

Bibliometric analysis of publications on kinesiophobia in orthopedics between 1970 - 2023

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Cite this article as: Kurt M. Bibliometric analysis of publications on kinesiophobia in orthopedics between 1970 - 2023. *J Health Sci Med.* 2024;7(1):58-67.

Received: 22.10.2023

Accepted: 04.12.2023

Published: 15.01.2024

ABSTRACT

Aims: This bibliometric study aimed to examine the hotspots and frontiers of kinesiophobia research in orthopedics and to assess the overall scientific output of the field.

Methods: The Web of Science Core Collection was mined for articles on kinesiophobia that were published between 1970 and September 2023. Using common bibliometric indicators, Vosviewer was used to examine the number of publications, countries, institutions, journals, authors, cited references, and keywords.

Results: The results of a bibliometric analysis focused on the body of knowledge on kinesiophobia. The study analyzed 2,035 articles from 75 different countries and identified important trends and groundbreaking research. In particular, there has been a steady increase in recent years, with publications increasing significantly between 2001 and 2012. The highest contribution came from the United States and the most cited articles addressed clinical recommendations for low back pain. Both the Florida State University System and the University of Florida made significant contributions. With a total of 51,443 citations, this study provides a comprehensive overview to help guide future research in orthopaedics and related fields.

Conclusion: The results of this bibliometric study give an overview of the state and trends in clinical research on kinesiophobia and may be used by researchers to pinpoint hot themes and consider fresh lines of inquiry.

Keywords: Kinesiophobia, bibliometric analysis, publications

INTRODUCTION

There are several conceptual definitions for fear in relation to pain, but the most prevalent ones include pain-related fear, fear-avoidance beliefs, fear of movement, and kinesiophobia.¹ Kinesiophobia is the fear of excessive, irrational and disabling physical movement and activity, manifested by the fear of a painful injury or re-injury.^{2,3} It is connected to the degree of pain in those with chronic pain.⁴ Also, fear of pain is thought to be a powerful psychological predictor of both chronic pain and impairment.⁵ Pain perceptions and reactions to physical exercise have been shown to be significantly influenced by psychological variables, such as pain catastrophizing and kinesiophobia.^{6,7} According to a recent study, orthopedic trauma patients may experience kinesiophobia at a rate of up to 52.8%.⁸ After orthopedic surgery, rehabilitation is hampered by the psycho-cognitive aspect of kinesiophobia. There is no proof that kinesiophobia affects a patient's ability to function in the short term after having orthopedic surgery.⁹

The bibliometric approach is a quantitative statistical analysis tool used to evaluate and track developments in research. We can swiftly identify the characteristics of literature, study and comprehend the growth process, and identify the research hotspots in research topics using the bibliometrics method. Currently, bibliometric analysis is used extensively in many different domains.¹⁰⁻¹⁴

In recent years, there have been many publications examining the available research evidence of kinesiophobia. However, the publication characteristics of kinesiophobia research have only been briefly summarized in one publication.¹⁵ Therefore, it is crucial to ascertain the current state of kinesiophobia as a whole in order to serve as a reference for future research. The Vosviewer software was used in this study to conduct a bibliometric analysis of articles on kinesiophobia covering the period from 1970 to September 2023. The analysis produced a thorough summary of accomplishments, new trends, and research hotspots in this field. The study, which concentrated on orthopedics and related fields, sought to provide a review

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of the literature to support future research, particularly in devising treatment methods for people with kinesiophobia. The study provided insights that informed and guided subsequent research into successful interventions for patients experiencing kinesiophobia in orthopedic contexts by summarizing the landscape of kinesiophobia literature.

METHODS

Ethics

As it is not a human or animal study there is no need for ethical approval. All procedures were carried out in accordance with the ethical rules and the principles.

Data Collection

Literature databases are used in the bibliometric analyses. Databases like Scopus, Web of Science, Pubmed, Cochrane Library, and etc., are currently used extensively. The Web of Science (WoS) database (<https://www.webofscience.com/wos/woscc/basic-search>) includes these, as well as sizable, multidisciplinary, high-impact, global, and thorough academic journals. Evidence has been demonstrated that when Vosviewer¹⁶ is used for visual analysis in which the most powerful and easy to understand visualization tool for depicting the relations between related aspects and the WoS database produces a greater knowledge map effect.

The WoS database is a rational and efficient choice for our study's data source. In particular, the data were gathered from the SCI-EXPANDED, and Emerging Sources Citation Index (ESCI) databases in the Web of Science Core Collection (WoSCC). We searched the literature retrieved from WoSCC on a single day, October 5, 2023, to prevent bias due to the daily database changes.

Inclusion Criteria

The search technique included the keywords: pain catastrophizing OR Kinesiophobia (Topic) OR fear of movement (Topic) OR fear-avoidance beliefs (Topic) OR pain-related fear (Topic) and the literature type was restricted to "ARTICLE." The research area selected as orthopedics and related fields [(Orthopedics or Rehabilitation or Sport Sciences (Web of Science Categories))]. We extracted English-language articles from publications between 1970 and October 30, 2023, and we evaluated the results for relevancy.

Exclusion Criteria

Only the "Articles in English Language" Documents were accepted. Remainder documents was excluded.

