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Deliberate Practice and the 10,000-Hour Theory: Its Relationship with Contemporary Surgical Education

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Abstract

The acquisition of expertise in complex disciplines such as surgery has traditionally been attributed to innate talent; however, the theory of deliberate practice and the 10,000 hours, formulated by Ericsson and popularized by Gladwell, posits that mastery depends on the quantity and quality of intentional training. This study presents a narrative review of literature published between 2015 and 2025, identifying relevant research on the impact of deliberate practice in surgical education. Articles were selected from academic databases such as PubMed, SciELO, and Google Scholar, prioritizing systematic reviews and scoping studies. Deliberate practice through simulators, guided training, and continuous feedback fosters the development of technical skills, reduces errors, and improves decision-making in real-world surgical settings. Furthermore, technologies such as virtual reality and emergency simulations enrich current training. Motivation, training design, and time allocation also have a significant influence. Deliberate practice, rather than the accumulation of hours, is the determining factor for achieving surgical competence. Its structured implementation is key to training surgeons who are confident, reproducible, and prepared for the clinical challenges of the 21st century.

Keywords: Deliberate practice; Surgical education; 10 o'clock theory; Surgeons

Introduction

The question of how people acquire expertise in performing complex tasks such as music, sports, and science has been the subject of debate, especially around the idea of "innate talent." However, deliberate practice of a specific task has been shown to be fundamental to achieving a high level of performance. Ericsson and colleagues proposed that expert performance is the result of prolonged and deliberate practice, and that differences in levels of expertise are largely due to the amount of time spent in structured practice with specific feedback [1]. This theory was popularized as the "10,000-hour rule" by Malcolm Gladwell in his book Outliers, where he argues that achieving mastery in any field requires approximately 10,000 hours of intentional and focused practice [2]. Although these theories have been widely debated, their application to surgical learning is significant. In the context of surgery, this theory provides an invaluable framework for structuring training and the development of surgical skills. Deliberate surgical practice and the 10,000-hour theory are fundamental pillars in the training of competent and expert surgeons. Deliberate surgical practice is not just about accumulating hours, but about investing time in the continuous improvement of techniques and skills. This practice includes training in high-fidelity simulators, participation in emergency drills, and performing procedures under the supervision of expert mentors. Furthermore, continuous feedback and reflection on each surgical experience are essential to identify areas for improvement and refine acquired skills [3]. Taken together, these strategies ensure that surgeons not only accumulate experience, but do so in a way that brings them closer to perfecting their skills with every hour of practice. The combination of deliberate practice and the 10,000-hour theory program create a solid foundation for training highly competent surgeons, capable of

facing the challenges of the operating room with confidence and precision.

Methodology

A narrative literature review focused on deliberate practice and the 10,000-hour theory was conducted. Articles in English or Spanish published between 2015 and 2025 were searched using various academic search engines (PubMed, Google Scholar, SciELO, among others), employing combinations of terms and keywords such as deliberate practice, surgical education, 10,000-hour theory, and surgeons. Narrative reviews, systematic reviews, and scoping studies addressing the educational impact of these approaches on surgical training were prioritized. From each included source, the main conclusions related to deliberate practice and the 10,000-hour theory in relation to the challenges and perspectives in surgical teaching were extracted. Finally, the information was synthesized descriptively for analysis in the discussion.

Discussion

Deliberate practice refers to a training method specifically designed to improve performance beyond mere repetition. It is vital for medical professionals, as it allows them to refine and solidify their surgical skills. Through structured repetition, surgeons have the opportunity to gain practical experience in simulated situations, consolidate their theoretical knowledge, and improve their technical proficiency. This systematic and repetitive practice gives surgeons the confidence to successfully perform any surgical procedure, thereby reducing the risk of complications and improving patient outcomes [4].

Application

- Simulation and Training with Animal and Human Models: In many surgical training programs, simulations and practice with animal or simulated human models are used to provide the most realistic experience possible. This allows surgeons in training to practice without putting patients' lives at risk [5].
- Use of Advanced Technology: Virtual and augmented reality tools are increasingly being used in surgical training. These technologies allow surgeons to practice complex procedures in a controlled virtual environment, providing instant and detailed feedback on their performance [6].
- Emergency Drills: Part of surgical practice includes preparation for emergency situations. Emergency drills allow surgeons to learn how to handle critical situations, make quick decisions, and coordinate effectively with their medical team [7].

