Conferences and Reviews

Performing Arts Medicine

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Arts medicine has come of age, resulting from 3 important developments over the past decade: improved methods of diagnosis and treatment, an awareness that artists suffer from special problems related to their occupation and lifestyle, and the establishment of health programs emphasizing an interdisciplinary approach to these patients. We focus on the patterns of illness afflicting performing artists, specifically dancers, singers, actors, and instrumental musicians, and explain some of the things a health care team can do in treating these patients. The conditions governing these patients' lives—early exposure to high expectations of excellence, incessant demands for perfection, long periods of intense practicing, fierce competition, high levels of anxiety associated with performance, and uncertain careers—need to be understood. Levels of disease and disability are remarkably high, but artists often ignore symptoms. We discuss the musculoskeletal, neurologic, vocal, psychological, and other syndromes found among performers and some of the difficulties in treating them. The prevention of injury, conservative management, collaboration with teachers, and a psychotherapeutic approach are desirable. Arts medicine programs for professional consultation exist in several major cities of the United States and abroad. Although research is needed regarding the effectiveness of health care services for performing artists, the scientific literature devoted to this field is growing.

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Performing artists face injuries and illnesses that stem from years of intensive training and the demand for peak functioning in the public eye. A 22-year-old violinist giving a concert debut will have studied more than 15,000 hours to perfect motor skills and musical understanding. Ballet dancers attend classes as young children to develop the strength and precise coordination needed to dance with the style and grace expected of them. According to a recent survey of American orchestral musicians, 82% experienced medical problems, with 76% reporting at least one problem severe enough to interfere with performance.[1] Among dancers the rate of serious injury, sampled over a period of eight months in one study, was 97%.[2]

The first treatise on disability in performing artists appeared in 1713, but only in the past decade have specialized medical programs for performing artists been organized.[3] Although a growing number of physicians, surgeons, and allied health professionals are becoming interested in the causes and care of performers' disorders, most lack experience in this area.[4] Millions of Americans participate in performing arts. This includes students, amateurs, apprentices, teachers, coaches, part-time artists, and 200,000 professional performers. Clearly the number of skilled medical practitioners is inadequate to care for this population.

Each type of performing artist will have slightly different problems, depending on the system most taxed—vocal cords in a singer; hips, backs, knees, and ankles of a dancer; and fingers, wrists, elbows, shoulders, and neck of a string player or pianist. Beyond this are general stresses related to having to perform under conditions of high adrenaline flow, anxiety, fatigue, social pressure, and financial insecurity. We review the problems commonly seen in dancers, vocal artists, actors, and instrumental musicians.*

Problems of Dancers

Foot injuries occur often in ballet dancers. Toe dancing *(sur les pointes)*, the expected form for women, results in nonphysiologic weight bearing that exaggerates the metatarsal arch and can lead to distorted posture.[5] This may produce fatigue, pain, stiffness of the tarsal joints, hallux valgus, bunions, and hammertoes. Excess loading of the foot joints can cause early arthritic changes, with bony spurs, narrowing of the joint spaces, and restricted motion. These create pain and, with efforts to relieve it by shifting weight, the potential for further injury. Treatment of acute foot discomfort consists of elevation and active motion to reduce edema and stiffness; padding of the dance shoes and molded arch supports may serve as preventive measures. In some cases surgical intervention is

*See also the editorial by R. J. Lederman, MD, "The Coming of Age of Performing Arts Medicine," on pages 73-74.

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needed, but arthrodesis should be avoided because it risks reducing the range of motion in a dancer's foot.

