BÜSAD 2024; 5(1): 47- 57 **DOI: 10.58605/bingolsaglik.1460464** **Araştırma Makalesi**
BUSAD 2024; 5(1): 47- 57 **BİNGÖL ÜNİVERSİTESİ SAĞLIK DERGİSİ** Original Article

Ortognatik Cerrahide Sınıf III Maloklüzyon Yayın Eğilimleri: Son Kırk Yılın Bibliyometrik Analizi

A Bibliometric Analysis of Class III Malocclusion Trends in Orthognathic Surgery Over the Last Four Decades

Ali KİKİ[1], Aybüke Asena ATASEVER İŞLER[2], Kübra Betül UYLAŞ[3], Abdulvahit ERDEM[4]

ÖZET

Bu çalışmanın amacı, ortodontide sıklıkla incelenen bir problem olan Sınıf III maloklüzyonların ortognatik cerrahi ile tedavisine yönelik bibliyometrik bir analiz gerçekleştirmektir. Bu çalışmada, Mart 1987'den Haziran 2023'e kadar Web of Science veritabanındaki yayınlar incelenmiş ve VOSviewer yazılımının 1.6.14 sürümü ile değerlendirilmiştir. Başlangıçta, 1173 makalenin tamamı Web of Science tarayıcısı üzerinde değerlendirilmiş ve sonrasında, ortak yazarlık, ortak kurum, atıflar, bibliyografik eşleşmeler veya ortak atıf bağlantılarını görselleştirmek üzere VOSviewer programına aktarılmıştır. Çalışma kapsamında, yayınların yıllara göre dağılımı incelenmiş, anahtar kelimeler aracılığıyla ilgili makaleler değerlendirilmiş, bu alanlarda en üretken yazarlar tespit edilmiş ve Web of Science platformu aracılığıyla 'ortognatik cerrahi' ve 'sınıf III' terimlerini başlık, özet ve anahtar kelimeler bölümünde barındıran en sık referans verilen ilk on makale derlenmiştir. Belirtilen konularla ilgili en yoğun yayın faaliyeti 2022 yılında kaydedilmiştir. Seung-Hak Baek, 413 atıfla en çok başvurulan yazar konumundadır. Chang Gung Üniversitesi, toplamda 729 atıfla en önde gelen kurum olarak belirlenmiştir ve bibliyometrik ağ haritasında da 60 makale ile en geniş yayın koleksiyonunu sunmaktadır. Güney Kore, 227 makale ile literatürdeki varlığını ve 2587 atıfla etkisini belirgin biçimde ortaya koymuştur. Sınıf III maloklüzyonun ortognatik cerrahiyle düzeltilmesine yönelik artan ilgi, teknolojik yeniliklerin yanı sıra hastaların estetik beklentilerindeki artışla yıllar boyunca sürekli olarak güçlenmiştir. Bu alandaki ilginin devam eden yükselişi, ilerleyen dönemlerde bu konuyu inceleyen daha kapsamlı çalışmaların gerçekleştirilmesine zemin hazırlaması muhtemeldir.

Anahtar Kelimeler: Ortognatik cerrahi, Sınıf III, Bibliyometrik.

ABSTRACT

This study aims to conduct bibliometric analysis on orthognathic surgery in class III malocclusions, a frequently investigated topic in orthodontics. The study analyzed all articles in the Web of Science database from March 1987 to June 2023 using VOSviewer software (version 1.6.14). Initially, all 1173 articles were analyzed in the Web of Science browser and later exported for further analysis in the VOSviewer program. The VOSviewer program was utilized to map relationship networks based on co-authorship, co-occurrence, citation, bibliographic coupling, or co-citation links. Additionally, the study examined the distribution of publications by year, analyzed articles related to keywords, identified authors with the most publications on these topics, and compiled the 10 most cited articles containing the words "orthognathic surgery" and "class III" in the title, abstract, and keywords using the Web of Science browser. The most publications on these topics were published in 2022. Seung-Hak Baek was the most cited author (413 citations). Chang Gung University ranked highest in terms of citations (729 citations) and had the most extensive publication record (60 articles) in the bibliometric network map. South Korea led in both article production (227 articles) and citation count (2587 citations). Orthognathic surgery for class III malocclusion has gained significant attention over the years due to technological advancements and increasing aesthetic concerns among patients. The interest in this field is expected to grow, leading to more studies exploring related applications and topics.

Keywords: Orthognathic surgery, Class III, Bibliometrics.

