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EDITORIAL

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Navigation surgery in musculoskeletal disorders

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Abstract

Background This collection focuses on Navigation Surgery, we aim to explore the intersection of cutting-edge technology and musculoskeletal surgery. It covers recent advancements, challenges, and future directions in navigational techniques. Navigation devices reconstruct 3D surgical information on monitors, aiding in safer and more accurate operations across orthopedic surgeons. While beneficial, there are risks like misplaced implants, necessitating careful navigation usage. The collection encourages discussions on clinical applications and the ongoing evolution of navigation surgeries.

Keywords Navigation surgery, Musculoskeletal surgery, Benefit, Pitfall

Background

In this collection focused on Navigation Surgery, we aim to explore the intersection of cutting-edge technology and musculoskeletal surgery, highlighting advancements, challenges, and future directions in navigational techniques. Recent developments in navigation equipment have made it possible to perform various surgical operations more safely and accurately. Surgery using navigation devices reconstructs 3D information of the surgical field as a virtual space on the monitor, by using patient-specific-instrumentation (PSI) or augmented reality allowing the surgeon to recognize information that cannot be confirmed from the surgical field in the virtual space while performing the operation [1]. In orthopedic surgery, it is widely applied in the fields of joint replacement, reconstructive, trauma, spine surgery and oncologic surgery. Navigation has been of great benefit to the medical field, starting with preoperative surgical planning [2], improving safety and accuracy during surgery [3], and enabling minimally invasive surgery [4], allowing intraoperative image control [5], as well as reducing radiation exposure to patients and surgeons [6]. More recently, the combination of robotics and navigation has been reported to be more accurate in surgery, and technological advances in this field continue unabated [7].

On the other hand, even if navigation is used, there is a risk of misplaced implants if accuracy is not ensured due to distance from the reference frame [8]. We need to be very careful not to fall into the pitfalls inherent in navigation [9]. It is also acknowledged that there is a learning curve in navigation, indicating that experience is necessary to improve accuracy.

Furthermore, screw insertion using patient-specific templates created with recently developed 3D printing technology is now being used in clinical practice, resulting in high screw insertion accuracy and reduced radiation exposure [10]. Because it does not require the purchase of an expensive navigation system, this tool can be easily introduced at many facilities and is attracting attention.

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This collection solicits a wide range of current topics and issues in the field related to navigation surgery in musculoskeletal surgery. We also ask that you discuss the potential clinical applications of this technology and discuss the further developments of navigation surgeries.

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Declarations

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Not relevant.

Consent for publication
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Competing interests
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