Microfractures of bones in the foot and ankle resulting from repeated impact with hard unyielding surfaces frequently go unnoticed in the early stages and fail to heal properly. Tenderness may be either diffuse or pinpoint, followed in several weeks by the sudden sharp pain of a "stress fracture," invisible on x-ray film. Even bone scans and computed tomographic scans have been known to be normal for the first few weeks. Treatment includes rest, ice packs, bandages, splints, and crutches to reduce weight bearing. If spontaneous repair does not occur, a bone graft may be indicated.[6]

Other disabling conditions include muscle spasm, ligamentous strain, tendinitis, nerve damage, injuries of the back, hip, or knee, and various cysts and dislocations. Modern dancers suffer mainly from back and knee problems, whereas classical ballet dancers more often have foot and ankle injuries.[7] Dislocation of the patella is relatively common in dancers. Typically a twisting injury is followed by severe pain, immediate swelling (due to hemarthrosis), and a distorted appearance. By the time a physician is consulted, the knee is so swollen that the diagnosis may be missed unless x-ray films are taken.[8]

Delayed menarche occurs in 70% of female dancers, with secondary amenorrhea seen in 50% of adolescent and 78% of adult dancers.[9] These problems frequently are linked to eating disturbances.[10] Female dancers strive to maintain a slender figure and low weight. A study of mid-teen student ballerinas showed that 25.7% met criteria for anorexia nervosa and 14.2% had bulimic syndromes.[11]

Enforced early retirement further complicates a dancer's career, which usually peaks in the late teens and early 20s. With declining strength and cumulative injuries, many are no longer in demand as performers by the time they reach their mid-30s. A few stay on as character dancers, coaches, teachers, or choreographers, but most dancers approach retirement in great emotional turmoil.[12]

Physicians treating dancers must be familiar with the artistic and social conditions governing their lives. Attending to their psychological difficulties, focusing on prevention (including conditioning, stabilization, and muscle rebalancing), the early diagnosis of injury, conservative management, and restoring functional ability are essential in the practice of dance medicine.

Problems of Vocal Artists and Actors

Simple ailments can disproportionately affect performance in singers and actors. Upper respiratory tract infections or acute allergic illnesses may interfere minimally with a nonperformer's life but can greatly change or prevent a singer's performance. Failure to understand this often leads physicians to label an artist-patient as "hyper" or "difficult." If the patient is a singer or actor, common maladies such as eustachian tube dysfunction after flying, otitis media with effusion, sinusitis, allergic rhinitis, laryngopharyngitis, and bronchitis require quick diagnosis and the immediate initiation of treatment. Taking blood specimens for culture and other blood tests is worthwhile, but the physician should not wait for the results to begin treatment. When performers have concerts or auditions in 24 or 48 hours, a "wait-and-see" approach increases the level of anxiety and results in delayed treatment and possibly a cancelled performance and damaged career. For the disorders mentioned earlier, amoxicillin with clavulanate potassium or a cephalosporin such as cefuroxime are appropriate choices.

Physicians should caution singers and actors to avoid frequent coughing and throat clearing, both of which lead to laryngeal edema and hoarseness. For most upper respiratory tract and laryngeal problems, performers are helped by a mucolytic such as guaifenesin, increased oral intake of fluids, and the use of a vaporizer in the bedroom at night. These measures thin tenacious mucus that can interfere with good vocal technique. Antihistamines are drying and remove natural lubrication; they should be taken only after a performance.

After completing the history, examine the patient, making certain to view the vocal cords thoroughly. Commonly encountered noninfectious problems include edema, nodules, and hemorrhages due to voice abuse, reflux laryngitis, and hormonal abnormalities. Saying that the cords are free of disease reduces anxiety, but positive findings tend to have the opposite effect. The treatment of vocal nodules involves work with a speech therapist and a temporary reduced use of the voice. Most nodules resolve without the need for surgical excision.

Experienced performers often know the symptoms of a recurrent ailment and request medication that has helped in the past. Reasonable requests should be honored, but the demand for an oral steroid may signal a habitual problem that will lead to further problems. Steroids are indicated for swelling of the vocal cords severe enough to ruin an audition or concert. They should be used on an infrequent and selective basis only by physicians experienced in treating performers.

