

## **Laparoscopic Surgery: Patient Benefits and Surgeon Challenges.**

### **A Systematic Literature Review and Narrative Synthesis**

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### **Abstract**

*Background:* Since the 1990s, laparoscopic surgery has revolutionised surgical practice by enabling smaller incisions, faster recovery, and reduced postoperative complications. However, musculo-skeletal (MSK) injuries among surgeons - across open, laparoscopic, and robotic modalities - remain an under recognised occupational hazard. This review examines the causes, prevalence, and prevention strategies for MSK injuries in laparoscopic surgeons.

*Methods:* A systematic literature review and narrative synthesis was conducted in accordance with PRISMA guidelines. Searches were performed in MEDLINE, Embase, and PubMed between August 2022 and March 2023 using PICO-derived terms. Inclusion criteria encompassed English-language studies published within the last decade focusing on MSK injuries in surgeons performing minimally invasive surgery (MIS).

*Results:* From 321 screened publications, 43 studies met inclusion criteria. The neck, back, and shoulders were the most frequently affected regions. Contributing factors included sustained non-neutral postures, non-adjustable or poorly designed surgical equipment, and lack of ergonomic training. MSK injuries led to decreased productivity, burnout, and in some cases, surgical absenteeism.

*Conclusion:* Preventive strategies- such as ergonomic education, equipment redesign, microbreaks, and strength training - can significantly reduce MSK injury risk among laparoscopic surgeons. Integration of ergonomics into surgical curricular and workplace design is crucial to protect surgeon wellbeing, ensure sustainable practice, and maintain high-quality patient care.

**Keywords:** surgeon, musculoskeletal, musculoskeletal pain, MSK, minimally invasive surgical procedures, laparoscopy, and robotics