



Evaluation of Scientific Publications on Osteoblastoma Published between 2000 and 2022

Osteoblastom ile İlgili 2000 ile 2022 Yılları Arasında Yayımlanan Bilimsel Yayınların Değerlendirilmesi

Selçuk Yılmaz, Mehmet Kurt

Department of Orthopedic and Traumatology, University of Kutahya Health Sciences, Turkey

Abstract

Aim: The aim of this bibliometric study was to review the scientific outputs published between 2000 and 2022 on osteoblastoma, a benign aggressive bone tumor.

Material and Method: Scientific research articles on osteoblastoma published between 2000 and 2022 were targeted and data were obtained from the Web of Science database. The data obtained were analyzed and visualized using bibliometric programs.

Results: A total of 679 articles about osteoblastoma published between 2000-2022 met our inclusion criteria. Most of the articles on osteoblastoma (n=48) were published in 2020. There was no noteworthy peak in the trend of the number of publications between 2000 and 2022. These articles cited 10366 times in total and 15.27 times per article. At least 62 various countries and regions took part in osteoblastoma publishing research over the past 22 years. The United States (192) was the largest contributor to osteoblastoma publications followed by China (60), India (51), Italy (50), and Turkey (46). The United States was the country that published the most publications in all years between 2000 and 2022. Especially China's publications increased in 2022. The United States was also the country with the highest level of publication collaboration (such as citation and co-authorship) among countries.

Conclusion: The number of published articles is well below the expected level. Although the number of scientific publications from China has increased in recent years, the United States still ranks first.

Keywords: Publication, osteoblastoma, bibliometric

Öz

Amaç: Bu bibliyometrik çalışmanın amacı, iyi huylu agresif bir kemik tümörü olan osteoblastom hakkında 2000 ile 2022 yılları arasında yayınlanan bilimsel çıktıları gözden geçirmektir.

Gereç ve Yöntem: Osteoblastoma ile ilgili 2000-2022 yılları arasında yayınlanan bilimsel araştırma makaleleri hedeflendi ve veriler Web of Science veri tabanından elde edildi. Elde edilen veriler bibliyometrik programlar kullanılarak analiz edilmiş ve görselleştirilmiştir.

Bulgular: Osteoblastom ile ilgili 2000-2022 yılları arasında yayınlanan toplam 679 makale dahil edilme kriterlerimizi karşıladı. Osteoblastom ile ilgili makalelerin çoğu (n=48) 2020 yılında yayınlanmıştır. 2000 ile 2022 yılları arasındaki yayın sayısı trendinde kayda değer bir zirve olmamıştır. Bu makaleler toplamda 10366 kez ve makale başına 15,27 kez atıf almıştır. En az 62 farklı ülke ve bölge, son 22 yılda osteoblastoma yayın araştırmalarına katıldı. Amerika Birleşik Devletleri (192) osteoblastoma yayınlarına en büyük katkısı yapan ülke oldu ve bunu Çin (60), Hindistan (51), İtalya (50) ve Türkiye (46) izledi. 2000 ile 2022 yılları arasındaki tüm yıllarda en çok yayın yapan ülke Amerika oldu. 2022'de özellikle Çin'in yayınları arttı. Amerika Birleşik Devletleri aynı zamanda yayın işbirliğinin (atıf ve ortak yazarlık gibi) en yüksek olduğu ülke oldu.

Sonuç: Yayınlanan makale sayısı beklenen düzeyin oldukça altındadır. Son yıllarda Çin'den yapılan bilimsel yayınların sayısı artsa da Amerika Birleşik Devletleri hala ilk sırada yer alıyor.

Anahtar Kelimeler: Osteoblastom, bibliyometrik, çalışma



INTRODUCTION

Osteoblastoma is a rare, benign but aggressive and bone-forming neoplasm that makes up 10% of all osseous spinal neoplasms, 1% of all primary bone tumors, and 1% to 5% of all benign bone tumors.^[1,2]

Due to its histopathologic resemblance to osteoid osteoma, it was previously known as large osteoid osteoma. However, the general consensus is that they are distinct pathologic entities with different clinical presentations, despite the fact that some writers believe the entities to be different manifestations of the same pathogenic process.^[1] It frequently occurs in the second decade of life and more frequently in males.^[3]