[1]Doç. Dr. Ali KİKİ, Atatürk Üniversitesi, Diş Hekimliği Fakültesi, Ortodonti ABD, akiki@atauni.edu.tr ORCID No: 0000-0002-0624-9566
[2]Dr. Öğr. Üyesi Aybüke Asena ATASEVER İŞLER, Abant İzzet Baysal Üniversitesi, Diş Hekimliği Fakültesi, Ortodonti ABD, aybukeasenaatasever@gmail.com, ORCID No: 0000-0003-0738-6797
[3]Doktora Öğrencisi Kübra Betül UYLAŞ, Atatürk Üniversitesi, Diş Hekimliği Fakültesi, Ortodonti ABD, kbuylas@gmail.com ORCID No: 0000-0002-9377-1917
[4]Prof. Dr. Abdulvahit ERDEM Kafkas Üniversitesi, Diş Hekimliği Fakültesi, Ortodonti ABD, aerdem@atauni.edu.tr, ORCID No: 0000-0002-6151-3470
İletişim/Corresponding Author: Aybüke Asena ATASEVER İŞLER
E-posta/E-mail: aybukeasenaatasever@gmail.com

Geliş Tarihi/Received : 28.03.2024
Kabul Tarihi/Accepted: 16.04.2024
Yayın Tarihi/Published: 30.04.2024

INTRODUCTION

Class III malocclusions are categorized as dental or skeletal origin. Skeletal class III can result from mandibular overdevelopment/forward positioning, maxillary underdevelopment/backward positioning, or a combination (1-3). Treatment approaches vary based on etiology and growth status. In growing individuals, options include maxillary growth stimulation, mandibular growth inhibition, or both. In individuals with growth potential and diagnosed at a developmental stage, mesialization of upper dentition and/or retrusion of lower dentition are common. In adults, the effectiveness of compensation treatment is limited and as aesthetic concerns increase, orthognathic surgical approaches come to the fore (4-7).

Before the 1970s, surgical treatment options for class III malocclusions were very limited due to inadequacies in maxillofacial surgical techniques. Nowadays, surgical interventions can be performed in adults' maxilla, mandible, or both jaws, as long as the surgical limits allow, accompanied by orthodontic treatment (8). The frequency of surgical procedures and related studies is increasing day by day.

Bibliometric analysis studies historical development, authorship patterns, and publication trends. The most common bibliometric indicators measure research productivity through paper citations (9). Dental literature has seen an increase in bibliometric studies (10,11), evaluating and highlighting relevant articles and active research areas. Bibliometric studies help to evaluate and filter public shed articles, allowing research stakeholders to highlight the most relevant published articles and the most active research areas and topics.

In bibliometric studies, numerical analysis constitutes the first step of the analysis. The next step is the qualitative evaluation of the articles (10). In this stage, the most commonly used methods, the most important findings, and key results in a particular topic or field can be identified. This assessment can then help researchers to find the most recent and relevant articles in a particular field.

This study aims to evaluate the studies on orthognathic surgical treatment of class III malocclusion, which is one of the important and current topics in both the orthodontic and maxillofacial surgery literature, to examine the content of these studies, to analyze information such as date of publication, author, institution, and country distribution, to examine the most cited publications and to present a perspective by determining the general trend.

MATERIAL AND METODS

In this article, using the Web of Science (WoS) database, which is owned by Clarivate and contains comprehensive and high-quality literature, orthognathic surgical treatment of class III malocclusion, was analyzed bibliometrically. The electronic search was limited to the subject area including title, abstract, and keywords. Keywords in the search string consisted of "orthognathic surgery" and "class III". The search took place in June 4th, 2023. Search results were exported and processed using VOSviewer (VOSviewer v1.6.14.; Center for Science and Technology Studies, Leiden University), a bibliometric software program. VOSviewer uses elements from networks of scientific publications, scientific journals, researchers, research organizations, research institutions, countries, keywords, and/or terms to construct networks of relationships through co-authorship, co-occurrence, citation, bibliographic coupling, or co-citation links (12).

RESULTS AND DISCUSSION

The first publication containing the relevant keywords on the site, which has remained up-to-date since 1970, was made in 1987. Until June 2023, a total of 1173 articles have been published, comprising 956 articles, 122 case reports, 67 review articles, 17 early access articles,

and 11 proceeding papers. The distribution of publications according to years is shown in Figure 1. 11.4% of the total articles were published in 2022.

