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Global Research Trends in Biomechanical Phenomena Related to Hernias (2004–2023): A Scientometric Analysis

Jiehua Zheng, Yixian Sun, Liuming Lin, Xiaoqi Lin, Daitian Zheng, Zhiyang Li, Yexi Chen
*The Second Affiliated Hospital of Shantou University Medical College,Shantou,China

Biomechanical Research Trends in Hernias: A 20-Year Scientometric Overview

Emerging Hotspots and Global Contributions in Hernia Biomechanics from 2004 to 2023

Aim

This study aimed to assess the global scientific output on biomechanical phenomena related to hernias over the past two decades using scientometric methods. It focuses on analyzing research trends, identifying leading contributors, and highlighting emerging areas of interest in the field.

Material & Methods

A systematic search was conducted in the Web of Science database for publications from 2004 to 2023 using predefined keywords related to hernia biomechanics. A total of 344 publications were retrieved and analyzed using scientometric tools, including VOSviewer and Bibliometrix R v4.2.1. Metrics such as annual publication trends, key subject areas, citation impact, and contributions from countries, institutions, authors, and journals were examined. Emerging core research themes and innovative trends were identified.

Results

The annual publication output exhibited consistent upward growth, peaking in 2023 with 39 publications. The United States emerged as the leading contributor, dominating publication volume, citation impact, and international collaborations. Iatridis JC was the most prolific author with the highest h-index, while the journal Spine published the most studies. Core themes included biomechanical applications in hernia repair techniques, improving access to safe hernia surgery, and the role of advanced materials in optimizing outcomes. Emerging trends featured minimally invasive techniques (e.g., eTEP) and biomechanically driven concepts (e.g., GRIP) for durable incisional hernia repair.

Conclusions

Biomechanical phenomena play an essential role in advancing hernia management strategies. Future efforts should address expanding access to safe hernia repair, innovating biomechanical materials, and refining biomechanically informed surgical techniques to improve global outcomes and reduce the hernia burden.