tissues, allowing smooth nerve gliding. However, prolonged repetition combined with prolonged and repeated awkward postures or contact stress may subject the tendons and nerves to increased pressure within the carpal tunnel region, posing an increased risk for the development of tendonitis or nerve entrapment (Rempel et al., 1998). The pathophysiology of carpal tunnel syndrome is thought to be related to the duration and magnitude of this increased pressure in the carpal tunnel region (Rempel et al., 1998). Gentle exercises may promote venous blood return from the median nerve region, decreasing the pressure inside the carpal tunnel (Akalin et al., 2002; Totten & Hunter, 1991). Although tendon gliding exercises have not been formally evaluated for preventing soft tissue injuries (i.e., tendonitis of the wrist or tenosynovitis of the digits), they have been successful for finger rehabilitation after fracture. These exercises may reduce the need for surgery for carpal tunnel syndrome; however, one study found no statistically significant improvement after 4 weeks of tendon gliding exercises (Akalin et al., 2002). Gliding exercises, developed by Totten and Hunter (1991), may maximize the relative movement of the median nerve and flexor tendons and decrease elevated pressure within the carpal tunnel (Figs. 1 and 2). They may be effective in preventing or reducing symptoms in mild to moderate cases of carpal tunnel syndrome.

Secondary prevention measures include early diagnosis and aggressive treatment of playing-related musculoskeletal disorders. Occupational health nurses must pursue a comprehensive history to identify both intrinsic and extrinsic risk factors. Musicians may underreport symptoms for fear of a career-ending disability, thus delaying diagnosis and treatment of playing-related musculoskeletal disorders. Inadequate treatment and incomplete rehabilitation of such disorders may contribute to persistent or recurrent symptoms. A knowledgeable music teacher should explore playing technique at the onset of symptoms so that risk factors for playing-related musculoskeletal disorders can be identified and corrected. For both primary and secondary prevention, musicians have used the Alexander technique, body mapping, and the Feldenkrais method for relaxation and body awareness during playing.

For tertiary prevention, hand therapy specialists and those knowledgeable about musicians' risk factors are critical to successful rehabilitation after an injury (Warrington, 2003). Emotional support should be part of the rehabilitative process. Musicians should seek professional support during the recovery period and treatment for any associated depression (Zaza, Charles, & Muszynski, 1998). Composing, arranging, or research are recommended during recovery from an injury (Hoppmann, 2001).

MUSICIAN HEALTH AND SAFETY PILOT PROJECT

The goals of the musician health and safety pilot project were to document playing-related risk factors, offer early access to clinical care, and educate musicians about prevention measures. One questionnaire, containing 63 items modified from the American Federation of Musicians Union questionnaire, was administered by the community agency. Data were collected on demographics and socioeconomic, professional, and health (e.g., symptoms and insurance coverage) status, but are not reported

Table 1

Musician Survey

- Primary instrument (piano, saxophone, guitar, etc.)
- Style of music played (classical, blues, jazz, etc.)
- Number of hours per day practicing music
- Body posture for playing music (sitting, standing, etc.)
- Weight of instrument
- Strap used while playing? (If yes, padded?)
- Exposed in the past to occupational hazards related to music?
  - Noise
  - Second-hand smoke
  - Hot or cold environments
  - Alcohol
  - Drugs
  - Other
- Ever experienced any of the following related to playing music?
  - Performance anxiety
  - Stress related to job insecurity
  - Fatigue from insufficient rest during playing sessions
  - Dehydration
  - Overheating
  - Other
- Any concerns with the following music-related problems?
  - Ringing in the ears
  - Hearing loss
  - Dental problems related to playing wind or brass instruments
  - Jaw pain
  - Hoarseness from singing
  - Vocal problems
  - Hand or wrist pain
  - Neck pain
  - Back pain
  - Other
- Ever been injured playing music?
- How have you modified your playing to improve your condition?
- Please identify one concern about your health related to playing music

in this article. The second questionnaire was a 12-item survey capturing playing-related risk factors and musician-related health hazards.