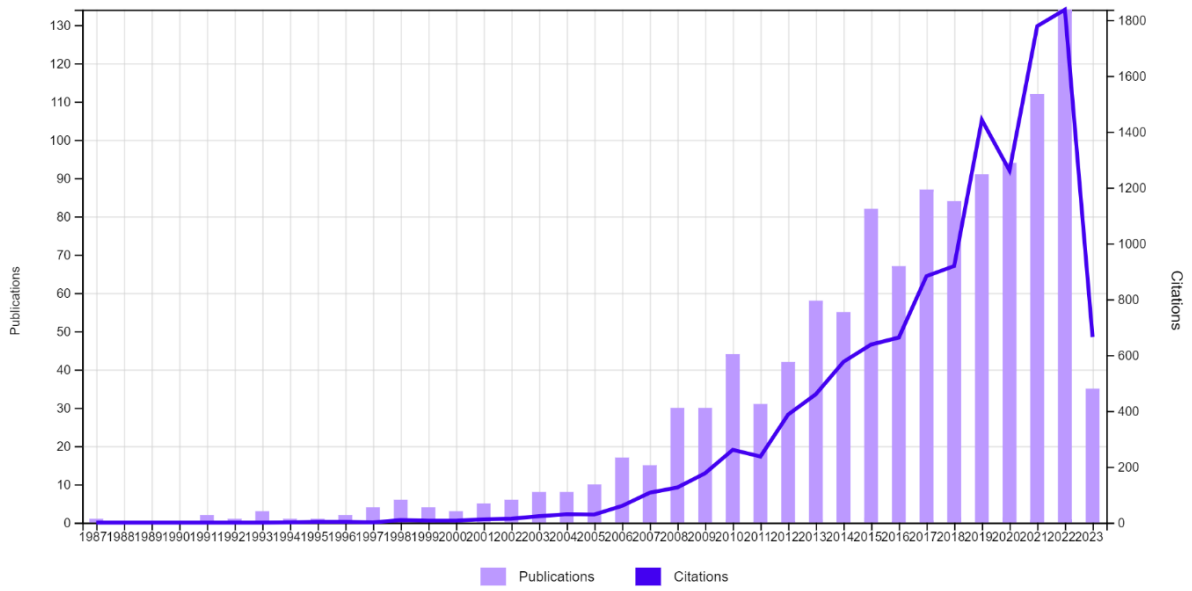

Figure 1: Distribution of Publications and Number of Citations by Year (1987-2023)

Bibliometric network map of authors' citation status

When authors with at least one publication in the fields of Class III and orthognathic surgery were analyzed, 3996 authors were reached. When it is specified that these authors have made at least one publication and these publications have at least one citation, 3244 authors were reached. When the map is analyzed, Seung-Hak Baek, Ellen Wen-Ching Ko, and Chung Shing Huang are the top three most cited authors (Table 1).

Table 1. The 10 Most Cited Authors in Class III Orthognathic Surgery Research

	Authors	Documents	Citiations
1	Seung-hak Baek	29	413
2	Ellen wen-ching Ko	21	391
3	Chung shing Huang	13	311
4	Yang-ho Park	8	300
5	Jin-young Choi	19	289
6	Koichiro Ueki	19	234
7	Hyoung-seon Baik	16	229
8	Yu ray Chen	3	221
9	Lucia h.s. Cevidanes	4	219
10	Robert a. Mischkowski	2	217

Bibliometric network map of citation status of articles

We found 1173 articles written in the fields of Class III and orthognathic surgery. When the link map of these articles was created, it was concluded that there were 918 articles cited at least once. Information about the cited articles is given by the VOSviewer program by associating them with the name of the first author. According to Table 2, when it comes to citation impact, the publication titled "Computer-assisted orthognathic surgery: feasibility study using multiple CAD/CAM surgical splints" authored by Zinser (2012) in the journal Oral Surgery Oral Medicine

Oral Pathology Oral Radiology, stands out as the article with the strongest network. The top 10 most cited articles are shown in Table 2.

