

# EDUCATING MEDICAL STUDENTS ABOUT MUSCULOSKELETAL PROBLEMS

## ARE COMMUNITY NEEDS REFLECTED IN THE CURRICULA OF CANADIAN MEDICAL SCHOOLS?

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**Background:** Musculoskeletal problems are a common reason why patients present for medical treatment. The purpose of the present study was to review the curricula of Canadian medical schools to determine whether they prepare their students for the demands of practice with respect to musculoskeletal problems.

**Methods:** The amount of time spent on musculoskeletal education at each of Canada's medical schools was reviewed by surveying the directors (or equivalents) of all sixteen undergraduate musculoskeletal programs. With use of data from this survey and the Association of American Medical Colleges' guide to curricula, the percentage of the total curriculum devoted to musculoskeletal education was determined. The prevalence of disorders related to the musculoskeletal system among patients of primary care physicians was determined on an international basis by reviewing the literature and on a local basis by surveying all primary care physicians affiliated with the University of British Columbia's Department of Family Medicine.

**Results:** The curriculum analysis revealed that, on the average, medical schools in Canada devoted 2.26% (range, 0.61% to 4.81%) of their curriculum time to musculoskeletal education. The questionnaires completed by the directors of the undergraduate programs indicated widespread dissatisfaction with the musculoskeletal education process and, specifically, with the amount of time devoted to musculoskeletal education. Our literature review and survey of local family physicians revealed that between 13.7% and 27.8% of North American patients presenting to a primary care physician have a chief symptom that is directly related to the musculoskeletal system.

**Conclusion:** There is a marked discrepancy between the musculoskeletal knowledge and skill requirements of a primary care physician and the time devoted to musculoskeletal education in Canadian medical schools.

Musculoskeletal problems are a major source of pain and disability in our society. This has led twenty-eight countries and the United Nations to designate the years 2000 to 2010 as The Bone and Joint Decade. The broad goal of this initiative is "to improve the health-related quality of life for people who have musculoskeletal disorders."<sup>1</sup> Orthopaedic surgeons are taking a leadership role in this movement; however, to achieve high-quality musculoskeletal care, all physicians must understand the basic principles of diagnosing and treating these disorders. Medical school education should provide physicians with this critical foundation. Are medical students being trained to meet the musculoskeletal problems of their future patients? The purpose of this study was to determine if there is a discrepancy between the musculoskeletal knowledge and skill requirements of a primary care physician and the attention given to musculoskeletal education in Canadian medical schools.

### Materials and Methods

We surveyed the musculoskeletal curriculum content of all sixteen Canadian medical schools, with consideration given to two indices: the percentage of the curriculum devoted to musculoskeletal-related education and the quality of musculoskeletal education. The director (or equivalent) of each undergraduate musculoskeletal program was asked how many hours of musculoskeletal-related education were received by each medical student enrolled in the school. These hours were broken down into "preclinical education" and "clinical education" and were then further divided according to whether the time was "mandatory" or "recommended." Preclinical education was defined as formal instruction in a setting where students have no formal clinical responsibilities. Clinical education was defined as any rotation in which students have formal clinical responsibilities. By comparing these results with the total number of hours in each medical school's curriculum as outlined in the Association of American Medi-

**TABLE I Results of the Survey of Directors (or Equivalents) of Undergraduate Musculoskeletal Programs\***

**Overall**, how well do you feel the curriculum at your institution prepares graduating medical students to adequately deal with the musculoskeletal problems that they would encounter in a typical community practice?

Average = 2.75 (n = 16)

Range, 1-4

With respect to musculoskeletal education, how would you rate the **quality of teaching** that medical students receive at your institution?

Average = 3.53 (n = 15)

Range, 3-4

How would you rate the **resources** (money, space, equipment) available for educating undergraduate medical students about common and important musculoskeletal problems?

Average = 2.81 (n = 16)

Range, 1-5

How would you rate the **time available** in your institution's medical curriculum for educating medical students about common and important musculoskeletal problems?

Average = 2.19 (n = 16)

Range, 1-3

With respect to musculoskeletal conditions, how would you rate the **quality of preclinical education** (anatomy, physiology, pathology, small-group teaching, problem-based learning, etc.) that medical students receive at your institution?

Average = 3.00 (n = 16)

Range, 1-4

With respect to musculoskeletal education, how would you rate the **quality of clinical experience** that medical students receive at your institution?

Average = 2.93 (n = 15)

Range, 1-5

\*A rating of 1 indicates that the curriculum was inadequate; 3, adequate; and 5, excellent.

cal Colleges' *AAMC Curriculum Directory*<sup>2</sup>, we determined the total percentage of the curriculum that was devoted to mandatory musculoskeletal education.

