

Canadian Multidisciplinary Core Curriculum for Musculoskeletal Health

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ABSTRACT. *Objective.* To determine the level of agreement among the Bone and Joint Decade Undergraduate Curriculum Group (BJDUCG) core curriculum recommendations for musculoskeletal (MSK) conditions targeted for undergraduate medical education and what the physicians and surgeons of Canada thought to be important at the postgraduate level of education.

Methods. An 80-item questionnaire was developed. A cross-sectional survey of educators representing 77 Canadian accredited academic programs representing 6 disciplines in medicine that manage patients with MSK conditions was completed. Histograms, Kruskal-Wallis, and principal component analyses were computed.

Results. In total, 164/175 (94%) respondents participated in the study. All 80 curriculum items received a mean score of at least 3.0/4.0. Sixty-four out of 80 items were ranked to be at least 3.5/4.0, and 35 items were ranked to be at least 3.8/4.0, suggesting that these items may be core content for all disciplines.

Conclusion. The World Health Organization declared the years 2000 to 2010 as The Bone and Joint Decade. The main goal is to improve the quality of life for people with MSK disorders worldwide. One aim of the BJD is to increase education of healthcare providers at all levels. The BJDUCG established a set of core curriculum recommendations for MSK conditions. Our study gives reliable statistical evidence of agreement among what the BJDUCG recommended for an MSK core curriculum for medical schools and what the physicians and surgeons of Canada thought to be important for residency education in several disciplines. (First Release Dec 15 2006; J Rheumatol 2007;34:567-80)

Key Indexing Terms:

MUSCULOSKELETAL

BONE AND JOINT DECADE

POSTGRADUATE AND UNDERGRADUATE MEDICAL EDUCATION

On January 13, 2000, The World Health Organization (WHO) declared the years 2000 to 2010 as The Bone and Joint Decade (BJD). The main goal of the Decade is to improve the quality of life for people with musculoskeletal (MSK) disorders worldwide. The main reason for this focus is due to the cur-

rent and projected burden of illness related to MSK conditions¹⁻³. MSK conditions are the second most common reason for the need to see a physician⁴ and account for 20% of the total cost of illness in Western countries⁵. Collectively they are the primary cause for severe longterm pain and physical disability and the most common cause of health related problems leading to a person's inability to work⁵. Sixty percent of the working people in Sweden¹ need to take early retirement or longterm sick leave because of MSK related conditions⁴. In addition, the cost of morbidity resulting from MSK conditions is second only to that of cardiovascular disease⁵. An even more drastic figure suggested by the WHO indicates that by the year 2020, motor vehicle accidents will be the second most common cause of premature deaths worldwide⁴ and osteoarthritis will be the fourth leading cause of disability worldwide².

One aim of the BJD is to increase education of healthcare providers at all levels⁶. To initiate this process, the Bone and Joint Decade Undergraduate Curriculum Group (BJDUCG) was established; its main contribution was a set of core curriculum recommendations for MSK conditions⁷. These recommendations were developed by medical experts from 29 nations, targeted specifically for medical school education for the purposes of worldwide acceptance.

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The need for the MSK curriculum in medical schools has been established⁶⁻¹⁸. The need for the MSK curriculum to be emphasized in residency training programs managing patients with such conditions has been established^{17,19-26}. The problem has been the lack of curriculum with a specific focus on MSK content. One of the main contributions in this area to date was by the BJDUCG⁷.

The purpose of our study was to determine the level of agreement among the BJDUCG's core curriculum recommendations for MSK conditions targeted for undergraduate medical education and what the physicians and surgeons of Canada thought to be important at the postgraduate level of training.

The objectives were first to develop an "outcome" based on the core curriculum recommendations outlined by the BJDUCG. Second was to utilize the "elite interview" technique with individuals who are positioned uniquely to judge content of curriculum suitable for educating physicians and surgeons in the area of MSK health. These individuals included program directors and selected educators from 16 accredited academic institutions within Canada. The third objective was to perform a statistical analysis to determine the level of agreement among physicians and surgeons in Canada on the items included in the BJDUCG curriculum recommendations.

MATERIALS AND METHODS

This study was conducted on the campuses of the 16 accredited academic institutions within Canada. A cross-sectional survey of program directors and selected educators representing 6 disciplines and 77 accredited academic training programs that manage patients with MSK conditions was completed. These disciplines included family medicine, sports medicine, and 4 specialty programs of the Royal College of Physicians and Surgeons of Canada (RCPSC): emergency medicine, physical medicine and rehabilitation, rheumatology, and orthopedic surgery. A research grant was obtained from the RCPSC outlining the question and the objectives. Then, a survey instrument based on the BJDUCG core curriculum recommendations for MSK health²⁷ was designed as an outcome measure, and the content of the survey was reviewed by medical experts who manage patients with MSK conditions.

Outcome measures. The survey consisted of 80 questions covering 14 different categories relating to MSK conditions. A broad variety of topics ranging from trauma to chronic conditions in both adult and pediatric populations was incorporated into the questionnaire. In addition, questions incorporating the CanMeds (Canadian Medical Education Directives for Specialists) objectives of the RCPSC and the Principles of Family Practice as outlined by the Canadian College of Family Practice were also incorporated into the questionnaire to make it specific to the current requirements of the RCPSC and the Canadian College of Family Physicians (CCFP). A copy of this questionnaire is available from the corresponding author upon request.

The 14 categories of questions included: Assessment and Diagnosis; Problem Based Symptomatic Approach; Red Flags and Emergent Conditions; Extremity Problems – Traumatic; Extremity Problems – Nontraumatic; Spinal Problems; Fractures/Injury/Trauma; Joints and Soft Tissue Conditions; Tumours; Bone Disorders; Pediatrics; Related Knowledge; and Methods for Management.

