

Performance-Related Medical Problems Among Premier Violinists

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Among musicians, several instrument-specific syndromes, such as violinist's neck, pianist's cramp, flutist's chin, and trumpeter's lip are medical problems that may limit performing and, in turn, jeopardize a career. With the exception of data on pianists, however, limited information is available on these increasingly recognized medical problems of musicians.¹ The existing evidence suggests that the necessity for rapid, controlled, repetitive musculoskeletal activity for prolonged periods of time may be a risk factor for instrumentalists. In addition, the demands of the music profession, long practice sessions and rigorous performance schedules may compound the risk for development of an instrument-specific occupational injury.

Until recently, prevalence data on the work-related problems associated with "making music" were virtually nonexistent.^{2,3} Even among concert musicians, a highly visible group, the extent of medical problems is largely unknown.⁴ Results of the few studies that have been conducted indicate that health problems affecting performance are widespread in musicians. In a survey of 485 symphony orchestra musicians, Fry found the prevalence of painful instrument-specific overuse syndrome to be greater than 50%.⁵ In a study of "high-level" musicians, 57%

of the respondents reported instrument-specific musculoskeletal problems that they believed were related to their profession.³ Similarly, some researchers have suggested that 50 to 60% of string instrumentalists have been affected by a performance-related problem at some point during their careers.⁶ Additional systematic investigations of the medical problems experienced by musicians, particularly instrument-specific occupational injuries, are needed.

One difficulty in conducting survey research in this population has been a reluctance on the part of musicians to respond to questionnaires or openly admit to occupational problems. In a recent pilot study of 1245 "high level" musicians in northern Ohio, researchers encountered only a 30% response rate.³ This poor response has been attributed to musicians' concerns that admission of performance-related health problems might jeopardize their employment and/or careers.⁷

We recently had the opportunity to survey the performance-related health problems experienced by an elite group of professional violinists. Our objectives were to determine the extent and types of health problems attributed to playing the violin, the performers' evaluation of the impact of the problem upon their playing, and the treatments, both conventional and unconventional, they had tried. The results are the basis for this report.

Methods

In September 1986, the Second Quadrennial International Violin Competition, the only major competition in the Western Hemisphere dedicated exclusively to the violin, was held in Indianapolis, Indiana. This prestigious competition, whose jury comprises eleven internationally famous violinists, bestows upon its win-

ners the richest monied prizes of any violin competition in the world, a Carnegie Hall debut, and over 70 engagements in music halls around the world.

From a field of 160 applicants, a screening committee selected the eligible candidates who met the competition criteria, including an age restriction (18–29 years). The 43 premier violinists who participated in the 1986 competition came from 20 countries; most had performed and competed on stages all over the world.

With the assistance of Cathedral Arts of Indianapolis, the presenter of the competition; we designed a mail survey. Four months prior to the event, study questionnaires were mailed to the 55 violinists who had accepted the invitation to participate. For those whose primary language was not English, we utilized questionnaires that had been translated into French or German, as appropriate. We were very sensitive to potential concerns regarding confidentiality. Respondents were asked not to identify themselves and in a letter accompanying the questionnaires we provided assurance that individual responses would be seen only by the study researchers and would not be available at any time to competition officials or judges.

For our descriptive study we developed a standardized instrument that contained questions on the occurrence, type, and extent of performance-related musculoskeletal problems, and their impact on the musician. Respondents were asked to identify the anatomic location (on a list of sites in the upper extremity and back regions) and describe the nature of their health problem. We used a 5-point Likert scale to determine the musician's severity rating (1 = mild, 5 = very severe) of the job-related injury. We also employed a 5-point Likert scale to measure the performer's evaluation (1 = no help,

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5 = complete relief) of the effectiveness of the treatments.

To measure the violinists' views on performing and their experiences with performance anxiety, we designed 23 single-item indicators, using a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree). It contained questions on the occurrence of performance anxiety, the performer's attitudes toward the audience and techniques used to relieve tension. For each item we computed a median, or 50th percentile, score for the respondents. Student's *t*-tests were used to determine if those musicians who had had a performance-related health problem differed by age or average number of daily practice hours from those without injuries. Fisher's exact test was used to compare the groups on the basis of gender.

Results

Respondents

Twenty-nine (52.7%) of the 55 violinists to whom we mailed survey questionnaires returned the forms. Because of their anonymity we were not able to determine how many of the survey respondents were among the participants in the Competition, but the minimum would have been 58.6%. Of the 29 questionnaires returned, 23 were in English, 2 in German and 4 in French.

