Randomized Trial to Assess the Effect of Supervised and Unsupervised Video Feedback on Teaching Practical Skills

Craig I. Nesbitt, MD, Alexander W. Phillips, FRCSEd (Gen Surg), FHEA,† Roger F. Searle, PhD,‡ and Gerard Stansby, FRCS**

*Northern Vascular Centre, Freeman Hospital, Newcastle upon Tyne, United Kingdom; †Northern Oesophagogastric Centre, Royal Victoria Infirmary, Newcastle upon Tyne, United Kingdom; and ‡School of Medical Sciences Education Development, Newcastle University, Newcastle upon Tyne, United Kingdom

BACKGROUND: Feedback is a vital component of the learning process; however, great variation exists in the quality, quantity, and method of delivery. Video feedback is not commonly used in the teaching of surgical skills. The aim of this trial was to evaluate the benefit of 2 types of video feedback—individualized video feedback (IVF), with the student reviewing their performance with an expert tutor, and unsupervised video-enhanced feedback (UVF), where the student reviews their own performance together with an expert teaching video—to determine if these improve performance when compared with a standard lecture feedback.

METHODS: A prospective blinded randomized control trial comparing lecture feedback with IVF and UVF was carried out. Students were scored by 2 experts directly observing the performance and 2 blinded experts using a validated pro forma. Participants were recorded on video when performing a suturing task. They then received their feedback via any of the 3 methods before being invited to repeat the task.

RESULTS: A total of 32 students were recruited between the 3 groups. There was no significant difference in suturing skill performance scores given by those directly observing the students and those blinded to the participant. There was no statistically significant difference between the 2 video feedback groups ($p = 1.000$), but there was significant improvement between standard lecture feedback and UVF ($p = 0.047$) and IVF ($p = 0.001$).

CONCLUSION: Video feedback can facilitate greater learning of clinical skills. Students can attain a similar level of surgical skills improvement with UVF as with teacher-intensive IVF. (J Surg 72:697-703. © 2015 Association of Program Directors in Surgery. Published by Elsevier Inc. All rights reserved.)

KEY WORDS: feedback, clinical skills, video feedback, training, unsupervised video-feedback

COMPETENCIES: Patient Care, Medical Knowledge, Practice-Based Learning and Improvement

INTRODUCTION

Clinical feedback is defined as "specific information about the comparison between a trainee's performance and a standard, given with the intent to improve the trainee's performance."[1] The importance of feedback while learning clinical skills is well established, and it has been suggested that its absence can prevent progress.[2] However, the delivery of feedback can often be a point of criticism from students.[3] There remains much debate on the optimal method of delivering feedback. Many medical curricula have employed formative assessments to formalize and ensure that students get a regular objective appraisal.[4] There have been mixed results on the use of video feedback to improve clinical skills, with Backstein et al.[5] failing to demonstrate an improvement in orthopedic skills using video feedback. By contrast, others demonstrated a significant improvement in surgical skill acquisition following verbal video feedback.[6] A recent Best Evidence in Medical Education review of simulation commented on the importance of trainee feedback to slow learner skill decay over time.[7]

Skin suturing is a mandatory skill for all graduating doctors in the UK registering with the General Medical Council.[8] However, skin suturing is not currently taught formally within the undergraduate clinical skills curriculum at our institution, thus ensuring that participants would be novices. As skin suturing is easily recorded on video and can be assessed using established criteria, it was felt that this

Correspondence: Inquiries to Craig I. Nesbitt, MRCS, MD, Northern Vascular Centre, Freeman Hospital, Freeman Road, Newcastle upon Tyne NE7 7DN, UK; e-mail: craigiainnesbitt@gmail.com

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would be the ideal clinical skill to use as the basis of this study.

