International Journal of Research and Review
[Indexed, Peer-Reviewed Journal]
Volume 13; Issue: 9; September 2026
Website: www.ijrrjournal.com
Review Paper
E-ISSN: 2349-9788; P-ISSN: 2454-2237

Artificial Intelligence (AI) in Orthopedic Physiotherapy: An Overview

Dr. Ishu Verma (PT)[1], Dr. Divya Midha[2], Dr. Mona Bhat (PT)[3], Dr. Rajneesh Parimoo[4]

[1]Assistant Professor, Department of Physiotherapy, Desh Bhagat University, Mandi Gobindgarh, Punjab, India.
[2]Proffesor & Head, Department of Physiotherapy, Desh Bhagat University, Mandi Gobindgarh, Punjab, India.
[3]Post Graduate Student, Department of Physiotherapy, Desh Bhagat University, Mandi Gobindgarh, Punjab, India.
[4]Associate Professor, Department of Periodontology, Desh Bhagat University, Mandi Gobindgarh, Punjab, India.

Corresponding Author: Dr. Ishu Verma (PT)

DOI: https://doi.org/10.52403/ijrr.20260913

ABSTRACT

The use of artificial intelligence (AI) is growing rapidly across the globe. Different domains are using it so widely. The medical field is also trying to move into it very quickly. AI is a uniform terminology that is defining the practical applications of algorithms to produce needful output without much need of human involvement. As AI is slowly but definitely outclassing the benefits in healthcare research and across all pathways related to patient care and diagnosis. Implications of AI in orthopedic physiotherapy in evolving and emerging technology is currently being used in predicting risk of injury, use of medical imaging, post-op patient performance and etc. The major aim of this review article is to provide a complete understanding and knowledge of AI and machine learning, and also to present its involvement in clinical applications in trauma and orthopedic physiotherapy.

Keywords: AI, physiotherapy, orthopedics, diagnosis

BACKGROUND

Over the years, Artificial intelligence (AI) has evolved rapidly, contributing to changes in different areas of medical profession through its ability to simulate human reasoning and help in clinical outputs.[1] In the United States (2016), preventable medical errors with more than 250,000 deaths were reported annually.[2] In health care set-up, AI holds immense promise for boosting the quality of patient care and reducing errors.[3] Advancements in computing engineering and data analytics have led to massive upsurge in the development of AI technologies and related medical devices approved by the United States Food and Drug Administration.[5] These innovations are usually being integrated into various medical special ties. In particular, in orthopedics, a field focused on diagnosing, treating, and preventing disorders of the musculoskeletal system, including bones, muscles, joints, ligaments, tendons, and nerves.

Since AI is increasingly used to enhance early diagnosis and precision work in the treatment of orthopedics[6], the integration of

AI into orthopedic practice represents unique challenges. Orthopedic conditions usually involve a mixture of bio-mechanical systems, patient-specific anatomical variations, and long-term recovery periods, abnormalities that require robust and precise AI solutions. Challenges like data scarcity, the complexity of unstructured clinical information, lack of training in machine learning and integration issues with current work flows continue to restrict the implementation in practical use of AI in allied health sciences. Furthermore, to ensure the ethical use of patient related data, patient compliance, and acceptance among health-care providers it further causes the difficulty. Although challenges remain, still various ways of AI applications in orthopedics continue to show substantial potential. AI technologies help in increasing accuracy in diagnoses through advanced image recognition, minimize surgical time period through predictive analytics, and personalize treatment plans using patient-oriented data. Particularly in surgical implications, AI-related robotics and navigation systems are transforming the way in the field of physiotherapy as well. Therapy to the patient is now planned and executed, which helps in improving precision and reducing recovery time.[7,8] Hence, patient need in these innovations align with the broader goals of precision medicine[9], offering tailored interventions to meet individual care.