The community agency distributed the first survey at an open house, at a fundraiser for the local community foundation, and through two workshops sponsored by the local musicians' union. Two educational sessions on health maintenance and the ergonomics of playing-related musculoskeletal disorders, held at the community agency–sponsored events, were provided by the university. At these events and through word of mouth, musicians were invited to visit the university grant-funded occupational health clinic if they had health-related questions. The second survey was administered during clinic visits (Table 1), along with the standard clinic health history form.

The clinical results of 10 musicians seen at the clinic are reported. This sample was a volunteer, symptomatic population who had heard of the clinic by word of mouth or through an outreach effort of the community agency.

The ages of the 10 musicians who visited the clinic ranged from 28 to 60 years (median age, 45 years). Six were men and four were women, and all had a college education. Three played the piano or organ, two the guitar, two the drums, and three the bass, cello, violin, or saxophone in styles including classical, jazz, flamenco, avant garde, and gospel. Two were self-employed music teachers in addition to performing musicians. One was involved in the musicians' union full-time. One was a full-time computer programmer with music as a hobby. Seven of the 10 had one visit, two had two visits, and one had four visits. Three of the 10 had health insurance through a health maintenance organization ($N = 2$) or Medicaid ($N = 1$).

Nine of the 10 were clinically evaluated by occupational health nurse practitioner students under faculty supervision and diagnosed as having musculoskeletal injuries related to repetitive motion associated with their music. Primary sites of pain included the digits ($N = 3$), one shoulder ($N = 3$), the back ($N = 1$), and multiple sites ($N = 1$). Diagnoses included rotator cuff tendonitis, bicipital tendinitis, trigger digit, de Quervain's tendinitis, digit tenosynovitis, and degenerative disk and joint disease of the lumbar spine. One musician had an entrapment diagnosis of left brachial plexopathy. Two musicians had non–music-related trauma (i.e., a motor vehicle accident or fall) complicating their musculoskeletal complaints. One musician underwent a full physical and reported occasional pain from neck flexion associated with playing the saxophone.

Nine of the 10 reported good health, but moderately high levels of pain averaging 3.375 on a 1 to 5 "FACES" pain scale (5 = most severe pain). Self-reported risk factors associated with musculoskeletal pain included prolonged playing times (range = 1 to 8 hours per day, 7 days per week), repetitive fine hand tasks, forceful playing, prolonged sitting, bending or reaching, and working in an uncomfortable position. Lifting and transporting equipment weighing up to 50 pounds often exacerbated soft tissue complaints. All of the musicians reported play-

ing less, modifying their playing technique (e.g., using a pick instead of an affected digit, applying less pressure on piano keys, not using a digit, or changing the angle of the wrist), playing other instruments, alternating styles of music, not playing at all for a period of time, and being more conscious of posture when playing because of their musculoskeletal complaints. Their goals for the clinic visit included "being able to last through a 1- to 2-hour set" and "to continue playing music." Many were concerned over not getting better despite modifying their playing technique.

Other health hazards reported by the 10 musicians included stress from performance and job instability, fatigue, dehydration, and exposure to second-hand smoke.

Because most of the musicians were uninsured, the clinic provided x-rays at no charge if indicated and referral for other diagnostic tests if necessary (e.g., audiometry). The two musicians covered by the health maintenance organization needed magnetic resonance imaging, which was ordered through the health maintenance organization. All treatments were conservative and included nonsteroidal anti-inflammatory agents for those unable to pay and ice packs and splints. Physical therapy was indicated for two musicians. Referrals were provided to local health care providers with expertise in musician health and safety, many of whom themselves were practicing musicians. However, payment for this specialty care remained problematic for those with limited ability to pay.

