Teaching sterile skills in anesthesia
Is providing context helpful for robust skill acquisition?

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EPI DURAL ANESTHESIA
• Pan relief method during childbirth and during and after operations
• As it is an invasive technique, it carries the risk of contamination
• Residents basically learn the procedure in the clinic
• Even after 4 years of training, residents still make sterility errors (Friedman et al. 2008)
• sterility is a complex concept
• sterility is not visible

DIFFERENT APPROACH: FOCUS ON THE CONTEXT
• Taatgen, Huss, Dickson & Anderson (2005) showed that in teaching flexible cognitive skills teaching materials should draw attention to:
  • the pre-conditions of actions (knowing when)
  • the post-conditions of actions (knowing the effects of actions in the environment)
• They found that Boeing pilots were more flexible and the skill was more robust after learning with a focus on these environmental cues
• learners can then rely on environmental cues rather than keeping track of all the executed steps in their mind
• We applied this approach to training preparing and executing epidural anesthesia

PRESENT TRAINING IS NOT OPTIMAL
• Medical skills should be flexible and robust (Cnossen, 2015)
• Flexible: applicable outside context in which it was learned
• Robust: resistant to stress and workload
• Present training of complex procedures often focuses on the order of the steps of the procedure
• This makes learning vulnerable
  • steps may be forgotten and skipped
  • steps may be performed in the wrong order
• In practice there is no fixed order of steps
  • different procedures have different steps, equipment, medication
  • not all steps have to be performed in a strict order
  • in practice, every supervisor has their own preferred order and method
• Focus on the steps in the procedure during learning
  • does not lead to flexibility in the skill
  • what if a step cannot be performed?
  • does not lead to robustness of the skill
  • in stress situation memory errors can happen

METHOD

PROCEDURE
• 37 medical students participated in simulation study
• Skill preparation of epidural anesthesia
  • 14 steps
  • 10-15 minutes

INSTRUCTIONS
• List condition
  • 34 steps in chronological, strict, order
• Context condition
  • steps arranged in sets
  • order within set was not important
  • photographs
  • pre-conditions of a set of actions (“before”)
  • post-condition (“after”)
  • description of the actions to be performed within the set

MATERIALS AND TOOLS NEEDED
• 2. Needle, sterile
• 3. Sterile gloves
• 4. Dedicated table
• 5. Bunsen burner, suction
• 6. 10 ml syringe, needle
• 7. Cotton swab, alcohol
• 8. 25 cm sterile tape
• 9. Antiseptic solution

DIFFERENT APPROACH: FOCUS ON THE CONTEXT
• Contrary to expectation the context condition did not result in robust skill
  • This stands in contrast to Taatgen et al’s study
  • Context condition even resulted in more sterility errors than the list condition

REFERENCES

DISCUSSION

MAIN RESULTS

CONCLUSIONS & RECOMMENDATIONS