Orthopedic imaging

Advancements in AI have aid progress in orthopedic imaging, particularly in the automated segmentation and also localization of anatomical structures.[10-12] AI offers clinical tools that streamline the complicated tasks and provides support to the application of ML and DL techniques in the correct diagnosis and treatment of orthopedic conditions. Ultrasound, CT and MRI images could also be hindered by metal jewellery.[50] Recent development in segmentation and classification system algorithms has benefited the orthopedic image analysis that enable the delineation of hard and soft tissue structures like cartilage, bone, muscle, and neural elements. These advances are supported by both traditional machine learning (ML) models and modern deep learning (DL) architectures. For example, Shah et al.[13] utilized a validated ML model to quantify cartilage thickness from 3,910 magnetic resonance imaging (MRI) datasets of healthy knees. This approach enabled accurate differentiation of tissue layers, facilitating longitudinal assessment of joint degeneration. However, ML-based models often exhibit limited adaptability, and their reliance on manual feature extraction restricts scalability.[14] In contrast, Norman et al.[11] employed a U-Net-based DL model for the segmentation of cartilage and menisci. The model achieved Dice coefficients ranging from 0.770 to 0.878 for cartilage and from 0.753 to 0.809 for menisci, with an average segmentation time of 5s per scan. The model also demonstrated a strong correlation with manual relaxometry and morphological measurements, highlighting its potential for reliable osteoarthritis (OA) assessment in clinical workflows. Similarly, Ghidotti et al.[14] compared the U-Net and SegResNet architectures and reported high spatial accuracy for cartilage segmentation. SegResNet, with its enhanced skip connections, demonstrated superior adaptability under specific training conditions, under scoring its potential for precise three-dimensional (3D) anatomical modeling in orthopedic applications. Similarly, in pelvic segmentation, Hemke et al.[10] developed a deep convolutional neural network (DCNN) model capable of segmenting pelvic computed tomography (CT) images into multiple tissue classes with high accuracy, completing segmentation of each image in under 0.1s on a graphics processing unit. These findings demonstrate the robustness and efficiency of the model, reinforcing the value of DL in comprehensive body composition analysis. These findings demonstrate the robustness and efficiency of the model, reinforcing the value of DL in comprehensive body composition analysis.

Orthopedic diagnostics

Diagnostic errors occur in every field of medical care and specialties, with clinical decision-making and lack of communication skill makes it a leading cause, resulting in at least moderate harm in over half of cases and death in 1 in 7 patients.[15-17] The advanced AI technologies, coupled with the expansion of medical data[18], has promote increasing integration of AI into diagnostic research and clinical outcomes.[19]

Diagnosis of fracture still remains a cornerstone of orthopedic practice, yet traditional radiographic interpretation is prone to misdiagnosis due to interobserver variability, variable anatomical structures, and increased clinical workloads.[20,21] The implementation of AI into diagnosis of fracture presents a promising advancement aimed at improving diagnostic precision, foster consistency in interpretation, and streamlining clinical results.[22] Many of the studies have shown that, AI-based models detects acute fractures, achieve accuracies comparable to those of expert radiologists (Figure.1).[23] Fractures of varying sizes and complexities have been successfully identified in various AI models that are trained on X-ray and CT datasets. In a study by Dankelman et al.[24], a DCNN showed proficiency in detecting proximal humerus fractures. A deep neural network (DNN) developed by also demonstrated detecting and localizing of wrist fractures in radiographs with accuracy similar to that of advanced sub-specialty plastic surgeons. This study also concluded that, emergency medicine clinicians assisted by the trained model achieved a sensitivity of 92.5% and a specificity of 94.1% respectively.

However, AI-based fracture diagnosis still facing multiple uncertain challenges.[25] Firstly, multi-centric validation is needed to ensure that AI systems perform reliably in clinical settings, as unexpected outcomes should not surface during standard evaluations.[26] Barriers to AI adoption in radiology primarily stem from cost concerns and limited transparency. Consequently, widespread implementation relies on demonstrating measurable enhancements in both clinical efficiency and diagnostic outcomes to justify the necessary investment.[27] Additionally, limited training exposure makes it difficult for current AI to detect subtle or atypical fractures, such as stress or pathologic bone fractures.

