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Acta Dermatovenerol Croat 2005;13(4):247-251 REVIEW

Health Problems in Musicians – A Review

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SUMMARY Among artists, musicians suffer from special health problems related to their occupation and lifestyle. These mainly include musculoskeletal disorders, skin disorders, respiratory disorders, and noise induced hearing impairment. In this review we point out the most prevalent health problems that musicians face in their professional lives as well as the means to prevent them. The characteristics of individual performer and the type of instrument that he/she plays will determine the occupational disorder or disease that a musician may suffer from. The main worry about health problems in musicians is that they can become potentially career-ending disabilities. Therefore well-planned preventive strategies should be employed to help musicians in obtaining long and healthy career.

KEY WORDS musicians; occupational medicine; occupational diseases; literature review

INTRODUCTION

The first publication to summarize the occupational diseases of voice-trainers, singers and musicians was Ramazzini's Diseases of Workers, published in 1713 (1). But only recently a new subspecialty of occupational medicine was recognized, reaching out to performers, art educators, art administrators and instrument manufactures (2,3). There have been three recent developments in occupational medicine as it relates to musicians: (i) improved methods of diagnosis and treatment, (ii) awareness that musical artists suffer from special problems related to their occupation and lifestyle, and (iii) the establishment of health programs emphasizing an interdisciplinary approach to these issues (4).

In the spectrum of health issues of musicians, performance-related risk factors and disorders differ widely depending on the characteristics of individual performers, the form of music they perform, and the specific instrument they play. Specific demands on musicians like performing before an audience, performing under constant critical scrutiny of conductors, being expected to perform perfectly as well as the physical demands of playing the specific musical instrument are seen as the determinants of complaints among musicians (3).

The main worry about health problems in musicians is that they can become potentially career-ending disabilities. For instance, a professional pianist may develop career-ending focal dystonia (5).

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OCCUPATIONAL DISEASES

Artists, including musicians suffer from special health problems related to their occupation and lifestyle (4). Performance-related disorders in musicians are in most cases caused by multiple risk factors. These are based on the chronic, complex, rapid repetitive and forceful motions that require highest precision, along with poor ergonomic conditions and psychological strains that musicians work under (6). The physical demands of performing on musical instruments can cause pain, sensory loss, and lack of coordination (7).

There are several specific groups of musicians depending on the musical instrument they play: string instrument, wind instrument, piano, and electronic keyboard or percussion instrument. Vocalists form a special group of musicians. Each of these groups has certain disorders that are characteristic for that particular group, and some disorders occur equally in all groups.

Musculoskeletal disorders

Work-related musculoskeletal disorders are the most frequent complaints among instrumental musicians. They can cause pain, disability and loss of employment. Three diagnoses predominate in the literature: overuse syndrome, entrapment neuropathy, and functional dystonia. The most common among musculoskeletal disorders is overuse syndrome, such as temporomandibular joint disorders, focal motor dystonias, joint hypermobility, carpal syndrome, tendonitis, bursitis, tenosynovitis, thoracic outlet syndrome, myofascial pain syndrome, and trigger finger/thumb syndrome (8-10). The overuse syndrome is frequently caused by intensive practice, incorrect posture, non-ergonomic technique, pre-existing trauma, excessive force, overuse, stress and insufficient rest (11). Knishkowy and Lederman (12) report on 50%-60% of string and keyboard instrumentalists to have experienced performance-related musculoskeletal symptoms. Zaza and Farewell (13) suggest that female and string players are at a higher risk of developing musculoskeletal disorders compared to other musicians.

Predominantly, it is the musculoskeletal system of upper extremities and spine that is affected by the acute or chronic syndromes and neuromuscular disorders. Markison *et al.* (14) report on hand pain to be the most common complaint among musicians, and that it can have devastating effects on their careers. Fry *et al*. (15) studied pianists with overuse syndrome in order to investigate whether painful musculoligamentous overuse in the arms and hands of pianists is accompanied by the loss of motor control. The authors report that pianists with overuse syndrome have a coordination disturbance. Eller *et al.* (16) compared musculoskeletal complaints among instrumentalists and professional singers, and found instrumentalists to have more symptoms from the arm region and fewer complaints from the hip, knee and foot joints than singers. Pettersen and Westgaard (17) studied classical singer's shoulder and neck region, and found that singers, although having an enhanced awareness of posture, may still have overuse of trapezius muscle in particular, and probably also of sternocleidomasteideus muscle.