Each of the 80 question items was structured in a fashion similar to the sample question below that pertains to a patient presenting with a joint infection. The choices for response for each question were: 0 – Unable to assess, 1 – Not important, 2 – Probably not important, 3 – Probably important, and 4 – Important. The question would be read to the physician in a direct interview.

The questionnaire was delivered to each respondent by the same researcher (VW) using the same sequence of delivery and no interruptions. Respondents were requested to "flag" questions that they did not understand and move on to the next question until the end of the interview, when the question flagged was clarified and the respondent proceeded to answer any previously unanswered questions. In addition, upon completion of each interview the respondent was asked to indicate if there were any topics that were omitted from the curriculum or any questions that were included in the curriculum that should be omitted from the questionnaire. These topics were documented.

Sample question. A sample question from the questionnaire is given in Figure 1; it pertains to joint infection. A program director in family medicine would likely rank this question as an important topic for family medicine residents to know and understand by the completion of their residency. This question would likely receive a score of 4.0.

Associate deans from the 16 Canadian academic institutions were contacted in advance to inform them of the educational initiative, and that their respective program directors and selected educators would be approached to participate in this study. The prospective respondents (program directors and selected educators) were then contacted by e-mail with a letter outlining the background information and purpose of the research project. The letter was followed by a telephone call to arrange a direct one-on-one interview. An elite interview with individuals uniquely positioned to make judgments on content of the proposed MSK curriculum was organized, and a 6-week national interview schedule was carried out.

Statistical analysis. Data analysis included histograms showing the frequency of distribution of the average mean rank scores for each of the 80 question items determined by each of the respondents. The average mean rank scores were presented in ascending order of importance. Histograms were then generated for each of the 6 disciplines participating in the study. A Kruskal-Wallis analysis²⁸ was used to determine if there were significant differences among the 6 disciplines with respect to the responses. A principal component analysis was conducted to identify these differences.

RESULTS

One hundred sixty-four of 175 possible physicians responded to the request we made, for a response rate of 94%. Ninety-six percent of program directors and 92% of selected educators from each of the 16 institutions participated. The average age of respondents was 46.4 years, with an average number of 14.3 years teaching. Men represented 72% (n = 118) of the respondents, women 28% (n = 46). The response rates from the various regions within Canada were 39% (64) from Western Canada, 41% (67) from Central Canada, and 20% (33) from Eastern Canada. A breakdown of the 164 respondents by disciplines showed the following response rates: 35/36 (97%) family medicine, 22/22 (100%) sports medicine, 21/23 (91%) emergency medicine, 20/24 (83%) physical medicine and rehabilitation, 28/29 (97%) rheumatology, and 38/41 (93%) orthopedic surgery.

Figure 2 illustrates that each of the 80 recommended core curriculum items⁷ received a mean score of at least 3 from the 164 respondents. Sixty-four of the 80 items were identified by all 164 respondents to be at least 3.5 out of 4.0. This suggests that all 64 items were very important. Thirty-five items received an average mean rank score \geq 3.8 out of a possible 4.0, suggesting that these items may indeed be core content for MSK health to all disciplines. The items are listed in Table 1.

Interestingly, of the 35 top-rated items, the top 10 appeared to fall into 3 areas (Table 2). First, the ability to take a good

Table 1. Thirty-five curriculum topics identified as core content for all 6 disciplines managing patients with MSK conditions. The 35 items received an average mean rank score ≥ 3.8 out of a possible 4.0. The number beside the curriculum item represents the number in the BJDUCG Questionnaire.

Basic Competencies in Clinical Assessment and Diagnosis:

- 1 History Taking
- 2 Relevant History Taking
- 3 Physical Examination
- 4 Interpretation of appropriate investigations

Problem Based Symptomatic Approach

Indicate the importance of the ability to construct an appropriate differential diagnosis and plan of patient enquiry, examination, limited investigation and assessment for a patient presenting with :

5. A musculoskeletal injury
- 6 Joint pain such as polyarticular, monoarticular, periarticular
- 7 Back pain
- 8 Regional pain or stiffness
- 10 *Decrease or loss of motion or weakness*
- 11 Altered sensation
- 12 A deformity
- 13 A mass

Red Flags & Emergencies

Indicate the importance of the ability to demonstrate knowledge, the ability to diagnose, initially manage and to know when to immediately refer a patient with:

- 15 Fractures associated with nerve or vascular compromise
- 16 Cauda equina compression
- 17 Compartment syndrome or vascular compromise
- 18 A joint infection
- 19 A soft tissue infection
- 20 A bone infection

Extremity Problems: Traumatic

- 23 Indicate the importance of the ability to identify and characterize injuries that include fracture of long bones, fracture involving joints, joint dislocations, sprains and strains

Extremity Problems: Non-traumatic

Indicate the importance of the ability to take a relevant history, to identify and characterize major non-traumatic extremity problems such as joint disorders including:

- 24 Osteoarthritis and rheumatoid arthritis
- 25 Soft tissue disorders such as bursitis, tendonitis, tenosynovitis, enthesopathy and nerve entrapment
- 27 Bone conditions such as malignancy and infection

Spinal Problems

Indicate the importance of the ability to take a relevant history, to identify and characterize:

- 28 Mechanical back pain relating to non-specific low back pain, spondylolysis, spondylolysis and lumbago
- 29 Spinal cord or root entrapment such as a herniated lumbar disc
- 30 Vertebral fractures of traumatic origin
- 31 Vertebral fractures of osteoporotic origin
- 32 Inflammatory back pain such as ankylosing spondylitis
- 34 Destructive lesions of the spine such as infections/tumors/metastasis
- 35 Low back pain and sciatica
- 36 Neck pain