AI-based treatment in orthopedic physiotherapy

Artificial intelligence (AI) has significantly enhanced the quality of orthopedic surgery by improving surgical precision, optimizing preoperative planning, and streamlining intraoperative workflows. Robotic platforms, navigation technologies, and AI-powered imaging analysis have become integral to optimizing patient-specific interventions.[28-29]

- **Shoulder Arthroplasty**

The integration of navigation systems and robotic platforms in reverse shoulder arthroplasty has improved the accuracy of glenoid component placement by reducing manual errors, including improper inclination and off-center positioning. Giorgini et al.[30] demonstrated that computer-assisted navigation significantly improved the accuracy of glenoid component placement while reducing errors associated with conventional manual techniques. However, Twomey-Kozak et al.[31] noted that, despite these promising findings, the application of navigation systems in shoulder arthroplasty remains in its early stages, particularly when compared with their well-established use in hip and knee arthroplasty. Darwood et al.[32] highlighted the advantages of robotic platforms for the real-time fabrication of patient-specific instruments. The system achieved version and inclination angle accuracies of 1.9° (standard deviation [SD] 1.3) and 1.2° (SD 0.7), respectively, along with a positional accuracy of 1.1 mm (SD 0.7) relative to the preoperative plan.

Although these innovations show considerable promise, shoulder arthroplasty presents unique challenges that may limit the effectiveness of AI-based navigation. Giorgini et al.[30] highlighted that navigation of the humeral component remains underdeveloped, limiting the ability to achieve optimal joint stability. Manual alignment of the humeral implant remains necessary, contributing to variability in surgical precision. Furthermore, the early implementation of AI-based navigation systems can prolong operative time while surgeons become familiar with new workflows.

- **Fracture Reduction**

Achieving optimal fracture reduction is essential for successful fracture healing. Ankle trauma is highly prevalent, with an estimated 2 million acute ankle sprains occurring annually in the United States.[33] Due to the complexity of the ankle anatomy, even minor injuries may result in serious consequences[34], and up to 70% of patients experience residual physical disability. Improper joint reduction during surgery can result in inadequate contact area or excessive contact force, thereby increasing the risk of postoperative complications.[35,36] AI-based fracture reduction techniques have been developed to reduce intraoperative fluoroscopy exposure while enhancing reduction accuracy. In this context, Gebremeskel et al.[37] proposed an image-guided robotic system for ankle fracture reduction, using the contralateral ankle as a reference to determine optimal manipulation forces and displacement parameters. This study quantified the manipulative forces and displacement required for accurate reduction of the ankle syndesmosis, marking a crucial first step in defining the design requirements for robotic assistance in terms of force and displacement. However, robotic-assisted fracture reduction has several notable limitations. The performance of AI-based force prediction models is influenced by inter-patient anatomical variability, and achieving real-time adaptation remains a significant challenge.

- **Reconstruction of Ligament**

AI has improved ligament reconstruction procedures by enhancing surgical planning and intraoperative precision. Sakakibara et al.[38] introduced a robotic biomechanical testing system to simulate joint kinematics and tendon graft placement, suggesting that reconstruction at 30° of plantar flexion yields optimal outcomes. Additionally, Yang et al.[39] utilized AI-based three-dimensional (3D) CT and MRI analyses for personalized ACL reconstruction planning, integrated with robotic assistance for real-time intraoperative surgical adjustments. Their study demonstrated that robotic guidance improved the accuracy of bone tunnel drilling, maintaining deviations within 1.5 mm.

- **Clinical drug development**

New drug development is a lengthy and complex process characterized by high R&D costs and considerable uncertainty.[40] In recent years, conventional drug development approaches have become increasingly challenging due to rising investments and prolonged development timelines. The field is currently at a bottleneck, necessitating innovative technologies to improve efficiency and reduce costs. The rapid advancement of AI has created new opportunities for high-quality development in the biopharmaceutical industry.[41] As early as the 1980s, Merck adopted computer-aided drug design for drug development.[42] With advances in computing technology, AI has gradually emerged as a dominant approach, becoming increasingly integrated into the drug development process.[43] This approach ensures analytical quality while significantly reducing drug R&D costs, shortening development timelines, and improving overall efficiency, thereby accelerating the drug development process.[44] AI has been applied to predict protein structure and functional properties, forecast drug–protein interactions, and facilitate high-throughput drug screening.[45-49]

