

This article reviews how human operators process imaging data and use it to plan procedures and make intraprocedural decisions” Duncan and Tabriz (2015).

Abstract:

Objective: Image-guided procedures have become a mainstay of modern health care. This article reviews how human operators process imaging data and use it to plan procedures and make intraprocedural decisions.

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Methods: A series of models from human factors research, communication theory, and organizational learning were applied to the human-machine interface that occupies the center stage during image-guided procedures.

Results: Together, these models suggest several opportunities for improving performance as follows:

1. Performance will depend not only on the operator’s skill but also on the knowledge embedded in the imaging technology, available tools, and existing protocols.
2. Voluntary movements consist of planning and execution phases. Performance subscores should be developed that assess quality and efficiency during each phase. For procedures involving ionizing radiation (fluoroscopy and computed tomography), radiation metrics can be used to assess performance.
3. At a basic level, these procedures consist of advancing a tool to a specific location within a patient and using the tool. Paradigms from mapping and navigation should be applied to image-guided procedures.
4. Recording the content of the imaging system allows one to reconstruct the stimulus/response cycles that occur during image-guided procedures.

Conclusions: When compared with traditional “open” procedures, the technology used during image-guided procedures places an imaging system and long thin tools between the operator and the patient. Taking a step back and reexamining how information flows

through an imaging system and how actions are conveyed through human-machine interfaces suggest that much can be learned from studying system failures. In the same way that flight data recorders revolutionized accident investigations in aviation, much could be learned from recording video data during image-guided procedures.

Full Text

Reference:

Duncan, J.R. and Tabriz, D. (2015) Improving Performance During Image-Guided Procedures. *Journal of Patient Safety*. 11(4), p.230-236.

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