Joint and Soft Tissue Conditions

Indicate the importance of the ability to: specify the symptoms, signs and predisposing factors; to outline the assessment and appropriate investigations; to propose a differential diagnosis and; to outline the principles of management of a patient with:

- 44 Osteoarthritis
- 46 Soft tissue lesions or enthesopathy such as a rotator cuff lesion, tennis elbow or any other soft tissue condition

Pediatric Population

Indicate the importance of the ability to: outline the clinical features; to specify the symptoms and signs; to outline the assessment and appropriate investigations; to propose a differential diagnosis and; to outline the principles of management of a pediatric patient:

- 61 Presenting with a limp

Methods for Management and Treatment (Non-Surgical Treatment)

- 71 Regarding Pharmacology: indicate the importance of the ability to be familiar with the major indications, adverse effects, drug interactions and contra-indications of drugs commonly used in the management of musculoskeletal conditions.

Procedures

Indicate the importance of the ability to perform:

- 76 Joint injections and aspirations

The numbers beside the curriculum item represents the number in the BJDUCG Questionnaire.

Table 2. Top 10 items in MSK core curriculum.

Clinical assessment	History
	Physical examination
Emergency and red flag conditions	Joint infections
	Spinal cord/root injury
	Bone infection
	Cauda equina syndrome
	Destructive lesions of the spine
Common problems	MSK injury
	Back pain
	Deformity

Figure 6 indicates the specific questions that distinguished family medicine and emergency medicine. It is difficult to make distinctions among the disciplines, and the differences observed are narrower than observed with the first principal component.

DISCUSSION

The curriculum proposed by the BJDUCG outlined 80 curriculum items pertinent to MSK conditions⁷. Our study demonstrates substantial support for that curriculum at the resident level of education. Table 3 provides a summary of each of the questions in the MSK curriculum and the average rank score of each discipline, along with the overall average rank score for each question when all respondents were included in the analysis. Very few items received a low average mean score. It is clear from these results that there is substantial agreement among the top 64 items in the curriculum, and the small amount of variance among the 6 disciplines for the remaining groups does reflect the nature of practices.

That the BJDUCG developed a consensus of material that should be learned in the area of MSK health was a substantial advantage for this research, as it provided a document that is now validated by close to 100% of the educational leaders of 77 academic programs managing patients with MSK conditions in Canada.

This study also identified certain topics that were not included in the recommendations provided by the BJDUCG. These included: (1) management of chronic pain and non-organic pain; (2) topics pertaining to foot and ankle; (3) assessment of medical/legal and disability; (4) conditions associated with female health; (5) ability to prescribe exercise for both health and disease; (6) ability to assess return to work activity; (7) ability to assess return to play activity; (8) ability to understand the various complementary and alternative forms of medical therapies; (9) issues relating to practice and life management; and (10) research and clinical appraisal skills. These items have been added to the product of this study, The Canadian MSK Core Curriculum (Appendix). The questionnaire is available from the corresponding author upon request.

The fact that the elite interview technique²⁹ was utilized for this research may explain the outstanding response rate of 94%. The program directors and selected educators appreciat-

ed the need to facilitate the advancement of MSK education in Canada. In addition, some unity has emerged among the 6 medical disciplines representing 16 accredited institutions in Canada, who agreed to combine efforts and work for the first time toward developing and implementing one nationwide multidisciplinary core curriculum for MSK health.

Weaknesses of the study included the positive response bias that may have existed with the format of the questionnaire³⁰. Educational literature indicates that some individuals tend to agree with statements presented to them, so that when all questions are worded in a positive manner the extent of agreement may be overestimated. Second, the groups of physicians in the various disciplines were not equal in number because the academic programs across Canada are not equal. Finally, it may have been useful to ask for more degrees of importance. In this study a range of integers from 0 to 4 was used for scoring. We may have elicited more differences if we had used a wider scale. On the other hand, asking for more precision might only have yielded noise.

The global concern for the need to develop and implement curriculum content in the domain of MSK health is not unique to medical schools^{7,10-12,15-18,31}. Acquisition of basic knowledge in MSK health is essential to any discipline required to deliver healthcare services to patients afflicted with MSK conditions^{6,14,19-23,26}.

In Canada, 77 accredited academic programs from the 16 accredited universities representing family medicine, sports medicine, emergency medicine, physical medicine and rehabilitation, rheumatology, and orthopedic surgery agreed to participate in validating an international core curriculum for MSK conditions. This initiative was undertaken with full endorsement of the RCPSC, CCFP, and Bone and Joint Decade Canada. This type of collaboration among the various specialty committees for the RCPSC and The College of Family Physicians of Canada Section of Teachers Executive Committee for the CCFP is unprecedented.

Our study demonstrated that all 80 items outlined by the BJDUCG are either probably important or important to know and understand upon completion of residency in these 6 disciplines that manage patients with MSK conditions. In addition, 64 items were ranked by all respondents to be important with scores no less than 3.5. Thirty-five items received rankings no less than 3.8. These items appeared to be important to all respondents and there was very little variability among the 6 disciplines. The small variance that did exist can be explained statistically, and these differences seem to reflect the character of practice of each discipline.

The Kruskal-Wallis analysis showed that a variance among the 6 participating disciplines did exist with the items ranked as probably important. Principal component analyses allowed us to determine where differences existed. Fifty-five percent of the variability was explained by the principal components that we studied.

The first principal component explained 37% of the vari-

Table 3. Average rank mean scores of each question item by discipline (80 questions).
 PMR: physical medicine and rehabilitation, Ortho: orthopedics, Rheum: rheumatology.

