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# Medical Problems of Marching Musicians

Susan E. Harman, M.S.L.S., M.Ed.

Within the last decade a number of studies of the playing-related problems of musicians have appeared. The majority have focused either on professional musicians<sup>1,3</sup> or on serious music students at conservatories or universities with music majors.<sup>3,4</sup> Recently, however, studies have focused on secondary school students, particularly those active in arts high schools or youth orchestras.<sup>5,6</sup>

Comparatively little research has focused on amateur musicians, serious or recreational. In 1987 Newmark and Lederman reported on the incidence of overuse in a group of amateur chamber musicians.<sup>7</sup> In 1990 Newmark and Salmon surveyed a group of nonclassical musicians, less than half of whom played professionally even on occasion.<sup>8</sup> In 1988 Dawson reported on upper-extremity problems in musicians seen in a hand-surgery practice, 48% of whom were either skilled or recreational amateurs.<sup>9</sup>

A previously neglected area of research is the marching band. The few articles, published almost entirely in the music literature, have focused on heat stroke or general fitness.<sup>10-13</sup> Literature specific to auxiliary units, such as flagline and color guard, is virtually nonexistent.

Recognizing the lack of relevant research, the author surveyed members of an active community marching band for information about health and medical issues.

## MATERIALS AND METHODS

The Baltimore Colts Band, composed entirely of volunteers, was founded in 1947 when the city received a professional football franchise. Its primary function initially

was half-time entertainment. During two periods of time without a professional team, the band concentrated on parades, half-time shows for other National Football League and college teams, and concerts at local events. The band performs approximately 15 times each year, with an emphasis on marching performances. Generally one or two performances each year entail an overnight trip. The band rehearses approximately 2½ hours per week for roughly 10 months of the year, depending on the year's schedule.

The main part of this study was a confidential questionnaire that asked for basic demographic information and detailed information about injuries and other health problems, either caused or aggravated by band participation, as well as preventive measures. After initial approval by the band leadership, development of the questionnaire began. During the fall of 1991 the author discussed the project with the band president, the musical director, and section leaders, asking them to encourage cooperation. The board of directors received rough drafts of the questionnaire and cover letter and had the opportunity to make suggestions and to ask questions before formal approval.

In December of 1991, at the last rehearsal for the year, questionnaires were completed by the majority of band members. At the last performance questionnaires were given to members not present at the last rehearsal. Those at neither meeting were mailed a questionnaire and a stamped, addressed envelope. Reminder telephone calls in December of 1991 and January of 1992 resulted in additional responses.

As a follow-up to the questionnaire, two other projects were carried out. In March of 1992 sound-level readings were made at the band's indoor rehearsal site. In May of 1992 each available brand of each instrument was weighed, along with equipment used by auxiliary personnel.

## RESULTS

Of the 110 performing members of the band, 97 (88%) completed the questionnaires, including 64 musicians, 20 flagline members, 13 others (e.g., color guard and banner carriers), and 4 equipment/ground crew members.

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All 20 flagline members are female; 47 musicians are male and 19 are female. The band's lower age limit is 14 (high school freshmen); there is no upper age limit. This accounts for the large range in age from 14 to 59 years, with a mean of 24.9 years.

Because none of the members are professional musicians, much of their time is devoted to other activities. An average of 21.2 hours per week was spent at school or work, with the upper extreme of 78 hours. Members reported an average of 6.5 hours per week spent in physical exercise. They were allowed to interpret the phrase as they wished, be it a physically demanding occupation, organized sports, or trips to a health club.

Despite other demands on their time, band members showed an extraordinary commitment to music. They estimated an average of 6.5 hours per week of physical practice with their instrument or flag. The upper limit was 33 hours per week, probably because some individuals belonged to as many as 5 musical groups. Members also spent an average of 4.4 hours per week on mental preparation, such as silent music study and visualization of half-time maneuvers. Members were asked to include administrative responsibilities in the category of mental preparation, which probably accounts for the highest report of 80 hours per week.

The average musician had been playing for 11.9 years. Members were asked to rate the importance of musical activities on a scale from 1 to 10, with 10 signifying the most important activity in their lives. The average response was 7.9.

