European Journal of Therapeutics
pISSN: 2564-7784
eISSN: 2564-7040

Eur J Ther. 2024;30(2):102-116.
https://doi.org/10.58600/eurjther1999

Original Research

A Science Mapping Analysis of Brazilian Literature on Oral and Maxillofacial Surgery

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Received: 2024-01-07 **Accepted:** 2024-02-07 **Published Online:** 2024-02-09

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ABSTRACT

Objectives: Bibliometrics serves as a valuable tool for assessing scholarly articles. The objective of this study is to conduct a bibliometric analysis of Brazilian literature on oral and maxillofacial surgery across various years.

Methods: Following the principles outlined in the Leiden Manifesto, a bibliographic search was conducted on the Web of Science using oral and maxillofacial terms. Parameters such as number of citations, citations per year, authors, and publication year were examined. Visual representations of authorship and keywords were generated using VOSviewer. These steps were essential for compiling a comprehensive list and comparing it to all published articles on the topic. Statistical tests were carried out, with significance determined at a 95% confidence interval.

Results: A ranking comprising 71 articles across seven different subject areas was compiled, with variables discussed individually. The USA leads in terms of publication volume, followed by Brazil. Noteworthy authors and institutions were identified through citation analysis. The visualization of data was assessed, and findings regarding subscription versus open access articles were discussed. The importance of selecting appropriate keywords was also highlighted.

Conclusions: This study presents a thorough bibliometric analysis of Brazilian literature on oral and maxillofacial surgery. The presence of Brazil among the top ten most prolific countries in oral and maxillofacial surgery underscores its significant contribution to the global discourse and advancements within the field. It serves as a valuable reference and source of inspiration for oral and maxillofacial surgeons, academics, and researchers.

Keywords: Bibliometrics; Citation Analysis; Scientometrics; Top-cited articles; Orthognathic Surgery; Maxillofacial Injuries; Surgery, Oral; Pathology, Oral; Ameloblastoma; Cleft Lip

INTRODUCTION

Knowledge has intrigued mankind for thousands of years. In the beginning, science involved speculation and dogmatism, but the procedures have been changed over the years. Galileu Galilei developed the scientific method, and for this reason is considered the father of the modern science [1]. From Galileu onwards,

science made great strides. Remarkable advances were seen more and more. But one question remains. Can we measure science? A useful tool is scientometrics, the metric values of scientific papers. Bibliometrics is only one method used in scientometrics [2]. It uses statistical methods to measure books, articles and other scholarly works. A common instrument of bibliometrics is citation analysis, a traditional method for assessing scientific impact [3,4]. From simple events to rocket science, any scientific matter could be evaluated. Each with its own peculiarities. Oral and maxillofacial surgery (OMFS) is part of this great diversity.

OMFS in Brazil has witnessed a remarkable evolution, shaped by historical context and contemporary advancements. Originating in the early 20th century to address facial trauma, the field has undergone significant refinement, bolstered by dedicated training programs and technological breakthroughs. Brazil now stands as a global highlight in OMFS research and innovation, with a focus on Virtual Surgical Planning protocols, interdisciplinary collaboration, and public health initiatives [5]. Academic institutions offer robust training programs, ensuring a steady supply of skilled professionals, while outreach efforts target prevalent oral health issues. As OMFS in Brazil continues to evolve, fueled by a commitment to excellence and patient care, its practitioners are poised to make enduring contributions to the field and improve outcomes for patients nationwide.

Main Points:

- The article highlights the importance of scientometrics and specifically bibliometrics in measuring the impact and productivity of scientific research. The use of citation analysis as a method for assessing scientific impact is emphasized, particularly in the field of oral and maxillofacial surgery.
- The study explores the geographic distribution of research output in oral and maxillofacial surgery. The article provides insights into the collaboration trends, research productivity, and global ranking of Brazil in various subtopics within the field.
- The University of São Paulo emerges as a leading institution in terms of research output in oral and maxillofacial surgery. Prolific authors such as Prof. Ricardo Santiago Gomez and Prof. Belmiro Cavalcanti do Egito Vasconcelos are highlighted, along with their respective h-index and citation counts, showcasing their significant contributions to the field.
- The article discusses the trends in the number of publications over the years for different topics within oral and maxillofacial surgery. Additionally, it notes the dominance of English as the primary language for publications, highlighting the need for international collaboration and suggesting the potential benefits of national or international cooperation programs for research universities.