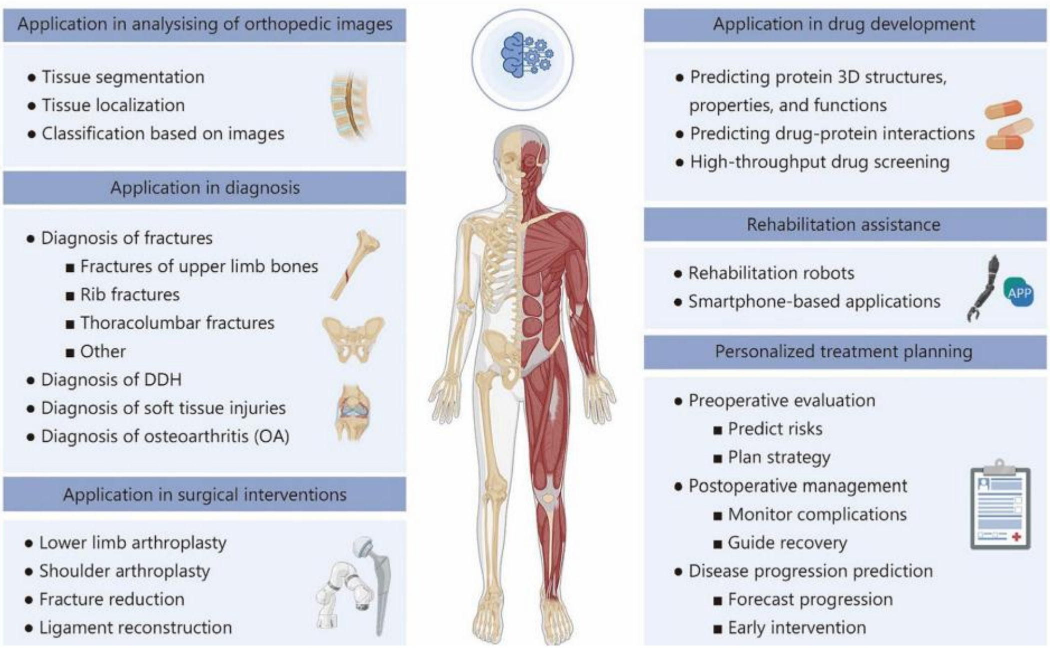

Fig. 1. Comprehensive applications of AI in orthopedics. DDH developmental dysplasia of the hip, 3D three-dimensional. Song et al. Military Medical Research (2025) 12:42 https://doi.org/10.1186/s40779-025-00633-z.

Shortcomings and future outlook

The clinical use of AI remains constrained by a range of technical and operational barriers. Most current systems are built to perform narrow tasks, such as image classification or structural recognition, but lack the capacity to support broader clinical workflows. As a result, they fall short in areas like correlating multiple diseases and developing individualized treatment plans.[19] Furthermore, AI demonstrates limited effectiveness in subjective evaluations and struggles to manage ambiguous or uncertain information[49], which restricts its usefulness in clinical practice. In addition, these systems are heavily reliant on large datasets and substantial computational resources. Many models demand considerable processing power and specialized software–hardware setups[48], making implementation in resource-constrained environments challenging. Their performance is also influenced by factors such as image quality and the presence of anatomical landmarks, while variations in imaging protocols across hospitals introduce additional complexity to deployment.[49] To drive progress in the field, future research should prioritize several key directions: building high-quality, multicenter, and ethnically diverse data platforms to enable standardized data sharing; designing more interpretable model architectures to enhance clinical trust; broadening AI capabilities to encompass the entire diagnostic and therapeutic continuum, including disease progression forecasting, surgical planning, and long-term outcome assessment; reinforcing ethical oversight and regulatory frameworks to clearly define the responsibilities of developers and users; and advancing long-term, multi-regional, real-world clinical validation with iterative optimization. Addressing these challenges is essential for AI in orthopedics to transition from a “laboratory innovation” into a “clinical productivity tool.”