The majority of the questions concerning health or medical problems focused on occurrence. We asked whether the individual had ever experienced specific symptoms or problems to a degree that playing or marching was affected. Further analysis of the questionnaire compared musicians and flagline members.

Figure 1 shows the number of members reporting pain or stiffness in their extremities. Leg and especially arm pain was expected among musicians; however, occurrence of upper-extremity pain is significantly higher among the flagline.

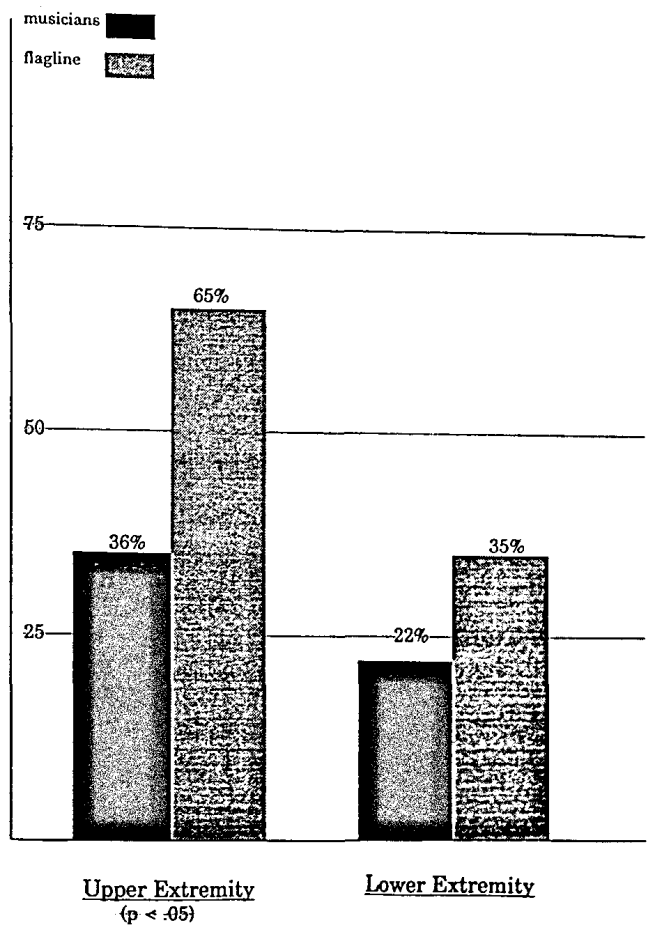


FIGURE 1. Percentage of musicians and flagline with extremity pain.

Figure 2 shows the number of individuals who reported pain in the back or central body region. Again, the occurrence of thoracic pain is significantly higher in the flagline. Lumbar pain was expected among musicians, especially those carrying heavy instruments such as drums or bells; the nearly 50% occurrence, however, was somewhat surprising, given the relatively young age of the sample.

Weights of the different brands of each instrument were uniformly lighter than estimated by the musicians, probably