Geographic bibliometrics plays a crucial role in understanding the distribution of research output across different regions, fostering collaboration, and identifying geographic trends, thereby contributing significantly to the advancement of scientific knowledge and global research networks [6]. Hence, the objective of this study was to conduct a bibliometric assessment of Brazilian literature on OMFS. A comprehensive compilation of the top 10 most referenced articles within each OMFS-related topic has been established. This research serves as a valuable resource for those engaged in the field, offering updated scientific insights and supporting ongoing scholarly endeavors.

MATERIALS AND METHODS

This work follows the principles of the Leiden Manifesto [7]. The selection criteria for articles in this literature search aimed to ensure the retrieval of relevant and high-quality literature within the field of OMFS. Articles with at least one Brazilian author were included to focus on international contributions, while only those indexed on Web of Science (WS) were considered to maintain consistency and reliability. Additionally, articles unrelated to OMFS were excluded to uphold the relevance of the retrieved literature. The choice of bibliometric indicators, including sorting by main topic, year of publication, and journal impact factor (IF), facilitated the organization and analysis of the data, enabling easy comparison across different subjects, tracking temporal trends, and assessing the quality and influence of the journals in which the articles were published. These criteria and indicators were selected to enhance the validity and comprehensiveness of the literature search, ultimately contributing to a better understanding of advancements within the field.

The data collected underwent manual input into Mendeley software (Elsevier, London, UK) to compile bibliometric indicators. Following refinement, all documents and results were gathered. Microsoft Excel was utilized for the collection

and analysis of values retrieved from Web of Science (WS). A global comparison with Brazil was conducted across all topics, considering variables such as institutional affiliation, publication language, Hirsch index (h-index), citations, and authorship. Inclusion and exclusion criteria for articles were determined through consensus between two authors (RG and AMB). Adjustments to the general search were made to ensure a maximum of 10,000 articles in each search, involving the removal of conference articles, specific search terms, or year of publication restrictions, as WS does not allow citation reports with more than 10,000 results. Impact Factor (IF) and Scimago Journal Ranking (SJR) journals were obtained from the same source to mitigate bias. A compilation of the 10 most cited articles on each topic was generated, including reference, year of publication, number of citations by WS, and citation density (number of citations per year). Articles from specialties unrelated to OMFS were excluded from this top 10 list.

Graphs and tables were crafted using Microsoft Excel and Microsoft PowerPoint (Microsoft Corporation, Redmond, USA) to facilitate bibliometric visualization. VOSviewer free software (Leiden University, The Netherlands) was employed to create graphical representations of critical elements, offering a visual form of bibliometric analysis. Statistical analyses were conducted, considering significance at a 95% confidence interval. As a bibliometric analysis, this study is exempt from institutional review board approval, as the data were sourced from publicly available electronic platforms and did not involve specific patient information.

RESULTS

A total of 39,979 articles were retrieved, of which 3,225 were published by at least one Brazilian author (n=8.06%). The USA leads in the seven subjects assessed (n=9,410; 23.53%). Brazil is among the top ten most productive countries on all subjects assessed (Fig. 1) and ranks second in third molar (n=260), oral pathology (n=872) and maxillofacial trauma (n=776). In addition, a fourth place in cleft lip (n=656) and two fifth places in orthognathic surgery (n=479) and temporomandibular (TMJ) surgery (n=124). The subject with the fewer published articles worldwide, odontogenic infections (n=1,426), Brazil ranks seventh (n=58).

The vast majority were published in English language (n=3,159; 97.95%). Articles were also published in Portuguese (n=57; 1.77%), Spanish (n=8; 0.25%) and only one in German (n=0.03%). There has been a clear upward trend in the number of publications for all seven topics over the years (Fig. 2). A more robust trend is found in orthognathic surgery ($R^2 = 0.8887$), oral pathology ($R^2 = 0.8597$), cleft lip ($R^2 = 0.8554$), maxillofacial trauma ($R^2 = 0.7887$) and third molar ($R^2 = 0.7884$). A moderate upward trend in TMJ surgery ($R^2 = 0.5253$) and a weak upward trend in odontogenic infections ($R^2 = 0.3691$).