A total number of references was then gathered. We recorded the document's information as complete records and cited sources as plain text. Data must first be prepared before being imported into the Vosviewer. Four folders were made in the newly constructed folder: input, output, data, and project. The file was previously exported in

WoSCC to input and saved with the name "download_**.txt" in a Vosviewer-compatible format.

Analysis Tool

The scientific mapping tool VOSviewer was created by Van Eck and Waltman,¹⁶ We used VOSviewer (version 1.6.19) for our bibliometric analysis. The superior network and cluster analysis visualization capabilities of VOSviewer led to its selection. Diagrams of institutional collaboration, journal co-citation, keyword co-occurrence, author collaboration, author co-citation, and literature co-citation were made easier by the tool. These analyses were essential for figuring out intricate relationships in academic literature.

Also Microsoft Excel was used to examine and decipher publication patterns across countries, institutions, journals, and authors for the distribution component. Excel's ability to handle and analyze bibliometric data systematically was made possible by its computational prowess. This combined strategy, which used Excel for thorough distribution analyses and VOSviewer for nuanced visualization, provided a thorough understanding of the scholarly environment under study. The strengths of VOSviewer and Microsoft Excel were combined in our methodology to produce a thorough and perceptive bibliometric analysis of institutional, authorship, and publication dynamics in the selected research domain.

RESULTS

General Information

A total of 2,035 academic articles on kinesiophobia in orthopedics were written by a total of 6,742 authors, who represented 2,377 affiliations and 75 different countries.

Our thorough bibliometric analysis revealed a total of 2,035 academic articles between 1970 and 2023, which together accumulated a significant 51,443 citations. An important metric for evaluating the scholarly impact of individual works is the average number of citations per item, which for this dataset was 25.27. Additionally, the h-index, a reliable measure of academic productivity and impact, reached a significant value of 98. This indicated that 98 works in the dataset had at least 98 citations each, demonstrating the breadth and impact of the body of literature that had been compiled over the time period under consideration.

Notable trends in scholarly output were revealed by comparing the distribution of publications over various time series. The division of time into the three categories of before 2000, between 2001 and 2012, and between 2013 and 2023 provided insights into the development of research productivity. There were few contributions made before 2000, making up just 0.197% of the entire dataset. The following decade, from 2001 to 2012, saw

a sharp increase in scholarly activity, accounting for 58.7% of all publications. Together, the years 2023, 2022, 2021, and 2020 contributed 35.32% of the total, demonstrating a consistent and significant output in recent years. Notably, the publication numbers showed a declining trend from 2013 to 2019, contributing a total of 35.83%. 1994 and 1995 were the first years mentioned in the dataset, with 2 and 1 publications, respectively. Recent years have seen an increase in the number of publications, with 2020 having the most with 201 publications, followed by 2021 with 200 publications and 199 publications 2022. The highest publication numbers were thus concentrated in the most recent years, particularly in 2020, 2021, and 2022, even though the dataset started in the mid-1990s. **Figure 1** shows trends in kinesiophobia publications and citations.

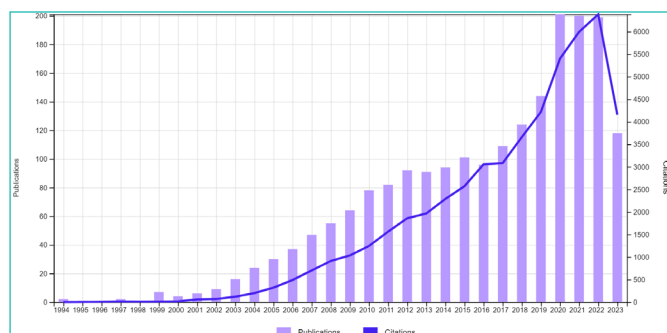


Figure 1. The trends in kinesiophobia publications and citations

Top Publishing Countries, and Affiliations

The field received contributions from 76 countries, with the United States providing the majority (28.138%) of the 2,035 records. The Netherlands (8.76%), England (8.71%), Australia (10.33%), and Canada (8.02%) were close behind. Sweden, Belgium, Brazil, Spain, and Norway were additional significant contributors. Contributions from the People's Republic of China, New Zealand, France, Ireland, Scotland, Switzerland, Denmark, Italy, Japan, Iran, Turkiye, Ireland, and the United Kingdom were also significant.

The top publishing organisations were listed in **Table 1**. According to affiliations, the top publishing countries represented a variety of regions. With 3.587% of the total number of records, the State University System of Florida was in the lead, followed by the University of Florida at 3.145%. The list also prominently included European universities like Maastricht University, Karolinska Institutet, University of Oslo, University of Sydney, and Vrije Universiteit Amsterdam. Among the notable contributors were the Pennsylvania Commonwealth System of Higher Education PCSHE, the University System of Ohio, and the University of Gothenburg. Vrije Universiteit Brussel, Ghent University, and the University of Southern

Denmark were all included in the international presence. The list showcased the interconnectedness of the academic landscape by including institutions from Australia, the United States, Europe, and beyond, reflecting a global collaboration in research.