The most usual location for osteoblastoma to develop is in the axial skeleton, and the pain is typically not worse at night and is less likely to be relieved by non-steroidal anti-inflammatory drugs.^[4] About 30 to 40 % of osteoblastoma develops in the posterior parts of the spine and the sacrum.^[1] The diagnosis is made in light of the symptoms, imaging, and histological examination.^[5] En bloc resection and intralesional curettage, which are primarily surgical techniques, are used in its treatment. In order to avoid recurrence, the procedure should be carefully planned and the tumor should be completely removed.^[3] Although surgical excision remains the gold standard of care, less invasive radiological procedures like thermoablation and, more recently, high intensity focused ultrasound, are becoming more significant in recent years.^[5]

Bibliometric analysis is a methodology for analyzing works of literature using statistical and mathematical methods to gain a comprehensive grasp of an research area. Additionally, it is a tool for exploring the organization and patterns of a subject through visualization and statistics for a quantitative evaluation of the effects of the research literature on certain research fields, nations or regions, research collaborations, journals, institutions, and authors over a specific time frame.^[6,7]

In recent years, bibliometric analysis has gained interest in the field of medicine,^[8-11] and orthopedics research area.^[12,15]

However, no recent bibliometric studies have been conducted on osteoblastoma and no emphasis has been placed on estimating research hotspots. The purpose of this study is to forecast the state of the osteoblastoma field in academia and to suggest future research directions.

MATERIAL AND METHOD

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

Data Collection

With the help of the following retrieval techniques, we completed a thorough collection of all articles from the Thomson Reuters Web of Science database between 2000 and 2022: osteoblastoma AND human. [Topic (Abstract, keywords, title); limited to article; time span: 2000-2022].

The Web of Science database was chosen for this study, because it is the most authorized and commonly used

electronic database for bibliometric studies. No language restrictions were applied for the entire literature review.

In order to prevent errors due to the Web of Science database updates, downloads completed in one day on April 13, 2023.

Two authors separately collected all the data, yielding an agreement rate of 0.99, which is a good level of agreement.^[16]

The data obtained as a result of the search were converted into txt and plain text formats and imported into VOSviewer (version 1.6.19)^[17] and the Online Analysis Platform of Literature Metrology (<https://bibliometric.com/app>) applications for make further analysis.

Statistical and Bibliometric Methods

First, we evaluated and compiled data on a wide range of variables (such as countries/regions, institutions/affiliations, journals, the Hirsch index, and the impact factor (IF) of the Journal Citation Reports (JCR) version (2021) for all extracted articles.

Additionally, through the online bibliometric platforms, the annual publishing volumes and trends of various countries/regions were discovered. The Vosviewer application and BIBLIOMETRIC.COM platform were used for visualizations.

We analyzed the 25 most cited papers and their number of citations, the journals they were published in and the year of publication.

With the help of the Vosviewer application, keywords' co-occurrence analysis was carried out to forecast new areas of study and trends. Depending on the purpose of our analysis, we selected several nodes whose size corresponds to the number of publications or the number of citations. We also tabulated the most frequent keywords (more than 10 occurrences) and total link strengths.

RESULTS

A total of 679 articles about osteoblastoma published between 2000-2022 met our inclusion criteria. Most of the articles on osteoblastoma (n=48) were published in 2020. There was no noteworthy peak in the trend of the number of publications between 2000 and 2022 (**Figure 1**). These articles cited 10366 times in total and 15.27 times per article. The mean of the Hirsch index was 48.

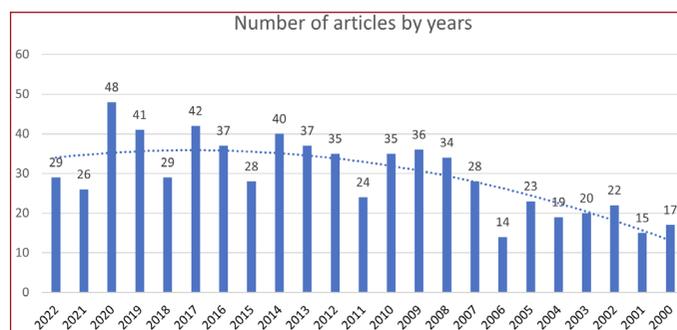


Figure 1. Number of articles by years

At least 62 various countries and regions took part in osteoblastoma publishing research over the past 22 years. The United States (192) was the largest contributor to osteoblastoma publications followed by China (60), India (51), Italy (50), and Turkey (46). The countries with the highest number of publications on osteoblastoma between 2020-2022 and the number of publications are summarized in **Figure 2**. According to this graph, the United States was the country that published the most publications in all years between 2000 and 2022. Especially China's publications increased in 2022. The United States was also the country with the highest level of publication collaboration (such as citation and co-authorship) among countries. The graph also implies that there are no academic interactions taking place between countries that have notable publications and countries with minimal numbers.