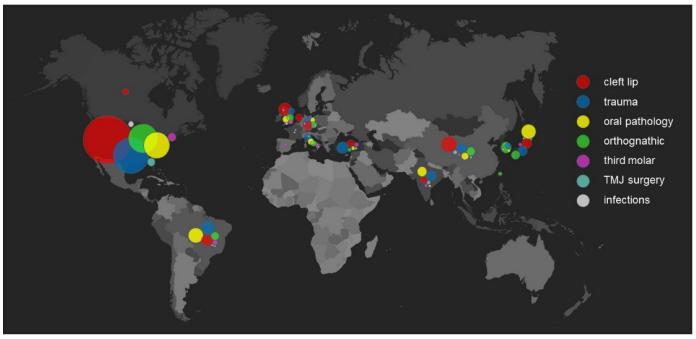

Figure 1. World map of oral and maxillofacial publications. The size of the circles is related to the number of publications.

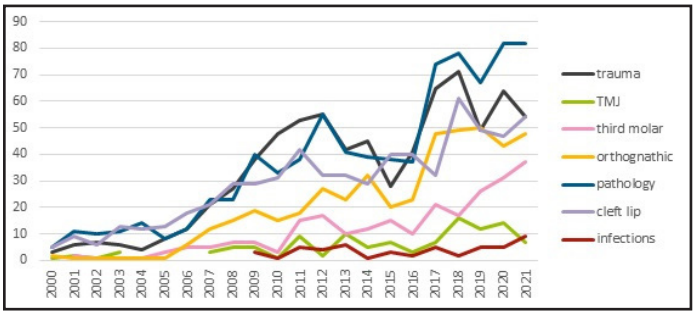

Figure 2. Number of Brazilian publications on this topic over the years

The University of São Paulo leads as institutional affiliation (n=987; 30.60%), followed by the University of Campinas (n=448; 13.89%) and the State University of São Paulo (n=338; 10.48%). Table 1 summarizes the first ten examples of each. Of particular note are Prof. Ricardo Santiago Gomez (n=423, H-index=39, citation count=11,215) from the Federal University of Minas Gerais and Prof. Belmiro Cavalcanti do Egito Vasconcelos (n=147, H-index=21, citation count=1,456), from the Federal University of Pernambuco. They are the most prolific authors related to oral pathology (Prof. Gomez) and maxillofacial surgery (Prof. Belmiro). Prof. Gomez is one of the more prolific not only from Brazil but from all over the world. Figure 3 shows a graphical representation of the authorship with VOSviewer.

The most cited article is "*Mutations in IRF6 cause Van der Woude and popliteal pterygium syndromes*" [8] by Kondo et al (582). The article with the highest citation density article is "*Essentials of oral cancer*" [9] by Rivera (46.71). A list of the 10 more cited publications on each topic was compiled, reaching 71 articles (Table 2) [10-78].

The Journal of Craniofacial Surgery was the journal with the most publications (n=273). The mean h-index of the journals with the ten greatest number of publications on each topic can be regarded as very high (h-index=90.39). A table listing the more common journals in each topic was created (Table 3).

Four themes were associated with a higher number of median citations in subscription access articles (third molar, orthognathic surgery, oral pathology, and maxillofacial trauma). While for three topics (TMJ surgery, cleft lip, and odontogenic infections) the number of average citations were higher in open access. A t-test was performed to assess the correlation between the type of article access and the number of citations. Neither subscription article nor open access articles are associated with a higher number of citations for OMFS ($t = -0.157106$; $p = 0.88031$).

After removing generic words "humans", "male", and "female", the most frequent keywords in the articles were "adults", "middle aged", "aged", "adolescent" and "mouth neoplasms". Figure 4 shows a graphical representation of the MeSH keywords using a network visualization (VOSviewer, Leiden University, Netherlands). VOSviewer is a tool helpful to construct and visualize bibliometric networks. The sizes of the circles are related to the numbers of citations using the determined keywords.

