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Title : PRACTICAL APPLICATION OF MACHINE CHECK-OUT SKILL TEST

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The Inter-Hospital Study Group has previously described a skill test utilizing a checklist for evaluating resident performance in anesthesia machine check-out and immediate preanesthetic preparation.[1] The check-list evaluation (CE) has the advantages of providing a more reliable objective measurement of technical skill and immediate feedback to residents. However, two questions are unanswered:

1) Does CE with feedback provide teaching superior to standard lecture techniques?
2) Does it provide evaluation of resident performance better than standard faculty subjective evaluation? (SE)

Methods. First a group of 7 residents was evaluated with the CE to measure their baseline performance without any instructions beyond their orientation to residency. The CE used consisted of 25 items on machine check-out, modified from the initial skill test for local use. The first CE (CE1) was not described as a test to the residents, but rather as a "survey" and they were specifically instructed to set up their machine in the usual fashion. Following CE1, a lecture on machine check-out was given to the group, demonstrating the correct procedures on the actual equipment and highlighting steps commonly omitted during the initial survey. After this demonstration lecture, CE was again performed (CE2). These results were reviewed at that time, and a copy of the scored CE form was given to each resident. Following this review and feedback, a third evaluation (CE3) was performed.

The results of the three CE's were then compared to the subjective evaluation (SE) received by the resident during the contemporaneous semi-annual faculty evaluation. This institutional evaluation form contains two items relevant to machine check-out: "speed and adequacy of set-up" and "instrument and anesthesia machine testing and balancing". For comparison to CE, scores of these two equipment-related items were averaged for each resident, and the rank order determined, as well as the rank order of the resident's "overall competence" score.

Results. The raw scores (number of items performed) of the 25 item CE are shown in Table 1, along with the SE ranking of each resident for specific machine check-out items and overall competence. The data show that although the rank order of SE on specific items correlates well with the overall competence ranking, there is poor agreement with CE ranking.

Discussion. The progressive increase in scores in all but one case from CE1 to CE3 shows that even though the didactic lecture produced improvement in performance, the use of CE to provide individual feedback provided even further improvement. Although part of this further improvement is related to familiarity with the evaluation device, this sequence suggests CE feedback might be more effective than a lecture in teaching this technical skill. Further data are required to substantiate the apparent advantages of CE as a teaching tool.

As a scoring device, comparison of CE scores to traditional SE scores in this case confirmed the impression that SE ratings of individual aspects of performance tend to be more closely related to the rater's impression of the ratee's overall competence than to actual CE performance. This "clustering" phenomenon limits the effectiveness of SE to identify specific resident strengths or weaknesses. This study would suggest that objective evaluations in the form of CE for technical tasks are more reliable in giving information about resident performance in these areas.

Conclusion.

1) Checklists are effective in producing improvement in performance of technical tests when utilized to provide immediate feedback.
2) Residents apparently respond better to one-on-one checklist teaching than to didactic lectures.
3) Subjective faculty evaluations correlate poorly with objective checklist scoring of technical performance.

Table 1
Checklist Evaluation vs Subjective Evaluation

Raw Scores			Rank Order	Rank Orders	
				Equipment Related Items (SE)	SE "Overall Competence"
CE1	CE2	CE3	CE1		
15	12	19	1	2	4
14	13	17	2	3	6
12	16	18	3	6	5
12	19	16		5	3
6	12	19		1	1
6	14	19	6	7	7
6	13	15		4	2

[1] Murray B, Herr GP, et al: Anesthesia Set-Up and Machine Check-Out Skill Examination. ASA Abstracts of Scientific Papers, 1977.