DIFFERENT APPROACH: FOCUS ON PRESENT EPIDURAL ANESTHESIA

- Executing epidural anesthesia
  - We applied this approach to training preparing and executing the skill was more robust after learning with a focus on the steps in the procedure during learning
- In practice there is contamination
  - Pain relief method during childbirth and during and after operations

PRESENT TRAINING IS NOT OPTIMAL

- Medical skills should be flexible and robust
  - Taatgen, Huss, Dickison & 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

METHOD

- Context condition
  - 37 medical students participated in simulation study
  - Skill preparation of epidural anesthesia
  - 34 steps
  - 10-15 minutes
  - Video instruction of procedure
  - Studying description of steps on paper
  - non-sterile actions were written in red
  - sterile actions were written in green
  - 15 minutes practice with materials and instruction sheets
  - Test: perform the procedure with an “non-obstructive nurse”

- List condition
  - 34 steps in chronological, strict, order

MAIN RESULTS

- Sterility errors
  - Order errors
  - Clinically relevant errors

DISCUSSION

- 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
- Environmental cues
  - In epidural anesthesia procedure, there are also many environmental cues in list condition (eg syringe filled or empty)
  - Boeing pilots used complicated system with low usability, so possibly profited more from context
- Memory load
  - Context condition possibly imposed larger memory load on participants
  - The known advantages of the context method were at least partly offset by the disadvantages of this high memory load

Sterility

- Apparently, sterility errors are difficult to prevent
  - even though we explicitly noted which steps of the procedures were sterile or not
  - The participants in the experiment were probably unfamiliar with the concept of sterility
  - Sterility is a complex concept
  - it is not obvious for example that crossing a sterile workspace with (unsterile) bare underarms is not sterile

CONCLUSIONS & RECOMMENDATIONS

- Complex medical skills involve many steps and induce a high memory load to learn them
  - Providing context when teaching a procedure may therefore not necessarily lead to better skill acquisition than learning the steps
  - but the resulting skill may be more flexible and robust after context-learning
  - Further research is needed to test whether it may be advantageous to first study the steps in a procedure until all steps are remembered before performing the skill
  - separating studying the declarative knowledge from training the procedural skill
  - we can then also test the flexibility and robustness of the skill
  - Further research is needed to test whether teaching sterility concepts separately from the procedure itself is needed

REFERENCES