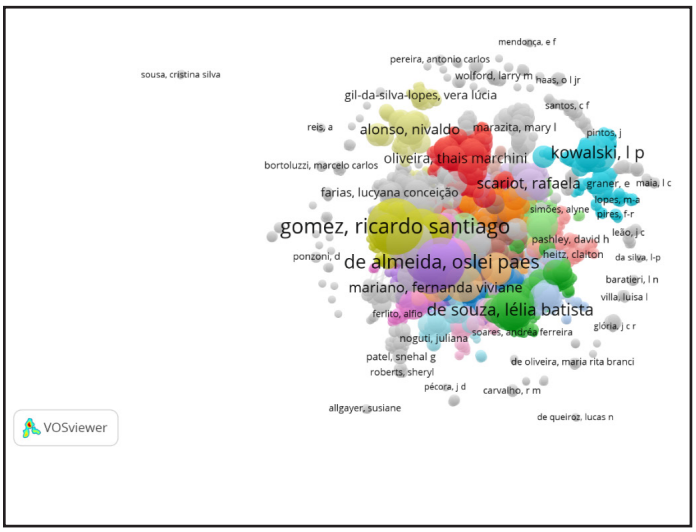

Figure 3. Graphic analysis of authorship

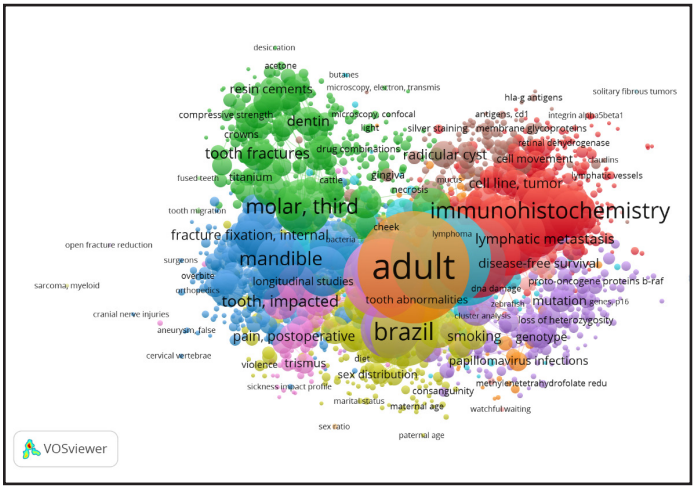

Figure 4. Graphic analysis of MeSH keywords

Table 1. Strategies used in bibliographic search.

1. ("third molar" AND surgery)
2. (Orthognathic surgery)
3. (Odontogenic Cysts OR Odontogenic Tumors OR Ameloblastoma OR Mouth Neoplasms)
4. (Temporomandibular Arthrocentesis OR Temporomandibular Arthroplasty OR Temporomandibular Joint Prosthesis OR Temporomandibular Ankylosis)
5. (Mandibular Fractures OR Maxillary Fractures OR Zygomatic Fractures)
6. ("Cleft lip")
7. (Odontogenic infections)