Skin disorders

Skin conditions among musicians are not very common, but when they do occurr, they may cause substantial discomfort and disability. They may lead to impaired performance and even become an occupational hazard. There are two main types of skin conditions in musicians, mechanical injuries of the skin and, more prevalent, allergic manifestations. Also, a combination of these etiologic factors of skin disorders occurs quite frequently.

Apart from aggravation of predisposed skin diseases (e.g., atopic eczema or psoriasis) due to music making, specific dermatologic conditions may develop that are directly caused by playing a musical instrument (18). Onder *et al*. (19,20) studied skin diseases in musicians working in a professional orchestra and found that musicians were subjected to a variety of skin problems in consequence of playing their instruments. The authors found a significant incidence of occupational and stress related skin conditions such as hyperhidrosis, cheilitis, lichen planus, psoriasis, seborrheic dermatitis and urticaria, as well as calluses of the fingertips. Skin infections such as herpes labialis seem to be a more common skin problem in woodwind and brass instrumentalists (18).

A special dermatosis of violinists, violists or cello players is the "fiddler's neck" (21). It presents as focal lichenification and pigmentation on the left side of the neck just below the angle of the jaw. Pigmentation, erythema and inflammatory papules or pustules are frequently present. The etiology of this skin change is probably due to a combination of contact allergic reaction and mechanical action of the instrument against the skin. The edema apparently results from pressure on the musician's neck by the base of the violin or viola, and is worsened by holding the instrument in a drooping position.

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The most frequent allergic disease in this special category of workers was contact dermatitis, always described in string and wind instrument players, involving the mouth and the hands. The most frequently reported culprit substances were colophony, exotic woods, nickel sulfate, varnishes, and propolis (bee glue) (22). Nickel allergy in a trumpet player was described by Nakamura *et al.* (23) and Thomas *et al.* (24). Inoue *et al*. (25) report on flautist's chin, which presented with a form of eczema on the chin and a positive reaction to nickel. The authors suggest that it was due to both mechanical irritation and allergy to nickel. Similarly, Farm *et al*. (26) report on cosmetic intolerance and contact allergy in 50% of opera-house artists.

Rimmer and Spielvogel (27) describe several other dermatologic problems of musicians such as "guitar nipple", "guitarist's groin", celist's chest", "cello knee", "cello scrotum", "Garrod's pads", "harpist's finger", Paget-Schroetter syndrome, "clarinetist's cheilitis", and "flutist's chin".

Respiratory disorders

Ramazzini (1) reports that musicians who play wind instruments with cheeks puffed and with the exertion of exhaling necessary for blowing the flute or trumpet may suffer serious injuries, e.g., rupture of the vessels of the chest and sudden discharges of blood from the mouth. He describes a case of a flutist with ruptured large vein in the lung, followed by violent hemorrhage and death within two hours.

Musical performance, especially in wind instrument players, depends on effective pulmonary function. Performance of wind instrument requires appreciable lung volumes, diaphragmatic mechanical force, skilled breath control, adequate patency and humidity of air passages, and precise coordination of the oropharyngeal cavity (28). Performing artists may be seriously impaired by respiratory disease that, comparatively, may produce only modest inconvenience to non-musicians (29). The breathing technique in wind instrument players can be compared to respiratory and glottal efficiency in professionally trained classical singers (30). Schorr-Lesnick *et al*. (31) compared pulmonary function of singers, wind instrumentalists, and string or percussion instrumentalists, and found no significant difference between these groups. Thorpe *et al.* (32) report on a larger rib cage, particularly in lateral dimension, of professional opera singers during performance of an aria recorded with two levels of voice projection.

