Clinical skills of medical residents: a review of physical examination

Clifford Chan-Yan, MB, ChB, FRCPC
Jean H. Gillies, MD, FRCPC
John Ruedy, MD, FRCPC
Julio S.G. Montaner, MD, FRCPC
Shane A. Marshall, MD, FRCPC

Students are introduced to techniques of physical examination at medical school. However, their skills are deficient at the time of graduation, and with the increasing shift of clinical teaching away from the bedside and into the conference room it is expected that these skills will weaken in succeeding generations of physicians. A practical and satisfactory method of addressing this problem during internship and residency training has not been forthcoming because of the lack of a regular forum for the teaching of clinical skills in busy tertiary referral hospitals and the shortage of teachers with the necessary skills and commitment to teaching a large number of house staff. We describe a program whose unique hierarchical approach has permitted a detailed ongoing review of physical examination. One clinician was able to teach 24 residents by instructing a small group of senior residents, who in turn, after practising with clinical clerks, taught groups of junior residents.

Si on initie les étudiants en médecine à l'art de l'examen médical ils montrent des carences sous ce rapport au moment de la collation des grades. Il est à prévoir que l'enseignement quittant de plus en plus le lit du malade pour la salle de conférence, on va voir s'affaiblir encore plus l'habileté, dans cet art, des médecins à venir. On n'a pas jusqu'ici trouvé de moyen pratique et efficace de contrer cet état de choses durant l'internat et la résidence, vu l'absence d'un enseignement formel des arts cliniques en milieu hospitalier centralisé de soins tertiaires et le manque de cliniciens doués de la compétence et de l'enthousiasme nécessaires pour donner cet enseignement à un grand nombre d'internes et de résidents. On décrit ici un programme novateur de structure hiérarchique qui a permis la révision continue de l'art de l'examen. Un seul clinicien a pu instruire 24 résidents en formant d'abord un petit groupe de résidents de dernière année qui, après s'être exercés sur des externes, ont enseigné cet art à des groupes de résidents moins avancés qu'eux.

From the Department of Medicine, University of British Columbia, and the Division of General Internal Medicine, St. Paul's Hospital, Vancouver

Reprint requests to: Dr. Clifford Chan-Yan, Department of Medicine, St. Paul's Hospital, 1081 Burrard St., Vancouver, BC V6Z 1Y6

There is an increasing shift of clinical teaching away from the bedside and into the conference room and corridors.[1,2] A study of the role of the attending physician on ward rounds found that only 16% of the time was spent at the bedside, and for half of this time the patient's presence was not required for the discussion.[3]

The physical examination skills of students receiving their medical degrees are deficient,[4] and there is no reason to believe that the deficiencies are ironed out during later years. One study revealed rates of error in physical examination by residents and interns of 13.1% and 15.6%; errors of omission occurred two to three times more often than errors of commission.[5] In almost two-thirds of the patients examined crucial errors led to major changes in differential diagnosis and therapy; these errors occurred despite the fact that the house staff were aware that their performance was being

assessed. Another study showed university-affiliated internists to be guilty of amazing rates of error and omission, which correlated with increased use of subspecialty consultation.[6]

Little time is spent on teaching house staff to elicit physical signs, especially in modern tertiary care, "high-tech" institutions. Reasons cited include patient discomfort and the fact that many attending staff feel uncomfortable about dealing with aspects of clinical medicine that are outside their immediate realm of expertise.[2] In addition, there are too few clinicians with the skills and commitment to teach physical examination techniques on an ongoing basis to a large number of house staff.

Methods of evaluating physical examination techniques used by house staff have frequently been described,[7-9] but seldom has there been any recommendation about how the techniques should be taught. Some methods are unwieldy and difficult to apply. In the study by Wray and Friedland[5] house staff examined new patients during team teaching rounds; the staff's performance was scored on cards. The attending physician then examined the patient and reviewed mistakes or omissions by the house staff. This method is accessible to only a few trainees because of the limited number of skilled and committed clinicians. In another study detailed history-taking and physical examination were done and then discussed by house staff and attending physicians during rounds. The patient was allowed to rest during the sessions, and no more than two patients could be seen in 2 hours.[10]

Accurately acquired clinical data are frequently more powerful and less expensive than "hard" laboratory data in achieving a diagnosis and formulating a therapeutic plan or prognosis.[11] Therefore, the methods of data acquisition should be taught and finely honed as important clinical tools. To this end a course in physical examination has been incorporated into the residents' weekly academic half-day session in the Department of Medicine at St. Paul's Hospital, Vancouver.