The violinists in our study ranged in age from 18 to 29 years (mean = 24.4 ± 3.2 years), which was the age spectrum determined by the rules of the competition. Sixteen (55.2%) were male. All but one were right-handed. They practiced an average of 4.8 hours per day and total daily practice time ranged from 2 to 7 hours.

Performance-Related Health Problems

Fifteen (51.7%) of the professional violinists reported that they had experienced a performance-related health problem at some time during their career. Pain was, by far, the most frequent complaint. Ten individuals reported having had pain, either as a solitary problem or in association with other complaints, such as swelling and/or stiffness (Table 1). Two respondents reported upper extremity "tendinitis" in the left arm. A third related "tendinitis" in the left hand and a com-

TABLE 1. Problems Reported by 29 Premier Violinists

<i>Problem</i>	<i>Number of Respondents*</i>
Pain	6
Pain/swelling/stiffness	1
Pain/soreness	1
Pain/swelling	1
Pain/numbness	1
Tendinitis	3
Muscle strain	1
Muscle ache	1
Weakness	1
Stiffness	1
Tension/tightness	1
Tingling	1
Numbness	1
Pins and needles/stiffness	1
Swelling	1
Stress/swelling	1
Swelling/cysts	1
Calcium deposits	1
Knots	1
Skin infection	1

*Problems are not mutually exclusive.

bination of "tendinitis and muscle strain" in the left forearm. Three individuals listed numbness, tingling or "pins and needles."

All 15 musicians who had experienced performance-related difficulties reported at least one problem related to an upper extremity. The most common sites of symptoms in the upper extremities were the wrist and shoulder, which were reported to have been problems by 7 and 6 musicians, respectively. In addition, the inner aspect of the elbow and little finger were each problem locations for five violinists (Table 2). Three respondents also had had lower back complaints, and one reported symptoms in the spine. Respondents judged their problems in these sites a 3 or 4 on the Likert scale.

Eleven of the 15 respondents with performance-related difficulties had had multiple physical problems, which were not limited to a single anatomic location. The median number of sites was two, although the range was 1–14 sites. These medical problems ranged in duration from 1 month to 16 years.

Left-sided symptoms predominated. Six violinists had experienced difficulties in the left upper extremity, five had had bilateral complaints and four

had had symptoms only in the upper right extremity. Problems related to the ring finger or little finger of the left hand were reported by four individuals.

Difficulties in the left upper extremity affected holding the violin in 5, vibrato in 4, playing repetitive passages in 4, shifting and playing in higher positions in 3 each, and rapid runs in one person. Right upper extremity problems affected bow control in 5, holding the bow in 4, playing on lower strings in 4, tremolo in 3, bow grip in 3 and pizzicato in 2. Nine musicians felt that their medical problems had affected more than one of the above aspects of their playing (Table 3).

Use of medication was reported by only three respondents. One had used a prescription nonsteroidal anti-inflammatory drug and aspirin for hand and arm problems. Another had taken anti-inflammatory drugs for wrist pain. Muscle relaxants had been prescribed for the elbow pain of a third performer.

Respondents reported use of a variety of physical measures that provided varying degrees of relief. Six indicated that exercise, alone or combined with other regimens, had been prescribed. Heat, in the form of baths, compresses or in combination with ice, was a self-help remedy for four violinists.

TABLE 2. Site and Severity of Most Frequently Reported Problems

Location of Problem	Number of Respondents	Percent of All Respondents Who Reported Problem at This Location	Laterality*			Severity†	
			RIGHT	LEFT	BILATERAL	MEDIAN	RANGE
Little finger	5	17.2%	1	4	0	2.5	2-4
Wrist	7	24.1%	2	3	2	3	2-5
Elbow, inner aspect	5	17.2%	2	2	1	3	3-5
Shoulder	6	20.7%	2	1	2	3	2-4

*One respondent with a shoulder problem did not specify laterality.

