Pesquisa Brasileira em Odontopediatria e Clínica Integrada 2023; 23:e220124
https://doi.org/10.1590/pboci.2023.061
ISSN 1519-0501 / eISSN 1983-4632

ORIGINAL ARTICLE

The 100 Most-Cited Papers in Dentin Hypersensitivity: A Bibliometric Analysis

Armando Baia Guiomarino Neto[1], Francisco Ivison Rodrigues Limeira[2], Kétsia Rayssa Henriques Ferreira[1], Diandra Costa Arantes[1]

[1]School of Dentistry, Federal University of Pará, Belém, PA, Brazil.
[2]Faculty of Dentistry, Presidente Antônio Carlos Faculty, Teófilo Otoni, MG, Brazil.

Correspondence: Diandra Costa Arantes, Federal University of Pará, Faculty of Dentistry, Rua Augusto Correa 01, Guamá, Belém, Pará, Brazil. 66075-110. **E-mail:** diandracosta@ufpa.br

Academic Editor: Alessandro Leite Cavalcanti

Received: 22 July 2022 / **Review:** 12 October 2022 / **Accepted:** 17 November 2022

How to cite: Guiomarino Neto AB, Limeira FIR, Ferreira KRH, Arantes DC. The 100 most-cited papers in dentin hypersensitivity: a bibliometric analysis. Pesqui Bras Odontopediatria Clín Integr. 2023; 23:e220124. https://doi.org/10.1590/pboci.2023.061

ABSTRACT

Objective: To identify the 100 most-cited articles in DH and analyze their characteristics. **Material and Methods:** A search was performed on the Web of Science (WoS) and the 100 most-cited articles were selected. The following data were extracted: citations, year of publication, authorship, institution, country, journal, language, study design, topic of interest, conflict of interest (COI), and sponsorship. The VOSviewer software was used to visualize bibliometric networks. Poisson regression analysis was performed to measure associations between several citations and the characteristics of the studies. **Results:** The number of citations ranged from 346 to 48. The most-cited article was published in 1997 by Holland in the Journal of Clinical Periodontology. This journal published the most papers, followed by the Journal of Oral Rehabilitation and Journal of Dentistry. Laboratory research, review, and clinical trial were the study designs most prevalent. Reviews ($p<0.05$; PR= 1.853) and method development studies ($p<0.05$; PR= 1.853) had a more chance to present more citations. The main topics of interest were the clinical effectiveness of desensitizers and *in vitro* analysis of dentin morphology. Sponsorship and COI were underreported. England and USA presented the greatest number of citations and connections in the coauthorship network map. **Conclusion:** Most of the articles were original research, and their topics of interest were mainly the clinical effectiveness of desensitizing agents and dentin morphology.

Keywords: Dentin Sensitivity; Dentin Desensitizing Agents; Bibliometrics; Databases, Bibliographic.

Introduction

Dentin hypersensitivity (DH) is a short pain that appears in response to a thermal, chemical, or tactile stimulus applied on an exposed dentin surface that cannot be explained as any other form of dental defect or pathology. The cervical area is the most commonly affected [1,2]. The hydrodynamic theory is the most accepted one to explain the pain mechanism present in DH, which states that the sensibility is based on the stimulus-induced fluid flow in the dentinal tubules and consequent nociceptor activation in the pulp [1]. It is a clinical condition frequently found in clinical practice. Different prevalences have been reported in the literature, with an average among the studies of 33,5% [3]. Although it is not treated as a severe dental problem, DH can be extremely uncomfortable and influence patients' quality of life, who may even have their diet restricted by the problem. This is one of the strong reasons why people seek professional help to treat DH [4,5]. Despite the numerous studies in this field, there is no standard treatment for DH [6].

