

*Editorial***The use of Artificial Intelligence (AI) in Orthopedic**Asep Santoso^{1,2}¹*Division of Adult Reconstructive Surgery and Sports Injury, Prof. Dr. R. Soeharso Orthopaedic Hospital, Surakarta, Indonesia*²*Department of Orthopaedic and Traumatology, Faculty of Medicine, Universitas Sebelas Maret, Surakarta, Indonesia*

Artificial Intelligence (AI) has become a significant area of interest in orthopedic surgery research, with a focus on enhancing clinical decision-making, improving patient outcomes, and optimizing surgical procedures. The integration of AI into orthopedics encompasses various applications, including image analysis, predictive modelling, patient monitoring, and the development of intelligent systems for surgery and rehabilitation. AI's role in clinical image analysis is one of the most prominent areas of research. Machine learning algorithms, particularly neural networks, have been developed to detect and classify fractures from imaging data. These systems have the potential to improve the detection of subtle fractures and ensure that injuries are not overlooked, especially in patients with multiple traumas.¹ However, it is crucial to recognize that AI does not possess "intelligence" in the conventional sense; it statistically predicts the presence of what it is trained to find within an image.¹

AI has shown promise in personalizing risk prediction for patients. By analyzing large datasets, AI can help tailor treatment plans to individual patient profiles, potentially leading to better outcomes. This approach is particularly relevant in orthopedic surgery, where patient-specific factors can significantly influence recovery and success rates.² The use of wearables and smart devices for patient monitoring is another area where AI is making strides. These technologies can track patient movement and recovery, providing valuable data for clinicians to assess progress and adjust treatment plans accordingly.³ Additionally, AI can assist in real-time rehabilitation monitoring, offering insights into patient adherence and the effectiveness of prescribed exercises.⁴

AI is also being applied to surgical navigation and robotic-assisted surgery. These technologies aim to increase precision during procedures, reduce the risk of complications, and improve overall surgical outcomes. AI-driven simulations and 3D modelling are tools that can enhance the training of orthopedic surgeons and the planning of complex surgeries.³ Despite the potential benefits, there are challenges and limitations associated with the use of AI in orthopedics. One significant concern is the quality of data used to train AI systems. The validity of AI research findings heavily depends on the data's accuracy and representativeness.² Additionally, there is confusion among orthopedic surgeons regarding the definition of AI and how to validate AI research, leading to cautious

optimism about its role in the field.⁵

Ethical considerations, such as the potential for research misconduct and the introduction of misinformation into clinical literature, are critical issues that need to be addressed. The use of AI tools like ChatGPT in scientific writing raises concerns about the misuse of these technologies and the need for strict regulations and honest utilization by researchers.^{6,7} The use of AI in orthopedic surgery research is a rapidly evolving field with the potential to revolutionize patient care. While AI offers exciting possibilities for improving diagnostics, treatment planning, and surgical procedures, it is essential to approach its integration with a critical eye towards data quality, ethical use, and the development of standardized reporting and validation frameworks.^{2,4,5,8} As AI continues to advance, it is imperative for the orthopedic community to stay informed and actively participate in shaping the future of AI applications in the field.⁹

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