Session 3. Practical Tips for Teaching Procedural Skills and Teaching in the Operating Room

Overview and Objectives

This session provides residents with a framework for how approach teaching technical skills. Predominantly, skill teaching takes place in the operating room. However, the session will also prepare residents to teach technical skills in other settings, such as the simulation center, or for procedures routinely done on the floor, such as placement of a nasogastric tube or obtaining an arterial blood gas specimen. At the end of the session, residents should be able to

1. Explain and apply principles of cognitive apprenticeship to teaching procedures
2. Synthesize procedural learning experiences
3. Apply the Briefing-Teaching-Debriefing model to plan teaching in the operating room

Readings

Roberts et al. The Briefing, Intraoperative Teaching, Debriefing Model for Teaching in the Operating Room.[8]

Activities

Activity 1.

The activity should familiarize residents with theoretical concepts relevant to technical skill teaching and learning. Specifically, social development theory and cognitive apprenticeship. Social development theory posits that learners occupy a zone of actual development (ZAD), or skills they can perform or attain individually. Outside of this is the zone of proximal development (ZPD), which comprises skills attainable through collaboration and guidance by an instructor. The ZAD can thus be expanded through appropriate guidance and social learning in the context in which skills are to be used.[22] Cognitive apprenticeship alludes to the concept of learning through guided experience in which the expert teacher makes their own thought processes and heuristics explicit to be able to teach their expertise. Cognitive apprenticeship is most effective when the learning takes place in the actual environment in which the knowledge is to be used, the learner is integrated into the workflow, and directly participates in the activities to be learned. The teacher should model behaviors and then coach the learner as they try to practice. As skills build, more complexity can be added to the learning process, allowing scaffolding of higher level skills on more basic skills.[23] Complex learning theory serves to unify the concepts. According to this, learners ought to read, review, and reflect on procedures they are to perform to develop a mental framework for what to expect and what to execute. The teacher then identifies the components of the overall task and deconstructs complex behaviors into smaller, achievable tasks. As more basic skills develop, additional skills are added to build on the basic foundation of skills. Through repetition of the tasks and deliberate practice, where the practice has a goal and is purposeful, the skills are solidified. As the learner demonstrates progression, they can be allowed progressively more responsibility for the task, moving them from observation to assisting, to leading a given procedure.[24]

Break residents into groups (up to 4 residents per group). Allow 5 minutes for them to discuss their own experience learning in the operating room. Residents are asked to reflect on strategies attending surgeons use that represent high quality teaching in the operating room; what strategies do not work well? Use the blackboard or PPT to take notes to help organize the responses; group responses as they pertain to the concepts of social development, cognitive apprenticeship and complex learning theory. Conclude with review of the key concepts. Provide an organizer for residents to take notes during this activity.

[PPT Session 3]

[Organizer 3]

Assessment: Note residents' engagement with the activity.

Activity 2.

Demonstrate skill teaching using a simple skill that can be easily taught in a short time frame. This activity should take approximately 15 minutes. At our institution we have used 'The Pinch' method for folding a T-shirt[25] and juggling three balls. Alternatively a card trick, tying a necktie, or similar tasks can be used. The instructor should model best practices for skill teaching. For simple tasks such as these, instructor should at least:

a. Ask about residents' prior experience

b. Show the whole task
c. Break down the task into components
d. Explain heuristics or memory aids that help instructor know how to execute the task
e. Model each component
f. Allow guided practice
g. Encourage residents who show proficiency to teach their peers

Assessment: Note residents' engagement with the activity.

Activity 3.
Learning contracts can be very helpful. Procedural learning and teaching lend themselves readily to this and can be very useful in framing expectations and allowing adequate preparation. In this activity, review the concept of a learning contract and illustrate one example of how this can be negotiated. The Briefing-Intraoperative Teaching-Debriefing Model described by Roberts and colleagues[8] is an example highly relevant to teaching in surgery. During the briefing phase, a learning objective is negotiated. The content of the intraoperative teaching then focuses on the previously agreed upon objective or objectives. Finally, at the completion of the procedure, the learner is asked to reflect on the experience and the teacher reinforces what was done well, corrects errors, and highlights rules or teaching pearls to use next time.[8]
[PPT Session 3]

Assessment: Activity 4 serves as an Assessment for Activity 3.

Activity 4.
In this activity residents are given an opportunity to synthesize the information from the session. Break residents into groups (up to 4 residents per group). Provide the groups with the task design challenge to prompt them to consider how to teach obtaining a radial arterial blood gas sample (ABG). Ask for volunteers from each group to describe and justify their work.
Task Design:
The goal is to teach a medical student how to draw a radial arterial blood gas sample (ABG).
You are the resident in the intensive care unit and have been asked to ensure that the student will be able to independently draw an ABG without supervision after your instruction.
The medical student is a sub-intern working with you in the intensive care unit.
The student has minimal experience in placing peripheral intravenous access. The student has not previously attempted to draw an ABG.
You need teach the skill so that the student will know all the relevant equipment necessary, the steps involved, and can perform the skill independently.
Your teaching plan must include a determination that the student can move to independent practice, i.e. be entrusted to independently perform the procedure. What criteria will you use to determine readiness?

Assessment: Note residents' engagement with the activity. Completion and discussion of the task design challenge demonstrates the residents' preparation as well as their ability to recall and make meaning of the material that has been discussed.

Activity 5. To wrap up the session residents are asked to complete a brief reflection piece on teaching of procedures. This is an opportunity for residents to reflect on their own teaching behaviors, recognize opportunities for improvement, and be open to incorporating approaches they may have not previously been aware of or considered in their own teaching practice. This is for the residents' own use and is not graded or scored.
Prompt: Please think about the most recent time you were in the operating room with a medical student or junior resident. In a few sentences, please describe what, if any, initiative you took in teaching. Please describe any facilitators or barriers to teaching you experienced. Please discuss how the experience felt to you. Please gauge how your learner would describe the experience. How, if at all, would you do things differently next time?

Exit items – Instructor: Task design challenge; Session survey (Session survey)

Exit items – Residents keep: Completed organizer; Reflection piece