Objectives of the physical examination course

The course was developed to enable a review with all medical residents of the methods of physical examination and their correlation with diagnostic tests. The review had to be accomplished realistically and with active participation by each resident. In addition, physical examination was taught to the clinical clerks doing their internal medicine rotations in the hospital.

Methods

The medical residency program at St. Paul's Hospital is part of the University of British Columbia's program and includes 24 residents (6 per year in a 4-year program). Seven residents from other teaching hospitals also participated and received the course evaluation questionnaire.

The course was taught in three parts each week, with a hierarchical method (Fig. 1). The first two parts were conducted in preparation for the academic half-day session held on Wednesdays. In part one (Mondays) the clinical skills director, a consulting general internist, conducted a 1-hour drill session with four of the senior residents. The residents took turns looking for a journal article that was pertinent to the session and that drew attention to various aspects of physical examination, including correlation with diagnostic tests, or that related an interesting historical perspective. The resident presented the essential message of the article in the first 10 minutes of the session. This was followed by a review of the physical examination of a particular body system. The patient was present throughout the session as a model for the examination techniques being taught. No attempt was made to complete the entire system review in a single session, and initially no specific number of sessions was devoted to a particular system, so as to gain experience and determine approximately how many sessions would be needed.

In part two (Tuesdays) each senior resident taught one or two clinical clerks who had been assigned to that resident for their 6-week rotation in internal medicine. The senior resident took the role of the clinical skills director, reviewing the reference article, handing out a hard copy of it and teaching the previously reviewed physical examination techniques.

In part three (Wednesdays), at the academic half-day session for all residents, during which they were freed from other duties, the senior resident who had first presented the journal article made the same presentation to the residents in the auditorium. The clinical skills director and the senior residents then proceeded to the wards to teach that week's physical examination techniques to small groups of junior residents. The director and the senior residents rotated to a different

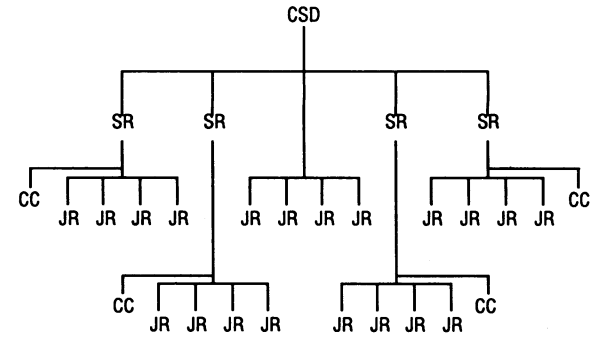

Fig. 1 — Hierarchical approach used by clinical skills director (CSD) to teach techniques of physical examination to 24 residents and 4 clinical clerks (CCs) every week. Senior residents (SRs), after "practising" on clinical clerks, taught junior residents (JRs) the same material.

group each week so that they could spend time with each resident. An atmosphere of collegiality was maintained. Other components of the academic half-day include courses on clinical epidemiology, subspecialty seminars, talks on research in progress and professor's rounds; the latter are usually conducted by the head of the Department of Medicine.

Every few weeks the clinical skills director conducted a "whole-group" session with all the residents in the auditorium. A complete, integrated physical examination was demonstrated at the first session and a detailed subroutine examination at later sessions. It was recommended that complete examinations be tailored to emphasize the system in which an abnormality is suspected. Economy of movement and avoidance of repetition were demonstrated. At these sessions the residents were questioned about physical findings in classic or important syndromes; a hard copy of this information was then distributed.

The small-group sessions were conducted intermittently by five invited subspecialty consultants, who performed bedside reviews of abnormal findings. Two didactic whole-group sessions were presented by consultants, who reviewed physical examination techniques in specialties such as dermatology and ophthalmology.