Table 1. Top publishing organisations		
Affiliations	Record count	% of 2.035
State University System of Florida	73	3.587
University of Florida	64	3.145
Maastricht University	58	2.850
Karolinska Institutet	55	2.703
University of Oslo	53	2.604
University of Sydney	53	2.604
Vrije Universiteit Amsterdam	52	2.555
University System of Ohio	43	2.113
University of Gothenburg	42	2.064
Pennsylvania Commonwealth System of Higher Education Pcshe	41	2.015
Vrije Universiteit Brussel	40	1.966
University of Queensland	39	1.916
Ghent University	38	1.867
University of Southern Denmark	36	1.769
Curtin University	35	1.720
University of Pittsburgh	34	1.671
University of Antwerp	32	1.572
University of Kentucky	30	1.474
University of Utah	30	1.474
Utah System of Higher Education	30	1.474
Linkoping University	29	1.425
University of Groningen	29	1.425
University of Texas System	29	1.425
Harvard University	28	1.376
Ku Leuven	28	1.376

Showing 25 out of 2.377 entries; 14 record(s) (0.688%) do not contain data in the field being analyzed

Top Cited Articles

Table 2 provides a concise overview of articles on kinesiophobia with a focus on three important studies. Clinical practice guidelines for low back pain are covered in the first article, which was written by Delitto et al. and published in the Journal of Orthopaedic & Sports Physical Therapy in 2012. It has received 571 citations overall, or an average of 47.58 per year. With 496 citations, or an average of 22.55 per year, the second study by Dite and Temple (2002) published in the Archives of Physical Medicine and Rehabilitation introduces a clinical test for identifying multiple falling incidents in elderly individuals. With 452 citations and an average of 20.55 per citation, Flynn et al. 's 2002 study published in SPINE presents a clinical prediction rule for classifying low back pain patients with short-term improvement through spinal manipulation.

Citation Topics Micro

Table 2. The summary of the kinesiophobia articles that were most frequently cited

Title	Authors	Source Title	Publication Year	DOI	Total Citations	Average citation per year
Low Back Pain Clinical Practice Guidelines Linked to the International Classification of Functioning, Disability, and Health from the Orthopaedic Section of the American Physical Therapy Association	Delitto, et al.	Journal of Orthopaedic & Sports Physical Therapy	2012	10.2519/jospt.2012.42.4.A1	571	47.58
A clinical test of stepping and change of direction to identify multiple falling older adults	Dite and Temple	Archives of Physical Medicine and Rehabilitation	2002	10.1053/apmr.2002.35469	496	22.55
A clinical prediction rule for classifying patients with low back pain who demonstrate short-term improvement with spinal manipulation	Flynn, et al.	Spine	2002	10.1097/00007632-200212150-00021	452	20.55
Falls in individuals with stroke	Weerdesteyn, et al.	Journal of Rehabilitation Research and Development	2008	10.1682/JRRD.2007.09.0145	437	27.31
Impact of Psychological Factors in the Experience of Pain	Linton, et al.	Physical Therapy	2011	10.2522/ptj.20100330	429	33
Fear of re-injury: a hindrance for returning to sports after anterior cruciate ligament reconstruction	Kvist, et al.	Knee Surgery Sports Traumatology Arthroscopy	2005	10.1007/s00167-004-0591-8	426	22.42
Neck pain: Clinical practice guidelines linked to the international classification of functioning, disability, and health from the orthopaedic section of the American physical therapy association	Childs, et al.	Journal of Orthopaedic & Sports Physical Therapy	2008	10.2519/jospt.2008.0303	415	25.94
Preliminary development of a clinical prediction rule for determining which patients with low back pain will respond to a stabilization exercise program	Hicks, et al.	Archives of Physical Medicine and Rehabilitation	2005	10.1016/j.apmr.2005.03.033	408	21.47
Information and advice to patients with back pain can have a positive effect - A randomized controlled trial of a novel educational booklet in primary care	Burton, et al.	Spine	1999	10.1097/00007632-199912010-00010	407	16.28
Randomized clinical trial of lumbar instrumented fusion and cognitive intervention and exercises in patients with chronic low back pain and disc degeneration	Brox, et al.	Spine	2003		395	18.81
The Effect of Neuroscience Education on Pain, Disability, Anxiety, and Stress in Chronic Musculoskeletal Pain	Louw, et al.	Archives of Physical Medicine and Rehabilitation	2011	10.1016/j.apmr.2011.07.198	392	30.15
Evaluating Common Outcomes for Measuring Treatment Success for Chronic Low Back Pain	Chapman, et al.	Spine	2011	10.1097/BRS.0b013e31822ef74d	349	26.85
Course and prognostic factors for neck pain in whiplash- associated disorders (WAD) -: Results of the bone and joint decade 2000- 2010 task force on neck pain and its associated disorders	Carroll, et al.	Spine	2008	10.1097/BRS.0b013e3181643eb8	339	21.19
Psychometric properties of the Tampa Scale for kinesiophobia and the fear- avoidance beliefs questionnaire in acute low back pain	Swinkels-Meewisse, et al.	Manual Therapy	2003	10.1054/math.2002.0484	339	16.14
Identifying subgroups of patients with acute/subacute nonspecific low back pain - Results of a randomized clinical trial	Brennan, et al.	Spine	2006	10.1097/01.brs.0000202807.72292.a8	334	18.56

The dataset for "citation topics micro" displayed a wide range of topics, including 95 entry points, totaling 2,035 records. The majority of the records (61.93%) were about low back pain, which was followed by records about anterior cruciate ligament, falls, shoulder, and intervertebral disc. Notably, the analyzed field contained no data for 1.82%

of the entries. The compilation provided a thorough look at the distribution of research emphasis within the micro context of citations, ranging from more general topics like sports psychology and cancer survivors to orthopedic concerns like Achilles tendon and osteoarthritis.

