

Teaching Clinical Skills in Musculoskeletal Medicine: The Use of Structured Clinical Instruction Modules

MALCOLM D. SMITH, JENNIFER G. WALKER, DAVID SCHULTZ, JULIE ASH, PETER ROBERTS-THOMSON, E. MICHAEL SHANAHAN, and MICHAEL J. AHERN

ABSTRACT. Objective. To assess student evaluation, satisfaction, and examination outcomes for a new method of teaching musculoskeletal (MSK) medicine clinical skills, structured clinical instruction modules (SCIM), and to compare with the outcomes of a traditional method of teaching clinical skills (small group bedside tutorials).

Methods. Year 2 students in a 4 year graduate medical school were taught using the method of bedside senior registrar teaching, supplemented by outpatient attendances in 1997 and by SCIM in 2000. All students in 1997 and 2000 were debriefed at the end of each unit of clinical skills teaching for student feedback on their teaching experience using a standardized questionnaire. At the end of the academic year, all students underwent an objective structured clinical examination (OSCE) in clinical skills that included rheumatology (hand examination) and orthopedic surgery (knee examination) stations. The effect of the method of teaching on the students' performance in the rheumatology (hand) and orthopedic surgery (knee) stations was analyzed.

Results. Sixty-seven students were taught clinical skills and completed the OSCE in 1997 and 78 students were taught clinical skills by SCIM and completed the OSCE in 2000. The teaching of orthopedics using traditional methods was poor, but there was no difference in satisfaction between traditional methods of teaching and SCIM for orthopedic surgery and rheumatology. There was no statistically significant difference in the performance of students in the hand OSCE stations in 2000 compared to the same station in 1997. There was a small but statistically significant difference in the performance of students in 1997 and 2000 in the knee station, the 1997 students performing better in this station.

Conclusion. The SCIM is an effective method of teaching clinical skills in MSK medicine, comparable with patient partners and traditional registrar based bedside teaching methods, but it is less resource intensive. (*J Rheumatol* 2002;29:813-7)

Key Indexing Terms

MEDICAL STUDENT TEACHING

MUSCULOSKELETAL EXAMINATION

STRUCTURED CLINICAL INSTRUCTION MODULES

Musculoskeletal (MSK) disorders are among the commonest reasons for a medical consultation in the Western world¹, yet there is considerable evidence to suggest that medical graduates are poorly trained in this area of medicine, with varying levels of competence in clinical skills in MSK medicine²⁻⁵. MSK disorders are frequently overlooked in patients admitted to teaching hospitals^{6,7}. One

of the difficulties encountered in teaching clinical skills to medical students is the considerable demand on scarce resources, particularly medically trained personnel who have competing priorities for their time, including clinical responsibilities for patient care. One method of improving the teaching of clinical skills in MSK medicine has been the implementation of programs that utilize patients as educators⁸⁻¹⁴. We published a comparison of patient partner teaching of clinical skills teaching in MSK medicine with that of a traditional registrar based bedside teaching method¹⁵. Although the 2 methods were comparable in their outcomes [both in student satisfaction and examination results of objective structured clinical examination (OSCE)], the former method is limited by the skill and expertise of the patient partners, which often limits teaching to restricted areas of MSK medicine, while the latter method is more demanding on the availability and expertise of medically trained personnel.

A new method of teaching clinical skills that closely resembles the OSCE method of examination has been described, which is referred to as structured clinical instruction modules, or SCIM¹⁶. This method resembles the OSCE

From the Rheumatology Unit, Repatriation General Hospital, Daw Park; Flinders Medical Centre, Adelaide; and School of Medicine, Flinders University of South Australia, Adelaide, Australia.

M.D. Smith, MBBS, PhD, FRACP, Associate Professor, Senior Consultant Rheumatologist; J.G. Walker, MBBS, Rheumatology Registrar; E.M. Shanahan, BMBS, MPH, FAFOM, FRACP, Senior Rheumatology Registrar, Rheumatology Unit, Repatriation General Hospital; D. Schultz, MBBS, FRACP, Senior Lecturer in Medicine; J. Ash, BMBS, Lecturer; School of Medicine; M.J. Ahern, MD, FRACP, Associate Professor, Department of Medicine, Flinders University; P. Roberts-Thomson, MD, DPhil (Oxon), FRACP, Professor, Head of Immunology, Flinders Medical Centre.