All of the musicians received education about the risk factors for playing-related musculoskeletal disorders, the concept of relative rest, and the need for playing modification (i.e., pacing practice and performance schedules, decreasing force, and being aware of neutral postures) (Table 2). Tendon and nerve gliding exercises were demonstrated (Figs. 1 and 2). Re-choreographing how to safely move equipment to decrease associated ergonomic stressors required creative solutions such as using soft (rather than hard) and more lightweight cases to transport instruments and backpacks or hand dollies to move equipment. The hand numbness of the musician with a brachial plexopathy was relieved when he used a looser strap across his left chest with his standup bass.

DISCUSSION AND IMPLICATIONS FOR PRACTICE

These 10 musicians had moderate to severe musculoskeletal pain related to their music. Prior to this pilot project, they had not received timely, comprehensive health care to adequately diagnose and treat their health complaints. All reported satisfaction with the clinic providers "hearing their story," providing care, and educating and counseling them on strategies to reduce and prevent further recurrence of their symptoms. Referrals were also provided for specialized care.

Occupational health nurses can recognize and prevent playing-related musculoskeletal disorders among musicians. They can apply an occupational health hierarchy of controls to the prevention of these disorders. To prevent injuries or progression of symptoms, occupational health nurses should first address extrinsic factors, including engineering or ergonomic, administrative, and personal protective interventions. The size, weight, and design of instruments should be modified to facilitate better musician fit (Markison, Johnson, & Kasdan, 1998; Pascarelli, 1999). String instruments, for example, are available in half, three-quarter, and full sizes. Lightweight, narrow-bodied guitars are available. The music industry is moving toward lighter-weight instruments, a move to be balanced against the quality of the music produced. Additionally, instruments should be maintained in optimal working condition.

Modifications to the playing environment such as proper seating and lighting can dramatically reduce playing-related musculoskeletal disorders. Chair height, back support, and seat depth should be properly adjusted to maintain neutral posture. For example, the cello is played while sitting. The seat pan needs to be shorter for the cello because the cellist leans forward into the instrument when playing; the chair edge needs to be padded to prevent contact stress to the posterior thigh. Both feet should be on the floor while sitting. Lumbar cushions are available if seat depth remains a problem or more lumbar support is needed. Lighting should be checked to decrease glare. The viewing angle should be 10° to 20° below the eyes to prevent forward flexion of the neck. Thus, music stands should be appropriately adjusted to reduce awkward neck postures (American Optometry Association, 1994).

Regarding playing technique interventions, "thinking neutral" and using neutral postures while playing an instrument should be stressed for preventing playing-related musculoskeletal disorders. Instruments should be positioned for comfort while playing. For instance, holding a guitar incorrectly may lead to awkward postures, with both wrists in extreme flexion (Pascarelli, 1999). Because guitars are played while sitting and standing, musicians must adjust their playing technique to mitigate awkward postures. Some instruments are played while standing but should be played while sitting (e.g., if an accordion weighing more than 30 pounds is played while sitting, its weight will be distributed across both thighs, freeing the neck and shoulders) (Bonica, 2006).

Administrative controls focus on both playing environment and musician technique. They include taking frequent breaks during practice or rehearsal, varying music styles, and exercising. Warming up prior to practice by playing slowly or doing general body warm-up exercises to increase heart rate and circulation is critical (Zaza, 1994). Breaks of 10 to 15 minutes should be taken every 30 to 60 minutes during practice sessions. Practice sessions should be progressively increased over time. An abrupt increase in practice time should be avoided. Cool-down periods should occur after practice sessions (Hoppmann, 2001). Hobbies and chores that may aggravate the musculoskeletal system should be kept to a minimum. Playing a variety of musical styles and improvising are beneficial in improving endurance and preventing repetitive strain injury (Zaza, 1994).

Personal protective equipment includes shoulder or chest cushions, chin rests, and wide straps while play-

Table 2

Musician Education Focused on Preventing Playing-Related Musculoskeletal Disorders

Management of symptoms

If symptoms present (muscle pain, tightness, or mild numbness), treat early and aggressively.

Apply ice, especially after practice and performance.

Use nonsteroidal anti-inflammatory agents (e.g., ibuprofen) in therapeutic doses (e.g., 600 mg every 6 hours with food).