Table 2. The ten most cited articles by Brazilian authors on each topic

Third molar surgery					
rank	**reference**	**year**	**title**	**citations**	**CD**
1	Laureano Filho et al	2005	The influence of cryotherapy on reduction of swelling, pain and trismus after third-molar extraction - A preliminary study [10]	67	3.94
2	de Santana-Santos et al	2013	Prediction of postoperative facial swelling, pain and trismus following third molar surgery based on preoperative variables [11]	65	7.22
3	Gomes et al	2008	Sensitivity and specificity of pantomography to predict inferior alveolar nerve damage during extraction of impacted lower third molars [12]	63	4.50
4	Alcantara et al	2014	Pre-emptive effect of dexamethasone and methylprednisolone on pain, swelling, and trismus after third molar surgery: a split-mouth randomized triple-blind clinical trial [13]	57	7.12
5	Falci et al	2012	Association between the presence of a partially erupted mandibular third molar and the existence of canes in the distal of the second molars [14]	56	5.60
6	Cerqueira et al	2004	Comparative study of the effect of a tube drain in impacted lower third molar surgery [15]	53	2.94
7	Colombini et al	2006	Articaine and mepivacaine efficacy in postoperative analgesia for lower third molar removal: a double-blind, randomized, crossover study [16]	52	3.25
8	Santos et al	2007	Epinephrine concentration (1 : 100,000 or 1 : 200,000) does not affect the clinical efficacy of 4% Articaine for lower third molar removal: A double-blind, randomized, crossover study [17]	47	3.13
9	Rosa et al	2002	Influence of flap design on periodontal healing of second molars after extraction of impacted mandibular third molars [18]	47	2.35
10	Célio-Mariano et al	2012	Comparative Radiographic Evaluation of Alveolar Bone Healing Associated With Autologous Platelet-Rich Plasma After Impacted Mandibular Third Molar Surgery [19]	42	4.20
Orthognathic surgery					
1	de Oliveira et al	2009	Observer reliability of three-dimensional cephalometric landmark identification on cone-beam computerized tomography [20]	132	10.15
2	Aragon et al	2016	Validity and reliability of intraoral scanners compared to conventional gypsum models measurements: a systematic review [21]	83	13.83
3	Mattos et al	2011	Effects of orthognathic surgery on oropharyngeal airway: a meta-analysis [22]	66	6.00
4	Gonçalves et al	2008	Postsurgical stability of counterclockwise maxillomandibular advancement surgery: Affect of articular disc repositioning [23]	60	4.28
5	Esperão et al	2010	Oral health-related quality of life in orthognathic surgery patients [24]	54	4.50
6	Weissheimer et al	2015	Fast three-dimensional superimposition of cone beam computed tomography for orthopaedics and orthognathic surgery evaluation [25]	51	7.28
7	Nicodemo et al	2008	Effect of orthognathic surgery for class III correction on quality of life as measured by SF-36 [26]	50	3.57
8	Magalhães et al	2010	The influence of malocclusion on masticatory performance A systematic review [27]	48	4.00
9	Brasileiro et al	2009	An in Vitro Evaluation of Rigid internal Fixation Techniques for Sagittal Split Ramus Osteotomies: Advancement Surgery [28]	48	3.69
10	Haas et al	2015	Computer-aided planning in orthognathic surgery-systematic review [29]	46	6.57
10	Trindade et al	2003	Effects of orthognathic surgery on speech and breathing of subjects with cleft lip and palate: Acoustic and aerodynamic assessment [30]	46	2.42

Oral Pathology					
1	Rivera	2015	Essentials of oral cancer [9]	327	46.71
2	Guha et al	2007	Oral health and risk of squamous cell carcinoma of the head and neck and esophagus: Results of two multicentric case-control studies [31]	225	15.00
3	Barreto et al	2000	PTCH gene mutations in odontogenic keratocysts [32]	148	6.72
4	Fregnani et al	2003	Lipomas of the oral cavity: clinical findings, histological classification and proliferative activity of 46 cases [33]	147	7.73
5	Pires et al	2007	Intra-oral minor salivary gland tumors: A clinicopathological study of 546 cases [34]	144	9.60
6	Schlecht et al	1999	Interaction between tobacco and alcohol consumption and the risk of cancers of the upper aero-digestive tract in Brazil [35]	112	4.86
7	Lopes et al	1999	A clinicopathologic study of 196 intraoral minor salivary gland tumours [36]	97	4.21
8	Crivelini et al	2003	Cytokeratins in epithelia of odontogenic neoplasms [37]	95	5.00
9	Velly et al	1998	Relationship between dental factors and risk of upper aerodigestive tract cancer [38]	95	3.95
10	Ledesma-Montes et al	2008	International collaborative study on ghost cell odontogenic tumours: calcifying cystic odontogenic tumour, dentinogenic ghost cell tumour and ghost cell odontogenic carcinoma [39]	92	6.57
TMJ Surgery					
1	Lobo Leandro et al	2013	A ten-year experience and follow-up of three hundred patients fitted with the Biomet/Lorenz Microfixation TMJ replacement system [40]	73	8.11
2	Manganello-Souza, Mariani	2003	Temporomandibuar joint ankylosis: Report of 14 cases [41]	72	3.78
3	Ribeiro-Dasilva et al	2009	Estrogen receptor-alpha polymosphisms and predisposition to TMJ disorder [42]	70	5.38
4	Cevidanes et al	2014	3D osteoarthritic changes in TMJ condylar morphology correlates with specific systemic and local biomarkers of disease [43]	52	6.50
5	Vasconcelos et al	2009	Surgical treatment of temporomandibular joint ankylosis: Follow-up of 15 cases and literature review [44]	43	3.30
6	Dela Coleta et al	2009	Maxillo-mandibular counter-clockwise rotation and mandibular advancement with TMJ Concepts ® total joint prostheses Part I – Skeletal and dental stability [45]	41	3.15
7	Wolford, Gonçalves	2015	Condylar resorption of the temporomandibular joint: How do we treat it? [46]	38	5.42
8	Firmino et al	2017	Oral health literacy and associated oral conditions. A systematic review [47]	36	7.20
9	Pinto et al	2009	Maxillo-mandibular counter-clockwise rotation and mandibular advancement with TMJ Concepts ® total joint prostheses Part III – Pain and dysfunction outcomes [48]	33	2.53
10	Pereira et al	1995	Surgical treatment of the fractured and dislocated condylar process of the mandible [49]	32	1.18
Maxillofacial trauma					
1	Brasileiro, Passeri	2006	Epidemiological analysis of maxillofacial fractures in Brazil: A 5-year retrospective study [50]	199	12.43
2	Kramer et al	2003	Traumatic dental injuries in Brazilian preschool children [51]	120	6.31
3	Gabrielli et al	2003	Fixation of mandibular fractures with 2.0-mm miniplates: Review of 191 cases [52]	106	5.57
4	Rocha, Cardoso	2001	Traumatized permanent teeth in Brazilian children assisted at the Federal University of Santa Catarina, Brazil [53]	103	4.90

