

Innovations in Surgical Technology and Techniques: Progress for Better Patient Care

Author: Islomjon Izbasarov, Student, Tashkent Medical Academy

Place of Work: Tashkent Medical Academy, Uzbekistan

Abstract. This article explores recent advancements in surgical innovations and technologies aimed at improving patient outcomes. Key topics include the development of MARVEL for minimally invasive brain surgery, smart surgical glasses for real-time collaboration, surgical robots with artificial intelligence, and the advent of remote robotics to enable surgery in underserved areas. The article emphasizes the role of innovation in enhancing precision, safety, and recovery times, as well as reducing complications. These advancements underscore the continuous evolution of surgery to meet modern healthcare demands.

Keywords: Surgery, innovation, robotics, artificial intelligence, minimally invasive techniques

Аннотация: В статье исследуются последние достижения в области хирургии и технологий, направленных на улучшение результатов лечения. Основные темы включают разработку MARVEL для минимально инвазивной хирургии мозга, умные хирургические очки, роботов с искусственным интеллектом и удаленную роботизированную хирургию. Отмечается, что эти достижения способствуют снижению сложностей и улучшению процесса восстановления пациентов.

Ключевые слова: Хирургия, инновации, робототехника, искусственный интеллект, минимально инвазивные методы

Introduction. Surgery has always been a field driven by innovation, seeking better methods to improve patient care and reduce complications. The continuous development of technologies such as artificial intelligence, robotics, and optical imaging has significantly advanced surgical capabilities, enabling safer and more efficient procedures.

Materials and Methods

The study analyzed recent articles, including the contributions of Jennifer Larson's "4 Advancements in Surgical Technology Improving Patient Care," as well as comprehensive reviews in the uploaded texts on surgical advancements. Data were synthesized and categorized into four main areas of innovation.

Results and Discussion

MARVEL for Brain Surgery

Developed through a collaboration between NASA and the Skull Base Institute, MARVEL is a 3D high-definition endoscope designed for minimally invasive brain surgery. This tool allows surgeons to visualize tumors with exceptional precision, potentially reducing complications and improving recovery times.

Smart Surgical Glasses

Mixed-reality smart glasses provide surgeons with real-time video streaming and access to augmented data. These devices are instrumental in training and collaboration, enabling remote experts to annotate materials and guide surgeries effectively.

Surgical Robots with Artificial Intelligence

The evolution of surgical robots, such as the da Vinci system, has introduced AI-driven functionalities that enhance precision. By analyzing vast datasets, these robots assist in planning and performing intricate procedures, such as cellular anti-cancer therapies. According to recent statistics, more than 76,000 surgeons around the world have been trained on da Vinci systems and have completed more than 14 million surgical procedures using da Vinci systems.

Remote Robotics

Combining telemedicine with robotics, remote surgery is expanding access to underserved regions. Clinical studies, such as Mayo Clinic's "telestenting" initiative, highlight the potential for improved cardiac care through robotic assistance.

Conclusion

The innovations discussed demonstrate the transformative potential of technology in surgery. From brain surgery to remote operations, these advancements promise to enhance precision, reduce complications, and improve recovery outcomes. Future research and development must continue within a framework of safety and rigorous evaluation to maximize patient benefits.

References

1. Larson, J. "4 Advancements in Surgical Technology Improving Patient Care."
2. Daniel J. Riskin, MD, MBA,* Michael T. Longaker, MD, MBA,† Michael Gertner, MD,† and Thomas M. Krummel, MD† "Innovation in Surgery: A Historical Perspective." *Annals of Surgery*, 2006.
3. Caycedo-Marulanda, A., et al. "Introduction of New Techniques and Technologies in Surgery." *World J Gastrointest Surg* 2020 May 27; 12(5): 203-207

DOI: <https://doi.org/10.4240/wjgs.v12.i5.203> ISSN 1948-9366 (online)

4. "Surgical Innovation, New Techniques and Technologies." Royal College of Surgeons of England, 2019.
5. Eduard Fosch-Villaronga, Pranav Khanna¹, Hadassah Drukarch, Bart Custers. "The Role of Humans in Surgery Automation". International Journal of Social Robotics (2023) 15:563–580 <https://doi.org/10.1007/s12369-022-00875-0>

**BADIIY MATN TARJIMASIDA MADANIY VA MILLIY
XUSUSIYATLARNI YETKAZISH MUAMMOLARI VA USULLARI
JIZZAX DAVLAT PEDAGOGIKA UNIVERSITETI**

Isomiddinova Laylo

Jizzax davlat pedagogika universiteti

Xorijiy til va adabiyoti fakulteti

747-24 guruh talabasi

Annotatsiya: Mazkur maqolada badiiy matn tarjimasida madaniy va milliy xususiyatlarni to'g'ri va aniq yetkazish muammolari va bu boradagi usullar tahlil qilinadi. Tarjima jarayonida til va madaniyat o'rtasidagi farqlar, tarjimonning badiiy asarni tarjima qilishda qarshi turadigan qiyinchiliklari, hamda bu muammolarga yechim sifatida ishlatilishi mumkin bo'lgan metodlar ko'rib chiqiladi. Shuningdek, milliy mentalitet va madaniyat o'ziga xos xususiyatlarini saqlagan holda tarjima qilishning ahamiyati haqida ham so'z yuritiladi. Maqolada tarjima jarayonida madaniy va milliy o'ziga xosliklarni saqlab qolish va ularni o'zbek auditoriyasiga to'g'ri yetkazish uchun kerakli metodik yondashuvlar taklif qilinadi. Tarjimaning badiiy qadriyatlarini yo'qotmaslik va original matnning semantik boyligini saqlab qolish borasida takliflar beriladi.

Annotation: This article discusses the issues and methods of conveying cultural and national characteristics in the translation of literary texts. The differences between languages and cultures, the difficulties faced by translators when translating literary works, and the methods that can be used to address these challenges are analyzed. The importance of maintaining national mentality and cultural features in translation is also emphasized. The article proposes the necessary methodological approaches to preserve cultural and national peculiarities during the translation process and to accurately convey them to the Uzbek audience. Recommendations are provided for maintaining the artistic value of the translation and preserving the semantic richness of the original text.