Table 2. Top 10 Most Cited Articles

Rank	Article	Journal	Authors	Year	Citiations
1	Computer-assisted orthognathic surgery: feasibility study using multiple CAD/CAM surgical splints	Oral Surgery Oral Medicine Oral Pathology Oral Radiology	Zinser MJ, Mischkowski RA, Sailer HF, Zoller JE.	2012-05-01	125
2	Three-dimensional assessment of facial soft-tissue asymmetry before and after orthognathic surgery	British Journal of Oral & Maxillofacial Surgery	Hajeer MY, Ayoub AF, Millett ET.	2004-10-01	125
3	Three-dimensional cone-beam computed tomography for assessment of mandibular changes after orthognathic surgery	American Journal of Orthodontics and Dentofacial Orthopedics	Cevidanes LHS, Bailey LJ, Tucker SF, Styner MA, Mol A, Phillips CL, Proffit WR, Turvey T.	2007-01-01	123
4	Efficacy of high condylectomy for management of condylar hyperplasia	American Journal of Orthodontics and Dentofacial Orthopedics	Wolford LM, Mehra P, Reiche-Fischel O, Morales-Ryan CA, Garcia-Morales P.	2002-02-01	107
5	Surgery-First Approach in Skeletal Class III Malocclusion Treated With 2-Jaw Surgery: Evaluation of Surgical Movement and Postoperative Orthodontic Treatment	Journal of Cranıofacıal Surgery	Baek SH, Ahn HW, Kwon YH, Choi JY.	2010-03-01	96
6	Evolution of Class III treatment in orthodontics	American Journal of Orthodontics and Dentofacial Orthopedics	Ngan P, Moon W	2015-07-15	96
7	Evaluation of facial soft tissue changes with optical surface scan after surgical correction of class III deformities	Journal of Oral and Maxillofacial Surgery	Soncul M, Bamber MA.	2004-11-01	94
8	Computer-assisted orthognathic surgery: waferless maxillary positioning, versatility, and accuracy of an image-guided visualisation display	British Journal of Oral & Maxillofacial Surgery	Zinser MJ, Mischkowski RA, Dreiseidler T, Thamm OC, Rothamel D, Zoller JE..	2013-12-01	92
9	Treatment decision in adult patients with Class III malocclusion: Orthodontic therapy or orthognathic surgery?	American Journal of Orthodontics and Dentofacial Orthopedics	Steilzig-Eisenhauer A , Lux CJ, Schuster G	2002-07-01	90
10	Comparison of Progressive Cephalometric Changes and Postsurgical Stability of Skeletal Class III Correction With and Without Presurgical Orthodontic Treatment	Journal of Oral and Maxıllofacıal Surgery	Ko EWC, Hsu SSP, Hsieh HY, Wang YC, Huang CS, Chen YR	2011-05-20	82

Bibliometric network map of the citation status of the institutions / organizations where the articles are produced

Upon examining the institutions where researchers prepare articles in this fieldwork, it has been found that there are 1057 organizations. When these organizations were asked to make

at least one publication and these publications were asked to receive at least one citation 838 organizations were found. When the map is examined, Chang Gung University, Seoul National University, and Yonsei University appear to be the institutions with the strongest network and highest citations.

Bibliometric network map of the citation status of the journals in which the articles are produced

It was observed that articles on Class III and orthognathic surgery were found in a total of 172journals. A total of 124 journals were identified that received at least one citation for these publications on these topics. When Table 3 is examined, the American Journal of Orthodontics and Dentofacial Orthopedics (2019 citations), Journal of Oral and Maxillofacial Surgery, International Journal of Oral and Maxillofacial Surgery, Angle Orthodontist, and Journal of Cranio Maxillofacial Surgery appear as the sources with the strongest network and citations. When analyzing the journals in which the 1173 publications were included, it was observed that 951 of them were listed in the Science Citation Index Expanded (SCI-EXPANDED) journals.

Table 3. Top 10 Most Cited Journals

	Source	Documents	Citiations
1	American Journal of Orthodontics and Dentofacial Orthopedics	100	2019
2	Journal of Oral and Maxillofacial Surgery	107	1869
3	International Journal of Oral and Maxillofacial Surgery	90	1788
4	Angle Orthodontist	54	1144
5	Journal of Cranio Maxillofacial Surgery	68	1041
6	Journal of Cranıofacial Surgery	97	752
7	British Journal of Oral& Maxillofacial Surgery	37	563
8	European Journal of Orthodontics	14	269
9	Oral Surgery Oral Medicine Oral Pathology Oral Radıology	12	268
10	Oral Surgery, Oral Medicine, Oral Pathology, Oral Radıology and Endodontology	6	228

Bibliometric network map of the citation status of the countries where the articles are produced

There are 72 different countries with published articles in the fields of Class III and orthognathicsurgery. When these countries are asked to have at least one citation for these publications on these topics, 65 countries appear. The citation network map of these countries is given in Figure 2. When the map is analyzed, South Korea appears as the country with the strongest network. On the other hand, USA, Japan, Brazil, Taiwan, and Germany are other countries with strong networks.