Benefits

In the training of surgeons, deliberate practice is essential for developing the necessary technical and cognitive skills. For this reason, residents spend hundreds of hours practicing on simulators, models, and in the operating room under supervision before becoming competent and, eventually, experts. The benefits include:

- Improvement of Technical Skills: Enables surgeons to develop and refine their motor and cognitive skills, resulting in more accurate and safer procedures for patients [8].
- Increased Confidence: By deliberately practicing, surgeons gain confidence in their skills, which is crucial during high-pressure situations in the operating room [9].
- Error Reduction: Deliberate practice helps to identify and correct errors before they occur in a real-world setting, thereby improving patient safety [10].
- Adaptation to New Techniques: Allows surgeons to become familiar with new technologies and surgical techniques, ensuring that they are always up to date with advances in the field [11].
- Evaluation and Feedback: Provides an opportunity for surgeons to receive constructive feedback from their mentors and colleagues, essential for their professional development [12].
- Communication training: Surgical practice also includes the development of effective communication skills with patients and the medical team, which are fundamental to success in the surgical environment [13].
- Documentation and Reflection: A crucial part of deliberate practice is the documentation and reflection on each procedure. Surgeons maintain detailed records of their practices, including successes and mistakes, and reflect on them to continually improve [14].

The role of experience

It is important to note that the main driving force behind deliberate practice is the learner's motivation to improve their skills, which fuels the effort involved in embarking on deliberate practice. It is not just about accumulating hours, but about practicing intentionally, with feedback, and in an environment that fosters continuous learning [15]. Experience is fundamental in surgical practice. It is not just a matter of time spent in the operating room, but of the quality and variety of experiences. With each procedure performed, surgeons refine their motor and technical skills, as well as making more informed and rapid decisions in critical situations. Exposure to a wide range of cases gives them the ability to anticipate and manage unexpected complications [16]. Another major benefit is that familiarity with the surgical environment reduces stress and increases confidence. An experienced surgeon is able to remain calm even in the most

challenging situations, developing what we might call a "sixth sense" for identifying problems and resolving complications, built from accumulated experience and reflection on each procedure [17]. Although the 10,000-hour rule comes from studies by psychologist Anders Ericsson, who investigated the role of deliberate practice in acquiring high-level skills, it's important to note that this number is more of a guideline than a strict rule. What's essential is the quality and intention behind the practice. Not all practice hours are created equal: deliberate practice, where you constantly strive for improvement with feedback and clear goals, is what truly leads to excellence [1]. This approach is applicable to surgery because surgeons not only need to accumulate experience, but to do so in a way that ensures every hour of practice brings them closer to perfecting their skills. And it's not just a matter of time, but how that time is used to improve their abilities.

Training design

Another important concept in structuring training is the sequencing of learning steps. Complex procedures are broken down into their basic components for training, known as partial task training. This approach, considered by Ericsson and colleagues as instructor-led training, allows the participant to gain proficiency in the individual parts before moving on to the complex task, reducing the high demand on mental resources that a complex task entails [18]. Another factor to consider is the chronological pattern of practice, that is, how it is distributed over time. Practical sessions can be scheduled in a concentrated manner or spaced out over time (distributed). Distributed practice has been shown to be more effective for the long-term retention of surgical skills, compared to massed practice [19]. Reproducibility is key in surgery because it ensures that techniques can be performed not only by experts but also by surgeons with average skills, thus guaranteeing consistency and patient safety [20]. Establishing clear and detailed protocols for each surgical technique allows for the standardization of procedures during deliberate practice, so that they can be successfully replicated by all surgeons.

Conclusion

Despite all this, deliberate practice cannot explain why some individuals achieve higher levels of performance than others. However, there is a direct relationship between the amount of practice or accumulated experience and the attainment of each individual's maximum skill level [20]. It should always be kept in mind that practice time alone is not the only relevant factor. Training design, mentor quality, and the practitioner's learning style are fundamental elements that significantly influence their professional development and surgical performance [21].