To evaluate the usefulness of this course, as perceived by the residents, questionnaires were distributed to all the participants at the end of the first 4 months. The questionnaire contained 183 fixed-choice questions about the academic half-day session, 40 of which were on physical examination. The residents were asked to evaluate each component of the course using a seven-point Likert-type scale.[12]

Many of the questions concerned such matters as timing and problems of attendance, but we will discuss only those that pertain directly to education.

Results

The rate of response to the questionnaire was 100%, although 1 of the 31 residents did not answer a question on "new material covered". The results are summarized in Table I.

The various components of the course were ranked in order of overall usefulness as follows: small-group bedside sessions, subspecialty small-group bedside sessions, whole-group clinical sessions conducted by the clinical skills director, subspecialty whole-group didactic sessions and articles on physical signs.

On a scale ranging from 1 (poor) to 7 (excellent) the residents' overall rating of the course averaged 5.9. On a scale from 1 (nothing new learned) to 7 (something new definitely learned) the average rating for "knowledge gained" was 5.5 and for "new material covered" 5.3. There were no significant differences between the ratings of junior and senior residents for the questions on physical examination.

Discussion

The introduction of this course at our hospital has reawakened interest in acquiring the skills to competently perform a physical examination. There was a high rate of acceptance by the residents and several favourable outcomes. After a regular session with a clinician the senior residents reinforced what they had learned by teaching the same material to clinical clerks and then to junior residents, enacting the old axiom that to teach is to learn twice.

There were high levels of cooperation and acceptance by the junior residents toward the senior residents. It has been estimated that residents may learn as much as 40% to 50% from their peers and spend as much as 20% of their time teaching.[13] The course was closely supervised by the clinical skills director and the senior residents, who rotated weekly among small groups of junior residents. The whole-group sessions in the auditorium were a different experience and popular because of their variety.

Most of the residents stated that they had not previously watched a clinician perform a complete physical or subroutine examination. The residents now had a yardstick with which to compare their own methods. All the residents felt that their ability to perform a physical examination had improved and that they had become more confident in the findings or lack of findings; this feeling was unanimous among the seven residents who later passed the final clinical examination of the

Table I — Resident evaluations of clinical course on physical examination

Aspect evaluated	Rating;* no. (and %) of residents							Total no. of residents
	1	2	3	4	5	6	7	
Overall course	0	0	0	0	9 (29)	15 (48)	7 (23)	31
Knowledge gained	0	0	0	4 (13)	12 (39)	9 (29)	6 (19)	31
New material covered	0	0	0	6 (20)	12 (40)	10 (33)	2 (7)	30†

*Poor (1) to excellent (7).
†One resident did not answer the question.

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The only organized formal teaching of physical examination techniques at our medical school is during the first and second years, when medical knowledge is still rudimentary. In later years the teaching varies according to the inclination of individual clinicians during case reviews. As well as participating in the sessions with the senior residents as part of the course we have described, the clinical clerks became more aware of other aspects of physical examination on the wards.

When ranked against other features of the academic half-day the usefulness of the physical examination course came a close second to that of the professor's rounds. Interestingly, the latter also stressed clinical skills, primarily the integration of clinical information into a diagnostic hypothesis.

We have responded to recommendations arising from the questionnaires and have taken steps to implement constructive changes. The course is now an established component of the academic half-day, and each session has been lengthened to 1½ hours. An annotated bibliography of important journal articles on physical examination techniques, particularly with reference to diagnostic tests, is being provided to all residents. A small group of clinicians, including the clinical skills director, has been developed, and these individuals are committed to the teaching and further development of the course. Similar physical examination courses are now being offered in the residency programs of associated teaching hospitals.

Our experience has shown that it is possible to overcome the main obstacles to teaching physical examination techniques to medical residents in an ongoing, realistic and practical fashion. Our method also formalizes the role of residents in teaching and provides an additional stimulus for the review of physical examination techniques by other house staff and students. Indeed, it may have an application in other areas of medical education.

It has been recommended that program directors organize formal courses for house staff on diagnosis based on the findings of physical examination.[14] We believe that the use of a hierarchical system such as the one we have described is worthy of consideration.

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