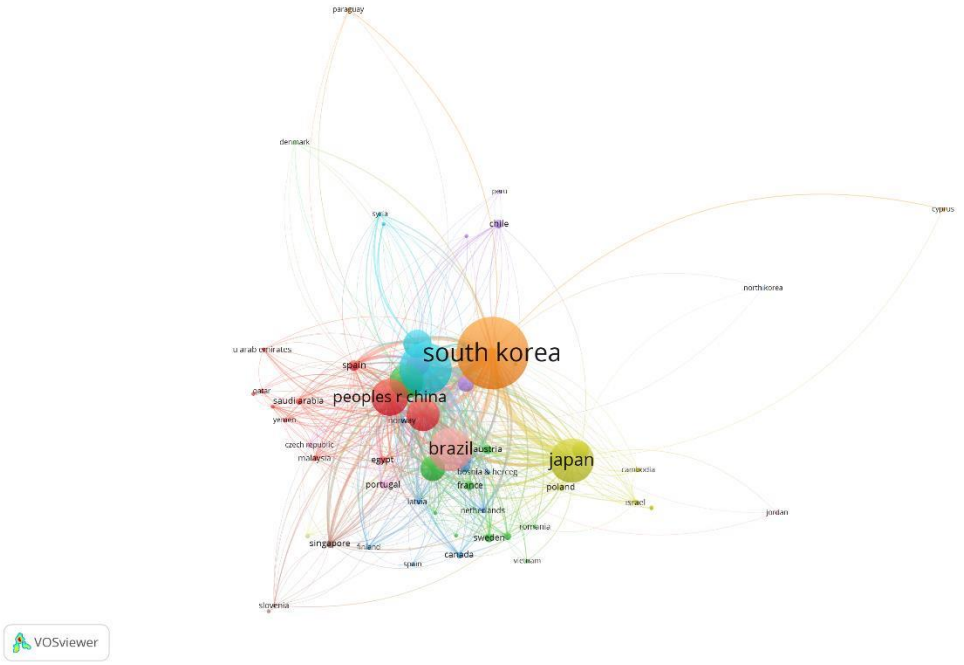

Figure 2: Network Map of Countries or Regions Involved in Orthognathic Surgery Research for Class III Malocclusions.

Keyword Analysis of Articles

When the articles produced in the fields of Class III and orthognathic surgery were analyzed, itwas determined that a total of 1578 keywords were used. When these words were analyzed by limiting them to those repeated 5 or more times, 114 keywords were reached. Upon examining the map, it is evident that the terms "orthognathic surgery," "class III malocclusion," and "facial asymmetry" emerge as the keywords with the most robust network, as indicated in Figure 3.

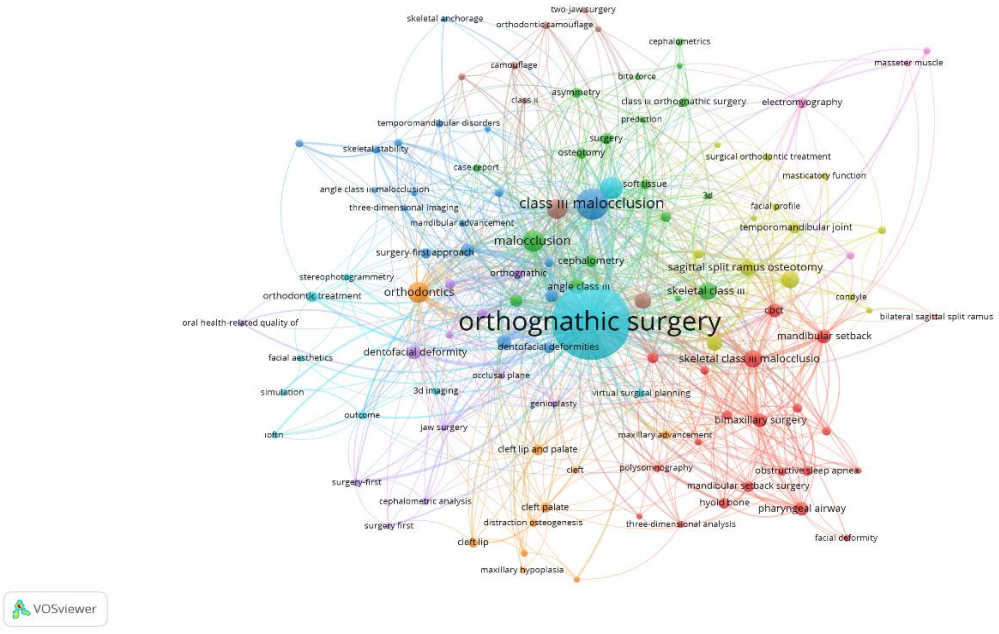

Figure 3: Keywords Network of Publications.