Address reprint requests to Prof. M.D. Smith, Rheumatology Unit, Repatriation General Hospital, Daws Road, Daw Park, South Australia 5041.

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in its structure but is designed to teach medical students and provide formative assessment. We describe our recent experience with this method of teaching examination skills in MSK medicine, and compare the results with a historical control group utilizing traditional registrar based small group bedside teaching.

MATERIALS AND METHODS

Flinders University of South Australia commenced a 4 year graduate medical course in 1996. Students came from a variety of backgrounds, all having a preliminary degree (> 70% science degrees), 10% having undertaken a higher degree to the level of PhD. The mean age of graduate students was 27 years (range 21–46) and 52% of students were female. The first 2 years of this course have a major focus on teaching clinical skills, culminating in an OSCE in clinical skills at completion of the 2nd academic year. In the 2nd semester of the 2nd year, students rotate through a 4 week clinical skills intensive block devoted to teaching clinical skills relevant to most aspects of medicine, in an inpatient and outpatient setting¹⁷. This 4 week block is part of a 12 week term that aims to help students integrate what they have already learned through the study of the various body systems, including a 6 week module on MSK medicine using problem based learning. As well as the clinical skills block, this 12 week block includes 4 weeks of emergency medicine and 4 weeks of disability/rehabilitation studies (Figure 1). The structure, syllabus, and student backgrounds were similar in 1997 and 2000, with the major difference being the method of teaching clinical skills. In 1997, 67 medical students entered the 2nd year of the graduate course and, over 4 weeks in the 2nd semester, they received tuition in clinical skills in MSK medicine from experienced senior rheumatology and orthopedic surgery fellows in small groups (9–10 students) at the patient bedside, supplemented by attendance at rheumatology and orthopedic surgery outpatient sessions staffed by senior consultants. In 2000, 78 students entered the 2nd year of

the graduate medical course and in the 2nd semester were taught clinical skills in MSK medicine using the SCIM method. Students were divided into 3 groups of 24–26 students, who attended one of 3 SCIM sessions lasting 3 h. Each SCIM session was identical and consisted of 6 stations, each staffed by a senior consultant in rheumatology and orthopedic surgery, with a selected patient relevant to that station. There were stations in (1) hand and wrist, (2) elbow and shoulder, (3) hip, (4) knee, (5) ankle and foot, and (6) spine examination, and students rotated in groups of 3–5 to each station, with each station lasting 30 min. These SCIM sessions focused entirely on clinical skills examination techniques and students were then instructed to practise these skills in the inpatient setting. At the completion of the 4 week clinical skills block in 1997 and 2000, all students attended a debriefing session and were asked to complete a standardized questionnaire¹⁵. The questions asked at the completion of clinical skills teaching in 1997 and 2000 were designed for the method of teaching and so were not identical. Student responses were recorded on a 5 point Likert scale, the categories ranging from strongly disagree (score 1) to strongly agree (score 5).

At the end of the academic year, all students undertook an 11 (1997) or 12 (2000) station OSCE (organized by Dr. Smith), which included a rheumatology station (examination of the hands of a patient with rheumatoid arthritis¹⁵) and an orthopedic surgery station (knee examination with a patient with osteoarthritis of the knee joint). The OSCE format was similar in 1997 and 2000, with the rheumatology and orthopedic surgery stations being identical in the 2 OSCE. All examiners in the OSCE were experienced rheumatology and orthopedic surgery consultants, who were not involved in the organization of the clinical skills teaching block and were unaware of the trial being conducted. The same examiners used the same standardized marking proforma for the 1997 and 2000 OSCE and the rheumatology (hand) and orthopedic surgery (knee) stations were identical in 1997 and 2000. Students were blinded to the content of the OSCE stations prior to the examination.