Item Number	ALL Disciplines	Family Medicine	Emergency Medicine	Sports	PMR	Ortho	Rheum
1	4.00	4	4	4	4	4	4
2	3.99	4	3.9	4	4	4	4
3	3.99	4	4	4	4	4	3.96
4	3.88	3.77	3.76	3.95	3.95	3.98	4
5	3.96	4	4	4	4	4	3.79
6	3.91	3.97	4	4	3.8	3.76	4
7	3.96	3.97	4	3.95	4	3.92	3.96
8	3.88	3.91	3.86	3.91	4	3.74	3.96
9	3.77	3.91	3.76	3.82	3.9	3.42	3.93
10	3.95	3.94	4	4	4	3.92	3.89
11	3.85	3.91	3.9	3.95	3.9	3.82	3.64
12	3.96	3.97	4	3.91	3.95	3.97	3.96
13	3.87	3.97	3.95	3.86	3.65	3.95	3.75
14	3.73	4	4	4	3.3	4	2.89
15	3.81	4	4	4	3.65	4	3.14
16	3.97	3.97	4	3.95	3.95	4	3.93
17	3.96	4	4	4	3.95	4	3.79
18	4.00	4	4	4	4	4	4
19	3.93	3.89	4	3.91	3.85	3.95	4
20	3.98	3.97	4	3.95	4	3.97	4
21	3.64	3.97	4	3.59	3.8	2.89	3.89
22	3.74	4	4	3.95	3.65	3.97	2.82
23	3.82	3.97	4	4	3.75	4	3.18
24	3.90	4	3.43	3.95	3.9	3.97	4
25	3.94	3.97	3.71	4	4	3.92	4
26	3.69	3.71	3.38	3.64	3.85	3.61	3.93
27	3.93	4	3.95	3.86	3.8	3.97	3.93
28	3.93	3.97	3.62	4	4	3.95	4
29	3.99	3.97	4	4	4	4	3.96
30	3.85	3.97	4	3.95	3.7	4	3.43
31	3.91	3.94	3.9	3.68	3.95	3.95	4
32	3.81	3.77	3.38	3.91	3.95	3.82	4
33	3.57	3.86	2.62	3.68	3.75	3.87	3.29
34	3.97	3.91	4	3.95	4	4	3.96
35	3.95	4	3.95	4	4	3.87	3.93
36	3.94	3.97	3.95	4	4	3.84	3.93
37	3.57	3.97	3.95	3.95	3.25	4	2.11
38	3.66	3.91	4	3.95	3.2	4	2.71
39	3.74	3.97	4	3.95	3.9	3.82	2.86
40	3.75	3.86	4	3.95	3.95	4	2.75
41	3.58	3.83	4	3.91	3.5	4	2.19
42	3.74	3.74	3.81	4	3.75	3.92	3.25
43	3.62	3.8	3.24	3.91	3.7	3.79	3.14
44	3.85	3.97	3.1	3.95	3.95	3.95	4
45	3.64	3.74	3.14	3.45	3.6	3.68	4
46	3.90	3.94	3.6	4	4	3.98	3.96
47	3.46	3.91	2.9	3.41	3.85	2.89	3.93
48	3.72	3.8	3.86	3.64	3.3	3.66	4
49	3.34	3.69	3.86	3.09	2.6	2.97	3.82
50	3.43	3.69	3.33	3.12	3.1	3.05	4
51	3.46	3.6	3.62	3.27	2.85	3.24	4
52	3.62	3.97	3.76	3.45	3.7	2.97	4
53	3.53	3.77	3.67	3.12	3.1	3.97	2.96
54	3.40	3.54	3.43	3.45	2.85	3.95	2.82
55	3.76	3.97	2.9	3.91	3.9	3.71	4
56	3.25	3.2	2.57	2.86	3.3	3.5	3.75
57	3.41	3.66	4	3.73	3	4	1.86
58	3.60	3.91	4	3.95	2.9	4	2.57
59	3.72	3.94	4	3.82	2.8	4	3.43
60	3.68	3.8	3.71	3.73	3.35	3.95	3.32
61	3.85	3.97	3.9	3.95	3.7	3.95	3.54
62	3.43	3.4	3	3.23	3	3.63	3.96
63	3.11	3.42	2.04	2.86	3.7	3.84	2.29
64	3.61	3.94	4	3.82	3.1	3.97	2.61
65	3.06	3.91	2.9	2.64	3.4	3.03	2.25
66	3.68	3.4	3.48	3.77	3.95	3.84	3.89
67	3.63	3.23	3.19	3.82	3.85	3.82	3.93
68	3.43	3.94	2.38	3.95	3.9	2.97	3.46
69	3.38	3.77	4	3.86	2.8	3.97	1.64
70	3.55	3.86	2.52	3.91	3.95	3.29	3.71
71	3.91	4	3.95	3.91	4	3.68	4
72	3.04	2.83	3.29	3.12	3	4	1.64
73	3.70	3.51	3.29	3.77	3.7	4	3.71
74	3.23	3.74	4	3.82	1.9	3.97	1.46
75	3.32	3.91	4	3.91	2.1	3.97	1.54
76	3.95	3.83	3.95	3.91	3.95	4	4
77	3.57	3.23	2.71	3.64	3.9	3.66	4
78	3.22	3.89	4	3.73	1.96	3.97	1.25
79	3.60	3.54	2.67	4	4	3.76	3.57
80	3.75	3.89	3.86	3.5	3.9	3.63	3.82