5	Oliveira et al	2007	Traumatic dental injuries and associated factors among Brazilian preschool children [54]	96	6.40
6	Chrcanovic et al	2012	1,454 mandibular fractures: A 3-year study in a hospital in Belo Horizonte, Brazil [55]	88	8.80
7	Cunha et al	2001	Oral trauma in Brazilian patients aged 0-3 years [56]	82	3.90
8	Passeri et al	1993	Complications of nonrigid fixation of mandibular angle fractures [57]	75	2.58
9	Passeri et al	1993	Relationship of substance-abuse to complications with mandibular fractures [58]	69	2.37
10	Cardoso, Rocha	2002	Traumatized primary teeth in children assisted at the Federal University of Santa Catarina, Brazil [59]	64	3.20
Cleft lip					
1	Kondo et al	2002	Mutations in IRF6 cause Van der Woude and popliteal pterygium syndromes [8]	582	29.10
2	Zucchero et al	2004	Interferon regulatory factor 6 (IRF6) gene variants and the risk of isolated cleft or palate [60]	433	24.05
3	Beaty et al	2010	A genome-wide association study of cleft lip with and without cleft palate identifies risk variants near MAFB and ABCA4 [61]	408	34.00
4	Suzuki et al	2000	Mutations of PVRL1, encoding a cell-cell adhesion molecule/herpesvirus receptor, in cleft lip/palate-ectodermal dysplasia [62]	244	11.09
5	Jezewski et al	2003	Complete sequencing shows a role for MSX1 in non-syndromic cleft lip and palate [63]	208	10.94
6	Mastroiacovo et al	2011	Prevalence at birth of cleft lip with or without cleft palate: Data from the international perinatal database of typical oral clefts (IPDTOC) [64]	196	17.81
7	Vieira et al	2005	Medical sequencing of candidate genes for nonsyndromic cleft lip and palate [65]	182	10.70
8	Rooryck et al	2011	Mutations in lectin complement pathway genes COLEC11 and MASP1 cause 3MC syndrome [66]	158	14.36
9	Jenkins et al	2007	RAB23 mutations in carpenter syndrome imply an unexpected role for hedgehog signaling in cranial-suture development and obesity [67]	152	10.13
10	Lines et al	2012	Haploinsufficiency of a spliceosomal GTPase encoded by EFTUD2 causes mandibulofacial dysostosis with microcephaly [68]	126	12.60
Odontogenic infections					
1	Siqueira, Rocas	2013	Microbiology and treatment of acute apical abscesses [69]	101	11.22
2	Sancho et al	1999	Descending necrotizing mediastinitis: a retrospective surgical experience [70]	61	2.65
3	Sato et al	2009	Eight-year retrospective study of odontogenic origin infections in a postgraduation program on oral and maxillofacial surgery [71]	32	2.46
4	Brito et al	2017	Deep neck abscesses: study of 101 cases [72]	30	6.00
5	Fernandes et al	2015	Association between immunologic parameters, glycemic control, and postextraction complications in patients with type 2 diabetes [73]	20	2.85
6	Moraes et al	2015	Distribution of genes related to antimicrobial resistance in different oral environments: a systematic review [74]	17	2.42
7	Martins et al	2017	The use of antibiotics in odontogenic infections: what is the best choice? A systematic review [75]	15	2.14
8	Antunes et al	2011	Brain abscess of odontogenic origin [76]	13	1.18
9	de Medeiros et al	2012	Orbital abscess during endodontic treatment: A case report [77]	10	1.00
10	Antunes et al	2013	Extensive cervical necrotizing fasciitis of odontogenic origin [78]	8	0.88