Class III malocclusions appear as dental and/or skeletal problems such as upper jaw hypoplasia, lower jaw prognathism, or a combination of both (13). Diagnosis, prognosis, and treatment are often a challenge for clinicians (14). Growth modification, orthodontic camouflage, or orthognathic surgery are the treatment options to achieve an ideal skeletal and dental occlusion and good facial aesthetics (15,16). The patient's age, the severity of the malocclusion, the patient's main complaint, clinical examinations, and cephalometric analysis define the preferred treatment (17). Orthognathic surgery is the treatment of choice for adult patients whose growth spurt has ended.

In this study, scientific publications indexed in the Web of Science (WoS) database were examined in the fields of Class III malocclusions and orthognathic surgery. Through bibliometric analysis, research trends, contributing universities/institutions, most productive authors, highly cited studies, and countries were listed and identified. Bibliometric analysis is an evidence-based technique that is highly beneficial for researchers, academics, and students. It facilitates the review of studies, research, or articles, resulting in time and effort savings. By bringing together the findings of this research and publications in these fields, it is believed to guide future research in terms of international collaboration and trends in the literature. Web of Science is a database of academic articles and other sources of literature. This database is an important tool for tracking and learning about scientific research. Web of Science is useful for citation analysis and can assist in evaluating the quality and impact of publications. Hence, the WoS database was utilized in this study.

VOSviewer is a program for the visualization and analysis of scientific literature. This program can determine how to group and analyze articles using different topics, keywords, authors, and other parameters. This approach enables the visualization and analysis of extensive literature in a more comprehensible manner, facilitating a clearer understanding of the subject matter.

In this study, the concepts of "orthognathic surgery" and "class III" were examined with in the articles published in English, which accounted for 96.4% of the total literature, from 1987 to 2023. In recent years, studies in this field have gradually increased. There are several reasons for this increase (18,19). These may include improved surgical techniques, less invasive treatments, increased aesthetic concerns, patient awareness, and a desire for improved quality of life. The spread of scientific research and bibliometric studies has also contributed to increased knowledge and more research on the subject.

The analysis revealed that the top 10 most cited journals included 4 leading orthodontic journals and 6 significant journals in maxillofacial surgery. Among the top 10 most cited authors, 6 were from the field of orthodontics, 3 were maxillofacial surgeons, and 1 was a plastic and reconstructive surgeon. Orthognathic surgery is a multidisciplinary study subject has always attracted orthodontists. Since patients usually have dental irregularities besides jaw deformities and refer to the orthodontist first, orthodontists are the constant member of the team.

South Korea leads among 72 countries in productivity with the highest publications and citations, followed by the United States. Despite the US's larger population (331 million) (20), South Korea's predominant genetic background in class III malocclusion may explain its higher ranking. Asians, including South Koreans, prefer a thin and soft facial shape (21,22), leading to orthognathic surgery being a common choice to achieve this aesthetic goal (23,24). However, more epidemiologic research is needed in this field.

Chang Gung University is in Taiwan and has achieved significant research in medicine and dentistry worldwide. Chang Gung Memorial Hospital, located with in the university, provides high standards of health care in many fields. In addition, Ellen-Ching Ko, Chung Shing Huang, and Yu Ray Chen, who are listed in the top 10 most cited authors, are among the academic staff of this university. This has enabled the university to increase the number of citations and become a leading institution in related fields. In addition, the academic staff of the university is composed of globally recognized researchers, and they conduct high-quality

research. For these reasons, the work of this university is frequently cited by other researchers and is recognized as a reputable institution.

Seung-Hak Baek, an esteemed researcher and author in orthodontics, has contributed significantly to class III malocclusion, orthognathic surgery, mini-screws, implants, and other topics. His expertise extends to reviewing for international orthodontic journals and holding leadership roles in orthodontic societies. Orthognathic surgery is a life-changing procedure for patients, and collaboration between orthodontists and maxillofacial surgeons leads to better outcomes (25). The orthodontist's goal is to achieve the ideal result in the shortest time to minimize any negative effects. Orthodontic treatment is essential before and after surgery, ensuring proper teeth positioning (26). Orthodontists and maxillofacial surgeons will achieve a successful result with multidisciplinary work. Orthodontic treatment is the basis for orthognathic surgery and ensures that the teeth are placed in an ideal position on each jaw before the surgical procedure (27,28). Researchers like Seung-Hak Baek take an active role in the treatment of orthognathic surgery and have received considerable attention in publications on this subject.

