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Review – Endo-urology

Update on Training Models in Endourology: A Qualitative Systematic Review of the Literature between January 1980 and April 2008

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Abstract

Context: Interest in the use of simulators in urological skills training is on the increase. To ensure effective implementation of training models, an overview of the nature and validity of the available models is of the essence.

Objective: To obtain an overview of training models and their validity by performing a qualitative systematic review of the literature.

Evidence acquisition: Studies were identified through searches of PubMed, the Cochrane Library, and Web of Science between January 1980 and April 2008 using two search strategies: ''urology and (training or simulat* or model)'' and combinations of these terms with ''prostate,'' ''kidney,'' ''bladder,'' or ''ureter.'' Studies were included if they (1) described one or more training models, and/or (2) examined the validity of training models. Studies in undergraduate education and of training models for physical examination were excluded. Validation studies were scored according to Kirkpatrick and Oxford Centre for Evidence-Based Medicine (OCEBM) levels of evidence.

Evidence synthesis: Forty-five articles (out of the initial list of 4753 retrieved articles, 0.9%) were included, describing 30 types of training models and 54 validation studies. The largest number of models has been described for ureterorenoscopy (nine types). Only three randomised controlled trials (RCTs), receiving a 1b OCEBM level of evidence score, were found. Studies investigating the impact of simulator training on performance in patients (criterion B validity) were scarce. The number of participants in experimental studies ranged from 7 to 136.

Conclusions: Due to growing interest in training models in urology, it is increasingly urgent to determine which of these models are most valuable for postgraduate training. Because the validation studies published so far are few in number, have low evidence levels, and are composed of only a few RCTs, it is important that more randomised controlled validation studies including larger numbers of participants are performed.

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1. Introduction

''See one, do one, teach one!'' For decades this has been the adage of postgraduate practical skills training. It captures the way in which many of today's doctors acquired their technical competence and went on to become excellent surgeons. However, today's patients are very different from those of earlier days, and tomorrow's patients will be different still; it is a general trend for patients to become more assertive and demanding. There is less willingness among them to be recruited as ''training models'' for untrained junior doctors' first attempts at performing a procedure.

In health care, it is not only the patients who are changing; operation techniques are also evolving continuously. Over the last decades, the applications of endoscopic techniques have expanded, and the use of minimally invasive techniques in urology has spread rapidly, as has the concomitant need for training and qualification in these complicated techniques. Furthermore, legal and ethical concerns about learning on the patient have become a major topic of interest. There is a growing realisation that a large part of the learning curve of procedures does not necessarily require practising on patients and that it may be even better to train on a model first.

The question of how to train novices in urological practical skills, prompted by the boom in the development of training models and skills laboratories, is urgently awaiting an answer. When the answer is ''by using models,'' the inevitable next question is which considerations should prevail in selecting a model. Sometimes it seems that hospitals allow their choices to be directed predominantly by financial considerations and outward appearance. Unfortunately, those responsible for procuring teaching materials rarely consider how effective a model is in shortening trainees' learning curves and, even if they do, they will find themselves faced with a disconcerting lack of convincing research evidence to provide a solid foundation for an answer. Because it is of paramount importance that training models and skills laboratories are implemented in a structured manner and based on evidence of the ability of (often expensive) training models to actually improve novices' performance in patients, validation of training models must be given priority in urological skills training [1].

The research question of this study was what types of endourologic training models have been described in the literature and to what extent they have been validated. We focused on endourologic training models, meaning models concerning intraluminal minimally invasive urological surgery. We mapped the current knowledge about these training models by making an inventory of studies describing and validating these models based on a qualitative systematic review of the literature. The results can be used by urologists and urology trainees to guide well-founded choices of models for skills training while also offering suggestions for which type of research in this area should have the highest priority.

2. Methods

2.1. *Selection criteria*

Articles were selected for inclusion if they described an endourological training model and/or subjected a model to testing of face, content, construct, or criterion validity. Definitions of these validity terms are described in Table 1 and were based on the definitions by McDougall [1]. Because the definitions and implications of validity in the articles showed considerable variation, we judged the descriptions in the studies based on the definitions of validity in Table 1. Articles about undergraduate skills training and physical examination models were excluded.

Table 1 – Definitions of validity

Kind of validity*	Subcategory	Definition
Face validity		Opinion of nonexperts about the simulator
Content validity		Opinion of experts about the simulator (and its appropriateness for postgraduate training)
Construct validity	A: within one trainee	Ability of simulator to distinguish between different levels of experience, measured within one trainee over time
	B: between groups	Ability of simulator to distinguish between different levels of experience, measured between groups with different levels of experience
Criterion validity	A: concurrent validity	Comparison of new model with old model/technique by OSATS
	B: predictive validity	Correlation of trainees' performance on the model with operating room performance measured by OSATS

Abbreviation: OSATS, Objective Structured Assessment of Technical Skills.
* Kinds of validity defined by authors based on definitions of McDougall et al [1].