Top Publishing Journals

According to record counts and percentages of the 2,035 records, the top publishing journals on this topic were as follows: BMC Musculoskeletal Disorders was in first place with 7.961%, and Spine was close behind with 7.813%. Physiotherapy Theory and Practice (3.147%), Disability and Rehabilitation (3.980%), European Spine Journal (3.980%), Journal of Orthopaedic Sports Physical Therapy (3.735%), and Physical Therapy (5.160%) were some of the other well-known journals. Significant literature contributions were also made by Archives of Physical Medicine and Rehabilitation, Musculoskeletal Science and Practice, and Journal of Rehabilitation Medicine (Table 3). The list highlighted a wide variety of journals, highlighting the fact that research on musculoskeletal disorders, rehabilitation, and related topics is multidisciplinary.

Publication journals	Record Count	% of 2.035
BMC Musculoskeletal Disorders	162	7.961
Spine	159	7.813
Physical Therapy	105	5.160
Disability and Rehabilitation	81	3.980
European Spine Journal	81	3.980
Journal of Orthopaedic Sports Physical Therapy	76	3.735
Physiotherapy Theory and Practice	62	3.047
Archives of Physical Medicine and Rehabilitation	59	2.899
Musculoskeletal Science and Practice	55	2.703
Journal of Rehabilitation Medicine	50	2.457
Spine Journal	45	2.211
Manual Therapy	43	2.113
Journal of Back and Musculoskeletal Rehabilitation	42	2.064
Journal of Manipulative and Physiological Therapeutics	38	1.867
Clinical Rehabilitation	35	1.720
Gait Posture	34	1.671
Journal of Manual Manipulative Therapy	29	1.425
Journal of Bodywork and Movement Therapies	28	1.376
Journal of Sport Rehabilitation	28	1.376
Physical Therapy In Sport	26	1.278
PMR	26	1.278
Physiotherapy Research International	24	1.179
European Journal of Physical and Rehabilitation Medicine	23	1.130
Knee Surgery Sports Traumatology Arthroscopy	22	1.081
Brazilian Journal of Physical Therapy	18	0.885

Showing 25 out of 195 entries

Keyword Analysis

There were 3,116 total keywords in the Vosviewer keyword analysis, 276 of which appeared more than five times. The most popular search terms, along with their respective frequency and total link power, were as follows: With 358 occurrences and an overall link

strength of 849, "low back pain" was the most popular keyword. The term "rehabilitation" came in second with 186 occurrences and a link strength of 472 while the term "kinesiophobia" showed up 173 times and a link strength of 428. Other significant terms included "chronic pain" (127 occurrences, 334 link strength), "disability" (124 occurrences, 364 link strength), and "pain" (122 occurrences, 346 link strength). The focus and connections between these themes in the research literature are shown by the prominence of terms like "neck pain," "chronic low back pain," "exercise," "physiotherapy," "back pain," "physical therapy," "fear," "fear of movement," and "physical activity" in the keyword analysis. Figure 2 shows the keyword analysis with Vosviewer.

Bibliographic Coupling Analysis Among Countries

Figure 3 shows the bibliographic coupling analysis among countries.

In total, 42 of the 76 publishing countries contributed at least 5 articles each. The outcomes of the analysis of bibliographic coupling with Vosviewer are as follows: With 576 documents, 19,184 citations, and a total link strength of 584,097, the United States took the lead. With 209 documents (5,679 citations, 238,145 link strength), 177 documents (4,806 citations, 201,064 link strength), and 177 documents (5,302 citations, 235,012 link strength), respectively, Australia, England, and the Netherlands were also significant contributors. Following closely were Brazil, Canada, Sweden, Belgium, and Belgium, all of which significantly improved the state of research. The analysis sheds light on how research efforts in the field are distributed globally, highlighting the extensive international cooperation and knowledge exchange.

In North America, the United States took the lead among the continents, making a significant contribution with 576 documents, 19,184 citations, and a total link strength of 584,097. Furthermore, Canada contributed significantly with 163 documents, 3,834 citations, and 198,873 link strength. With 209 documents, 5,679 citations, and a total link strength of 238,145, Australia stood out in Oceania. Several European countries made significant contributions, including Belgium (108 documents, 2,961 citations, 146,034 link strength), Sweden (143 documents, 5,484 citations, 191,448 link strength), the Netherlands (177 documents, 5,302 citations, 235,012 link strength), and England (177 documents, 4,806

citations, 201,064 link strength). Brazil provided 106 documents, 1,080 citations, and 89,437 link strength to represent South America. Turkiye, Germany, and Iran made notable contributions in Asia. The global distribution of research efforts on the subject is thoroughly outlined by this bibliographic coupling analysis with