Ethical approval

This research work is governed by the four principles of bioethics established by Beauchamp and Childress.

Conflict of interest

The authors declare that they have no conflict of interest.

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References

1. Ericsson KA, Krampe RT, Tesch-Romer C. The role of deliberate practice in the acquisition of expert performance. Psychol Rev. 1993; 100: 363-406.
2. Gladwell M. Outliers: The Story of Success. New York: Little, Brown and Company; 2008.
3. Grantcharov TP, Reznick RK. Teaching procedural skills. BMJ. 2008; 336: 1129-1131.
4. McGaghie WC, Issenberg SB, Cohen ER, Barsuk JH, Wayne DB. Does simulation-based medical education with deliberate practice yield better results than traditional clinical education? Acad Med. 2011; 86: 706-711.
5. Stefanidis D, Korndorffer JR Jr, Markley S, Sierra R, Heniford BT, Scott DJ, et al. Closing the gap in operative performance between novices and experts: does hard work pay off? Ann Surg. 2008; 247: 854-859.
6. Seymour NE, Gallagher AG, Roman SA, O'Brien MK, Bansal VK, Andersen DK, et al. Virtual reality training improves operating room performance: results of a randomized, double-blinded study. Ann Surg. 2002; 236: 458-463.
7. Rosen MA, Hunt EA, Pronovost PJ, Federowicz MA, Weaver SJ. In situ simulation in continuing education for the health care professions: a systematic review. J Contin Educ Health Prof. 2012; 32: 243-254.
8. Van Dongen KW, Tournoij E, Van der Zee DC, Schijven MP, Broeders IA. Construct validity of the LapSim: can the LapSim virtual reality simulator distinguish between novices and experts? Surg Endosc. 2007; 21: 1413-1417.
9. Kneebone R. Simulation in surgical training: educational issues and practical implications. Med Educ. 2003; 37: 267-277.
10. Barsuk JH, Cohen ER, Wayne DB, McGaghie WC. Cost savings of simulation-based education. Chest. 2013; 143: 718-724.
11. Aggarwal R, Mytton OT, Derbrew M, Hananel D, Heydenburg M, Issenberg B, et al. Training and simulation for patient safety. Qual Saf Health Care. 2010; 19: 34-43.
12. Issenberg SB, McGaghie WC, Petrusa ER, Gordon DL, Scalese RJ. Features and uses of high-fidelity medical simulations that lead to effective learning: a BEME systematic review. MedTeach. 2005; 27: 10-28.
13. Yule S, Flin R, Paterson-Brown S, Maran N, Rowley D. Development of a rating system for surgeons' non-technical skills. Med Educ. 2006; 40: 1098-104.

14. Cook DA, Hatala R, Brydges R, Zendejas B, Szostek JH, Wang AT, et al. Technology-enhanced simulation for health professions education: a systematic review and meta-analysis. JAMA. 2011; 306: 978-988.
15. Ericsson KA. Deliberate practice and acquisition of expert performance: a general overview. Acad Emerg Med. 2008;15: 988-994.
16. Eva KW. The aging physician: changes in cognitive processing and their impact on medical practice. Acad Med. 2002; 77: S1-S6.
17. Norman GR, Eva KW. Diagnostic error and clinical reasoning. Med Educ. 2010; 44: 94-100.
18. Moulton CA, Dubrowski A, MacRae H, Graham B, Grober E, Reznick R, et al. Teaching surgical skills: what kind of practice makes perfect? A randomized, controlled trial. Ann Surg. 2006; 244: 400-409.
19. Stefanidis D. Optimal acquisition and assessment of proficiency on simulators in surgery. Surg Clin North Am. 2010; 90: 475-489.
20. Sonnadara RR, Mui C, McQueen S, Mironova P, Nousiainen MT, Kraemer W, et al. Reflections on competency-based education and training for surgical residents. J Surg Educ 2014; 71: 151-158.
21. George BC, Teitelbaum EN, DaRosa DA, Dunnington GL. Quality of feedback using a novel real-time performance dashboard in a simulation-based laparoscopic curriculum. J Surg Educ. 2014; 71: 263-270.