Zinser (2012) (29) examined the effectiveness of computer-assisted orthognathic surgery applications. The study investigated whether jaw surgery operations can be performed successfully using multiple CAD/CAM surgical splints. This study is an important step toward the development of technologies that can help patients complete their treatment by making surgical interventions more precise and safer. Technological advances improve the diagnostic and planning steps in the orthognathic surgical process and make surgical procedures more precise and predictable. Computer-aided surgical planning software, three-dimensional imaging techniques, and virtual surgical simulation (VSS) play an important role in orthognathic surgery (19). Technological developments are expected to further advance in the field of orthognathic surgery.

Bibliometrics is a powerful tool applicable to all health professionals, from students to academics, and can offer significant savings in time and effort for stakeholders. Identifying appropriate keywords is a critical step in achieving a broad dissemination of articles (30).

In recent years, interest in bibliometric analyses has increased due to the method's ability to provide in-depth information and data analysis capabilities. The integration of artificial intelligence and other advanced analytical tools has enabled more effective processing and analysis of large datasets, thereby offering more comprehensive insights into trends, networks, and influence within the academic literature. These analyses reveal details about who is leading in research fields, which topics are emerging, and the structural characteristics of scientific collaborations (31-32).

Among the limitations of this study is that the bibliometric analysis was confined to publications listed in the WoS database only. Despite the known broader coverage of the WoS compared to other significant databases, some articles related to orthognathic surgery may likely have been excluded. Additionally, integrating data from various databases could create challenges in filtering overlapping literature and visualizing data patterns. It is possible that some significant studies that did not include general terms such as "orthognathic surgery" and "class III" were excluded from this analysis. Had these general terms been used, many irrelevant studies would have been included, which would have significantly complicated the subsequent screening process.

CONCLUSION

Based on the findings of this bibliometric analysis, the following conclusions can be drawn:

1. The field of orthognathic surgical treatment for class III malocclusion remains popular in various multidisciplinary journals, including those focused on orthodontics, oral and maxillofacial surgery, radiology, plastic surgery, and otolaryngology.
2. The analysis shows a consistent and significant publication trend in this field, indicating sustained interest and impact.
3. By identifying countries and institutions with a concentration of research in orthognathic surgery, this study provides an opportunity for the development of international collaborations and scientific networks.

This study's results will be a valuable resource for future research and guide interested authors.

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

Conflict of Interest:
No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.