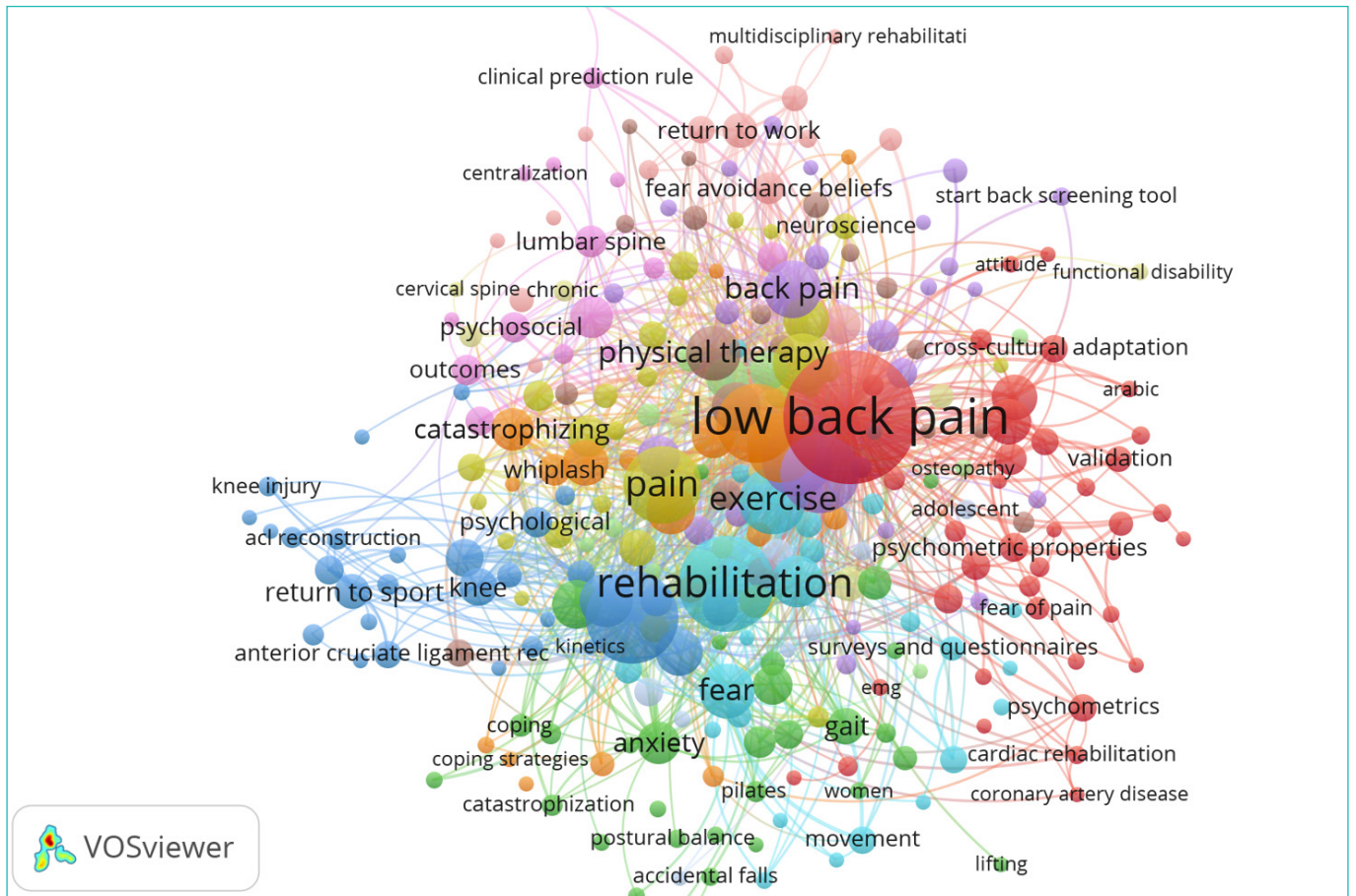


Figure 2. Keyword analysis

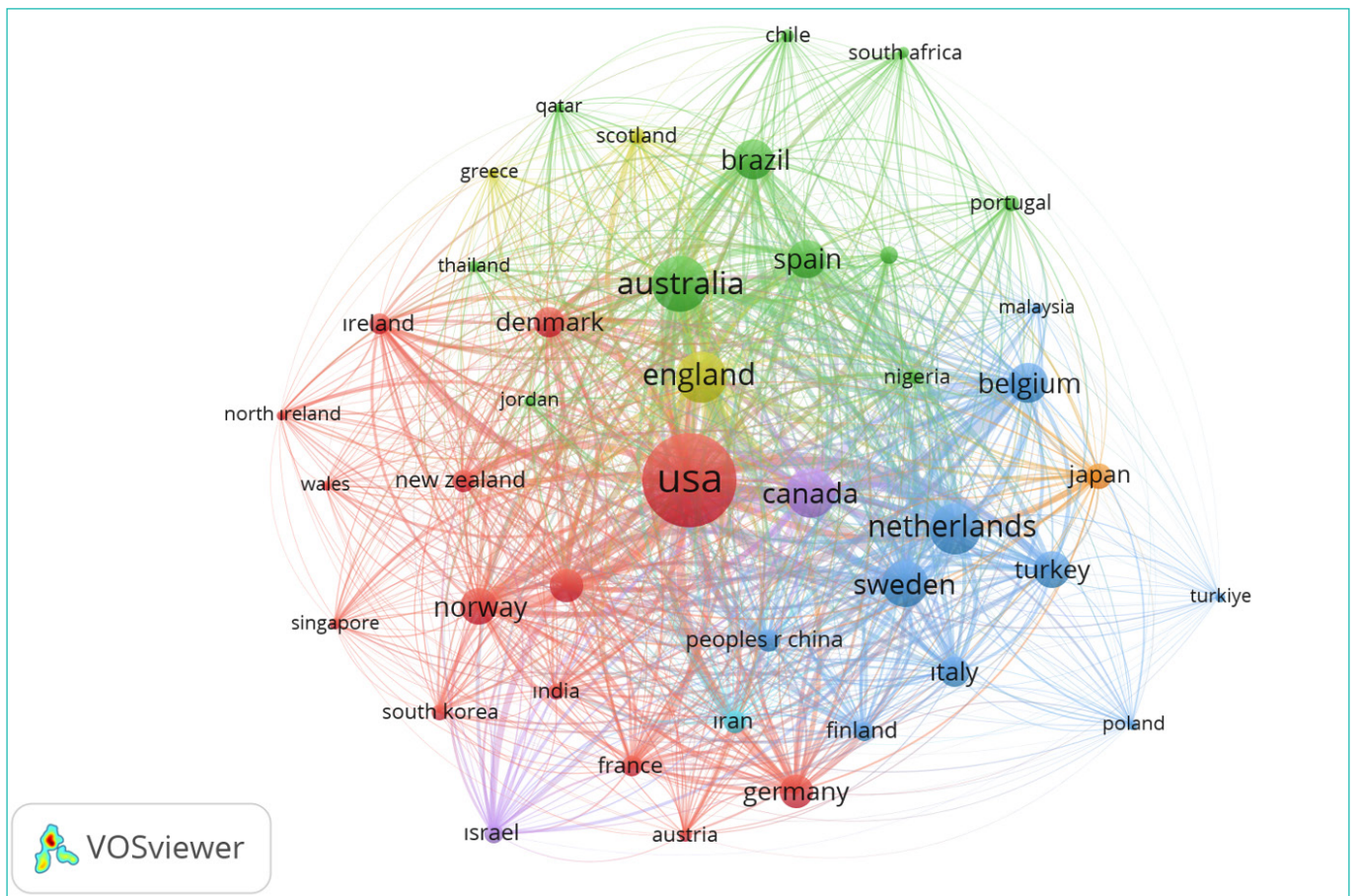


Figure 3. Bibliographic coupling between countries

Vosviewer, which emphasizes the cooperative nature of scientific exploration across continents.

Bibliographic Coupling Analysis Among Organisations

Figure 4 shows the bibliographic coupling analysis among organisations.

The bibliographic coupling analysis with Vosviewer showed that 249 of the 2,518 publishing companies made noteworthy contributions with at least 5 articles each. With 64 documents, 2,814 citations, and a significant total link strength of 183,088 the University of Florida emerged as a notable leader. Maastricht University and Karolinska Institutet came in second and third, respectively, with 54 documents (1,411 citations, 97,015 link strength), and 49 documents (1,411 citations, 111,668 link strength), demonstrating their influence. University of Sydney, University of Oslo, University of Queensland, University of Ghent, and University of Gothenburg are just a few more noteworthy institutions. With 33 documents, 2,730 citations, and 66,194 link strength, the University of Pittsburgh stood out and demonstrated its significant impact on the research landscape. Furthermore, 33 documents from Vrije Universiteit Amsterdam and Vrije Universiteit Brussel, with 926 citations and 49,746 link strength, respectively, were also contributed. These findings demonstrate the variety of international organizations actively advancing the field's scholarly conversation.

DISCUSSION

The use of Vosviewer software to conduct a bibliometric analysis of articles on kinesiophobia from September 2023 to 1970 gave important insights into the state of research in this field. Key findings are highlighted in this discussion section, along with general information, noteworthy trends, top publishing countries and affiliations, most-cited articles, citation topics, top publishing journals, keyword analysis, and analyses of the bibliographic couplings between various nations and organizations.

The study by Luo et al.¹⁵ used bibliometric techniques to evaluate the global scientific output on pain catastrophizing and to pinpoint hotspots and frontiers from 2010 to 2020. Through the use of CiteSpace, they extracted publications from the WoSCC and examined various bibliometric indicators. Their analysis of 1,576 publications showed a steady rise in annual publications. In terms of publication and citation frequency, the pain journal led productivity, and the University of Washington in particular dominated in the United States. The current bibliometric analysis included a sizable dataset of 2,035 academic articles on kinesiophobia in orthopedics written by 6,742 authors with 2,377 affiliations and contributors from 75 different nations. A thorough analysis of the scholarly output and teamwork within the field was made possible by the dataset's sizeable scope.