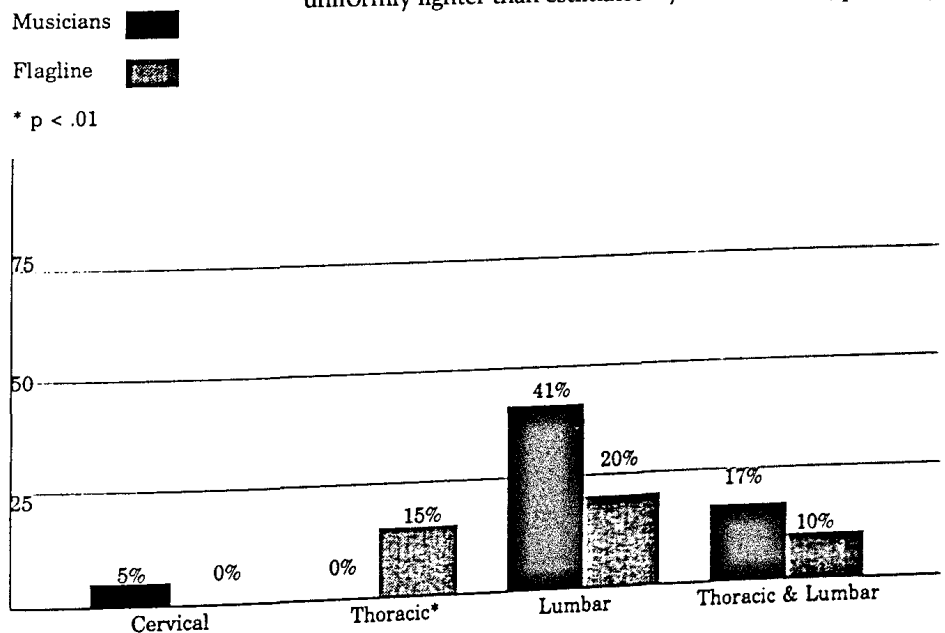


FIGURE 2. Percentage of musicians and flagline with central body pain.

**TABLE 1. Percentage of Musicians and Flagline Reporting Other Neuromuscular Problems**

	Musicians	Flagline
Sensory symptoms	50%	40%
Loss of coordination		
Lips*	19%	0%
Fingers	16%	25%
Tinnitus*	41%	15%

\*p < .05

in part because awkward carriage positions require extra effort to maintain. For example, the largest of 4 tuned bass drums weighs just over 28 lbs, but vector analysis shows that the force needed to carry it is approximately 35 lbs.

Table 1 shows the results of questions about sensory symptoms. Half the musicians and some of the flagline reported numbness, burning, or loss of sensation, primarily in the hands or fingers. Obviously, only musicians complained of embouchure problems, fatigue, and loss of coordination of the lips.

Because we expected to find a significantly higher occurrence of hearing complaints among the musicians, it was somewhat surprising to find that 15% of the flagline reported hearing complaints. However, when it rains, the flagline members rehearse inside with the band, and during parades the drum section marches directly behind them.

Sound-level readings were made at the indoor rehearsal hall, a large, empty, concrete building at a county fairgrounds. With the band seated in concert formation, readings were taken at approximately 5 feet from each instrumental section while the entire band played. Readings during a rehearsal of fairly new music, programmed for an upcoming concert, averaged approximately 90-105 dB over almost all sections. Some of the stronger brass players could reach a crescendo of 117-119 dB while still maintaining reasonably good tonal quality.

Table 2 shows other complaints that affected marching or playing. The flagline had a significantly higher occurrence of dizziness and nonspecific chest pain. In fact, their percentages were higher than the musicians in every category except breathing problems.

The data related to exhaustion were quite interesting. The questionnaire asked: "Have you ever been so exhausted

**TABLE 2. Percentage of Musicians and Flagline with Other Complaints Associated with Marching or Playing**

Problem	Musicians (n = 54)	Flagline (n = 20)
Headache	16%	20%
Dizziness*	13%	35%
Shortness of breath	30%	20%
Chest pain (unspecified)*	11%	30%
Exhaustion	34%	50%

\*p < .05

**TABLE 3. Percentage of Musicians and Flagline Who Consulted a Medical Professional**

Musicians (30%)	Flagline (30%)
Lumbar pain	Lumbar pain
Shortness of breath	Thoracic pain
Upper-extremity sensory symptoms	Headache

during a rehearsal or performance that you felt you could not play or march any longer?" Many members wrote comments about the Fourth of July, which is always a busy time for the band. For example, in 1992 the band marched in 3 parades on July 4 and in 1 on July 5. The July 4 parades ranged from a little over 1 mile to over 3 miles in length, with approximately an hour's rest after the longest march. The temperature was 87° with 44% humidity. Musicians were dressed in a wool-blend uniform and a plastic, un-ventilated hat.

In summary, musicians experienced a significantly greater occurrence of loss of coordination in the lips and of hearing problems. Flagline members experienced significantly greater occurrence of upper-extremity pain, thoracic pain, dizziness, and nonspecific chest pain.

Table 3 shows performance-affecting problems for which band members consulted a health professional. In each case, the most frequently mentioned item is listed first. Shortness of breath and upper-extremity problems are of great concern to musicians because of their effect on playing. Of interest, the flagline reported a higher occurrence of thoracic pain, yet consulted a health professional more often for lumbar pain. In addition, although 30% of the band members reported seeing a physician, only 23% reported a health problem that affected participation in the band.