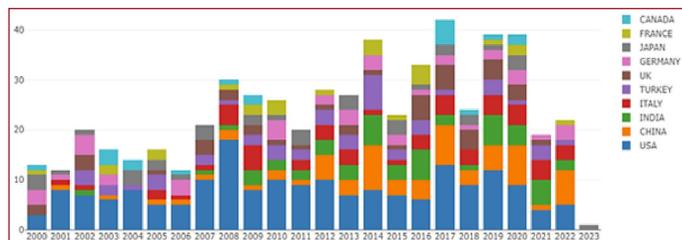


Figure 2 . Number of articles of the mostly publishing countries according to years

In terms of institutions (924 in total), European, Chinese, and the United States universities in the top 10 had published the highest number of articles on osteoblastoma. In addition, Leiden University (the Netherlands) and Harvard University (the United States) had the highest number of citations, with 132 and 130, respectively. However, publications originating from Klinikum Neustadt had the highest number of citations per publication (72) (**Table 1**).

These 679 publications were published in 330 different journals, and the top 10 most popular journals published a total of 90 publications. Most of the articles on osteoblastoma were published in Skeletal Radiology. Articles published in this journal received 112 citations. The articles which published in The Journal of Surgical Oncology journal had highest average citation number (average citation: 26) (**Table 2**).

Table 1. The top 10 organisations contributing to publications on osteoblastoma

Organisation name (Country)	Total number of articles	Total citations	Average citations
Leiden University (the Netherlands)	24	132	5.50
Harvard University (the United States)	17	130	7.65
Peking University (China)	17	95	5.59
São Paulo University (Brazil)	12	88	7.33
Childrens Hospital	8	72	9
The University of Münster (Germany)	2	72	36
Klinik Neustadt (Germany)	1	72	72
The Children's Hospital of Philadelphia(the United States)	17	69	4.06
Massachusetts General Hospital (the United States)	13	66	5.08
Heidelberg University (Germany)	3	63	21

As seen in **Figure 3**, the number of citations has shown an accelerating trend over the years.

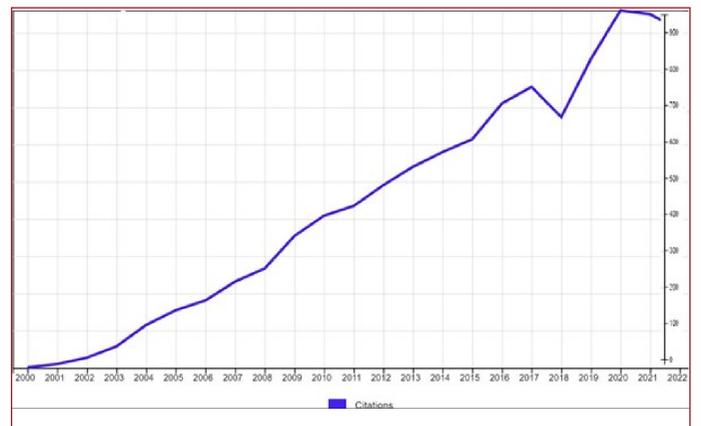


Figure 3. Number of citations by years

The top 25 articles in the field of osteoblastoma with the most citations were presented in **Table 3**. Most of these were animal and clinical studies, including descriptive studies. Clinical studies were radiological studies and diagnostic-treatment studies.

Table 2. The top 10 most popular journals published about osteoblastoma

Journal name	Total number of articles	Total citations	Average citations	Journal impact factor™ 2021	Journal impact factor five year
Skeletal Radiology	26	112	4.31	2.128	2.073
Spine	14	105	7.50	3.269	3.753
Clinical Orthopaedics and Related Research	10	102	10.20	4.837	5.885
European Spine Journal	13	73	5.62	2.721	3.362
Oral surgery, oral medicine, oral pathology, oral radiology, and endodontics	5	66	13.20	1.457	1.815
Radiology	5	62	12.40	29.146	17.483
Archives of Pathology & Laboratory Medicine	5	57	11.40	5.686	5.913
The Journal of Surgical Oncology	2	52	26.00	2.885	3.445
European Journal of Radiology	7	42	6	4.531	4.218
Neurosurgery Clinics of North America	3	32	10.67	3.348	3.471