CONCLUSIONS

Artificial Intelligence is set to transform physiotherapy by improving diagnostic precision, tailoring treatment strategies, and enhancing patient outcomes. From applying machine learning algorithms for data-driven diagnostics to utilizing AI-enabled wearables that provide real-time feedback during rehabilitation, the technology is reshaping the physiotherapy landscape. Although certain challenges remain, the potential advantages: greater efficiency, improved results, and stronger patient engagement make AI a highly promising tool for the future of physiotherapy. As advancements continue, AI will play an increasingly vital role in healthcare, equipping physiotherapists with the resources needed to deliver more effective and individualized care.

Declaration by Authors

Ethical Approval: Not applicable
Acknowledgement: None
Source of Funding: None
Conflict of Interest: No conflicts of interest declared.

REFERENCES

1. Rajpurkar P, Chen E, Banerjee O, Topol EJ. AI in health and medicine. Nat Med. 2022;28(1):31–8.
2. Makary MA, Daniel M. Medical error—the third leading cause of death in the US. BMJ. 2016;353: i2139.
3. Xiang Y, Zhao L, Liu Z, Wu X, Chen J, Long E, et al. Implementation of artificial intelligence in medicine: status analysis and development sug-gestions. ArtifIntell Med. 2020;102:101780.
4. Malik AT, Khan SN. Predictive modeling in spine surgery. Ann Transl Med. 2019;7(Suppl 5): S173.
5. Wu E, Wu K, Daneshjou R, Ouyang D, Ho DE, Zou J. How medical AI devices are evaluated: limitations and recommendations from an analysis of FDA approvals. Nat Med. 2021;27(4):582–4.
6. Hui AT, Alvandi LM, Eleswarapu AS, Fornari ED. Artificial intelligence in modern orthopaedics: current and future applications. JBJS Rev. 2022. https://doi.org/10.2106/JBJS.RVW.22.00086.
7. Charles YP, Lamas V, Ntilikina Y. Artificial intelligence and treatment algorithms in spine surgery. Orthop Traumatol Surg Res. 2023;109(1S):103456.
8. Gyftopoulos S, Lin D, Knoll F, Doshi AM, Rodrigues TC, Recht MP. Artificial intelligence in musculoskeletal imaging: current status and future directions. AJR Am J Roentgenol. 2019;213(3):506–13.
9. Ho D, Quake SR, McCabe ERB, Chng WJ, Chow EK, Ding X, et al. Ena- bling technologies for personalized and precision medicine. Trends Biotechnol. 2020; 38(5):497–518.
10. Hemke R, Buckless CG, Tsao A, Wang B, Torriani M. Deep learn- ing for automated segmentation of pelvic muscles, fat, and bone from CT studies for body composition assessment. Skeletal Radiol. 2020; 49(3):387–95.
11. Norman B, Pedoia V, Majumdar S. Use of 2D U-net convolutional neural networks for automated cartilage and meniscus segmentation of knee MR imaging data to determine relaxometry and morphometry. Radiology. 2018;288(1):177–85.
12. Burström G, Buerger C, Hoppenbrouwers J, Nachabe R, Lorenz C, Babic D, et al. Machine learning for automated 3-dimensional segmentation of the spine and suggested placement of pedicle screws based on intraoperative cone-beam computer tomography. J Neurosurg Spine. 2019;31(1):147–54.
13. Shah RF, Martinez AM, Pedoia V, Majumdar S, Vail TP, Bini SA. Variation in the thickness of knee cartilage. The use of a novel machine learning algorithm for cartilage segmentation of magnetic resonance images. J Arthroplast. 2019; 34(10):2210–5.
14. Ghidotti A, Vitali A, Regazzoni D, Cohen MW, Rizzi C. Comparative analysis of convolutional neural network architectures for automated knee segmentation in medical imaging: a performance evaluation. J Comput Inf Sci Eng. 2024;24(5):051005.
15. Leung K, Zhang B, Tan J, Shen Y, Geras KJ, Babb JS, et al. Prediction of total knee replacement and diagnosis of osteoarthritis by using deep learning on knee radiographs: data from the osteoarthritis initiative. Radiology. 2020;296(3):584–93.