Bibliometric analysis is the application of quantitative measures to evaluate scientific activity and performance [7]. The number of citations is one of the most widely used bibliometric indicators, which involves constructing and applying indicators of impact, influence, or quality of the works [8]. The most-cited articles are used to identify past and current research trends in specific fields and the contributing authors, institutions, and journals [9]. These indicators are important to help researchers to select the journal to which they will submit their manuscripts by evaluating the impact in the scientific community of previously published studies and to guide organizations in their make-decisions relating to promotion and funding [10]. Bibliometrics studies are important for providing an overview of research and scientific activity in a specific field [11]. Medical sciences use bibliometric applications to track research trends, correlations, and changes in disease treatments over time [12]. In dentistry, bibliometric studies have been published in several fields, including general dentistry [13], endodontics [9,14], oral pathology [15], orthodontics [16,17], pediatric dentistry [18], prosthodontics [11], implant dentistry [19], and cariology [20]. However, no bibliometric analysis was performed in DH.

The absence of well-established protocols for treating DH and its high prevalence raises the question: "What are the research trends and characteristics of the studies published worldwide on this topic?". Thus, this study aimed to identify the 100 most-cited articles in DH and evaluate their main characteristics.

Material and Methods

Search Strategy

On February 17, 2022, an advanced search was conducted in the Web of Science Core Collection (WoS-CC) database (https://www.webofscience.com/wos/woscc/advanced-search) to select the 100 most-cited papers in the DH field. The search strategy was determined using the MeSH terms (https://www.ncbi.nlm.nih.gov/mesh/) related to the DH: (((((((TS=(Dentin Sensitivity)) OR TS=(Dentin Sensitivities)) OR TS=(Dentine Sensitivity)) OR TS=(Dentine Sensitivities)) OR TS=(Dentine Hypersensitivity)) OR TS=(Dentine Hypersensitivities)) OR TS=(Dentin Hypersensitivity)) OR TS=(Dentin Hypersensitivities)) OR TS=(Dentin Desensitizing Agents).

No language, publication year, or document type restrictions were applied. The search results were sorted by citations, from the highest number to the lowest. A researcher (ABGN) selected through the title, abstract and full text, when necessary, the 100 most-cited papers. Subsequently, a second researcher (DCA) reviewed all selected articles. When there was a lack of consensus, a third researcher (FIRL) was consulted to determine the selection of the article based on the pre-established criteria. The inclusion criterion was articles

that had DH or the use of desensitizing agents to treat DH as their main objective. Articles that did not correspond to the required topic, such as those discussing sensitivity related to tooth whitening, adhesion, or caries, were excluded.

Data Collection

The following data were extracted from each article: title, WoS Core Collection number of citations, WoS all databases number of citations, the density of citations (mean of citations per year), WoS number of citations in the last six months, and the last seven years, year of publication, authors features (name, number, authorship position, country, and continent), institution (based on the affiliation of the first author), publication journal and its Journal Impact Factor (JIF) in 2020, language, study design, the topic of interest of the study, report of information about conflict of interest (COI) and sponsorship.

The study designs were classified into animal research, cross-sectional study, laboratory research, method development, clinical trial, review and systematic review, and meta-analysis [21,22]. The topic of interest was based on the objective of the study. When an article had more than one aim, all of them were considered. The types of COI were classified as follows: none, individual or institutional financial, and unclear [23]. For sponsorship, the following classification was used: no sponsor, sponsored (for-profit or non-profit organization), or unclear. Donations were considered a type of sponsorship. When the study was sponsored by for-profit and non-profit organizations, the sponsorship was classified as for-profit [23].

The VOSviewer software (Version 1.6.15; Leiden University, The Netherlands) was used to visualize bibliometric networks. VOSviewer maps are distance-based: more important items have larger circles and a smaller distance between two items indicates a stronger relation [24]. In the coauthorship map, the relatedness of items was determined based on the number of coauthored documents by authors and by institutions. In the term cooccurrence map based on text data, the relatedness of items was determined based on the number of titles and abstracts in which they occur together.

Data Analysis

In the cross-sectional analysis of this bibliometric review, descriptive analyses were used to describe data about the number of citations, number of articles, sponsorship, and conflicts of interest. Poisson regression was performed to measure associations between the number of citations (WoS Core Collection section) and some characteristics of the studies, such as continent, study design, COI, sponsorship, JIF, and time of publication. The statistical analysis of data was performed using JAMOVI software (Version 1.6.23; Sydney, Australia) with the probability of a type I error set at a 0.05 level of significance.

