

Advances in Teaching and Assessing Nontechnical Skills



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KEYWORDS

• Nontechnical skills • Teamwork • Training • Education • Assessment

KEY POINTS

- The importance of surgeons' nontechnical skills is gaining widespread recognition as a critical element of high-quality and safe surgical care.
- The fundamental nontechnical skills that have been identified to contribute to safety and efficiency in the operating room (OR) include:
 - Communication, teamwork, leadership (social skills).
 - Decision making, situational awareness (cognitive skills).
 - Managing stress and coping with fatigue (personal resource skills).
- Surgeons' nontechnical and teamwork skills are typically trained in an informal and unstructured manner (the so-called hidden curriculum). This informal and unstructured approach is neither optimal nor adequate.
- The need to provide formal and structured training in nontechnical aspects of surgical performance has never been so widely accepted by the surgical community, and consequently initiatives to train these skills have gained increasing prominence in the surgical literature over the past 10 years.
- Despite clear progress in the training and assessment of nontechnical skills, more work is needed to integrate these skills into undergraduate and postgraduate surgical education and training as well as into the continuing professional development of surgeons throughout their careers.

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Conflicts of interest: L. Hull and N. Sevdalis provide team skills training and advice on a consultancy basis in the United Kingdom and internationally.

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INTRODUCTION

This article reviews the knowledge base on training and assessing surgeons, and entire operating room (OR) teams, in nontechnical aspects of their performance. Drawing predominantly on the surgical literature, it first defines nontechnical skills in the context of the OR and reviews some of the key assessment instruments that have been developed to capture these skills. It then reviews key developments that have taken place in the past decade on formal skills training, including recently developed guidelines regarding how best to train faculty to evaluate and train nontechnical and team skills in the OR context. In addition, recommendations to further advance nontechnical skill and team-based training and assessment in surgery are presented.

NONTECHNICAL SKILLS IN THE OPERATING ROOM AND PERIOPERATIVE CARE: WHAT ARE THEY AND HOW CAN THEY BE EVALUATED?

Nontechnical skills have emerged as key components of high performance in the OR in the past 10 to 15 years.¹ Major publications in the United States, United Kingdom, and internationally have identified that, in addition to the technical performance of surgeons, additional skills are required to ensure safety and efficiency in the OR and the wider perioperative care pathway. The realization that technical ability alone does not equate with superior surgical performance and/or better patient outcomes arose following analyses of incidents that revealed that key problems in perioperative care related to communication and team factors rather than simply deficiencies and failures in surgeons' technical performance.^{2,3} Additional factors were thus identified as important determinants of surgical outcomes. This systemic perspective on what determines surgical outcomes explicitly articulated the need to focus on nontechnical aspects of performance in the OR as key components of surgical safety and outcomes.

Nontechnical skills have been defined as "the cognitive, social and personal resource skills that complement technical skills and contribute to safe and efficient task performance."⁴ This broad definition applies not only to ORs but across health care settings and also across industries (eg, aviation) in which expert performance and ongoing mitigation of risk are required. Key nontechnical skills applicable to the OR that are within this definition include the following:

- Communication, teamwork, leadership: these are social skills (ie, they refer to how surgeons behave and interact as members of the OR team).
- Decision making, situational awareness: these are cognitive skills (ie, they refer to how surgeons think, both in routine situations and also when crises arise).
- Managing stress and coping with fatigue: these are personal resource skills (ie, they refer to how surgeons manage themselves as health care professionals under the time pressure and stressful conditions that are often the reality of surgical care).

More specifically within the OR and with a surgical focus, several instruments have been developed to capture a range of nontechnical elements of surgeons' performances. A systematic review of the literature, published in 2011, identified 11 articles detailing 4 tools developed to capture the quality of surgeons' nontechnical and teamwork skills.⁵ The assessment tools identified in the review are presented in **Box 1**. Key nontechnical skill assessment tools developed since the publication of Ref.⁵ are also included (in italics) to provide an up-to-date picture.

Review of the instruments summarized in **Box 1** reveals significant overlap in the nontechnical skills identified and captured across assessment instruments, which is an important positive factor in the development of clinicians' understanding of what

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