

# Toward Better Prevention of Injuries Among Performing Artists

To paraphrase the old saying, a sixteenth note of prevention is worth a whole note of cure. Unfortunately, in 2006 we have very few sixteenth notes of proven prevention to offer performing artists. Therefore, practitioners of performing arts medicine are mostly limited to offering injured artists whole notes of treatment, assuming that the artist is in an area where she or he can find some treatment and can afford to pay for it. Should we be concerned that we have so little to offer in the way of injury prevention in the third decade of the existence of the field? What follows are my thoughts on the subject, sparsely annotated, focusing mainly on the instrumental musician. In future issues, we will develop these ideas further for other forms of the performing arts.

The basic requirements for establishing an effective prevention strategy to reduce the number of performance-related injuries consist of several components. First, we need to have a fairly detailed description of what those injuries are, how often they occur, what the risk factors are and the mechanism(s) of injury. Articles published in *Medical Problems of Performing Artists* and in other journals have painted a fairly clear picture of the types of injuries that performing artists sustain and how often they occur. It appears that about half of the members of professional symphony orchestras are having a problem at any given point in time,<sup>1</sup> and just under 10% of college-level instrumental performance majors sustain a performance-related injury each year.<sup>2</sup> We know that soft-tissue injury (general muscle pain syndromes and tendon damage) accounts for the majority of diagnoses when a performing artist seeks care for a

problem of recent onset; the parts of the body most commonly affected have also been described.<sup>3</sup>

Risk factors for injury can be divided into intrinsic (i.e., structural and functional characteristics of the performer) and extrinsic (i.e., characteristics of the environment). They can be modifiable (e.g., strength or hours of practicing per day) or non-modifiable (e.g., gender); some may be theoretically modifiable but not practically so (e.g., key width on the piano that must be used for tomorrow's concert). We have data showing that women are injured more frequently than men and that the frequency of injury varies with the instrument played.<sup>4</sup> Demonstrating other clear risk factors has been somewhat more difficult, although it appears that a sudden increase in playing time is a likely risk factor for injury. The role of technique and the interaction between technique and various characteristics of the human body remain a mystery.

Data on the mechanism(s) of injury are very sparse in our field. Studies using sophisticated imaging and other methodologies are difficult to do in performing artists due to the expense and, in some cases, the invasiveness of the research procedures. Animal studies of basic repetitive motion can provide some of the fundamental concepts, but there is no substitute for measuring exactly what is happening to a specific muscle performing a specific task to the point of fatigue and failure. It's ironic that this is in fact happening every day in practice rooms around the world, yet it is so hard to investigate scientifically.

The second step in developing an effective prevention strategy would be to

design an intervention based on the types of information mentioned above and then test it. Dr. Brandfonbrener did such a study with nine symphony orchestras several years ago,<sup>5</sup> but this remains one of the few trials of a prevention effort in the field. Even though it failed to show a positive effect (due to a high attrition rate), it still stands as a model for how to determine the effectiveness of an injury prevention program in a group of instrumental musicians. The essential elements were all present: a baseline assessment of a defined population, carrying out a defined intervention in one group while observing a control group, and repeat assessment of both groups after the intervention. Another element, blinding the participants to the intervention, will typically be difficult to implement in most studies of performing artists. Blinding the observer to the intervention will be possible more often and can add to the validity of the study.

The field of sports medicine has had a head start on performing arts medicine, and the progress made in the prevention of sports injuries may be useful for us to examine. A review article on injuries in children and adolescents in sports was published in 2003.<sup>6</sup> It was based on 46 published articles pulled from a comprehensive review of the sports medicine literature dating back to 1966; however, the vast majority of the articles had been published in the 1980s and 1990s. Adolescent sports injury rates (for both acute and repetitive motion injuries) as counted by emergency department admissions are on the same order of magnitude as instrumental injury rates

for the college population. A notable achievement in sports medicine is the measurement of injury frequency according to the amount of time spent on the sport; we don't have good data on "incidence density" in performing arts medicine.

Gender is a (non-modifiable) risk factor for injury in sports, but it is typically males who are at increased risk. The sport played, analogous to the instrument played, is a significant risk factor but varies by gender. I am not aware of any data showing that the risk associated with playing a particular instrument varies by gender, but studies with sufficient power to detect such a difference probably have not been done. Increasing age is associated with an increasing risk of injury in sports; again, we don't have good data on injury rates among the youngest performers in the arts. Anthropometric measurements (mainly height and weight) have not shown a consistent correlation with injury in sports, but they may predict certain types of injury in certain sports. Interestingly, being left-handed is a risk factor for injury in sports.

A number of modifiable risk factors are important in sports, and this is

(obviously) where prevention strategies have been tested. The results have not been overwhelming. Only two randomized controlled trials showed a benefit of physical training on injury prevention: one was in adolescent female handball players, and the other in female high school soccer players. Previous injury is a significant risk factor for future injury, but without a way to prevent the original injury, this is only theoretically a modifiable risk factor. Psychosocial factors also are related to injury risk in sports.

**H**ow can we make progress in the prevention of performance-related injuries in the coming years? In some ways, it may help us to follow the path that sports medicine researchers have marked for us. The 1993 review by Zaza<sup>7</sup> is still useful as well. Clearly, more formal reviews of the published data on injuries in performing artists are needed, along with a synthesis of the relevant basic science and animal data on repetitive motion injuries. A few well-designed studies looking at the mechanism(s) of injury in specific groups of performing artists would be very helpful. Once these have been

done, we should be in a position to initiate controlled trials of prevention initiatives with some likelihood of success. MPPA is eager to facilitate the dissemination of all relevant work in this area.

RALPH A. MANCHESTER, M.D.  
Rochester, New York  
rmanchester@uhs.rochester.edu

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## MANUSCRIPT SUBMISSIONS

Manuscripts to be considered for publication and other editorial correspondence regarding MPPA should be addressed to the Editor as follows:

Dr. Ralph A. Manchester  
Director, University Health Service  
University of Rochester  
250 Crittenden Blvd., Box 617  
Rochester, NY 14642-8617

e-mail: rmanchester@uhs.rochester.edu