Results

The search in the WoS-CC database obtained 6,162 articles. Among the selected articles, the number of citations ranged from 346 to 48 (mean of 87.72), totaling 8,772 citations. The most-cited paper is entitled "Guidelines for the design and conduct of clinical trials on dentine hypersensitivity", published by Holland in the *Journal of Clinical Periodontology* in 1997 [25]. This is a method development study that aimed to produce a guideline for the conduction of new clinical trials in DH. On the other hand, the study with the higher citation density (16.5 citations per year) was published in 2006 by Orchardson and Gillam, in a review entitled "Managing dentin hypersensitivity" [6]. The 100 most-cited papers and their respective numbers and average citations are listed in the Supplementary File.

The 100 most-cited papers in DH were published in 25 journals. *Journal of Clinical Periodontology* (n=22), *Journal of Oral Rehabilitation* (n=12), and *Journal of Dentistry* (n=10) were the journals that published the highest number of articles. The 2020 JIF of the journals ranged from 8.947 to 1.522 (mean of 4.190). *Acta Biomaterialia* was the journal with the highest JIF. The 2020 JCR was considered for all journals, except for the *Journal of Orofacial Pain* and Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology, and *Endodontology*, because they were not included in this year. The journals *Archivum Histologicum Japonicum* and *Dental Clinics of North America* had no JIF.

Sixteen authors collaborated on three or more articles in the TOP 100 list (Table 1). The number of authors per paper ranged from 1 to 10 (mean of 3.51). Articles with two (n=21) and three (n=20) authors were the most frequent. Addy M (18 articles, 2,178 citations), Gillam D (10 articles, 646 citations), and Pashley D (8 articles, 894 citations) were the authors who published the most articles on the list.

Table 1. Authors with three or more papers in the TOP 100 most-cited papers in dentin hypersensitivity.

Author	Number of articles	Number of citations
Addy M	18	2178
Gillam D	10	646
Pashley D	8	894
West NX	6	486
Absi E	4	461
Adams D	4	461
Lan W	4	241
Liu H	4	241
Newman H	4	375
Brannstrom M	3	349
Bulman J	3	296
Chabanski M	3	258
Dowell P	3	315

The articles in the TOP 100 were published between 1963 and 2015. The oldest article was published by Brannstrom [26] in the Journal of the American Dental Association. This study aimed to evaluate the relationship of the displacement of odontoblastic nuclei with pain production. Zhu et al. [27] published the most recent article, a systematic review, and a meta-analysis that investigated the effect of a desensitizing agent in the treatment of DH. Thirty percent of the articles were published in the decade 2000-2009. This period received the highest number of citations (n= 2,700).

All the 100 most-cited papers were published in English. Europe was the continent with the largest number of publications (n=58) and citations (n=5,265). Asia published the second largest number of articles (n=29) and citations (n=2,028). The largest number of countries in the TOP 100 is in Europe, followed by Asia. England and the United States of America (USA) were the most-cited countries, with 2,470 and 1664 citations, respectively. Fifty-seven institutions published at least one article among the 100 most-cited on DH. The institutions that stood out the most of them were the University of Bristol (13 articles and 1,183 citations), Cardiff University (nine articles and 993 citations), and the Medical College of Georgia (five articles and 641 citations).

Laboratory research (29 articles) and review (25 articles) were the most prevalent study designs. Review (2,672 citations), laboratory research (2,445 citations), and clinical trial (1,591 citations) were the most-cited. Articles presented as a topic of interest the clinical effectiveness of desensitizing agents and their methods of application (n=29); analysis *in vitro* of dentinal tubule occlusion, dentinal permeability, or dentinal morphology (n=25); prevalence (n=18); aetiology (n=15); DH management or treatment (n=13); DH mechanisms (n=12);

demineralization or remineralization (n=4); produce of guideline for original studies (n=3); measure of OHRQoL (n=2); desensitizers biocompatibility (n=1) and diagnostic (n=1).