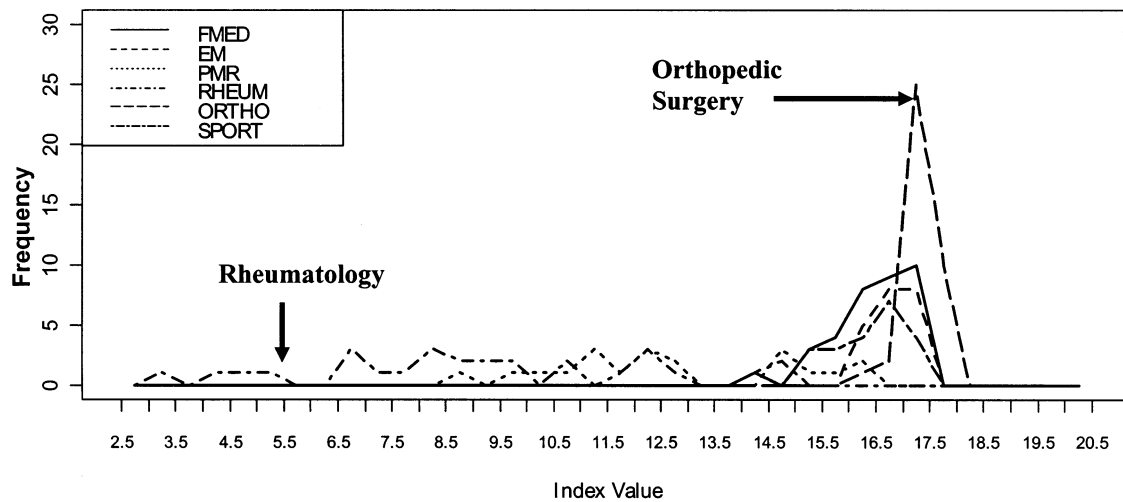


Figure 3. First principal component analysis explaining 37% of the variability among the 6 disciplines.

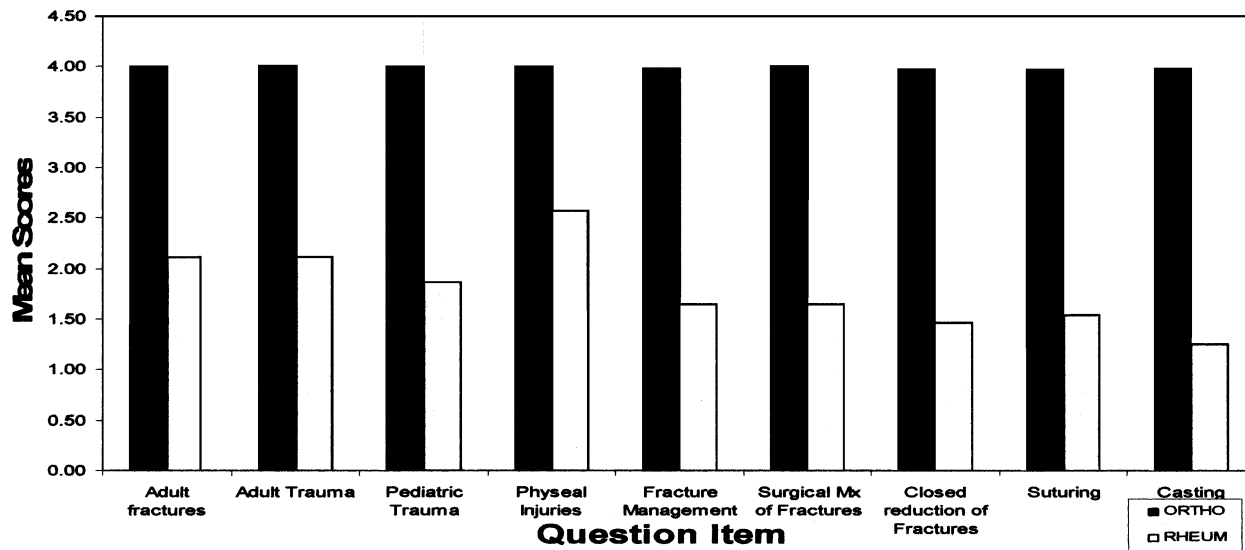


Figure 4. Curriculum content distinguishing orthopedic surgery (Ortho) and rheumatology (Rheum) in the first principal component.

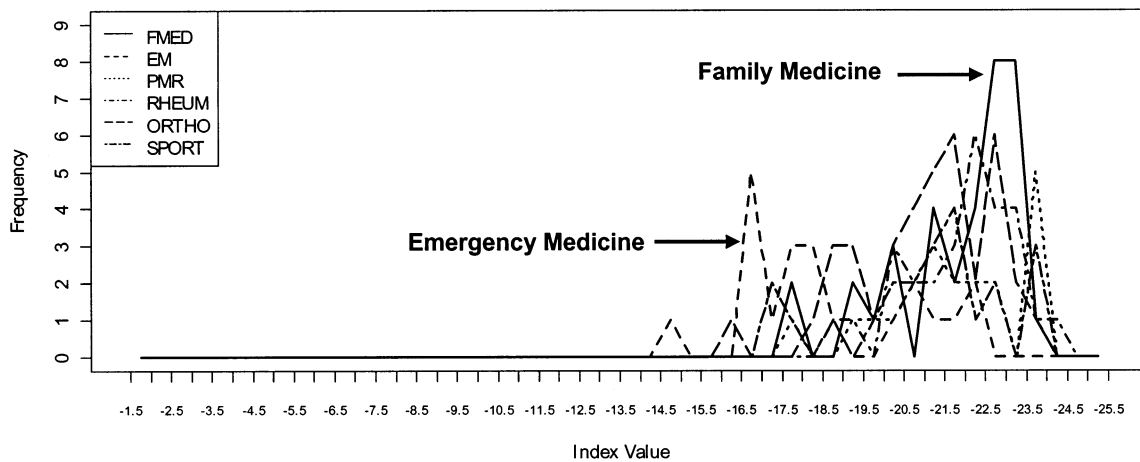


Figure 5. Second principal component analysis explaining 19% of the remaining variance among the 6 disciplines.