We were also concerned with any aids or strategies used by band members to avoid or to relieve physical problems connected with playing or marching (Table 4). Fortunately, many members realize the importance of hydration before and during performances in the heat. Specific drinks and numerous dietary modifications, sometimes stretching over several days, were mentioned. At virtually all rehearsals or performances, some members used knee braces, ankle braces, or wrist supports for chronic musculoskeletal conditions. During the busiest portions of the schedule, use of such devices increased. Comparatively few members reported using earplugs; some, however, used them for all indoor rehearsals, whereas in others, use depended on the situation.

Fortunately, most members with chronic conditions such as hypertension, diabetes, or asthma take regular medications with extra care on performance days. Others report using "as needed" medications to prevent flare-ups

**TABLE 4. Preventive Measures Reported**

Increased fluid intake	Vigorous rehearsal
Exercise; heat/cold conditioning	Regular and specific medications
Braces, bandages, etc.	Dedicated ground crew
Earplugs	

of medical problems during performances. For example, several members with arthritis or old sports injuries timed dosing of an anti-inflammatory agent for maximal effect during performance.

A third group included in this study, the ground crew, provide water during parades and other functions as well as a first-aid kit when needed. As the season progresses, the ground crew learns which band members have chronic conditions and can anticipate problems with heat tolerance or other difficulties. A member of the ground crew stays with anyone forced to drop out of a parade or performance.

## DISCUSSION

Based on other surveys of musicians, some of our results were expected, whereas others were surprising. In our study, the occurrence of musculoskeletal problems, as well as medical problems in general, was a little higher than that reported for secondary school students but much lower than that reported for orchestral musicians. The number of band members reporting problems such as shortness of breath, chest pain, and exhaustion was surprising and perhaps reflects an overall lack of conditioning and fitness.

As expected, many more complaints involved the upper extremities than the lower extremities. Further review of the military and sports medicine literature may facilitate follow-up on issues concerning the leg and foot as well as help to explain what appears to be an unduly high occurrence of lumbar pain.

Unlike almost all other studies, we found no significant differences between the responses of males and females to any question. Among musicians, males outnumber females by more than two to one, whereas the entire flagline is female. We were particularly struck by the higher rate of problems in almost every category for the flagline. Given the paucity of literature specific to such auxiliary units, we can only speculate that the high rate of upper-back and upper-extremity pain is due to the degree of shoulder movement required for twirling.

We were surprised to find that 30% of the band had consulted a health professional about a problem that affected participation. As mentioned above, this figure contradicts the fact that only 23% admitted to such a problem. In a number of cases, members who had seen a physician answered "no" to the question about having such problems. Part of the explanation may be the adolescent feeling of invincibility and denial. Perhaps older members considered the problem part of aging. Finally, others may have rationalized that as long as they continued playing and marching, in spite of the pain or inconvenience, no real problem existed. As with any questionnaire, it is often difficult to know exactly how different members interpreted the questions.

## CONCLUSIONS

The study resulted in an increased awareness of health problems among members of this particular band. Section

leaders routinely advise members to drink plenty of water on hot days, to dress sensibly, and to drop out if they feel sick. We have made recommendations to the band leadership about uniforms, first-aid training for a designated member of the ground crew, collection of relevant health information from band members, and possible conditioning/exercise programs.

This study has obvious limitations. The sample size is quite small, making difficult any further analysis based on instrument, age, or specific problem. The sample is not entirely representative of other marching bands. The schedule is not as rigorous, for example, as that of Drum Corps International groups. The mean age is older than that of secondary school or college bands. Other community bands with a similar age spread do not march nearly as often. Military bands are generally fully staffed by professional musicians.

Nonetheless, the study provides a first look at health problems encountered by members of marching bands. Physicians are provided with further questions to ask patients regarding their musical experience. Music educators may become aware of additional considerations in directing marching bands. A larger study using more and varied types of marching bands will add valuable information about this neglected area of music medicine.

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