Surgical Team Training: Promoting High Reliability with Nontechnical Skills

John T. Paige, MD

KEYWORDS

• Team training • High reliability • Nontechnical skills
• Operating room • Teamwork

The past decade has witnessed an ongoing transformation in surgical training in the United States and abroad, led in large part by the incorporation of simulation into residency educational curricula. As a result, the Halstedian apprentice-based teaching model, founded on the maxim of "See one, do one, teach one," is steadily giving way to an objectives-based educational model centered around the triad of targeted task performance, immediate feedback, and repeated focused practice associated with Ericsson's conceptual framework of deliberate practice.[1] This paradigm shift in *how* surgery is taught has also been accompanied by an expansion in *what* is taught, as surgical educators have realized the importance of organization- and team-based dynamics in the care of the surgical patient. To succeed in today's health care environment, a surgeon must be more than a masterful technician; he or she must be an expert team leader with a firm grasp of how the system in which he or she operates functions.

This article focuses on key aspects of these "nontraditional" surgical subjects of organizational structure and team interaction. First, the deficiencies in team dynamics found within the modern operating room (OR) and their resultant consequences are highlighted. Next, essential human factors concepts related to error generation, organizational culture, high reliability, and team science as applied to the OR environment are reviewed. Finally, various strategies for improving OR team function, including the use of high-fidelity simulation (HFS) in team training are discussed.

MODERN OPERATING ROOM TEAM DYNAMICS AND THEIR CONSEQUENCES

The modern OR is a highly dynamic work environment that brings together a diverse group of professionals who must work effectively together as a team to provide safe,

Department of Surgery, Louisiana State University School of Medicine, 1542 Tulane Avenue, Room 734, New Orleans, LA 70112, USA
E-mail address: jpaige@lsuhsc.edu

Surg Clin N Am 90 (2010) 569–581
doi:10.1016/j.suc.2010.02.007 **surgical.theclinics.com**
0039-6109/10/$ – see front matter

quality care to the surgical patient. In such a high-risk environment, each team member must draw upon his or her expert clinical knowledge as well as several distinct categories of skills (**Table 1**).[2,3] Nontechnical skills (NTS) are the combination of those cognitive and interpersonal skills that complement each team member's technical skills to contribute to a safe, effective operative intervention.[2,4] They form the foundation on which team interaction and dynamics are built. Fortunately, NTS are not innately derived; instead, they can be acquired through teaching and training, much like technical skills are learned.[5]

That NTS are teachable skills is encouraging, especially given the dysfunctional status of current OR team dynamics. Indeed, the modern OR team is more appropriately characterized as a group of experts rather than an expert team.[6] Members favor *multi*professional practice over *inter*professional collaboration.[7] The resultant "silo mentality" that each profession brings to the OR is reinforced only by its ready stereotyping of the "other" professions working on the OR team.[8] Finally, differentials in both status and the frequency of individual traits such as motivation, competitiveness, and dominance among the various OR professions contribute to a hierarchical structure prone to interprofessional friction.[9]

This multiprofessional nature of practice within the modern OR allows each profession to harbor divergent conceptions of appropriate team interactions and norms. For example, McDonald and colleagues[10] demonstrated that nurses' reliance on adherence to written rules of conduct and standardized approaches to therapy were in direct conflict with surgeons' beliefs in following unwritten rules of established behavior and maintaining flexibility in treatment plans. These differing attitudes related to behavior and clinical decision making negatively affected trust between the two professions. Additionally, Undre and colleagues[11] revealed that the definition of the term "team" itself differed among OR professions. Whereas nurses tended to view an "OR team" as a unit made up of members working together, surgeons and anesthesiologists took the more traditional view of the "OR team" as a grouping of specialists working within defined boundaries (ie, silos).

The divergent conceptions of team combine with stereotyping to distort each profession's perception of each other and their performance in the OR. Lingard and colleagues[12] found that each profession's self-described role on the OR team was in fact discordant with how other professions within the OR viewed that profession's

Table 1
Operating room skill categories

Category	Example
Technical skills	Endotracheal intubation Patient positioning Suturing
Cognitive skills	Decision making Planning Analytical thinking
Interpersonal skills	Communication Assertiveness Conflict resolution

Data from Fletcher GCL, McGeorge P, Flin RH, et al. The role of non-technical skills in anesthesia: a review of current literature. Br J Anaesth 2002;88:418–429; North Carolina State University Counseling Center. Interpersonal skills. Available at: http://www.ncsu.edu/counseling_center/resources/personal/interpersonal_skills/interpersonal_skills.htm. Accessed October 31, 2009.