Statistical analysis. The means of the results for the hand station were

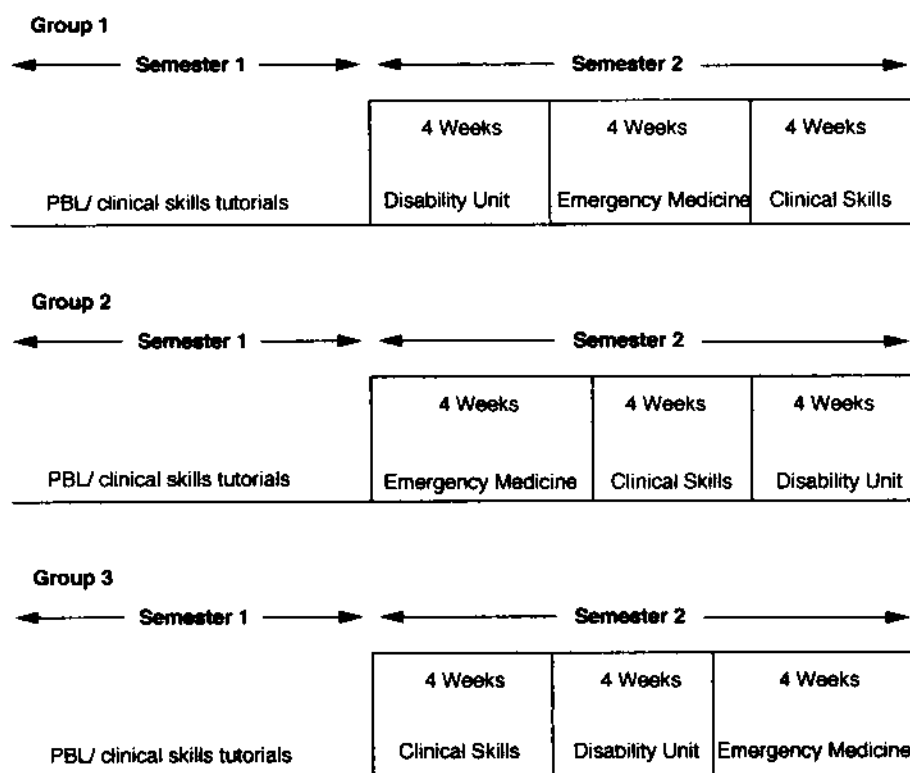


Figure 1. Student rotations during the consolidation block in semester 2, year 2.

compared between the year 1997 and 2000 graduate medical students and with the results for patient partner and traditional registrar teaching groups¹⁵, using one-way analysis of variance. The means of the results for the knee station in 1997 and 2000 were compared using Student t test. A p value < 0.05 was accepted as statistically significant.

RESULTS

Debriefing sessions. The results from student debriefing sessions held after the clinical skills teaching sessions in 1997 and 2000 are presented in Table 1. Overall, both the traditional and SCIM methods of teaching clinical skills in MSK medicine were well received by the students, but there was greater student satisfaction with the SCIM method. In addition, the teaching of orthopedic surgery by the traditional method was rated poorly by the students, due to variable attendance by the tutors. The students appreciated the structured form of teaching clinical skills in MSK medicine that the SCIM method provided, and also appreciated the use of real patients in the SCIM stations. However, students felt that the SCIM method was too restricted in time and did not give adequate time for practising clinical skills.

OSCE results. Overall, the results for the OSCE in 1997 and 2000 were similar (Table 2). The results for both the hand and knee examination stations in 1997 and 2000 are shown in Figure 2. There was no statistically significant difference between the overall results for students taught by the traditional registrar based method (mean score 62.6, 95% confidence intervals 59–66.2) and those taught by SCIM (mean score 64.3, 95% CI 60.6–68.0) (Figure 2) in the performance of students in the hand station. In addition, there was no difference with the results for the patient partners teaching method¹⁵. However, there was a small, but statistically significant difference in the performance in the knee station, with the 1997 students (mean score 72.4, 95% CI 69–75.8) performing better than the year 2000 students (mean score 66.7, 95% CI 63.1–70.3, p = 0.028).

DISCUSSION

Comparison between these 2 methods of clinical skills teaching in MSK medicine suggests that students were equally satisfied with both forms of teaching. However, the use of a historical control group means that neither student group was aware of or experienced the alternative form of teaching, so it cannot be concluded that students would have found these methods equally acceptable if they had been directly compared. We reported that graduate medical students had no particular preference for traditional methods of clinical skills teaching or patient partners when they were directly compared¹⁵. Also, both forms of teaching produced similar results in an OSCE using the same hand station as was used in this investigation. Students in 1997 rated orthopedic surgery teaching poorly. Despite this perception of poor teaching quality, these students performed better in the OSCE orthopedic surgery station than the students taught by the SCIM method in 2000. Clinical examination of the knee was taught separately by the rheumatology and orthopedic surgery registrars in 1997 and it is possible that additional teaching on knee examination by the rheumatology registrar, supplemented by attendance at outpatient sessions, compensated for the perceived inadequate teaching in orthopaedic surgery in 1997. There may, however, be no relationship between student perceptions of quality of teaching and outcome of such teaching, as assessed in an OSCE.