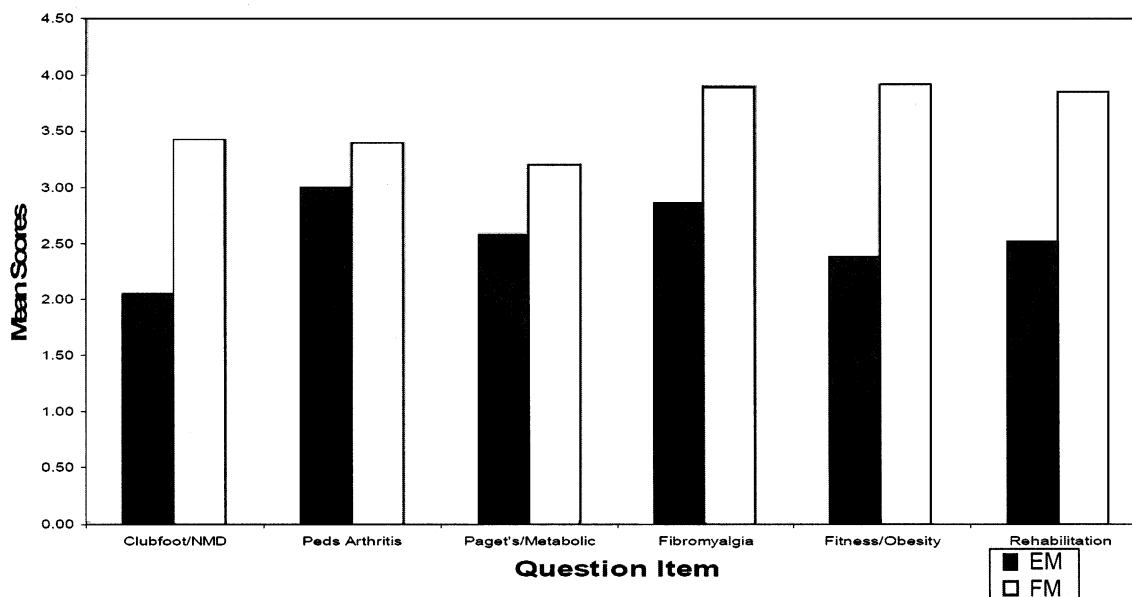


Figure 6. Curriculum content distinguishing family medicine (FM) and emergency medicine (EM) in the second principal component.

ability, and identified the main difference to be between the discipline of rheumatology and orthopedic surgery. The question items that distinguished these 2 disciplines pertained to adult and pediatric trauma, performing procedures, and knowing how to apply casts. The content is reflective of an orthopedic surgeon's practice, not that of a rheumatologist.

The second principal component explained an additional 12% of the variability among the 6 disciplines, 19% of that remaining after the first principal component, and identified that a real difference did exist between family medicine and emergency medicine. The curriculum content distinguishing these 2 disciplines includes pediatric conditions such as clubfoot and arthritis, metabolic diseases, pain syndromes, fitness, obesity, and rehabilitation. These conditions reflected the nature of a family physician's practice, not that of an emergency medicine physician. It is important to emphasize that the observed differences were among items deemed to be probably important among all disciplines. These items all received an average score of at least 3 out of 4. Some overlap regarding the core curriculum content for MSK health did exist among all 6 participating disciplines; however, these differences were explained statistically.

To develop a truly comprehensive and well balanced core curriculum for MSK health it would be important to incorporate the complementary skill sets and abilities of all disciplines charged with managing patients with MSK conditions.

Conclusions. This study demonstrated with evidence reliable enough to inform policy that there is much agreement between what the BJDUCG recommended for a core curriculum for MSK conditions targeted for undergraduate medical education and what the physicians and surgeons in Canada thought to be important at the postgraduate level of medical education

among 6 disciplines in medicine. In addition, the product from this study is a Canadian Multidisciplinary Core Curriculum for Musculoskeletal Health. The main question remains how to transmit this body of knowledge in a useful manner to benefit others.

We recommend a possible change in the educational paradigm and a closer look at developing technologies to support this core curriculum for MSK health. We are considering a shift from traditional methods of learning to more interactive learning experiences. We recommend the development of one "online" curriculum that would function to address the educational needs of: (1) patients, by providing information pertaining to MSK conditions and screening examinations; (2) current healthcare providers, by providing current evidence to support the decisions they make when managing patients; and (3) future healthcare providers, by developing interactive online learning experiences as an educational tool to augment, not replace, clinical encounters. A multidisciplinary team of medical experts would design the modules. These modules would be evidence based and would be accessible online for nationwide implementation.

One of the main aims for this educational initiative is to optimize the learning from a clinical encounter by providing a learner with exposure to a clinical situation before actually encountering one, or reinforcing a clinical encounter by revisiting the learning module. The intention is to optimize learning while encouraging evidence based practices in a user-friendly fashion.