It is important to rest and avoid playing in pain. Return to play should begin with brief sessions, advancing in duration over time.

"Relative rest" is to cut back on practicing or performing schedule, intersperse more 5- to 10-minute rest breaks, and avoid any pain-producing activity. Try two short rehearsals instead of one long, intense rehearsal.

Soft tissue injuries may take 4 to 6 weeks to heal. Do not push too hard, and work on regaining proficiency slowly. If symptoms are severe, or persist for longer than 4 to 6 weeks with consistent self-care management, consult a health care provider.

Assessment of playing technique with modification

Examine playing posture in a mirror or by videotape to "think neutral." See whether the chin is tucked, for example, or the neck is rotated. Keep both feet on the floor and use lumbar support if playing in a sitting position. Visualize pulling the posture "up" and gently pulling the shoulders "back and down." Adjust the approach to the instrument. Be creative and "think neutral."

Use less force when possible. Gently approach playing. The musician needs to be comfortable with the instrument, teacher, and audience.

Play a wide variety of styles of music and vary the content of practice sessions.

Explore areas of contact stress. Is the instrument resting over a soft tissue area? Can the instrument strap be padded? Shoulder cushions and chin rests are important when playing the violin and viola.

Use larger muscles when possible. Avoid body use that involves fixed, tensed positions.

Evaluate the instrument. Is adjustment needed? For example, if the distance between the string and the fingerboard is too great, the musician may be exerting more finger force to depress the string.

Transporting instruments and other musical equipment is a high-risk activity. Use hand dollies or rolling suitcases for this purpose.

Talk to other musicians about suggested modifications of technique to reduce the overall risk factors of force, awkward or static postures, repetition, vibration, manual lifting, and contact stress.

Other prevention tips

Focus on overall conditioning. The goal of exercise is balance or core strength, stretching or flexibility, and aerobic fitness.

Keep warm. Warm muscles are injured less. Do a body warm-up before practice or performance. Wear gloves to keep hands warm.

Stretch, change positions, and deep breathe every hour during practice or performance when possible.

Neck and head placement is important for overall upper body health. Again, the focus is on a neutral posture when possible. Avoid a head-forward posture with rounded shoulders.

Assess and re-choreograph other activities of daily living to minimize stress on the musculoskeletal system. Carry less weight, divide the load, and be aware of other activities that can aggravate symptoms including carrying children, cradling the phone, and using the computer.

With new instruments, take time to adjust to them before starting to play.

Consider body posture work such as the Alexander technique, yoga, tai chi, or Feldenkrais and mindfulness stress management.

Avoid smoking. It can cause reduced blood supply to soft tissues, delaying healing.

Proper nutrition is important. A multivitamin containing vitamin C and plenty of fluids are recommended.

Sleep is important! A good night's sleep can speed healing of soft tissues. Avoid caffeinated beverages and alcohol 3 to 4 hours before planned bedtime.

ing to support and reduce overall load and contact stress on a body part (Markison, Johnson, & Kasdan, 1998). However, violin and viola players with improperly placed shoulder rests can lack support in the area under the left clavicle, potentially leading to increased gripping of the instrument and strain on the thumb (Pascarelli, 1999). Special backpacks are available that distribute instrument weight evenly. As noted earlier, soft rather than hard carrying cases can lighten the load of instruments (Hoppmann, 2001; Pascarelli, 1999). Additionally, using dollies to transport instruments or asking for help can be pivotal in preventing injuries (Markison, Johnson, & Kasdan, 1998).