Among all the 100 articles on the list, only 26% reported COI and 77% of them were unclear. Six articles presented COI classified as individual financial, four as institutional financial and 16 declared no COI. Thirty-eight articles were sponsored, 20 of them were supported by for-profit organizations and 18 by non-profit organizations. Only three articles reported no financial support, while 59 articles were unclear about this. Considering the study designs, clinical trials were the studies that most presented COI. Table 2 shows study designs, COI, and sponsorship information.

Table 2. Sponsorship and conflict of interest (COI) according to the study design.

Study Design	Total	Sponsorship			Conflict of Interest (COI)		
		For-profit or non-profit	None	Unclear	COI	No COI	Unclear
Animal Research	1	1	-	-	-	-	1
Cross-sectional	13	4	-	9	-	2	11
Laboratory Research	29	13	16	-	-	1	28
Method Development	3	2	-	1	-	1	2
Randomized Clinical Trial	23	10	-	13	7	2	14
Review	25	6	-	19	3	5	17
Systematic review and meta-analysis	6	2	3	1	-	5	1

-: Value equal to zero.

The map of the collaboration network among authors shows the existence of 12 clusters (Figure 1A). On the map of collaboration between countries, England and the USA were the most connected to the other countries in the network (Figure 1B). Countries from different continents compose the same cluster, such as the one formed by Brazil, Canada, and England. A co-occurrence map of the terms presented in the title or the abstract of the TOP 100 articles was also obtained (Figure 2).

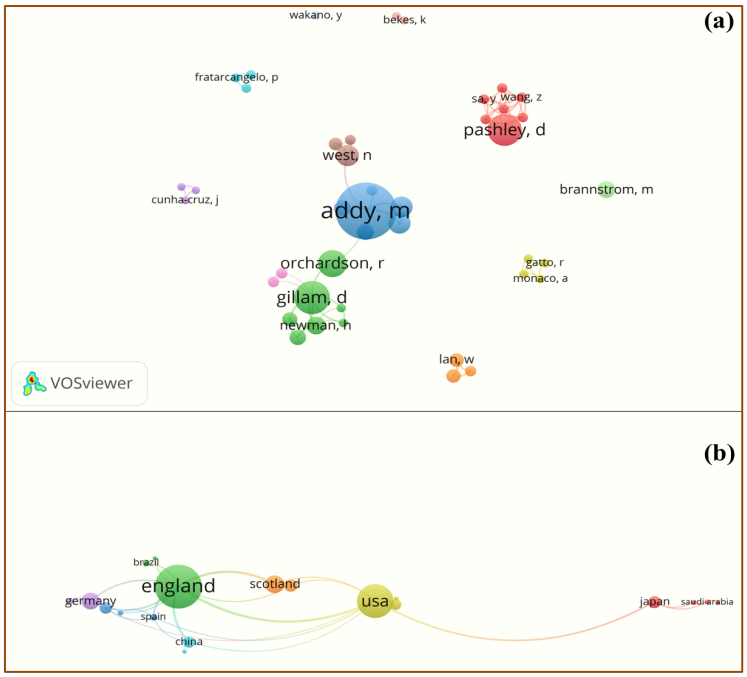

Figure 1. (a) Coauthorship network map between authors in the 100 most-cited papers in dentin hypersensitivity. (b) Coauthorship network map between countries in the 100 most-cited papers in dentin hypersensitivity.