Reflux laryngitis caused by gastric acid regurgitation sometimes develops in professional singers. Substernal burning with an acid taste when lying down, pain on vocalizing, and the finding of erythematous arytenoid mucosa are keys to the diagnosis. Treatment involves elevating the head of the bed, avoiding late evening meals, and taking antacids. Premenstrual hormonal changes may result in fluid retention in the vocal cords and hoarseness. If thyroid abnormalities are the suspected source of vocal dysfunction, a full medical evaluation is required.[13]

Disorders of Instrumental Musicians

Skin Problems

Skin disorders in musicians vary widely, depending on the instrument played and the material it is made from. Lesions appear at the point of contact (in the mouth, on the lips, under the chin, between the legs), based in part on whether the instrument offers support (an organ or piano) or has to be supported (a trombone or guitar). Left-sided submandibular lesions develop in 62% of violinists and violists from holding their instrument.[14]

Seemingly minor ailments such as bruises, calluses,

cuts, abrasions, ulcers, eczema (allergy to bow resin), and hyperhidrosis can interfere substantially with practicing and performing.[15] A recent survey found work-related skin problems among 32% of the string players and 27% of the wind and brass players questioned, compared with 9% of nonmusician controls.[16] Consultation with a dermatologist is usually indicated.

Musculoskeletal Injuries

Various musculoskeletal problems can result from the repetitive movements required of instrumentalists. Aching, burning, fullness, tiredness, or pain in one or more body parts involved in playing the instrument are usually the initial symptoms. These problems commonly develop after an unusually intense or prolonged period of practicing and performing, often of difficult repertoire, sometimes on a different or unfamiliar instrument. Later, symptoms occur even with playing for short periods. Contributing factors may include tension or excessive finger articulation, fatigue, poor posture, physical disproportions between the player's anatomy and the instrument, and adverse biomechanical preconditions in the hand, such as hypermobility or hypomobility of critical joints.[17] Among string players, women appear to be more vulnerable than men to severe musculoskeletal problems.[18]

Overuse disorder or cumulative trauma disorder, often diagnosed in occupational medicine, is being identified with increasing frequency in musicians.[19] This diagnosis implies that tissues of the body have been stressed beyond their limits. Clinical evaluation requires considerable time and patience, and it is essential to examine musicians with their instruments to observe posture, signs of tension, disproportions between player and instrument, range of motion, and the position of wrists, elbows, shoulders, neck, and back. How the fingers move should also be noted, particularly if there are difficult reaches or if the musician aggressively uses the finger extensors and flexors rather than the intrinsic muscles of the hands to create pressure, which can then be simply released instead of having to extend against gravity.

Management is summarized in Table 1. An immediate reduction of playing time is desirable to allow healing, but performers may resist this because of having to meet concert schedules. Heat and soft tissue mobilization before play, cold applications with the stressed limb in a stretched position after performance, and analgesic or nonsteroidal anti-inflammatory drugs are helpful. With sufficient rest and appropriate exercises to balance intrinsic with extrinsic muscles, restore normal synergies, and release adhesions, the symptoms usually subside within a few weeks. If neglected, overuse syndromes may escalate until there is persistent and severe pain, even when not playing the instrument, requiring much longer time for recovery and increasing the risk of prolonged disability.[20]

To avoid career complications and to minimize the risk of injury during playing, it is advisable to involve a patient's teacher, coach, or manager in making plans for treatment and rehabilitation. For ergonomic reasons, it may also be helpful to suggest physically altering a musical instrument, such as changing the position of keys on a clarinet or flute, modifying the chin and shoulder pads of a violin or viola, or using straps and supports to reduce the weight of heavy brass and woodwind instruments.[21] Unless they are experienced musicians themselves or working closely with music teachers, examining physicians should avoid suggesting substantial changes in playing techniques.