Table 3. Most frequently cited journals and their h-index

Journals	h-index	Number of publications						
		trauma	third molar	orthognathic	oral pathology	TMJ	cleft lip	odontogenic infections
American J Orthodontics Dental Orthopedics	**129**			39			18	
Angle Orthodontist	**91**			10			11	
British JOMS	**78**					4		
Brazilian J ORL	**36**				19		12	3
Brazilian Oral Research	**50**	19			34	3	12	
Cleft	**83**						146	
Clinical Oral Investigation	**88**		13				9	
Cranio	**47**					10		
Dental Traumatology	**86**	57						
International JOMS	**105**	35	36	66		13		
J Applied Oral Sciences	**49**	11		14			25	
J Dental Research	**192**				22		9	2
J Craniofacial Surgery	**76**	76	16	54	38	10	72	7
J Cranio Maxillofacial Surgery	**82**	24	8	26		7		
JOMS	**126**	44	34	53	21	11		3
J Oral Pathology Medicine	**88**				69			
J Maxillofacial Oral Surgery	**24**		6					
Medicina Oral Patologia Oral Cirugia Bucal	**61**		23		45	4		
OMFS	**34**	11	11	17		3		
Oral Diseases	**91**				37		9	2
Oral Oncology	**121**				36			
Quintessence International	**74**	13	5					
Triple Oral	**126**		10	11	74	5		

Legend: J – Journal; JOMS – Journal of Oral and Maxillofacial Surgery; ORL – Otorhinolaringology; OMFS – Oral and Maxillofacial Surgery; Triple Oral – Oral Surgery, Oral Medicine, Oral Pathology, and Oral Radiology

DISCUSSION

The objective of this paper was to conduct a bibliometric examination of Brazilian literature in oral and maxillofacial surgery, encompassing the compilation of the ten most frequently cited articles across seven distinct topics. It is important to note that bibliometrics does not aim for surgical precision [7]. Statistical tests were conducted to enhance the comprehensibility of the information. Bibliometrics enables researchers and readers to track the development of research within a specific field over time, providing insights into both its progression and potential limitations [79].

Similar to many other fields, the United States takes the lead in the quantity of publications, with Brazil following closely behind. Two authors are considered to be the most prolific worldwide, Prof. Ricardo Santiago Gomez and Prof. Belmiro Cavalcanti do Egito Vasconcelos. Both are considered as a good h-index (n≥20) [80]. The h-index of the publications was considered good, reaching almost outstanding (n=39.21). The significance of this index varies across different scientific disciplines. In the field of OMFS, this compilation can be regarded as having a high impact, indicative of the increasing number of high-quality studies in this

area. This trend can be observed through comparisons of total citation counts, h-index values, and citation density over time. The recognition of highly prolific authors emphasizes the crucial role of individual contributions in influencing the research landscape.

Cleft lip and oral pathology are the subjects with a larger number of citations and higher citation density. On the other hand, odontogenic infections is a topic that deserves more attention, with more publications and articles in top-level journals. More than 95% of the articles were published in English language, according to other publications [81,82]. A national exchange or even an international cooperation program could benefit universities to reach a higher level of research. A significant number of articles were published in high or medium ranked journals, with a mean h-index of 90.39. Open access articles were cited as subscription articles, but without statistical significance ($p = 0.88031$).