The SCIM method of teaching clinical skills is stated to have a number of advantages over traditional teaching methods including greater relevance of teaching content, opportunity to take a multidisciplinary approach to teaching, the ability to standardize the format and content of teaching across student groups and medical school years, the use of adult learning principles, and the ability to provide direct feedback to students about their clinical skills. While many

Table 1. Evaluation results. Data in parentheses are ranges.

2000 Teaching: Questions Asked	SCIM Teaching	1997 Teaching: Questions Asked	Traditional Teaching by Registrars	
			Rheumatology	Orthopedics
I enjoyed learning clinical skills in this way	4.70 (2–5)	The overall performance of the teaching was good	4.3 (3–5)	2.3 (0–4)
The material covered was useful	4.71 (2–5)	The tutor was well prepared for teaching clinical skills	4.2 (4–5)	1.7 (0–4)
The learning objectives for each station were clear	4.61 (2–5)	This teaching session stimulated my interest in the topic and improved my knowledge	4.1 (3–5)	2.2 (0–4)
The tutors were helpful to my learning	4.74 (2–5)	The tutor was reliable in attendance and teaching	4.2 (3–5)	2.1 (0–5)
The session was well organized	4.67 (2–5)	The tutor demonstrated good teaching skills	4.0 (3–5)	2.4 (0–4)
There was sufficient time at each station	3.19 (1–5)	The topic was relevant to my education needs	4.3 (3–5)	2.9 (0–5)
It was beneficial to have real patients	4.78 (2–5)			
I was able to practice my skills	4.29 (2–5)			
The group sizes were small enough to allow all students to participate	4.04 (1–5)			
The session has improved my confidence in my clinical skills	4.38 (2–5)			
I will be more confident with patients as a result of this session	4.43 (3–5)			

Table 2. Results of 1997 and 2000 OSCE. Data are mean (range).

Station	1997 OSCE	2000 OSCE
Psychiatry	60 (27.5–82.5)	74.5 (27.5–95)
X-ray	48.7 (10–93.3)	Combined with ECG station
ECG	56.7 (20–96)	62.5 (25–100)
Rehabilitation	75.4 (50–100)	68.5 (25–100)
Rheumatology	62.6 (26–99)	64.3 (25–100)
Orthopedic surgery	72.4 (34–100)	66.7 (14–94)
General surgery	76.9 (30–100)	82 (40–100)
Vascular surgery	61.2 (23–97)	71.5 (40–95)
Cardiology	73.8 (28–98)	84.5 (50–100)
Respiratory	66.1 (23–97)	ND
Gastroenterology	72.3 (49–92)	73.5 (40–95)
Ear/eye	ND	52.5 (22.5–85)
Acute medicine	ND	85.5 (45–100)
Neurology	ND	79.5 (41–81.5)
Overall OSCE Mark	66 (52.5–84.1)	67.5 (41–81.5)

ND: station not done

of these advantages were realized in the use of SCIM in this student group, it should be noted that the graduate medical students did not derive any benefit from the SCIM method in relation to feedback and practising clinical skills in MSK medicine. This is probably related to the inadequacy of time allotted to each SCIM station, as recognized by the medical

students, and a reallocation of time for SCIM stations along with some reorganization of the content of SCIM stations may be required to make full use of this novel method of teaching clinical skills.

Despite the failure to optimize the SCIM method of teaching, we show that similar OSCE results were seen when the same rheumatology (hand examination) but not the orthopedic surgery (knee examination) stations were used in 1997 (traditional clinical skills teaching method) and 2000 (SCIM method), although it might have been expected that the students who were taught using the SCIM method would have performed better, due to the similarity in format between SCIM and OSCE. However, traditional methods of teaching supplemented by outpatient exposure (as performed in 1997) may give the medical student a wider exposure to different MSK conditions, with the disadvantage of greater demands on limited availability of medically trained personnel, conflict between patient care and teaching in the outpatient setting, and the limited opportunities for feedback and observation of student clinical skills technique. We have estimated that students in 1997 had 20 contact hours in MSK medicine (registrar teaching and outpatient sessions), compared to 3 hours contact time with SCIM teaching in 2000.