TABLE 1.—*Management of Musculoskeletal Injuries in Musicians*

Reduce playing time
Warm up before playing
Incorporate periods of rest into sessions that make excessive demands on structure
Correct problems of performing technique
Reduce static and dynamic loads
Allow the choreography of the instrument to adapt to the hand
Use nonsteroidal anti-inflammatory drugs
Physical or occupational therapy—splints, ice, exercise, adaptive devices
Ultrasonography, soft-tissue and neural mobilization, sensory and motor re-education
Relaxation training, Alexander technique, Feldenkrais method
Local injections
Surgery
Counseling; psychotherapy
Balanced diet, adequate hydration

Neurologic Complications

Nerve entrapment and focal dystonia. Loss of sensation and eventual interference with motor control result from a variety of conditions that put pressure on adjacent nerves. These include hypertrophy of muscles and tendons, playing postures that require prolonged positioning with the joints at end ranges, as well as fat and fluid accumulation in narrow spaces at the wrist (carpal tunnel syndrome), elbow (cubital tunnel syndrome), and thoracic outlet.[22] In addition to a complete neurologic examination, it is essential to carry out specific clinical tests, such as checking the warmth of the hands, the symmetry of arterial pulsation, strength, size, and coordination of muscles, and sensory abilities. Auscultation at the site of suspected entrapment may reveal friction noise. If electromyographic and nerve conduction studies are done, patients should practice their instrument for at least an hour before testing. With magnetic resonance imaging, the affected area should be visualized in both neutral and playing positions because compression may occur only when the patient is playing.

Although surgical decompression has dramatically benefited some performers, extreme caution is required. Frequently patients have problems at multiple levels. The first approach should be conservative—the release of soft tissue restrictions around the area plus improved posture and modification of playing positions. If surgical treatment eventually seems necessary, a hand specialist experienced in treating musicians and familiar with the special risks involved should be consulted.[23]

Focal dystonia (also called "cramp") is a disorder that can have devastating consequences for musicians.[24] There

is interference with the speed, coordination, and accuracy of movements controlling the instrument. In pianists the fourth and fifth digits curl uncontrollably into the palm of the hand and the index finger extends excessively. Trumpeters lose control over fine adjustments of the lips and tongue; string instrumentalists can no longer finger their notes accurately. Initially these symptoms are task specific and usually disappear when patients are not playing their instrument, pointing to possible psychogenic factors. Identifying subtle nerve entrapments, biomechanical abnormalities, anteceding trauma, and characteristic training patterns leads to a clearer understanding of cause. Research with nonhuman primates suggests that changes in the sensorimotor cortex occur with repetitive performance.[25]

Treatment with various methods of sensory and motor retraining, psychotherapy, pharmacotherapy, and local injection of botulinum toxin has generally yielded less than satisfactory results. Early intervention to change habits that may trigger abnormal movements appears critical. A few patients have recovered after prolonged retraining with new music and different techniques, but further research is needed to pinpoint the cause of focal dystonia.[26]

Arthritis

Although many instrumentalists continue to play despite arthritis, degenerative change in the bones of the wrist and fingers can be progressively disabling. This is especially the case if the range of motion of the carpometacarpal joint of the thumb or the interphalangeal joints of the fingers are restricted or if there is considerable pain with performance. Responding promptly to tendinitis or fasciitis as harbingers of abuse or excessive use may prevent some arthritis. Exercise has a beneficial effect on repair, collagen deposition, and tendon strength, whereas immobilization or excessive rest brings about unnecessary demineralization of bones and atrophy of muscles. Taking the time to change playing techniques before damage results is critical to long-term health. This requires having the patient try to play or perform with the joints in midrange, with more careful use and balance between the muscle stabilizers and movers under conditions of good circulation. Playing in a well-heated environment, warming the extremities, and increasing general body metabolism under conditions of good hydration help to maintain perfusion and oxygenation of tissues.[27]

Although rheumatoid arthritis is no more common among performing artists than among others, it is definitely associated with deformities that are usually incompatible with continued high-level performance.