The analysis of trends and patterns observed in the data reveals several noteworthy insights into the landscape of OMFS research. The upward trend in the number of publications across all topics underscores the growing interest and activity within the field, reflecting advancements in technology, increasing collaboration, and expanding knowledge domains. Particularly notable is the robust trend observed in orthognathic surgery, oral pathology, cleft lip, maxillofacial trauma, and third molar topics, indicating areas of significant research focus and potential avenues for further exploration. These trends suggest a dynamic and vibrant research environment within OMFS, with implications for future research priorities, interdisciplinary collaboration, and the dissemination of knowledge to advance clinical practice and improve patient outcomes.

While the USA maintains its leading position in terms of the sheer number of publications, Brazil emerges as a significant contributor, ranking among the top ten most productive countries across all subjects assessed. This highlights Brazil's growing influence and participation in shaping the global discourse within the field. Moreover, the upward trend in the number of publications observed in Brazil mirrors broader global trends, indicating a shared emphasis on advancing research and innovation in OMFS. While aligning with global trends in many respects, Brazil's emphasis on certain topics and its contributions to the overall research landscape reflect its distinct priorities and strengths. In comparison, Africa and the Middle East exhibit lower levels of research output [6,83]. This underscores Brazil's position as a leading contributor to OMFS research, with its efforts playing a crucial role in advancing the field on a global scale. Furthermore, Brazil's increasing prominence in OMFS research underscores the importance of international collaboration, as partnerships with researchers and institutions from around the world can further enrich the field's knowledge base and foster interdisciplinary innovation.

Appropriate title and keywords are critical to enable search retrieval, rendering a more precise, sensitive and efficient bibliographic search [84,85]. An effective article widespread can be achieved by selecting adequate keywords [86,87]. VOSviewer is a useful, free and easy-to-use tool for selecting these keywords and other actions [88,89].

This study's limitations encompass the exclusive reliance on data from WS, which may introduce bias by potentially excluding relevant publications indexed in other databases like PubMed and Google Scholar (GS). PubMed, despite being a widely used database in the medical field, does not employ citation analysis, while GS does, albeit necessitating other software for comprehensive analysis. The lack of data from these additional databases could result in an incomplete representation of the global landscape of OMFS research, potentially overlooking significant contributions or trends. Moreover, the scarcity of geographic bibliometric analyses in the field underscores the need for more comprehensive data collection methods to provide a more holistic understanding of regional variations and contributions to OMFS research.

Future research endeavors could focus on integrating data from multiple databases to provide a more comprehensive overview of OMFS research trends and patterns globally. Additionally, exploring collaborative networks and international partnerships within OMFS research could offer valuable insights into emerging trends and areas of mutual interest, guiding future research priorities and fostering interdisciplinary collaboration to advance the field. This bibliometric analysis serves as a foundation for identifying gaps and trends in OMFS research, providing a roadmap for future investigations aimed at addressing these knowledge deficiencies and driving innovation in the field.

CONCLUSIONS

This study presented a compilation of the most referenced articles across seven distinct topics. The bibliometric data validate that

Brazilian literature on OMFS ranks among the most prolific and frequently cited globally. The prominence of Brazil among the top ten most productive countries across all subjects highlights the nation's growing contribution to the global body of literature in OMFS. This work provides a valuable reference and stimulus for the growing body of quality publications for oral and maxillofacial surgeons, academics and researchers. Choosing an appropriate title and keywords, in addition to publishing in English language, are helpful strategies for disseminating the article.

Informed Consent: Not applicable.

Conflict of interest: The authors declare no conflicts of interest to disclose.

Funding: No source of funding.

Ethical Approval: Not applicable since this was a bibliometric study.

Author Contributions: Conception: G, R; B, MA - Design: G, R; S YS - Supervision: B; AM - Materials: G,R; B, MA; L,A - Data Collection and/or Processing: G,R; B, MA; L,A - Analysis and/or Interpretation: G,R; B, MA; L,A - Literature: S, YS; B, AM - Review: All authors - Writing: All authors - Critical Review: All authors

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How to Cite;

Grillo R, Aparecida Brozoski M, Lucamba A, Slusarenko da Silva Y, Meireles Borba A (2024) A Science Mapping Analysis of Brazilian Literature on Oral and Maxillofacial Surgery. 30(2)102-116. Eur J Ther. https://doi.org/10.58600/eurjther1999