†(1 = mild, 5 = severe)

TABLE 3. Aspects of Playing Affected in 15 Premier Violinists with Performance-Related Health Problems

Aspect of Playing Affected	Number of Respondents (%)
Holding the violin	5 (33.3%)
Bow control	5 (33.3%)
Repetitive passages	4 (26.7%)
Vibrato	4 (26.7%)
Playing on lower strings	4 (26.7%)
Holding the bow	4 (26.7%)
Shifting	3 (20.0%)
Tremolo	3 (20.0%)
Bow grip	3 (20.0%)
Playing in higher positions	3 (20.0%)
Pizzicato	2 (13.3%)
Rapid runs	1 (6.7%)
Playing on upper strings	0

TABLE 4. Characteristics of Violinists Surveyed

	Performance-Related Health Problem(s)*	
	REPORTED (N=15)	NOT REPORTED (N=13)
Male, number (%)	7 (46.7%)	9 (69.2%)
Age, mean, years	24.8	24.3
Daily practice time, hours†	5.3‡	4.3

*One respondent did not complete the health problem question.

†One respondent who reported a health problem did not indicate daily practice duration.

‡p<.05

Unconventional remedies that had been employed included visualization techniques for an elbow problem and yoga and the Alexander technique for a shoulder ailment.

Ten musicians had decreased the duration of their practice sessions in an attempt to reduce their discomfort. Eight reported that they had tried "warming-up" before playing. Six had stopped playing the violin for periods of one to four weeks because of physical problems which they believed were related to playing their instrument. Three had reduced their daily total playing time.

Ten of those who had had problems had sought medical attention from general practitioners, physical therapists, chiropractors, and/or specialists, such as rheumatologists, neurologists or orthopedic surgeons. One had consulted a yogi and had used the Alexander technique. Another had tried kinesiography.

The above treatments, both conventional and unconventional, were highly variable in their effectiveness, as judged by the respondents.

Comparison of those violinists who had experienced medical problems with those who had not revealed no differ-

ences with respect to age or sex. However, those who had had injuries reported a longer total daily practice time than those without problems (mean = 5.3 hours and 4.3 hours, respectively, p<.05) (Table 4).

Views on Performance Anxiety

Eighty-three percent of these accomplished professionals agreed that every artist experiences some performance anxiety (Table 5). In fact, 52% concurred that some tension aided their performance.

Performance anxiety in these artists manifested itself in several ways. Nineteen of the 29 respondents (66%) had experienced racing or pounding of the heart and 13 (45%) had had sweating or tremor. Other manifestations included dry mouth in 5, nausea or vomiting in 4, memory loss in 2, frequent urination in 2 and faintness in 1 respondent.

The median score on the Likert scale (3) indicates the group, as a whole, did not hold a strong conviction about the benefits of deep breathing for relief of tension. However, they tended to agree (median score = 4) that focusing intently on their performance helped to relieve anxiety. On the other hand, they strongly disagreed that either medicine or alcohol aided in relieving performance anxiety (median scores = 1 for both items).

Over half (51.7%) of the 29 premier musicians in our study reported having experienced a physical problem that they believed was related to playing the violin.

Discussion

We were fortunate to have had the opportunity to survey this select group of accomplished violinists and to gather prevalence data on their performance-related problems. While it may be argued that our sample of musicians was unique in some respects, the prevalence of job-related injuries which they reported was similar to that reported in other groups of musicians. Over half (51.7%) of the 29 premier musicians in our study reported having experienced a physical problem that they believed was related to playing the violin. This is comparable to the prevalence (56.8%) of instrument-specific musculoskeletal problems reported by other "high-level" musicians in professional orchestras and teaching institutions.³

Our results are more striking when one considers that the average age of our respondents who reported having experienced medical problems was 24.8 years. While we did not determine if these violinists were experiencing their problems at the time of the survey, or their age at the onset of the problem, our findings do reflect the potential risk of injury for serious musicians at a relatively young age. Consistent with our observation, the mean age of musicians in symphony orchestras and teaching institutions who reported performance-related medical problems was 30 years.³

Pain was the most frequently reported symptom among the Violin Competition musicians and was noted by 6 of the 15 (40%) who had experienced medical problems. In an evaluation of 25 string players treated for musculoskeletal problems, Knishkowsky found pain to be a complaint in 17 musicians (68%).⁶ In contrast, violinists/violists in Caldron's study identified blisters and calluses as their most common problems followed by "sores" and "tendinitis."³ Three individuals in our survey also reported "tendinitis." It should be cautioned, however, that the diagnosis of "tendinitis" in both studies was based on self-reports and not confirmed medically. A variety of painful musculoskeletal conditions, e.g., sprains, arthritis, overuse syndrome, may be mistaken for "tendinitis." This term should be reserved to denote the presence of tendon inflammation.

In any event, the upper extremity problems in these violinists affected

several mechanical aspects of playing the instrument (Table 3). To our knowledge, this is the first reported survey to relate health problems to specific components of violin technique.