Table 3. Most cited 25 articles about osteoblastoma

Title	Authors	Source Title	Publication Year	Total Citations	Average per Year
Skeletal changes in rats given daily subcutaneous injections of recombinant human parathyroid hormone (1-34) for 2 years and relevance to human safety	Vahle, JL; Sato, M; Long, GG; Young, JK; Francis, PC; Engelhardt, JA; Westmore, MS; Ma, YFL; Nold, JB	Toxicologic Pathology	2002	475	21.59
Osteoid osteoma: Percutaneous treatment with radiofrequency energy	Rosenthal, DI; Hornicek, FJ; Torriani, M; Gebhardt, MC; Mankin, HJ	Radiology	2003	363	17.29
Osteosarcoma - Anatomic and histologic variants	Klein, MJ; Siegal, GP	American Journal of Clinical Pathology	2006	309	17.17
Bone neoplasms in F344 rats given teriparatide [rhPTH(1-34)] are dependent on duration of treatment and dose	Vahle, JL; Long, GG; Sandusky, G; Westmore, M; Ma, YL; Sato, M	Toxicologic Pathology	2004	253	12.65
USP6 and CDH11 oncogenes identify the neoplastic cell in primary aneurysmal bone cysts and are absent in so-called secondary aneurysmal bone cysts	Oliveira, AM; Perez-Atayde, AR; Inwards, CY; Medeiros, F; Derr, V; Hsi, BL; Gebhardt, MC; Rosenberg, AE; Fletcher, JA	American Journal Of Pathology	2004	252	12.6
Radiologic Diagnosis of Osteoid Osteoma: From Simple to Challenging Findings	Chai, Jee Won; Hong, Sung Hwan; Choi, Ja-Young; Koh, Young Hwan; Lee, Joon Woo; Choi, Jung-Ah; Kang, Heung Sik	Radiographics	2010	139	9.93
A YKL-40-Neutralizing Antibody Blocks Tumor Angiogenesis and Progression: A Potential Therapeutic Agent in Cancers	Faibish, Michael; Francescone, Ralph; Bentley, Brooke; Yan, Wei; Shao, Rong	Molecular Cancer Therapeutics	2011	126	9.69
Inactive Wnt/beta-catenin pathway in conventional high-grade osteosarcoma	Cai, Yongping; Mohseny, Alexander B.; Karperien, Marcel; Hogendoorn, Pancras C. W.; Zhou, Gengyin; Cleton-Jansen, Anne-Marie	Journal of Pathology	2010	123	8.79
The diagnostic accuracy of MR imaging in osteoid osteoma	Davies, M; Cassar-Pullicino, VN; Davies, AM; McCall, IW; Tyrrell, PNM	Skeletal Radiology	2002	121	5.5
Spinal tumors	Van Goethem, JWM; van den Hauwe, L; Ozsarlak, O; De Schepper, AMA; Parizel, PM	European Journal of Radiology	2004	118	5.9
Fusions at the craniovertebral junction	Ahmed, Raheel; Traynelis, Vincent C.; Menezes, Arnold H.	Childs Nervous System	2008	106	6.63
Defining a noncarcinogenic dose of recombinant human parathyroid hormone 1-84 in a 2-year study in Fischer 344 rats	Jollette, Jacquelin; Wilker, Clynn E.; Smith, Susan Y.; Doyle, Nancy; Hardisty, Jerry F.; Metcalfe, Anna J.; Marriott, Thomas B.; Fox, John; Wells, David S.	Toxicologic Pathology	2006	102	5.67
Surgical approaches: postoperative care and complications transoral-transpalatopharyngeal approach to the craniocervical junction	Menezes, Arnold H.	Childs Nervous System	2008	101	6.31
Imaging of osteoid osteoma with dynamic gadolinium-enhanced MR imaging	Liu, PT; Chivers, FS; Roberts, CC; Schultz, CJ; Beauchamp, CP	Radiology	2003	99	4.71
Osteosarcoma of the jaws: A 30-year retrospective review	Bennett, JH; Thomas, G; Evans, AW; Speight, PM	Oral Surgery Oral Medicine Oral Pathology Oral Radiology and Endodontology	2000	99	4.13
Osteoid osteoma and osteoblastoma of the spine: Experiences with 22 patients	Ozaki, T; Liljenqvist, U; Hillmann, A; Halm, H; Lindner, N; Gosheger, G; Winkelmann, W	Clinical Orthopaedics and Related Research	2002	96	4.36
Activation of AMPK protects against hydrogen peroxide-induced osteoblast apoptosis through autophagy induction and NADPH maintenance: New implications for osteonecrosis treatment?	She, Chang; Zhu, Lun-qing; Zhen, Yun-fang; Wang, Xiao-dong; Dong, Qi-rong	Cellular Signalling	2014	92	9.2
COX-1 and COX-2 expression in osteoid osteomas	Mungo, DV; Zhang, XP; O'Keefe, RJ; Rosier, RN; Puzas, JE; Schwarz, EM	Journal of Orthopaedic Research	2002	81	3.68
Thermal Ablation of Spinal Osteoid Osteomas Close to Neural Elements: Technical Considerations	Rybak, Leon D.; Gangi, Afshin; Buy, Xavier; Vieira, Renata La Rocca; Wittig, James	American Journal of Roentgenology	2010	75	5.36

