



The Current Status of Indian Orthopaedic Research: A Comprehensive Overview

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This overview illuminates the significant evolution of Indian orthopaedic research from 1996 to 2023, showcasing exponential growth in publications and an increasing global presence. The study reveals a remarkable annual growth rate of 20.8% in literature, with predominant contributions from leading institutions. Despite the surge in quantity, the research underscores the imperative enhancement required in the quality of publications, with only a minor fraction gaining substantial citations. Highlighting the role of international collaborations, particularly with the USA and UK, the overview articulates how these partnerships have been pivotal in elevating the research quality and impact. The narrative also addresses the diverse range of topics covered by Indian researchers in international journals, emphasizing significant scientific contributions in areas like joint replacement, sports medicine, and fracture research. The study acknowledges the regional distribution of contributions across India, signalling a call for increased research emphasis in underrepresented areas. Looking forward, the overview accentuates the potential of Indian orthopaedic research, advocating for enhanced funding, infrastructure, and global collaboration to address prevailing challenges and leverage technological advancements for the betterment of patient care and health equity.

Keywords: Indian orthopaedic research, publication growth, international collaborations, research quality, global impact, futuristic directions

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Introduction

The landscape of orthopaedic research in India has undergone a remarkable transformation in recent years. With a burgeoning population and a rising incidence of musculoskeletal conditions, the country has emerged as a significant player in the global orthopaedic research arena, a feat that is both impressive and a source of pride.

Growth and Development

In a bibliometric study of Indian Orthopaedic research between 2002 and 2021, 4606 publications were found with an annual growth rate of 20.8%. The premier institutions like AIIMS-New Delhi and PGIMER-Chandigarh produced a more significant proportion of articles (5.2% and 4.3%), and R. Vaishya and S. Rajasekaran were the most productive authors, contributing 1.6% and 1.1% share of publications respectively [1]. Indian orthopaedic research has witnessed exponential growth since 1996, with only 22 publications to 972 publications in 2023 (Figure 1) [2]. It is driven by several factors, like the increasing prevalence of orthopaedic diseases, coupled with the establishment of specialized research institutions and centres, has created a conducive environment for research. Increased funding for research projects and scholarships has also played a crucial role in fostering a research-oriented culture [3].

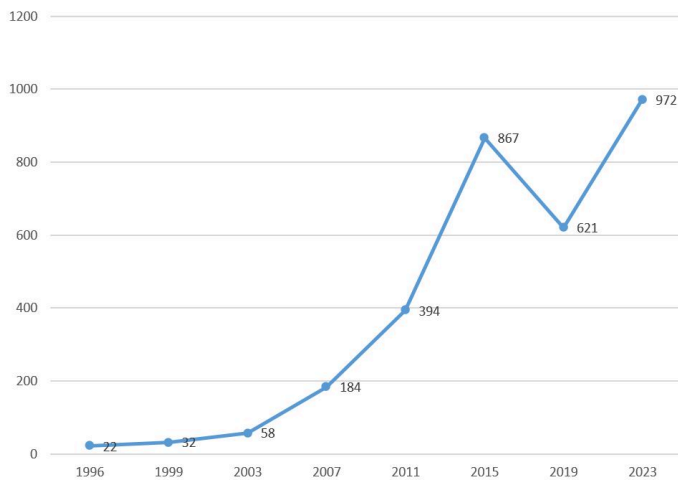


Figure 1: Indian Orthopaedic publications from 1996 to 2023, showing an increasing trend, especially since 2011. (Source: SCIMAGO [2])

However, the quality of Indian research needs to be boosted. A study found that only 179 (3.88%) of all the Indian publications received more than 50 citations in the last two decades, with an average Citations Per Paper (CPP) of 127.2 [4]. Collaborations with international institutions have significantly enhanced the quality and impact of Indian orthopaedic research. The USA and UK (31.8% and 21.3%) represented the highest collaborative share with Indian authors in a study [1]. Joint research projects, exchange programs, and knowledge sharing have facilitated the transfer of expertise and technology, enabling Indian researchers to stay at the forefront of global advancements.

Indian orthopaedic research has made substantial contributions to the global knowledge base. Indian researchers have published numerous high-quality studies in prestigious international journals, addressing a wide range of topics such as joint replacement [5], sports medicine [6,7], and fractures [8].

Scientometric analysis of Indian Orthopaedic research in some sub-specialities has also been done recently. In Arthroplasty, 872 publications were found from 2002-2021, with a 1.36% share of global output [5]. In contrast, in arthroscopy, 632 publications were found between 1994 and 2020 [6,7], and in fracture research, 1046 publications were found between 1989 and 2022, with an average CPP of 8.5 [8].

In a study, Indian Orthopaedic publications between 2009 and 2020 were maximum from the states of Tamil Nadu (n=4503), followed by Delhi (n=3480), Maharashtra (n=2588), Karnataka (n=1877) and West Bengal (n=1329), with similar contributions from the Government (n=1459) and Private (n=1225) institutions [9].

It is to be noted that the state of Madhya Pradesh did not appear on the list of the top 10 contributing Indian states. Hence, more emphasis on research and publications is needed here as this state now has about 30 medical colleges and many orthopaedic postgraduates and practising orthopaedic surgeons.

Current Global Standing

An increasing trend in publications in Orthopaedics and Sports Medicine was reported from across the globe, with some Asian countries like China and India showing substantial growth [10].

In Asia, India ranks fourth in 2023, after China, Japan and South Korea, with a total of 10333 publications from 1996 to 2023, with an average of 9.34 citations per publication [3]. India's global ranking in Orthopaedics and Sports Medicine is at 16th position in 2023, which has improved from 32nd in 1996 [2].

Future Directions

Despite its significant progress, Indian orthopaedic research still faces several challenges, including limited funding for research, inadequate infrastructure, and a shortage of skilled researchers. To address these issues, investing in research infrastructure, providing adequate funding, and fostering a conducive research environment is imperative.

Future directions for Indian orthopaedic research (Figure 2) are filled with promise and potential. A focus on translational research, collaboration with industry, and the use of technological advancements can revolutionize orthopaedic research and patient care. Furthermore, prioritizing research on conditions that disproportionately affect underserved populations can help improve health equity, offering a hopeful outlook for the future of Indian orthopaedic research.



Figure 2: Future Research Directions Suggested for Indian Orthopaedic Community

Conclusion

Indian orthopaedic research has grown remarkably and significantly contributed to the global scientific community. By addressing the existing challenges and capitalizing on future opportunities, India can further strengthen its position as a leading force in orthopaedic research and improve the lives of millions of people worldwide.

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