16. Kwan JL, Calder LA, Bowman CL, MacIntyre A, Mimeault R, Honey L, et al. Characteristics and contributing factors of diagnostic error in surgery: analysis of closed medico-legal cases and complaints in Canada. Can J Surg. 2024;67(1): E58.
17. Federico CA, Trotsyuk AA. Biomedical data science, artificial intelligence, and ethics: navigating challenges in the face of explosive growth. Annu Rev Biomed Data Sci. 2024;7(1):1–14.
18. Rabie AH, Saleh AI. Diseases diagnosis based on artificial intelligence and ensemble classification. Artif Intell Med. 2024; 148:102753.
19. Guermazi A, Tannoury C, Kompel AJ, Murakami AM, Ducarouge A, Gillibert A, et al. Improving radiographic fracture recognition performance and efficiency using artificial intelligence. Radiology. 2022;302(3):627–36.
20. Link TM, Pedoia V. Using AI to improve radiographic fracture detection. Radiology. 2022;302(3):637.
21. Ajmera P, Kharat A, Botchu R, Gupta H, Kulkarni V. Real-world analysis of artificial intelligence in musculoskeletal trauma. J Clin Orthop Trauma. 2021; 22:101573.
22. Shen L, Gao C, Hu S, Kang D, Zhang Z, Xia D, et al. Using artificial intelligence to diagnose osteoporotic vertebral fractures on plain radiographs. J Bone Miner Res. 2023;38(9):1278–87.
23. Bai L, Wu Y, Li G, Zhang W, Zhang H, Su J. AI-enabled organoids: construction, analysis, and application. Bioact Mater. 2024; 31:525–48.
24. Dankelman, L.H.M., Schilstra, S., IJpma, F.F.A. et al. Artificial intelligence fracture recognition on computed tomography: review of literature and recommendations. Eur J Trauma Emerg Surg 49, 681–691 (2023). https://doi.org/10.1007/s00068-022-02128-1
25. Oakden-Rayner L, Gale W, Bonham TA, Lungren MP, Carneiro G, Bradley AP, et al. Validation and algorithmic audit of a deep learning system for the detection of proximal femoral fractures in patients in the emergency department: a diagnostic accuracy study. Lancet Digit Health. 2022;4(5): e351–8.
26. Tadavarthi Y, Vey B, Krupinski E, Prater A, Gichoya J, Safdar N, et al. The state of radiology AI: considerations for purchase decisions and current market offerings. Radiol Artif Intell. 2020;2(6): e200004.
27. Borjali A, Chen AF, Muratoglu OK, Morid MA, Varadarajan KM. Detecting total hip replacement prosthesis design on plain radiographs using deep convolutional neural network. J Orthop Res. 2020;38(7):1465–71.
28. Chen X, Li S, Liu X, Wang Y, Ma R, Zhang Y, et al. Acetabular diameter assessment and three-dimensional simulation for acetabular reconstruction in dysplastic hips. J Arthroplast. 2023;38(8):1551-8.
29. Hashimoto DA, Rosman G, Rus D, Meireles OR. Artificial intelligence in surgery: promises and perils. Ann Surg. 2018;268(1):70–6.
30. Giorgini A, Tarallo L, Novi M, Porcellini G. Computer-assisted surgery in reverse shoulder arthroplasty: early experience. Indian J Orthop. 2021;55(4):1003–8.
31. Twomey-Kozak J, Hurley E, Levin J, Anakwenze O, Klifto C. Technological innovations in shoulder replacement: current concepts and the future of robotics in total shoulder arthroplasty. J Shoulder Elbow Surg. 2023;32(10):2161–71.
32. Darwood A, Hurst SA, Villatte G, Tatti F, El Daou H, Reilly P, et al. Novel robotic technology for the rapid intraoperative manufacture of patient specific instrumentation allowing for improved glenoid component accuracy in shoulder arthroplasty: a cadaveric study. J Shoulder Elbow Surg. 2022;31(3):561 70.
33. Herzog MM, Kerr ZY, Marshall SW, Wikstrom EA. Epidemiology of ankle sprains and chronic ankle instability. J Athl Train. 2019;54(6):603–10.
34. Peiffer M, Lewis L, Xie K, Guild TT, Ashkani-Esfahani S, Kwon JY. The influence of talar displacement on articular contact mechanics: a 3D finite element analysis study using weightbearing computed tomography. Foot Ankle Int. 2024;45(4):393–405.
35. Gregersen MG, Dalen AF, Skrede AL, Bjelland Ø, Nilsen FA, Molund M. Effects of fibular plate fixation on ankle stability in a Weber B fracture model with partial deltoid ligament sectioning. Foot Ankle Int. 2024;45(6):641–7.
36. Spindler FT, Gaube FP, Böcker W, Polzer H, Baumbach SF. Value of intraoperative 3D imaging on the quality of reduction of the distal tibiofibular joint when using a suture-