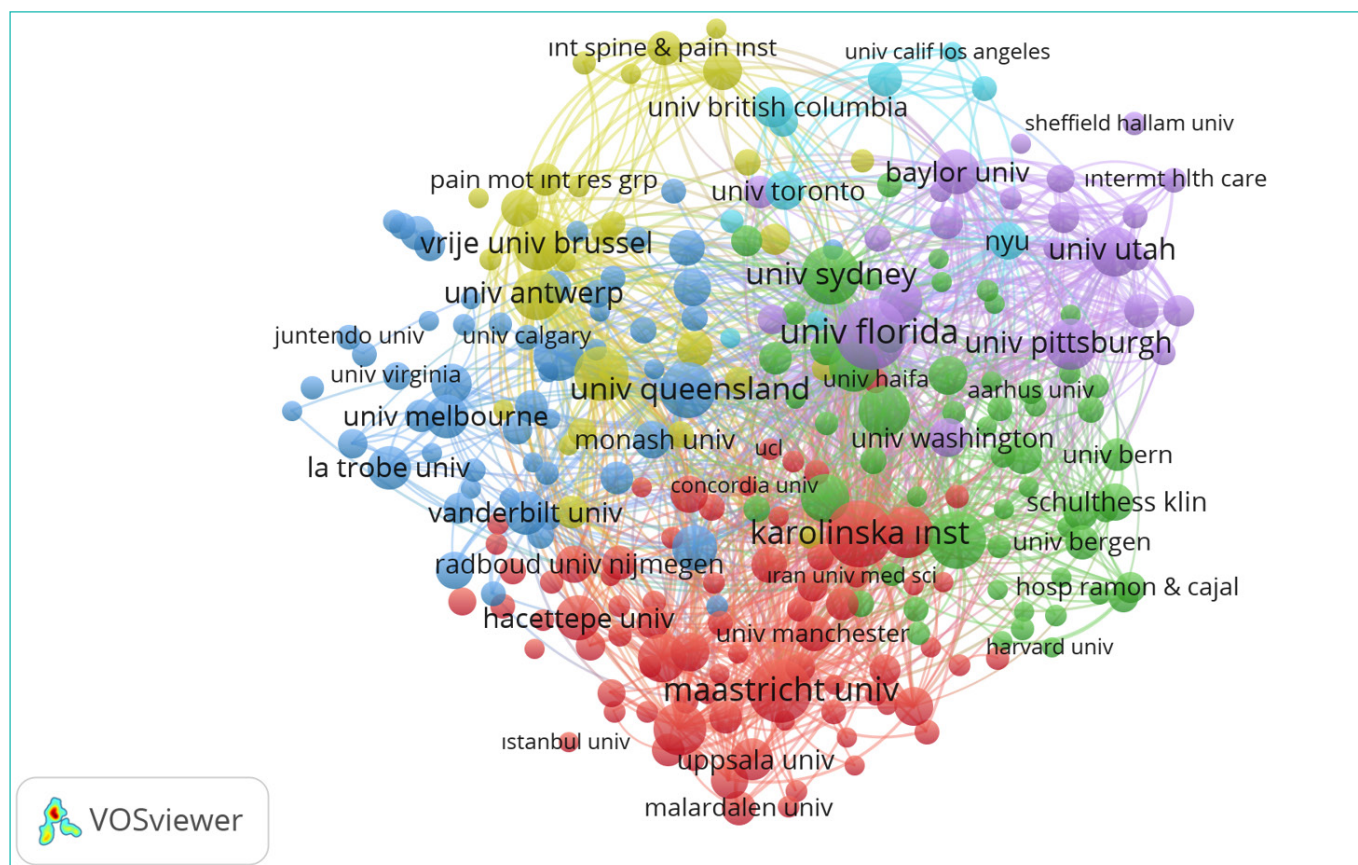


Figure 4. The bibliographic coupling analysis among organisations

The analysis showed that the 2,035 articles had a significant total of 51,443 citations, with an average of 25.27 citations per article. The depth and significance of the kinesiophobia literature are reflected in the high h-index of 98, which indicated a significant number of highly cited works. Indicating a noticeable increase in publications from 2001 to 2012 and a consistent and significant output in more recent years, particularly in 2020, 2021, and 2022, trends in scholarly output were identified over a variety of time periods.

There were both noticeable differences and similarities between the findings of the current study on kinesiophobia and those reported by Luo et al.¹⁵ in their study on pain catastrophizing. The United States' status as a significant research power in both fields was recognized, reflecting the country's significant contributions to the literature on kinesiophobia and pain catastrophizing. Both studies emphasized the value of international cooperation and the requirement for greater collaboration between nations and institutions in order to improve knowledge exchange. The landscape of collaborative work revealed differences. While Luo et al.¹⁵ noted limited international cooperation in pain catastrophizing research, the current study on kinesiophobia highlighted more extensive collaboration, involving contributions from 76 countries. As a result of numerous institutions from various geographical areas taking part in the kinesiophobia research, the academic landscape's interconnectedness was clear. The State University System of Florida, University of Florida, Maastricht University, Karolinska Institutet, Vrije Universiteit Brussel, and the University of Southern Denmark were all recognized as major contributors to kinesiophobia literature in the current study. The University of Washington was the top publishing institution in the Luo et al. study.¹⁵ In the current study, the analyses of the bibliographic coupling between countries and organizations shed light on joint research initiatives. The United States emerged as a significant contributor in both instances, highlighting its pioneering work in advancing kinesiophobia research. Significant contributions from Australia, England, the Netherlands, and numerous international organizations were also highlighted in the analyses, highlighting a global network of collaboration.

