

# Tutoring Trainees to Suture: An Alternative Method for Learning How to Suture and a Way to Compensate for a Lack of Suturing Cases

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**INTRODUCTION:** Tutoring in suturing was developed to compensate for a shortage of suturing cases. The objective of this study was to compare ideal suturing score (ISS; 9 points), suturing time (min:sec), and suture placement error (mm) between medical students completing the suturing tutoring program and medical students attending ordinary medical school training program.

**METHODS:** Participants consisted of 2 groups of medical students who had never performed suturing. The study group had the role of suturing tutor to teach interested high school students. The control group consisted of volunteers from the ordinary medical school program. Skills measurement was performed by having students from both the groups perform 3 vertical mattress sutures on a model. The study group was tested at weeks 1, 9, and 10 to assess improvement. Both the groups were tested at week 10 to compare final learning outcome.

**RESULTS:** There were 41 and 40 participants in the study group and the control group, respectively. ISS was significantly improved in the study group from week 1-week 10 ( $7.0 \pm 1.3$  vs.  $8.2 \pm 0.9$ ,  $p = 0.01$ ). At week 10, the study group had a higher mean ISS than the control group ( $8.2 \pm 0.9$  vs.  $7.8 \pm 1.1$ ,  $p = 0.68$ ). Mean suturing time and mean placement error were also lower in the study group at the end of suturing training ( $5:1 \pm 1:0$  vs.  $5:2 \pm 1:2$ ,  $p = 0.13$ ;  $7.4 \pm 7.4$  vs.  $8.0 \pm 10.8$ ,  $p = 0.44$ ).

**CONCLUSION:** Tutoring trainees to suture can improve a student's ability to learn how to suture. (J Surg Ed ■■■-■■■)

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**KEY WORDS:** suturing training, teaching, tutoring, medical student

**COMPETENCY:** Practice-Based Learning and Improvement

## INTRODUCTION

Suturing is one of the most challenging basic procedures in medical training and is a basic requirement for general practitioners. Methods of teaching suturing at most medical schools include lecture, video, and one-to-one demonstration, either on simulator or on real patients. Bath and Lawrence<sup>1</sup> proposed an approach for teaching procedural skills that had the tutor start by demonstrating the procedure. The tutor then repeats the procedure, explaining the process. The student then instructs the tutor by repeating the procedure and similarly describing the steps of the process. The tutor then concludes the teaching session by providing student feedback.<sup>1</sup> Although this teaching methodology is simple and easy to describe, it is difficult to implement effectively and it leaves many students feeling inadequately prepared to perform suturing.<sup>2,3</sup> To solve this problem and increase the level of suturing competency, other training methods must be identified to enhance the learning process and accelerate the learning curve.<sup>4</sup>

"See one, do one, teach one" was at one time the popular method of teaching and learning surgery, but has, over time, fallen out of favor.<sup>5,6</sup> This learning method combines explanation, action, and demonstration. Given the number "one" in the "see one, do one, teach one" method, learners acquire inadequate levels of experience with patients and often do not feel sufficiently trained to carry out procedures safely by themselves.<sup>5</sup> As the process of teaching and

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learning surgery continued to evolve, the concept of a “learning curve” became more popular.<sup>7,8</sup> In a “learning curve” learning environment, students perform and practice a procedure until achieving a level of skill that allows them to confidently and competently perform a procedure on their own. This added experience by doing and doing again contributes to incremental outcome improvement and, eventually, plateaus in an ability to perform independently.<sup>7</sup>

A major difference between the “see one, do one, teach one” and learning curve styles is that “see one, do one, teach one” involves teaching (tutoring) as a process component of learning. It has been reported that learning to teach is significantly better than learning to be tested, because those who learn to teach tend to have more intrinsic motivation.<sup>9</sup> This teaching and tutoring component may augment the learning curve.

In today’s medical learning environment, medical students have fewer opportunities to perform suturing, because of higher student-patient ratios and legal issues. Tutoring in suturing training was developed to compensate for this obstacle to suturing skill development. This study aimed to compare ideal suturing score (ISS; 9 points), suturing time (min:sec), and suture placement error (mm) between the group completing the tutoring program (study group) and the group that received suturing training in the ordinary medical school program (control group).

## METHOD

### Study Design

This was an experimental study. *The study group* consisted of medical students who were given the additional role of suturing tutor without any practice on real patients. The *inclusion criteria* were as follows: 1st-3rd year medical students (6-year curriculum), no prior surgical training, ability to participate in all phases of training and attend all teaching sessions, and voluntary participation. It was emphasized that participation in this study was voluntary, that it would not affect their grade standing, and that it would provide them with no other added benefits. In the 1st week, students were taught how to suture on a model by experienced investigators. Criteria for good suturing were given in the form of a checklist to each student. At the end of week 1, students were tested by performing 3 vertical mattress sutures. Students then had 9 weeks of self-practice with suturing kits. At the end of week 9, students were retested using the same vertical mattress suture test criteria. After week 9 testing and during week 10, the study group was assigned responsibility of teaching suturing to 1312 interested high school students who were participating in a surgical education workshop (November 2012). Each tutor was assigned approximately 100 tutees and tutored for 8 hours per day for 3 days of the 5-day workshop. The

study group was then tested a third time at the end of week 10, being again asked to perform 3 vertical mattress sutures.

*The control group* consisted of an entire class of ordinary 4th-year medical students who had never been through a surgical rotation and never performed suturing. During their first week of regular surgical rotation, students were invited to participate in this study. It was similarly emphasized to the control group that participation was strictly voluntary and that students could choose not to participate without any negative consequences or repercussions. Once having agreed to participate, students in the control group were taught how to suture on a model by experienced investigators. Similar to the study group, criteria for good suturing were provided in the form of a checklist to all students. They then had 10 weeks during their surgical rotation to practice suturing independently on our institute’s suturing model and each had an opportunity to perform suturing on real patients, usually performing not more than 10 stitches per patient. At the end of week 10, control group students were tested by performing 3 vertical mattress sutures, according to the criteria provided.

### Study Material

Suturing training kits were composed of commercial needle holder, forceps, Mayo scissors, 2-0 nonsterile needle, silk, and suturing pad.

### Suturing Criteria

Suturing criteria for this study were based on Thailand National Licensing Examination suturing criteria. Study criteria comprised ISS; 9 points, suturing time (min:sec), and suture placement error score (mm). ISS measured the steps involved in suturing, with each step having its own score. Suturing steps were scored as follows: grasping suturing needle with needle holder approximately one-third needle distance from eye of needle (0.5 point); correct handling of tooth forceps (0.5 point); vertical placement of suture 5-8 mm from wound edge (1 point); use of needle holder to pull needle up from wound ridge (0.5 point); vertical placement of suture 5-8 mm from opposite wound ridge (1 point); turning the needle without using hand (0.5 point); placement of suture within 2 mm of both wound ridges (1 point); use of needle holder to pull needle up from wound ridge (0.5 point); knot tying with square knot (1 point); pulling together of wound ridges (0.5 point); performing another vertical mattress suture (1 point); and, performing 3 vertical mattress sutures within 5 minutes (1 point). If 5 minutes was reached and student had not completed 3 sutures, student was permitted to continue without interruption and suturing time was recorded. The total number of ISS points available was 9 points.

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