Intrinsic risk factors need to be addressed to prevent playing-related musculoskeletal disorders and preserve career longevity. Occupational health nurses should emphasize overall conditioning, postural awareness, and

regular exercise as primary prevention measures. The Alexander technique and body mapping are posture-modifying methods musicians can use to improve body awareness. They address similar concepts of body alignment, but have a few differences. The Alexander technique is a method of kinesthetic re-education extensively employing hands-on instruction using a process called constructive conscious control in which a maladaptive postural pattern is "inhibited" while a more constructive pattern is learned (American Society for the Alexander Technique, 2005). Body mapping studies the brain maps or the "conception of the structure," function, and size of the body and the effect of these parameters on the use of the body ("What Every Musician," 2005). Students in a body mapping course learn how the bones, muscles, tendons, nerves, and joints work together to perform an action, and how this applies to the movement of singing or playing an instrument. With proper training and retraining, musicians become more aware of proper body alignment and functional mobility of all the structures to avoid harmful playing positions.

Stretching and strengthening exercises are particularly important. Tendon and median nerve gliding exercises should be performed regularly, including at the beginning of a playing session or during a break (Totten & Hunter, 1991). These gentle stretching exercises are not harmful if done correctly, and may indeed be helpful as one component of an overall fitness plan. The exercise program (Totten & Hunter, 1991) consists of doing two sets of exercises—tendon gliding and median nerve gliding—five times a day. Each exercise is held for 5 seconds and done 10 times each session. For the tendon gliding exercises, with the neck and shoulders in neutral position and the elbows supinated and in 90° of flexion, the hands are placed in five discrete positions: straight, hook, fist, tabletop, and straight fist (Fig. 1). For the median nerve gliding exercises, the median nerve is mobilized by six wrist and digit positions: the wrist in neutral position; the fingers and thumb in flexion and extended; the wrist and fingers extended; the wrist, fingers, and thumb extended; the forearm in supination; and the thumb stretching with the opposite hand (Fig. 2). Musicians need to be educated about the limited evidence supporting the effectiveness of tendon gliding exercises for preventing or treating soft tissue and nerve entrapment conditions. Prospective cohort studies are needed to document the intrinsic and extrinsic risk factors that contribute to the development of playing-related musculoskeletal disorders. A consistent case definition of playing-related musculoskeletal disorders is needed for future research. The role of tendon and median nerve gliding exercises and overall conditioning in preventing and treating playing-related musculoskeletal disorders requires validation through both observational and experimental studies.

This pilot project provided a unique opportunity for occupational health nursing graduate students to actively participate in a university–community agency partnership, learn more about health and safety concerns of musicians, and appreciate the complex primary and secondary prevention challenges associated with playing-related musculoskeletal disorders. This pilot project was primarily focused on playing-related musculoskeletal disorders. All of the musicians involved were satisfied with the comprehensive clinical evaluation, education, and case management. However, musicians are exposed to additional instrument-specific hazards, many of which go unrecognized. Musicians often do not have health insurance and therefore have limited access to health and safety education within the context of occupational health, physical or occupational therapy, or primary care services. Health and safety prevention measures can be targeted to schools of music, musician unions, and organizations that hire large groups of musicians (e.g., churches). The goal is to prevent not only playing-related musculoskeletal disorders, but also other hazards associated with making music. Occupational health nurses are well positioned to educate and counsel both professional and amateur musicians on ways to prevent playing-related musculoskeletal disorders and other unique risks associated with playing music.

IN SUMMARY

Musician Health and Safety

Preventing Playing-Related Musculoskeletal Disorders

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1. Musicians are exposed to high-risk musculoskeletal activities such as repetition, hours of exposure, and awkward postures when playing instruments. These activities may result in playing-related musculoskeletal disorders.

2. Musicians often work part-time or seasonally or are self-employed. Thus, they may be uninsured or underinsured and may delay seeking care for these painful and potentially disabling conditions.

3. Prevention of playing-related musculoskeletal disorders includes identification of both intrinsic (e.g., musician strength and flexibility) and extrinsic (e.g., musician posture while playing an instrument) factors involved in the interface between musicians and their instruments and the playing environment (e.g., rest breaks or hours of practice).

4. Student occupational health nurse practitioners in this pilot project performed outreach and comprehensive screening and treatment for a small group of musicians diagnosed as having playing-related musculoskeletal disorders. Tendon and nerve gliding exercises were a key component of the treatment plan.

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