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Contribution of Robotic Surgery to Surgeon Ergonomics: A Review of Current Data and Perspectives

Topic: Robotics

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BACKGROUND

Musculoskeletal disorders (MSDs) are a major concern among surgeons, particularly those performing laparoscopic procedures. Prolonged static postures, repetitive movements, and cumulative microtraumas contribute to increased fatigue, potentially impairing performance and shortening surgical careers. Robotic surgery, by modifying the interface between the surgeon and the patient, offers innovative ergonomic solutions. This study aims to analyze the impact of robotic surgery on surgeon ergonomics through a review of current evidence and a discussion of future research perspectives.

METHODS

A comprehensive review of published studies on ergonomics in robotic surgery was conducted, including electromyographic (EMG) analyses, biomechanical studies, and comparative assessments with laparoscopic and open surgical techniques. Additionally, ongoing and prospective research directions aimed at further improving surgical ergonomics were explored.

RESULTS

Current evidence suggests that robotic surgery significantly reduces muscular workload and postural strain compared to conventional laparoscopic techniques. Improved surgeon ergonomics may lead to enhanced surgical precision and a reduction in fatigue-related errors. However, long-term studies are still needed to evaluate the impact of robotic platforms on the prevention of MSDs and the overall longevity of surgical careers.

CONCLUSION

Robotic surgery significantly improves surgeon ergonomics by reducing musculoskeletal strain and fatigue. These benefits may enhance surgical precision and prolong career longevity. Further research is essential to optimize robotic interfaces and confirm long-term advantages in MSD prevention, ensuring sustainable surgical practice and improved occupational health for surgeons.

Statement of Disclosures

None

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