Future research should focus on development of this online interactive educational initiative to determine if it is an effective, efficient, and enjoyable way for physicians and surgeons across Canada to learn about MSK conditions. The outcome

I Basic Competencies In Clinical Assessment And Diagnosis

1. The ability to identify abnormality from normality with respect to pain, displacement, dislocation, stiffness, swelling and limitation of activities by a history relevant to the musculoskeletal system.
2. The ability to take a relevant history in the knowledge of the characteristics of major conditions of: bone; joints; connective; nerve and; muscle tissue as they relate to both acute and chronic injury or other disease processes and to understand the impact on the individual of a chronic musculoskeletal condition in terms of impairment of function, limitation of activities and restriction of participation.
3. The ability to: identify normality and abnormality by physical examination of the musculoskeletal system; to be able to perform a screening, trauma and focused physical examination of major joints including the hip, knee, ankle, shoulder, elbow and smaller joints such as the finger and to be able to identify and characterize by physical examination pain, tenderness, swelling, dislocation, displacement, deformity, muscle wasting, weakness, abnormal movement and functional impairment.
4. The ability to order and understand interpretation of appropriate investigations including serology, synovial fluid analysis, radiographs, arthrograms, MRI/CT/Bone scans, bone densitometry, musculoskeletal ultrasound and/or EMG and nerve conducting tests.

II Problem Based Symptomatic Approach

The ability to construct an appropriate differential diagnosis and plan of patient enquiry, examination, limited investigation and assessment for a patient presenting with:

5. A musculoskeletal injury.
6. Joint pain such as polyarticular, monoarticular, and periarticular pain.
7. Back pain.
8. Regional pain or stiffness.
9. Generalized pain or stiffness.
10. Decrease or loss of motion or weakness.
11. Altered sensation.
12. Deformity.
13. A mass.

III Red Flags & Emergencies

The ability to demonstrate knowledge, the ability to diagnose, initially manage and to know when to immediately refer a patient (to urgent subspecialty care if necessary) with:

14. Open fractures
15. Fractures associated with nerve or vascular compromise.
16. Cauda equina compression.
17. Compartment syndrome or vascular compromise.
18. Joint infection.
19. A soft tissue infection
20. A bone infection.
21. Temporal arteritis.

IV Extremity Problems: Traumatic

22. The ability to take a relevant history in the knowledge of the characteristics of trauma and fractures.

23. The ability to identify and characterize injuries that include fracture of long bones, fracture involving joints, joint dislocations, sprains and strains.

V Extremity Problems: Non-Traumatic

The ability to take a relevant history, to identify and characterize major non-traumatic extremity problems such as:

24. Joint disorders including osteoarthritis and rheumatoid arthritis.
25. Soft tissue disorders such as bursitis, tendonitis, tenosynovitis, enthesopathy and nerve entrapment.
26. Muscle disorders of congenital, inflammatory and neurological origin.
27. Bone conditions such as malignancy and infection.

VI Spinal Problems

Please indicate the importance of the ability to take a relevant history, to identify and characterize:

28. Mechanical neck and back pain relating to non-specific low back pain, spondylolysis, spondylolsthesis and lumbago.
29. Spinal cord or root entrapment (e.g. herniated lumbar disc).
30. Vertebral fractures of traumatic origin.
31. Vertebral fractures of osteoporotic origin.
32. Inflammatory back pain such as ankylosing spondylitis.
33. Spinal deformity such as scoliosis.
34. Destructive lesions of the spine presenting with back pain which may be of infectious or tumor origin such as tuberculosis, metastasis and/or malignancy

The ability to: specify the symptoms and signs; to outline the assessment and appropriate investigations; to propose a differential diagnosis and; to outline the principles of management of a patient with:

35. Low back pain and sciatica
36. Neck pain

VII Fracture/Injury/Trauma

Please indicate the importance of the ability to specify the symptoms, signs and immediate complications; to outline the assessment and appropriate investigations and; to outline the immediate and long term management of patient with:

37. Common adult fractures
38. Joint dislocations
39. Soft tissue injuries
40. An acute spinal injury
41. Multiple injuries
42. Joint instability of the hip, knee, ankle, foot, shoulder, elbow, wrist, finger or spine
43. Obtain clinical experience during of all stages of injury and healing. For example, obtain clinical experience in the emergency room or outpatient clinic through to the rehabilitation clinic.

VIII Joint and Soft Tissue Conditions

The ability to: specify the symptoms, signs and predisposing factors; to outline the assessment and appropriate investigations; to propose a differential diagnosis and; to outline the principles of management of a patient with:

44. Osteoarthritis.
45. Chronic inflammatory arthritis such as rheumatoid arthritis, or any of the spondyloarthropathies.
46. Soft tissue lesion or enthesopathy such as a rotator cuff lesion, tennis elbow or any other soft tissue condition
47. Fibromyalgia or chronic generalised pain
48. Crystalloid arthropathy
49. Rheumatic fever
50. An autoimmune connective tissue diseases such as SLE

51. Viral arthritis such as HIV
52. Polymyalgia rheumatica

IX Tumors & Bone Disorders

The ability to: specify the symptoms and signs; to outline the assessment and appropriate investigations; to propose a differential diagnosis and; to outline the principles of management of a patient with:

53. Metastatic bone disease
54. Primary bone and soft tissue tumors
55. A patient with osteoporosis
56. A patient with other metabolic bone diseases including osteomalacia and Paget's Disease.

X Pediatric

The ability to: outline the clinical features; to specify the symptoms and signs; to outline the assessment and appropriate investigations; to propose a differential diagnosis and; to outline the principles of management of a pediatric patient with:

57. Multiple injuries
58. Common fractures involving the wrist or forearm, the elbow, the femoral neck or shaft and to understand the complications associated with physeal injuries, a slipped capital femoral epiphysiseal injury and osteonecrosis
59. Musculoskeletal infections
60. Hip conditions such as DDH, SCFE and AVN
61. A limp
62. Juvenile chronic or idiopathic arthritis
63. Chronic conditions that often require orthopaedic management such as a patient with clubfeet, scoliosis or neuromuscular disorders
64. Non-accidental trauma
65. The ability to: outline the developmental milestones of the pediatric patient; the ability to outline the hallmarks of developmental delay by physical exam, school performance, social function and speech.