While patient partner oriented teaching methods have the advantages of reducing demands on the time of medically

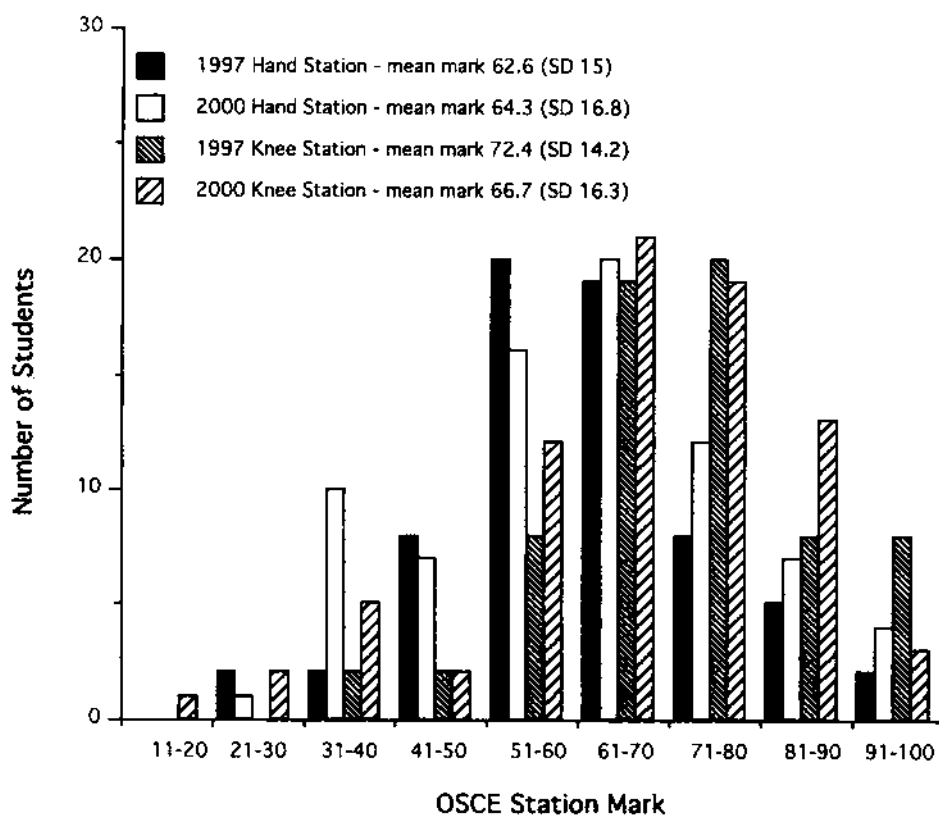


Figure 2. Results from the OSCE, 1997 and 2000.

trained personnel and also providing excellent opportunities for student feedback by the patient partner, this method of teaching is limited by the skill and training of the patient partner. While it would be possible to expand the range of MSK areas that could be taught by patient partners, it would be difficult to teach the entire MSK curriculum in clinical skills using this method. In addition, the method of examination used to test medical student competence in MSK clinical skills would need to be modified from the currently used OSCE to test those aspects of patient partners teaching that are unique to this method of teaching clinical skills. A valid criticism of this investigation is the reliance on 2 MSK stations out of a total of 11 (1997) or 12 (2000) OSCE stations to compare 2 methods of teaching. However, we required a method of assessment of competence in clinical skills in addition to assessing student perceptions using questionnaires, and the OSCE has gained general acceptance as a valid method of assessing competence in clinical skills. It was not possible to include more MSK medicine stations in the end-of-year OSCE because of a requirement to examine clinical skills competence in all areas of clinical medicine and the logistical limitations to the number of stations that can be included in an OSCE.

The decision about which method (or combination of methods) will be utilized by a medical school to teach clinical skills in MSK medicine will depend on the availability of a range of teaching resources, the most restricted of which is often the availability of appropriately qualified medical personnel. However, it is reassuring that, irrespective of the method of teaching clinical skills that is chosen, the outcomes, as measured by student satisfaction and OSCE results, are similar. Further studies are in progress, including a modification of the SCIM to allow students to practise clinical skills under supervision, with immediate feedback from consultants, as well as improving methods of assessing the outcome of teaching clinical skills to medical students.

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