Interestingly, asthma is the most common chronic pulmonary disorder among wind instrument players (28). Lucia (33) suggests that wind instrumentalists present a significantly better "asthma health" picture, perceiving themselves better able to cope with the disease. The author suggests that playing a wind instrument has the potential of being a long-term therapeutic agent for asthmatics. Asthma is not unknown among vocalists either. Cohen (34) describes asthma in Teresa Teng (1953-1995), the famous Taiwanese singer, and in Alyce King Clarke (1915-1996), the famous American vocalist (35).

Noise-induced hearing loss

Musicians who play percussion instruments are particularly exposed to excessive levels of noise. Potential occupational hearing impairment resulting from noise exposure has been described in classical orchestral and symphonic musicians (36). Cudennec *et al.* (37) report on the effects of loud music on brass band musicians manifested by ear fatigue, noise intolerance, tinnitus, earaches, sleep disturbance and psychic disorders. Kahari *et al*. (38) describe that percussion and woodwind players display slightly worse hearing thresholds than other musicians. Laitinen *et al.* (39) studied sound exposure among Finnish National Opera personnel and found that choir members were exposed to sound levels of 92 and 94 dB(A). Within the orchestra, the highest sound exposure levels were found among percussionists and flute/piccolo players, 95 dB(A); and brass players, 92-94 dB(A), which is considerably higher than the recommended value of 85 dB(A). Steurer *et al.* (40) studied noise-induced hearing loss due to choir singing and found that singing might lead to increased endolymph pressure, and thus might cause hearing loss, especially in the low-frequency region.

PREVENTION

The principles of industrial and occupational medicine, especially those related to ergonomics and adaptive equipment, can be applied to the treatment and prevention of injuries and diseases in musicians. Considering the high rate of work-related injuries among different types of musicians, the preventive programs are warranted. It is necessary to design specific programs according to the type of instrument a musician plays.

Musicians frequently tend to underestimate and/or conceal their problems. This behavioral pattern can be quite harmful, causing the

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musicians to ignore signals that require rest, or medical treatment in more severe cases. Many occupational diseases of musicians arise due to ignorance causing work-related diseases. The most important step in the prevention therefore should include the education of musicians about possible injuries (e.g., physical stress, musculoskeletal disorders, hearing impairment, respiratory diseases, skin diseases, etc.). Additionally, an important part of the preventive strategy should include developing a positive attitude of the musicians themselves toward their performance and their audience.

A balance of warming up and breathing exercises before a performance and taking short breaks during long practice sessions may protect subjects from musculoskeletal disorders. Frequent short-lasting breaks during practice are recommended. In addition, strengthening, stretching, nonimpact aerobics and instrument-specific exercises to rehabilitate tight and injured tissues should be included in preventive programs. To avoid diseases related to unfavorable body posture, which contribute to muscle or spinal injuries, it is necessary to keep the body in an ergonomically recommended posture during a musical performance. Regarding the loud and more or less continuous sound levels over 85 dBA, there should also be a protective effect from continuous contraction of the stapedius muscle. In order to reduce the deleterious effects of excessive and long-lasting noise, the wearing of personal ear protection should be mandatory for orchestral musicians. Although hearing protection designed for industrial use may not be appropriate for the professional musician, recent advances in hearing protection design have made hearing protection practical for this population. However, given the lack of acceptance of personal ear protectors, the risk of acute hearing damage due to sound level could be reduced by avoiding the immediate proximity to speakers or other sources of intensive and loud sounds.

Early and regular prevention clearly can contribute to the reduction of medical problems in musicians. Preventive medical examinations should include pre-employment and periodic medical examinations of professional orchestral symphony and other musicians. These measures should screen musicians with already existing musculoskeletal disorders, hearing problems, respiratory and skin diseases, or psychological problems, and also remove early musicians sensitive to injury from this environment. It would also be very important to undertake a medical prevention program for young musician students. They should be educated on all occupational hazards regarding the risks of professionally performing music.

It is possible to prevent work related disorders in musicians by analyzing the principal factors responsible for their development, such as poor posture, intensive practice, change in technique, inappropriate lifestyle, and anxiety. Musicians should be familiar with the anatomic and physiologic principles, which create their disabilities, and should also be educated about techniques of body movement, posture and breathing. They should exercise regularly. They should also learn about the basic anatomy of playing an instrument as well as developing ways to manage stress and anxiety.

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