REFERENCES

1. Graber TM, Rakosi T, Petrovic AG, Proffit. Dentofacial orthopedics with functional appliances. Second ed. Mosby, St. Louis. (1997).
2. Guyer EC, McNamara JA Jr, Behrents RG. Components of class III malocclusion in juveniles and adolescents. Angle Orthod. 1986;56:7-30.
3. Jacobson A, Evans WG, Preston CB, Sadowsky PL. Mandibular prognathism. Am J Orthod Dentofacial Orthop. 1974;66:140-171.
4. Mcnamara JA, Mermigos J, Full CA, et al. An orthopedic approach to the treatment of class III malocclusion in young patients. J Clin Orthod. 1990;21:598-608.
5. Baik HS. Clinical results of the maxillary protraction in Korean children. Am J Orthod Dentofacial Orthop, 1995;108:583-592.
6. Nanda R. Protraction of the maxillofacial complex. Am J Orthod Dentofacial Orthop, 1980;98:47-55.
7. Ngan P, Hagg U, Yu C, et al. Treatment response to maxillary expansion and protraction. European Journal of Orthodontics. 1996;18:151-168.
8. Ellis EE, Mcnamara JA Jr. Components of adult class III malocclusion. J Oral Maxillofac Surg. 1984;42:295-305.
9. Jayaratne YS, Zwahlen RA. The evolution of dental journals from 2003 to 2012: a bibliometric analysis. 2015;10(3):e0119503. doi: 10.1371/journal.pone.0119503. PMID: 25781486; PMCID: PMC4363896.
10. Larsen PO, Von Ins M. The rate of growth in scientific publication and the decline in coverage provided by the Science Citation Index. Scientometrics, 2010;84(3):575-603.
11. Pandis N, Polychronopaulou A, Makou M, et al. Reporting of research quality characteristics of studies published in 6 major clinical dental specialty journals. J. Evid. Based Dent. Pract. 2011;11:75- 83.
12. Van Eck N, Waltman L. Software survey: VOSviewer, a computer program for bibliometric mapping. Scientometrics. 2010;84(2), 523-538. doi: 10.1007/s11192-009-0146- 3
13. Perillo L, Vitale M, Masucci C, et al. Comparisons of two protocols for the early treatment of class III dentoskeletal disharmony. Eur J Orthod. 2016;38(1):51-6.
14. Jamilian A, Cannavale R, Piancino MG, et al. Methodological quality and outcome of systematic reviews reporting on orthopedic treatment for class III malocclusion: an overview of systematic reviews. J Orthod. 2016;43:102-20.
15. Showkatbakhsh R, Jamilian A, Ghassemi M, et al. The effects of facemask and reverse chin cup on maxillary deficient patients. J Orthod. 2012;39:95-101.
16. Ngan P, Wilmes B, Drescher D, et al. Comparison of two maxillary protraction protocols: tooth-borne versus bone-anchored protraction facemask treatment. Prog Orthod. 2015;16:26.
17. Perillo L, Femminella B, Farronato D, et al. Do malocclusion and Helkimo Index ≥ 5 correlate with body posture? J Oral Rehabil. 2011;38:242-52.
18. Hong M, Kim MJ, Shin HJ, et al. Three-dimensional surgical accuracy between virtually planned and actual surgical movements of the maxilla in two-jaw orthognathic surgery. Korean J Orthod. 2020;50(5):293-303. doi: 10.4041/kjod.2020.50.5.293. PMID: 32938822; PMCID: PMC7500567.
19. Jandali, D., Barrera, J. E. Recent advances in orthognathic surgery. Current Opinion in Otolaryngology & Head and Neck Surgery. 2020;28(4):246-250. doi: 10.1097/MOO.0000000000000638
20. Moore, D. US population estimated at 334,233,854. America Counts: Stories behind the Numbers. 2023.
21. Gao Y, Niddam J, Noel W, et al. Comparison of aesthetic facial criteria between Caucasian and East Asian female populations: An esthetic surgeon's perspective. Asian J Surg. 2018;41(1):4-11. doi: 10.1016/j.asjsur.2016.07.007. PMID: 27630035.
22. Fabi SG, Park JY, Ho WWS, et al. Aesthetic considerations for treating the Asian patient: Thriving in diversity international roundtable series. J Cosmet Dermatol. 2023;22:1805-1813. doi:10.1111/jocd.15787.
23. Kim YJ, Lee BK. Recent Trends in Orthognathic Surgery in Asia. Facial Plastic Surgery Clinics. 2021;29(4), 549-566.
24. Piao Y, Kim SJ, Yu HS, et al. Five-year investigation of a large orthodontic patient population at a dental hospital in South Korea. Korean J Orthod. 2016;46(3):137-45. doi: 10.4041/kjod.2016.46.3.137. PMID: 27226959; PMCID: PMC4879316.
25. Larson BE. Orthodontic preparation for orthognathic surgery. Oral and Maxillofacial Surgery Clinics, 2014;26(4), 441-458.
26. Alpan D. Combining accelerated orthodontics with orthognathic surgery to reduce overall treatment time. Orthodontics Practice US, 2018;9(5),39-43.
27. Seo HJ, Choi YK. Current trends in orthognathic surgery. Arch Craniofac Surg. 2021;22(6):287-295. doi 10.7181/acfs.2021.00598. PMID: 34974683; PMCID: PMC8721433.
28. Huang CS, Hsu SS, Chen YR. Systematic review of the surgery-first approach in orthognathic surgery. Biomed J. 2014;37(4):184-90. doi:10.4103/2319-4170.126863. PMID: 25116713.

29. Zinser MJ, Mischkowski RA, Sailer HF, et al. Computer-assisted orthognathic surgery: feasibility study using multiple CAD/CAM surgical splints. Oral Surg Oral Med Oral Pathol Oral Radiol. 2012;113:673-87.
30. Grillo R. Orthognathic Surgery: A Bibliometric Analysis of the Top 100 Cited Articles. Journal of oral and maxillofacial surgery: official journal of the American Association of Oral and Maxillofacial Surgeons, 2021;79(11), 2339–2349. https://doi.org/10.1016/j.joms.2021.06.004
31. Wong, K.F., Lam, X.Y., Jiang, Y. et al. Artificial intelligence in orthodontics and orthognathic surgery: a bibliometric analysis of the 100 most-cited articles. Head Face Med 2023;19-38. https://doi.org/10.1186/s13005-023-00383-0.
32. Yang, L. C., Liu, F. H., Liu, C. M., Yu, C. H., & Chang, Y. C. Bibliometric analysis of top-cited articles in Journal of Dental Sciences. Journal of dental sciences, 2023;18(1), 338–344. https://doi.org/10.1016/j.jds.2022.09.017.