Overall, Luo et al.¹⁵ study and the current study shed light on the global research landscape in their respective fields, but the distinct dynamics of each field of study—pain catastrophizing¹⁵ and kinesiophobia—were highlighted by differences in international collaboration and institutional contributions.

The "citation topics micro" analysis showed a wide range of topics, with low back pain receiving a disproportionate amount of attention (61.93% of records). This thorough

explanation offered a nuanced understanding of the research focuses within the literature on kinesiophobia, covering various topics like sports psychology and orthopedic issues.

Researchers can assess the standing and influence of particular publications within their field by knowing the best journals to publish in. Additionally, it assists in evaluating the methods of research dissemination by highlighting the venues that draw significant contributions. Understanding the significance of particular journals is crucial for putting research into context and identifying scholarly communication trends. Additionally, by using this data, it is possible to select pertinent sources for literature reviews, extract data, and make sure that the bibliometric analysis is based on a thorough knowledge of the academic ecosystem.¹⁷⁻²⁰ In the forefront of the kinesiophobia literature, BMC Musculoskeletal Disorders and Spine stand out as significant contributors, underscoring their importance in influencing the conversation about musculoskeletal health. With their large readerships and strict editorial standards, these journals stand for the authority and significance of the research they publish. Their placement at the top of the list highlights the significant influence they have on the dissemination of information about kinesiophobia-related topics. Furthermore, the inclusion of prestigious journals like Physiotherapy Theory and Practice, Disability and Rehabilitation, and European Spine Journal demonstrates the diversity of sources that enrich the literature on kinesiophobia. This eclectic collection of journals, which includes topics like physiotherapy, rehabilitation, and spinal health, reflects the multidisciplinary nature of research on kinesiophobia. The existence of these journals not only widens the scope of the literature but also represents interdisciplinary cooperation in tackling the complex issues related to kinesiophobia.

The discovery of "burst" keywords, according to Luo et al.¹⁵ reflects current research areas, and the development of keywords in papers that catastrophize pain sheds light on the research's past. As an illustration, the terms "adjustment," "dimension," and "confirmatory factor analysis" all showed strong citation bursts in the earlier stages, indicating a focus on emotional psychological adjustment and the reliability and validity testing of pain catastrophizing scales. Notably, the term "total hip" became a popular search term in 2016, indicating a persistent pattern in orthopedic studies on pain catastrophizing. In contrast, the current study on kinesiophobia showed a wide range of topics in the "citation topics micro" analysis, with low back pain (61.93% of records) receiving disproportionate attention. This nuanced understanding touched on a number of topics, including orthopedic

problems and sports psychology. "Low back pain" was the keyword with the highest popularity according to the Vosviewer keyword analysis, with 358 occurrences and an 849 link strength. With terms like "adjustment" and "confirmatory factor analysis" indicating early research foci, Luo et al.'s study¹⁵ contrasted and displayed a different emphasis. Both studies demonstrate the dynamic nature of research in their respective fields, but the emphasis on particular keywords and research areas varies, highlighting the divergent trajectories of the literature on pain catastrophizing and kinesiophobia.

Limitations

The Web of Science Core Collection was used as the only data source, which could lead to biases in the bibliometric study on kinesiophobia in orthopedics. Despite being a comprehensive database, the Web of Science might not contain all pertinent articles since some might be indexed in other databases not used in this study. Furthermore, the search was limited to articles written in English, potentially omitting valuable contributions written in other languages. The study's concentration on orthopedics might make it less applicable to other medical specialties. Kinesiophobia can be researched and treated in a variety of medical settings, so limiting the analysis to orthopedics may leave out crucial information from related disciplines. Additionally, the selection of keywords and analytical tools may affect how "hotspots" and "frontiers" are identified in kinesiophobia research. The accuracy of these tools and the consistency of keyword usage over time are prerequisites for the interpretation of trends and patterns in the literature.

Last but not least, the study gives a brief overview of the literature up to September 2023. Since the field is dynamic, new research is constantly being produced. After this cutoff date, changes in the research landscape are not captured, and the study's findings could be out of date as the field develops.

CONCLUSION

The thorough bibliometric analysis presented in this study offers a thorough overview of the literature on kinesiophobia, taking into account scholarly impact, trends, prominent authors, and thematic emphases. These results not only deepen our understanding of the state of kinesiophobia research, but they also provide important information for guiding future research and treatment in orthopedics and related fields. The collaborative nature of the research, as shown by the contributions from various nations and organizations, emphasizes the importance of the scientific study of kinesiophobia on a global scale and how interconnected it is.

ETHICAL DECLARATIONS

Ethics Committee Approval

As it is not a human or animal study there is no need for ethical approval.

Informed Consent

As it is not a human or animal study there is no need for informed consent.

Referee Evaluation Process

Externally peer reviewed.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

Financial Disclosure

The authors declared that this study has received no financial support.

Author Contributions

All the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

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