Undergraduate medical students were recorded while performing a simple suturing task and then provided with a generic feedback lecture, individualized video feedback (IVF), or unsupervised video-enhanced feedback (UVF) before being asked to repeat the task. A feedback lecture is a form of generic feedback that medical students commonly receive. The 2 video feedback methods involved either students reviewing their performance with an expert providing one-to-one individual analysis of the performance (IVF) or students reviewing their own performance unsupervised but enhanced, with an expert video and a video of an expert delivering "hints and tips."

The aim of this trial was to assess the role of video-enhanced feedback (VEF), in particular to look at the potential role of UVF, in optimizing candidate performance during undergraduate medical clinical skills training.

METHODS

This prospective randomized clinical trial was carried out at Newcastle University Medical School in 2012. Ethical approval was obtained from the Newcastle University Ethics committee. Year-1 and year-2 undergraduate medical students were invited to participate in the study, and written consent was obtained from all those who volunteered. Students were assigned a unique training number (UTN) that was subsequently used for randomization and to ensure anonymity when evaluating the video performances.

The only exclusion criterion was having greater than "low novice" experience at suturing. This was defined as having performed fewer than 10 previous sutures.

Students were randomized into 3 feedback groups using a closed envelope system with students' UTNs blocked into groups of 12. This created 3 training groups of the same size. Group 1 would meet on the first day of the trial, group 2 on the second, and group 3 on the third. Students were then e-mailed confirmation of their training group date and time.

Before carrying out the suturing task, students received a short 5-minute introductory lecture explaining the task and that the procedures would be recorded and were asked to complete a questionnaire to record demographics and previous experience.

All participants were taught a basic suturing exercise using an approved Royal College of Surgeons of England technique (Intercollegiate Basic Surgical Skills). The "instrument-tied reef knot" was taught as the method for securing sutures. To ensure uniformity in teaching techniques between the 3 training groups, this teaching session was video recorded before the study, and participants watched this video on the day of the trial. The teaching video was annotated with expert demonstrations of each step and commentary explaining the technique in detail. This ensured that the teaching was entirely standardized.

After performing the task, the students received their feedback via the method they had been randomized to and were then asked to repeat the procedure (Fig. 1).

The students were scored by experts in real time and subsequently had their recordings scored by 2 further experts who were blinded to the candidate and whether the performance was prefeedback or postfeedback.

Feedback Methods

The students were randomized to any of 3 feedback methods before repeating the suturing exercise.

Group 1—Standard Lecture Feedback: 20 Minutes

The students who were randomized to the standard feedback group received a generic lecture. This feedback took place in the clinical skills laboratory and involved a 20-minute PowerPoint presentation. The presentation covered the most common errors and difficulties that had been observed in participants during a pilot experiment of suturing teaching. The lecture was delivered in a didactic fashion, and although participants were permitted to ask questions, care was taken to ensure no additional "individualized" feedback was delivered. Standard lecture feedback (SLF) was agreed to represent the closest assimilation of the feedback currently delivered by staff at Newcastle University Medical School during skills training sessions.

Group 2—UVF: 20 Minutes

The participants who were randomized to UVF were escorted to a remote private viewing room. Each participant was given a laptop computer. The computer was installed with 3 videos, which participants were instructed to watch within a 20-minute time frame. These videos included the following: a real-time unedited video of their own performance (without commentary), which lasted 7 minutes, an edited video of an expert performing the suturing exercise, with additional expert commentary, which lasted 5 minutes, and a video of an expert delivering "hints and tips," which targeted the areas that had been previously identified as causing difficulties for candidates performing this suturing exercise, which lasted 5 minutes. Additionally, 3 minutes were allowed for students to be able to stop, rewind, and replay sections of the videos as they wished.

Group 3—IVF: 20 Minutes

Participants in the IVF group watched an unedited video of their suturing performance and were given real-time, one-to-one technical skills feedback on their performance by an expert. Participants and experts were permitted to pause, rewind, and replay the video at any point and to ask technical questions. A maximum of 20 minutes was allowed for this feedback.