The mean daily practice time of the 29 respondents in our study was 4.8 hours. The mean daily practice time of those musicians who had experienced medical problems, 5.3 hours, was similar to that reported previously by 100 musicians with performance-related hand difficulties who practiced 5 to 6 hours daily.⁴

Caution must be exercised when interpreting our finding that the average total daily practice time of performers who reported injuries was significantly longer than that of those without medical problems (Table 4). Among our sample, we failed to determine if the performer was currently experiencing the medical problem, which limits our ability to draw any correlations. In future research, we recommend collecting more complete information about the relationship of practice patterns and occurrence of physical problems. Knowledge of the quality of the practice session, type and intensity of playing, and the number and schedule of rest periods would also be useful in examining this possible relationship. Unfortunately, our open-ended question on the number and length of daily practice sessions failed to capture this information.

Due to our small sample size and variability in responses, we are also unable to draw meaningful conclusions about the efficacy of the measures employed by these artists in an attempt to deal with their performance-related problems. The variety of measures reported by our respondents does indicate a need for more research and education into the optimal treatments for performance-related problems.

It is commonly accepted that most, if not all, musicians, professional as well as amateur, experience performance anxiety or "stage fright" to some degree.⁸ Our respondents, all recognized virtuosos, overwhelmingly agreed with this observation (Table 5). Seventy-nine percent related that focusing attention on their performance relieves their tension. Ninety-three percent of the violinists did not report that medication helped decrease performance anxiety. Despite the current interest in the use of beta blockers to

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reduce anxiety,^{7,8,9} none of our respondents mentioned the use of these agents.

Predictably, several additional questions have emerged from our preliminary survey. In future research we suggest obtaining the musicians' perceptions of the suspected causes of their health problems. Serving as historians, they can help to determine the circumstances related to the onset of their medical problem and provide insights regarding any associated changes in their playing technique, instruction, repertoire, performance schedule and treatment regimens.

We were encouraged by the relatively high response rate to our survey, especially in view of the pressures and demands of preparation for a major international competition. We believe the high response rate under these circumstances may indicate that musicians are becoming more willing to disclose their experiences with performance-related problems. Perhaps the publicity given to the hand injuries of two internationally acclaimed concert pianists, Gary Graffman and Leon Fleischer, may foster a new openness among disabled musicians who, heretofore, have been reluctant to admit their injuries.¹⁰ Certainly, the "play-through-the-pain" philosophy of some music teachers, enormous competition for symphony chairs, and frequently inadequate management of performance problems by health care professionals contribute to musicians' reluctance to admit openly their occupational health problems.

Our 52% response rate for a single mailing of an unsolicited survey is higher than the 30% rate in Caldron's study of "high-level" musicians. Despite our assurances that survey participation would not affect or influence their competition status, it is possible that

TABLE 5. Views on Performance Anxiety by 29 Premier Violinists

Statement	Median Score*	No. of Musicians in Agreement (Score= 4 or 5)	No. of Musicians in Disagreement (Score= 1 or 2)
Every artist has performance anxiety.	5	24	1
Some tension aids my performance.	4	15	11
Waiting to go on stage is the most difficult time.	4	16	9
It is easy to relax before a performance.†	2.5	7	14
I sense some muscle tension before a performance.†	2	7	16
Apprehension disappears as I begin my performance.	3	13	5
I can relax after I have begun my performance.	3	10	7
I have some muscle tension throughout a performance.	3	8	14
I have extreme difficulty overcoming anxiety while performing	2	5	19
Extreme nervousness prevents me from enjoying competitions.†	3	10	11
I play better during practice than I do during competitions.	3	10	8
Deep breaths help me relieve tension.	3	12	7
I focus intently on my performance to relieve tension.	4	20	3
Medicine helps me relieve tension.‡	1	0	26
Alcohol helps me relieve tension.†	1	0	28

*1 = strongly disagree, 5 = strongly agree; †one musician did not answer the question; ‡two musicians did not answer the question. Table does not contain frequencies for score = 3.

some respondents may have felt compelled to participate in this study.

With the opening of clinics devoted to performance problems and the increasing awareness among the public and medical community, perhaps more musicians will step forward and share their experiences with occupational injuries. The few preliminary studies in this relatively new area of research indicate that performance-related health problems are, indeed, common among musicians. Additional systematic investigations into the instrument-specific problems of musicians are needed to ascertain the nature and etiology of problems related to making music.

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