Other Conditions

Repeated intense pressure within the pharynx of wind instrument players—brasses and woodwinds—can produce dilatation and outpouching, and several cases of pneumothorax have been reported.[28] Periodontal disease, malocclusion, loose or missing teeth, and other dental problems may seriously affect performance, requiring the design of special dentures.[29] Loss of muscular strength and coordination between lips and tongue, temporomandibular joint dysfunction, facial pain, and other oropharyngeal disorders need to be evaluated and treated to preserve a wind player's career.[30]

With the increasing size of orchestras, loudness of instruments, and especially the introduction of electronic amplification, the incidence of hearing disturbances has grown among musicians. Rock and roll musicians were first thought to be at greatest risk, but symphony players' daily exposure to high-intensity sound at rehearsals and concerts makes them equally vulnerable. Because of the obvious importance of good hearing for musicians, deficits and their possible causes—trauma, infection, nerve damage, aging—should be evaluated by otologic and audiometric examination and promptly treated.[31] Measures to prevent hearing loss include education, the avoidance of excess noise exposure, shields to deflect the sound of high-intensity instruments, and the use of earplugs designed to reduce sound levels without interrupting feedback.[32]

Psychological and Emotional Issues

Success in the performing arts demands an almost exclusive focus of time and intellectual and emotional energy. Having sacrificed, in many cases, typical social experiences during childhood and adolescence in favor of career advancement, professional artists may have fewer skills in coping with stress. Performers who fail to meet their own goals or to win acceptance from others sometimes suffer from psychological symptoms that call for treatment both in their own right and because they hinder ongoing medical therapy.[33]

Depression among performers can occur when there is a loss of opportunity, popularity, self-esteem, or physical integrity due to illness, injury, and aging. The contrast between postperformance highs and the mundane pressures of daily life raises the likelihood of acute depression in susceptible persons.[34] Sensitive to their reputations, performers may attempt to disguise or deny depression or other unacceptable emotions.

Anxiety surrounding important auditions and concerts is extremely common.[35] Mental symptoms include pronounced apprehension, a dread of failure, and fears of memory lapses, losing control, and being disgraced. Often observed physical symptoms are muscle tension, tremulousness, respiratory distress, palpitations, dry mouth and throat, loss of sphincter control, and other hyperadrenergic responses. Many artists develop personal coping stratagems. Some use self-hypnosis, relaxation exercises, or deep breathing. Others who insist that stage fright adds to the excitement of performing need not be treated, but some are so disturbed by it that they retreat from public exposure. Physicians need also to stay alert to the destructive role of self-medication with drugs and alcohol.

The management of psychological problems among performing artists demands sufficient time for these patients to relax, establish trust, and lower their defenses. In contrast to the 10- to 15-minute contacts (about which patients often complain)[36] dictated by physicians' busy schedules, consultations lasting 60 to 90 minutes seem more

successful. Artists will often want to know how the therapist feels about their performances and whether they have attended concerts or read reviews. Although it is desirable to show interest in what a performer does, extreme enthusiasm or criticism may lead patients to see the therapist as yet another parent, teacher, or agent more interested in their fame than in aspects of their health.

Psychoactive medications must be used judiciously with artists, keeping in mind that certain side effects—drowsiness, dry mouth, insomnia, tremor—may interfere with high-level performance. Nonsedating antidepressants, such as nortriptyline hydrochloride and sertraline hydrochloride, have proved to be effective in treating musicians and dancers who are depressed. For the treatment of performance anxiety, the use of β-blockers such as propranolol hydrochloride, taken in low doses (10 to 20 mg) an hour before going on stage, has become popular. Anxiolytics, such as alprazolam and diazepam, are recommended for treating the generalized anxiety syndromes of performing artists, and monoamine oxidase inhibitors such as phenelzine sulfate are useful when severe anxiety (panic) and depression coexist.

Conclusion

No single physician, surgeon, psychiatrist, or other health professional, regardless of the scope of his or her skills, can treat the vast range of problems and disabilities occurring among performing artists. That is why recently organized programs in Boston, Chicago, Cleveland, San Francisco, New York, Washington, DC, and other metropolitan centers offer an interdisciplinary approach to performing arts medicine.

Artists and performers provide many of the most memorable moments in our lives, and art is probably the most potent healing force known to humanity. The medical profession is increasingly recognizing its duty to help performing artists in their fight against pain and disease and to treat them and their ailments in the most humane and effective ways possible.

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