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The Influence of Peer Feedback on the Acquisition of Physical-Examination Skills

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Received 22 January 2016; accepted 29 July 2016

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Abstract

Studies have suggested that having students observe peers while acquiring physical-examination (PE) skills fosters the acquisition of the psychomotor skills required to conduct a PE. One difficulty, however, has been to disentangle the effect of peer observation from peer feedback, both of which occur when students learn in groups. This study investigated the influence of peer feedback on learning the neurolocomotor physical exam for low-back pain. 120 second-year medical students were randomly assigned to a peer-feedback group (n=61) or a no-peer-feedback group (n=53), during a regular learning activity with a standardized-patient instructor. Students first practised the NLE in groups of three, with or without peer feedback, depending on the group to which they were assigned. Subsequently, the members of both groups performed the NLE individually. The final NLE was videotaped and assessed later. Peer feedback had a positive effect on the acquisition of PE skills (87.9% vs. 90.8%, p=0.023), despite the fact that students had an initial preference for instructor feedback compared with peer feedback. These results support the use of group activities that give students the opportunity to provide feedback to their peers while learning PE skills.

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Q2 Keywords: Psychomotor skills; Peer feedback; Learning; Observation; Peers; Physical examination skills

35 1. Introduction

Physical-examination (PE) skills essential for good clinical performance are usually taught in small groups^{1,2} by demonstrating the skills and then providing feedback as

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Peer review under responsibility of AMEEMR: the Association for Medical Education in the Eastern Mediterranean Region.

students practise them. While this approach is widespread, medical students in a small-group setting know little about the factors that facilitate the acquisition of PE skills. Of the factors that have been studied, observation of peers seems to contribute significantly to psychomotor-skill acquisition.^{3,4} With respect to peer influence on PE learning, however, it has been difficult to disentangle the effect of peer observation from that of peer feedback, because both observation and feedback occur simultaneously when students learn together in a naturalistic setting. This article reports on a study aimed at clarifying the specific influence of peer feedback on the acquisition of PE skills in a natural small group learning setting.

http://dx.doi.org/10.1016/j.hpe.2016.07.002

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Please cite this article as: Martineau B, et al. The Influence of Peer Feedback on the Acquisition of Physical-Examination Skills. *Health Professions Education* (2016), http://dx.doi.org/10.1016/j.hpe.2016.07.002

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Mastering the PE requires medical students to learn and integrate several psychomotor skills. There is some evidence that observing peers may facilitate acquisition of these skills. Ste-Marie et al.⁵ reviewed the literature on model observation using the lens of social-learning theory⁶ to explore how observation improves the acquisition of motor skills and subsequent sport performance. Peer observation helps because it allows the learner to build up a model that acts as an intermediary blueprint against which the learner can compare his or her own performance, making it easier to detect and correct mistakes.^{7,8} For PE skill acquisition, in a natural-learning environment, Martineau et al.³ showed that second-year medical students who had the opportunity to observe peers while learning an integrated PE performed better than students who did not have this opportunity. A second study by the same team showed that the effect of observation was enhanced when students observed a peer who performed well compared to observing a weaker performance while learning the NLE for low-back pain.⁴ Nevertheless, it was difficult to isolate the effect of peer observation in the aforementioned studies from other potentially confounding factors, one of which is feedback.

Van de Ridder et al.⁹ defined feedback in clinical education as "specific information about the comparison between a trainee's observed performance and a standard, given with the intent to improve the trainee's performance." This implies that learners receive information from a teacher or from another learner on achieving task goals. Key feedback elements are comments on their actual task performance as well as suggestions on the next steps to be taken in order to raise their level of performance. When learning PE skills in groups, both feedback (from teachers and peers) and the observation of others are part of the learning process. It may be difficult in these contexts to isolate the specific effects of feedback on learning from those of observation.

Hattie and Timperley¹⁰ found that feedback had an effect size on achievement of 0.79 compared to the average effect of all instruction that contribute to schooling, which was 0.40. Feedback is expected to facilitate learning by increasing learners' awareness of the gaps between their current level of performance and the desired one. This effect seems to depend on the type of feedback provided. Feedback providing information about the task and about how to better execute the task tends to have a more positive effect on learning than feedback based on rewards, praise, or punishment.¹⁰

However, Kluger and DeNisi,¹¹ and Kluger and Van Dijk¹² found that providing feedback does not always have the intended positive effect, because it can

threaten the learner depending on how it is given. They concluded that a more systematic approach to giving feedback could enhance learning and skill performance while protecting the learner's self-esteem. Their findings echoed those of various authors who developed a more structured form of feedback consisting of an intermediate check of performance against expected performance criteria, accompanied by feedback on observed strengths and weaknesses as well as tips for performance improvement. ^{11,13,14}

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Peer feedback; however, tends to occur in a less formal fashion. Topping 15 suggested that peer feedback could be seen as a formative assessment that supplements the more formal feedback of teachers. It can also be seen as an arrangement structured by a teacher or initiated by learners in order to increase performance.

One of these arrangements is peer-assisted learning (PAL) (i.e., learning support provided to junior students by senior students). While PAL studies have demonstrated that students appreciate feedback from more advanced peers, ^{16,17} the influence of such feedback on skill acquisition has not yet been investigated.

The influence of peer feedback on future performance has been shown in the area of writing skills, as evidenced by higher performance subsequent to receiving comments from a student of the same level. In a meta-analysis of 123 studies on effective instructions for improving writing skills, Graham and Perin found an effect size of 0.75 for peer assistance. Does peer feedback have the positive impact on medical students? And would PE skills acquisition be influenced by peer feedback?

Norcini²⁰ is skeptical, because he assumes that peer judgments may suffer from low reliability and validity, which makes them of limited use in fostering learning. Most studies in the medical field have explored the ability of students to accurately assess peer performance, rather than focusing on the effects of peer feedback on student performance. These studies have investigated the reliability and validity of student assessments compared to a gold standard, which is the assessment conducted by teachers.^{21,22} The results of these studies carried out in various medical specialties are variable. For example, in studies on psychomotor skills with advanced medical students, 1st-year postgraduate medical residents (PGY1) overrated their peers' performance in comparison to their teachers' marks.²³ Obstetrics and gynecology residents underrated it,²⁴ whereas the rating was similar to that of experts for general-surgery residents.²⁵ These studies, however, do not provide evidence of the effects of peer feedback on the performance of learners.

Another potential shortcoming for any real impact of peer feedback on performance is the fact that peer feedback is not

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