The coverage, focus, and tools offered by various literature databases (such as PubMed, Scopus, and Web of Science) vary from one another. While Scopus and Web of Science are multidisciplinary, PubMed primarily focuses on life sciences and biomedical disciplines. Both Web of Science and Scopus offers search analysis tools that allow for representative data.^[20] We selected the Web of Science database as detailed citation reports can be reached from this database.

Our statistical and quantitative analysis revealed that the number of publications in the field of osteoblastoma research not increased much between 2000 and 2022. Of the 679 articles, the United States contributed most of the research articles, demonstrating the strong collaboration and highest centrality with other countries. The other largest contributors to osteoblastoma publications were China (60), India (51), Italy (50), and Turkey (46) with lesser cooperation and relatively low centrality.

In terms of institutions, (924 in total), European, Chinese, and United States universities in the top 10 had published the highest number of articles on osteoblastoma. Leiden University (the Netherlands) and Harvard University (the United States) had the highest number of citations, with 132 and 130, respectively. However, publications originating from Klinikum Neustadt (Germany) had the highest number of citations per publication.

The journals that publish the most on osteoblastoma are those in the fields of radiology, orthopedics, oncology and neurosurgery. Most of the articles on osteoblastoma have been published in *Skeletal Radiology*, *Spine and Clinical Orthopedics and Related Research*. The *Journal of Surgical Oncology*, published in the field of oncology surgery, received the highest number of average citations, while the journal *Skeletal Radiology*, published in the field of radiology, received the highest number of citations.

Examining the most cited articles among those published on a topic can guide researchers on this topic.^[14,21-23] In this study, we analyzed the 25 most cited articles on osteoblastoma published between 2000 and 2022. An animal experimental study on osteoblastoma published by Vahle et al.^[26] was the most cited article with 475 citations. Also, most of the most cited papers were experimental, clinical and radiological studies.

The main themes, concepts, ideas, or arguments of a text are summarized in the keywords, which offer high-level summaries of the subject matter. It is essential to the processing of documents, including indexing, categorization, clustering, and summarization. For instance, describing the context of a statement could be as simple as stating the word that comes before or after the phrase of interest.^[24,25] We used the VOSviewer program to group the most important keywords in our study. As a result, we summarized the keywords with more than 10 occurrences in **Table 4**. These keywords may provide perspective to those who will conduct research on osteoblastoma.

Limitations

It is important to note some of this study's limitations. The sole database used in this study was the Web of Science database because it has been considered to be the most significant source of information for bibliometric analysis. As a result, some studies might have been skipped. As a result, depending on the database chosen, the outcomes of bibliometric analyses may differ. The bibliometric community should keep working to create techniques and metrics that take into account scientific output not taken into account in global databases (Web of Science, Scopus, etc.) such as domain-specific and country citation indices.

Additionally, the analysis employed only articles and publications in the English language, which could have influenced the results in a biased way. Furthermore, it was unable to definitively determine the author's affiliation. Also, some authors may have names that are identical and that may cause bias. When utilizing Web of Science JSON files, only the first authors are taken into consideration with Vosviewer application.

CONCLUSION

Osteoblastoma is a rare benign tumor of the bone. Treatment experience is limited. Diagnosis and management of this lesion includes multimodal radiological imaging and careful histological and surgical evaluations to determine the best treatment protocol. Surgical resection in patients with osteoblastoma may provide satisfactory clinical and radiographic results and further studies in this area are worth recommending.

The number of published articles is well below the expected level. Although the number of scientific publications from China has increased in recent years, the United States still ranks first. The United States is also the leader in international collaborations. Looking at the citation graph, there is an upward trend in the number of citations for osteoblastoma. Those who will publish on this topic can benefit from our keyword analysis.

ETHICAL DECLARATIONS

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

Referee Evaluation Process: Externally peer-reviewed.

Conflict of Interest Statement: The authors have no conflicts of interest to declare.

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Author Contributions: All of 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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