The directors of the undergraduate programs were also surveyed in order to assess the quality of musculoskeletal education that was delivered. Each program director was asked six questions regarding the quality of teaching and resources, the time available, the quality of preclinical and clinical education, and the overall quality of the curriculum as it pertained to musculoskeletal education. The program directors were asked to honestly formulate their opinion on the basis of their knowledge of the curriculum, student feedback, and examination results. The same rating scale, from 1 (inadequate) to 5

(excellent), was used for each question. A 100% response rate (sixteen of sixteen) was achieved.

To assess the prevalence of musculoskeletal problems in local primary care practice, we surveyed the clinically active members of the University of British Columbia's Department of Family Medicine. Physicians were asked to estimate the percentage of patients in their practice who presented with a chief symptom related to the musculoskeletal system. The results of this survey were then compared with results derived from a review of the international literature.

## Results

The typical Canadian medical school offered 76.7 hours (range, thirty-five to 125 hours) of preclinical and 32.5 hours (range, zero to 160 hours) of clinical musculoskeletal education (see Appendix). By convention, the Association of American Medical Colleges designates one clinical week as equal to forty hours. On the basis of the *AAMC Curriculum Directory*<sup>2</sup>, we determined that the average total curriculum time at Canadian medical schools was 4833 hours (range, 3484 to 5975 hours). Mandatory musculoskeletal education in Canada thus represents 2.26% (range, 0.61% to 4.81%) of the average medical school curriculum. Only five of the sixteen medical schools provided mandatory exposure to musculoskeletal education in the clinical setting. The remaining eleven did not mandate that students perform a clinical musculoskeletal rotation (in orthopaedics, rehabilitation medicine, and/or rheumatology).

The survey of the program directors' assessments of the present state of musculoskeletal education at their institutions is presented in Table I. The six questions that were asked are followed by the range of responses and the average rating on a scale of 1 to 5, with a rating of 1 indicating that the curriculum was inadequate; 3, adequate; and 5, excellent. Of the sixteen respondents, eleven stated that the time available in their institution's curriculum for educating medical students was inadequate (a rating of 1 or 2). In addition, seven respondents rated their university's curriculum as inadequate overall (a rating of 1 or 2) in preparing students to deal adequately with musculoskeletal problems.

The survey of the clinical faculty of the University of British Columbia's Department of Family Medicine produced a response rate of 52% (141 of 270). Ninety-nine respondents (70%) were men, and forty-two (30%) were women. The respondents had been in practice for an average of nineteen years (range, three to forty-three years). Seventy-five (53%) practiced in a large center, and sixty-six (47%) practiced in a small or moderate-sized center. In answer to the question "Approximately what percentage of patients in your practice present with complaints related to the musculoskeletal system?" the average response was 27.4% (median, 20%; range, 5% to 100%).

## Discussion

To determine how commonly musculoskeletal problems are seen in a primary care practice, a number of investi-

gators have analyzed the content of a typical primary care practice. Marshland et al. performed a review of all patients presenting to a large group of primary care physicians over a two-year period<sup>3</sup>. There were a total of 526,196 patient encounters, each of which was entered into one of 567 diagnostic categories. We found that at least fifty-nine of these categories could be considered directly related to the musculoskeletal system, accounting for a total of 72,139 encounters (13.7%). The most prevalent category comprised patients presenting for a general medical examination with no specific chief complaint. If this category is excluded, then musculoskeletal symptoms were the reason for at least 15% of the patient encounters.

Rosenblatt et al. reviewed data from two large primary care practices<sup>4</sup>. One set of data, representing 38,511 patient encounters, was gathered by researchers at the University of Southern California<sup>5</sup>, and the other, representing 9164 patient encounters, was obtained by the National Ambulatory Medical Care Survey<sup>6</sup>. When the thirty most common patient problems were considered, seven were found to be clearly related to the musculoskeletal system, representing 19.5% and 17.4% of the patient encounters studied by the University of Southern California investigators and the National Ambulatory Medical Care Survey, respectively. Again, the most common category was "general medical examination"; when this category was excluded, musculoskeletal problems represented 22.5% and 21.8% of patient encounters, respectively.

Spitzer et al. performed a prospective review of the patients presenting to two groups of primary care physicians in southwestern Ontario<sup>7</sup>. The study population comprised 5478 adults older than the age of twenty-five years who had had a total of 3744 physician visits during a one-year period. Musculoskeletal symptoms were the reason for 27.8% of these visits.