button system. Foot Ankle Int. 2022;44(1):54–61.
37. Gebremeskel M, Shafiq B, Uneri A, Sheth N, Simmerer C, Zbijewski W, et al. Quantification of manipulation forces needed for robot-assisted reduction of the ankle syndesmosis: an initial cadaveric study. Int J Comput Assist Radiol Surg. 2022;17(12):2263–7.
38. Sakakibara Y, Teramoto A, Takagi T, Yamakawa S, Shoji H, Okada Y, et al. Effects of the ankle flexion angle during anterior talofibular ligament reconstruction on ankle kinematics, laxity, and in situ forces of the reconstructed graft. Foot Ankle Int. 2022;43(5):725–32.
39. Yang G, Liu D, Zhou G, Wang Q, Zhang X. Robot-assisted anterior cruciate ligament reconstruction based on three-dimensional images. J Orthop Surg Res. 2024;19(1):246.
40. Bajorath J, Kearnes S, Walters WP, Meanwell NA, Georg GI, Wang S. Artificial intelligence in drug discovery: into the great wide open. J Med Chem. 2020;63(16):8651–2.
41. Smalley E. AI-powered drug discovery captures pharma interest. Nat Biotechnol. 2017;35(7):604–5.
42. Brown FK, Sherer EC, Johnson SA, Holloway MK, Sherborne BS. The evolution of drug design at Merck Research Laboratories. J Comput Aided Mol Des. 2017;31(3):255–66.
43. Gangwal A, Lavecchia A. Unleashing the power of generative AI in drug discovery. Drug Discov Today. 2024;29(6):103992.
44. Gligorijević V, Renfrew PD, Kosciolek T, Leman JK, Berenberg D, Vatanen T, et al. Structure-based protein function prediction using graph convolutional networks. Nat Commun. 2021;12(1): 3168.
45. Spencer M, Eickholt J, Cheng J. A deep learning network approach to ab initio protein secondary structure prediction. IEEE/ACM Trans Comput Biol Bioinform. 2015;12(1):103–12.
46. Yuan L, Ma Y, Liu Y. Ensemble deep learning models for protein second-ary structure prediction using bidirectional temporal convolution and bidirectional long short-term memory. Front Bioeng Biotechnol. 2023; 11:1051268.
47. Offensperger F, Tin G, Duran-Frigola M, Hahn E, Dobner S, Ende CWa, et al. Large-scale chemoproteomics expedites ligand discovery and predicts ligand behavior in cells. Science. 2024;384(6694): eadk5864.
48. Wang F, Liu D, Wang H, Luo C, Zheng M, Liu H, et al. Computational screening for active compounds targeting protein sequences: methodology and experimental validation. J Chem Inf Model. 2011; 51(11):2821-8.
49. Ren F, Aliper A, Chen J, Zhao H, Rao S, Kuppe C, et al. A small-molecule TNIK inhibitor targets fibrosis in preclinical and clinical models. Nat Biotechnol. 2025; 43(1):63–75.
50. Parimoo R, Singh B, Sharma D, Sharma V, Javaid A. Oral Ornaments: An Overview. Int Healthc Res J. 2020;4(6):143-147. https://doi.org/10.26440/IHRJ/0406.09359

How to cite this article: Ishu Verma, Divya Midha, Mona Bhat, Rajneesh Parimoo. Artificial intelligence (AI) in orthopedic physiotherapy: an overview. *International Journal of Research and Review*. 2026; 13(9): 115-122. DOI: *10.52403/ijrr.20260913*

******