XI Related Knowledge

66. The ability to understand the basic science associated with bone and joint health such as: the structure and function of bone, joints, muscle, connective tissues and disease processes.
67. The ability to understand the basic physiology, cell biology and pathology relating to bone and joint health conditions which include: the ageing process, injury and disease states and repair of musculoskeletal tissues such as bone, cartilage, synovium, muscle and entheses.
68. The ability to: assess overall fitness and to diagnose and manage patients experiencing the negative impact of obesity, poor nutrition, lack of physical activity and environmental health hazards and; strategies to educate and to engage patients to take the necessary steps towards improving their overall health condition.

XII Methods for Management and Treatment

XIIa Non-Surgical Treatment

69. The ability to describe the principles of fracture management and multiple trauma management in terms of: reduction, fixation and immobilization; to be aware of the most common non-operative procedures for fractures and dislocations. This includes closed reduction and the use of external fixation devices such as casting or elastic wraps. Common injuries may include fractures of the wrist or proximal humerus, shoulder or hip dislocations and fracture/dislocation of the ankle or a sprained ankle.
70. Regarding rehabilitation: the ability to understand and be able to describe the strategies available for the management, including rehabilitation, of acute and chronic musculoskeletal disorders and for chronic musculoskeletal pain as it pertains to bone and joint health. This would include education, drug therapy, physical treatments, relaxation method, self-efficacy,

psycho-social interventions, social support, referral and shared care. In addition, to be familiar with factors that influence compliance to a management plan.

71. Regarding pharmacology: the ability to be familiar with the major indications, adverse effects, drug interactions and contra-indications of drugs commonly used in the management of musculoskeletal conditions.. This includes analgesics, non-steroidal anti-inflammatory drugs, antidepressants in pain management, corticosteroids, hypouricaemic drugs, disease modifying and cytotoxic drugs, therapy for osteoporosis, acute and chronic pain management therapy and disease-modifying therapy.

XIIb Surgical Treatment

72. Regarding surgical treatment: the ability to describe the surgical principles of fracture and multiple trauma management in terms of: reduction, fixation and immobilization. This would include familiarity with the treatment of the most common fractures such as hip, wrist and ankle fractures and; to be aware of the most common operative procedures for fractures and dislocations. This would include open reduction, and the use of internal and external fixation devices.
73. The ability to be aware of the most common operations for musculoskeletal conditions including: arthroscopy; joint reconstruction; spine surgery including discectomy and spinal fusion; amputation, synovectomy, osteotomy, arthrodesis, and nerve decompression.

XIII Procedures

74. The ability to perform a closed reduction of fractures and dislocated joints and understand the principles of management and when to refer to further subspecialty care.
75. The ability to perform suturing skills.
76. The ability to perform joint injections and aspirations.
77. The ability to perform peritendon injections.
78. The ability to apply a cast for the purposes of non-operative management of fractures such as an above or below elbow cast and an above or below knee cast.
79. Please indicate the importance of understanding the basic principles of prosthetics, orthotics and bracing as they pertain to musculoskeletal injury.

XIV CanMeds 2000/Principles of a Family Physician

80. Please indicate the importance of the ability to demonstrate the objectives outlined by CanMeds 2000 of being a medical/clinical expert and decision-maker, communicator, collaborator, manager, health advocate, scholar and professional or The Principles of Practice as a Family Physician.

XV Topics not included in the BJDUCG Core Curriculum Recommendations and identified as necessary components for The Canadian Multidisciplinary Core Curriculum for MSK health.

The ability to understand and manage:

81. Non-organic pain and chronic pain that may be pertinent to musculoskeletal health.
82. Patients requiring medical/legal and disability assessment and the pertinent issues that may be associated with the management of these patients such as: demands made by insurance companies, the Worker's Compensation Board and employers.

Women's Health

The ability to diagnose and manage:

83. The "female athlete triad"
84. Non-accidental trauma

The ability to provide medical management of women during pregnancy regarding:

85. exercise prescription and pregnancy
86. Medications and pregnancy

General Knowledge

The ability to:

87. prescribe exercise for diabetic or arthritic patients or for general health and fitness
88. Assess return to work or return to play/activity
89. Demonstrate knowledge and understanding of the principles of rehabilitation of a musculoskeletal injury or disorder
90. Demonstrate knowledge and understanding of the various complementary and alternative forms of medical (CAM) therapies available for the management of musculoskeletal injuries or disorders

General Principles of Practice

91. Demonstrate knowledge and understanding regarding issues relating to “real life” such as: how to start a practice; dealing with time management and finances both in personal and business life and; proper balance between work and personal life
92. Work cooperatively with other medical and paramedical personnel

Research/Clinical Appraisal Skills

93. The ability to be able to develop effective teaching and communication skills by means of teaching colleagues and students, conference presentations, clinical and scientific reports and patient education.
94. The ability to be able to develop, demonstrate or appreciate critical appraisal skills of literature, be involved with clinical/basic science research projects and/or participate in journal clubs as they may pertain to the area of musculoskeletal health/conditions.

Foot and Ankle Section

The ability to: specify the symptoms and signs; to outline the assessment and appropriate investigations; to propose a differential diagnosis and to outline the principles of management of a patient with:

95. Foot pain
96. A diabetic/neuropathic foot
97. A patient presenting with pes planus
98. A patient presenting with pes cavus

may influence the education of future healthcare providers and healthcare delivery within Canada and perhaps elsewhere.

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