In a review of the 1990 Ontario Health Survey, Badley et al. reported that musculoskeletal problems are the primary reason why people seek the advice of a health-care professional and that they are also the most common cause of chronic health problems among the general population<sup>8</sup>. Kahl also studied the prevalence of musculoskeletal problems and reported that 525 (23%) of 2285 patients presenting to a family physician had a primary musculoskeletal symptom<sup>9</sup>. Our literature review revealed that the prevalence of musculoskeletal problems among patients presenting to a typical primary care physician ranged from 13.7% to 27.8%.

These figures contrast sharply with the 2.26% portion of the average Canadian medical school curriculum that is presently devoted to mandatory musculoskeletal education. Even if a typical Canadian medical student took advantage of all of the recommended musculoskeletal educational opportunities, a marked discrepancy would still exist. Furthermore, this discrepancy is not a uniquely Canadian problem<sup>10</sup>. Williams analyzed the curriculum time devoted to trauma and orthopaedic surgery at twenty-one medical schools in the United Kingdom and found that only 2% of the available teaching time during the clinical years was allotted to these two areas<sup>11</sup>. He also found that only 10% of the vocational training schemes for general practitioners included orthopaedics.

It is likely that there is a similar lack of musculoskeletal education in medical schools in the United States. The Association of American Medical Colleges is the governing body for medical schools in both the United States and Canada; therefore, the parameters for curriculum development are identical in each country. Freedman and Bernstein found that 82% of recent medical school graduates had failed a basic-competency examination in musculoskeletal medicine<sup>12</sup>. Those authors concluded that students graduating from American medical schools were poorly prepared to manage musculoskeletal problems, and they recommended an increase in instructional time and a revision in the content of the curriculum. We used a different approach in our study; however, the general conclusions are similar, indicating that Canadian medical students are poorly educated about problems related to the musculoskeletal system.

Some may argue that these discrepancies are not important or that the subject matter is easy to teach. For example, the common cold is a major health problem in terms of the number of individuals that it affects. However, most educators would agree that there is probably no need to devote 5% to 10% of the average medical school's curriculum to issues related to this problem because students can be prepared to assess and manage it in far less time. Unfortunately, educating students about musculoskeletal disorders is far more complex, as these conditions represent not one but rather a myriad of clinical entities. Furthermore, there is limited ability to generalize between different types of musculoskeletal problems. Students' ability to assess and treat a patient with osteoarthritis of the knee does not ensure that they will know how to manage a patient with low-back pain. Educating medical students about musculoskeletal medicine requires an organized program, conscientious teachers, and adequate curriculum time.

Our survey of directors of undergraduate musculoskeletal programs suggests that these individuals are not satisfied with the quality of the educational experience that their medical schools are providing to students. Seven of the sixteen program directors whom we surveyed stated that, overall, the program at their institution did not adequately prepare students to deal with common musculoskeletal problems. The time available for musculoskeletal education in their institutions' curricula was viewed as inadequate by eleven of the sixteen respondents. Educational resources as well as the quality of the clinical experience were also regarded as less than adequate by the respondents.

Our hypothesis in undertaking this study was that there is a discrepancy between the musculoskeletal knowledge and skill requirements of a primary care physician and the time and resources devoted to musculoskeletal education in Canadian medical schools. The findings in this study provide strong evidence to support our hypothesis.

On the basis of our findings, we offer three recommendations. First, substantially more curriculum time should be devoted to musculoskeletal education in Canadian medical schools. An initial step in this direction would be to make at

least one musculoskeletally oriented clinical rotation (in orthopaedics, rheumatology, or rehabilitation medicine) mandatory during medical school. At the time of this study, only five Canadian medical schools had a mandatory clinical rotation in a musculoskeletal discipline. Second, all proposed curriculum reforms should ensure that every medical student is exposed to the essential principles of musculoskeletal medicine. This can be a challenge when medical students are spread out among different hospitals and receiving a variety of different clinical experiences. However, through the use of clearly stated objectives, uniform reading lists and/or instructional sessions, and well-planned examinations, this challenge can be met. Our final recommendation is that musculoskeletal education should be coordinated throughout the entire medical school curriculum by one individual. When we were surveying the musculoskeletal program directors (or equivalents), it was often difficult to obtain an overview of each medical school's musculoskeletal education program without talking to a number of individuals. Many individuals were quite knowledgeable about their specific component of the curriculum but had no knowledge about other areas in the curriculum that involved musculoskeletal education.

## Appendix

**eA** A table showing specific data regarding musculoskeletal educational content in Canadian medical school curricula is available with the electronic versions of this article, on our web site at [www.jbjs.org](http://www.jbjs.org) (go to the article citation and click on "Supplementary Material") and on our CD-ROM (call 781-449-9780, ext. 140, to order). ■

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