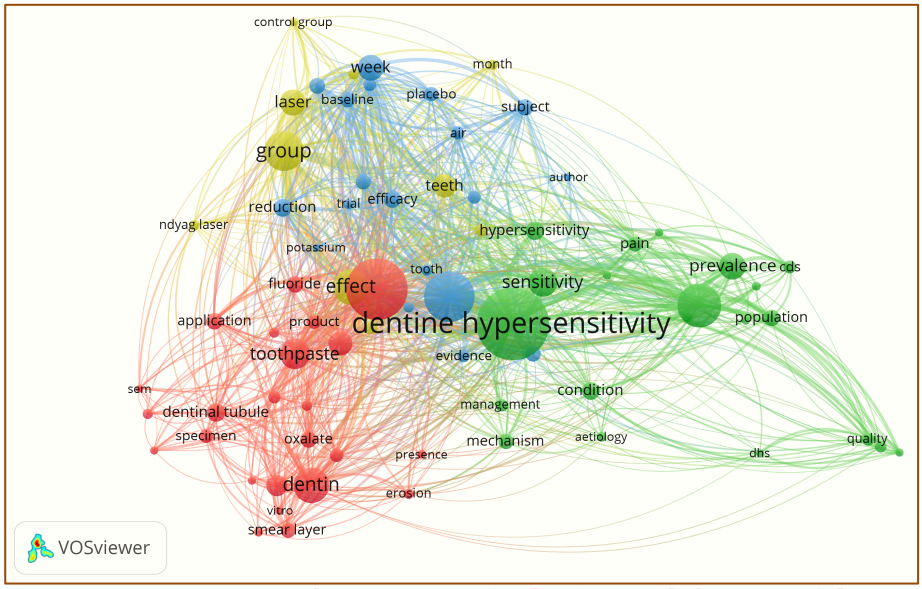

Figure 2. Cooccurrence network map between terms in the titles and abstracts of the 100 most-cited papers in dentin hypersensitivity.

The Poisson regression analysis showed an association between the total number of citations and the articles' time of publication. Articles with more years since publication had a greater prevalence of citation (p=0.010; PR=1.01). Reviews (p=0.025; PR=1.853) and method development studies (p=0.003; PR=1.853) had a more chance to present a higher number of citations than systematic reviews and meta-analysis. Regarding the continent of the nationality of the first author, only the prevalence of Asian authors' citations was higher than that of European authors (p=0.044; PR=0.732). The JIF, sponsorship, and COI showed no significant association with the article's total number of citations (p>0.05). These results are available in Table 3.

Table 3. Poisson regression model between the total number of citations (WoS Core Collection) and some characteristics of the studies.

Variables	Number of Citations		
	p-value	Prevalence Ratio	CI 95%
Time of Publication (years)	0.010	1.01	1.00-1.02
Journal Impact Factor	0.490	1.02	0.972-1.06
Study Design			
Systematic Review and Meta-Analysis	1		
Method Development	0.003	2.746	1.434-5.38
Laboratory Research	0.165	1.462	0.886-2.59
Review	0.025	1.853	1.127-3.28
Cross-Sectional	0.114	1.586	0.923-2.89
Randomized Clinical Trial	0.518	1.200	0.712-2.16
Animal Research	0.925	0.936	0.179-3.06
Conflict of interest			
None	1		
Unclear	0.069	1.369	0.992-1.94
Individual Financial	0.098	1.549	0.914-2.56
Institutional Financial	0.925	0.967	0.450-1.87
Sponsorship			
None	1		
Unclear	0.259	1.596	0.779-4.02
For-profit	0.230	1.667	0.790-4.27
Non-profit	0.558	1.288	0.599-3.33
Continent			
Europe	1		

North America	0.352	1.146	0.855-1.514
South America	0.838	0.920	0.370-1.871
Oceania	0.650	1.179	0.532-2.233
Asia	0.044	0.732	0.537-0.980

CI = Confidence Interval.

Discussion

The number of citations received by an article may indicate the level of performance and impact of the research in the scientific community [10]. The citations of the articles in this bibliometric review are lower compared to other lists of the 100 most-cited papers from other specialties and topics in dentistry [20,28,29]. It has been suggested that classic papers are those that have at least 100 citations [13]. In this bibliometrics, twenty-five articles are classified as classic papers and can be references to the development of other studies in the DH field. This dwindling number of classic papers may be due to the high specificity of this topic. The articles in this TOP 100 are cited almost exclusively by DH and restorative dentistry researchers, while articles in other bibliometric reviews cover topics that interest researchers from different areas of dentistry.

Older articles tend to have a higher number of citations, independently of their current impact [30]. In the present study, the period with the most citations is similar to that found in other reviews [15,31]. Although the results showed that publication time is associated with the number of citations, there is no considerable difference between older and more recent articles. For example, the second most-cited article [32] was published in 1987 and received only four more citations than the third on the list [6], published in 2006. DH research is moving toward the search for more effective treatments. The most recent years accumulate a higher number of citations since the effectiveness of desensitizing agents is a more recurrent topic of interest. Thus, the topic of interest of the article has more impact on citations than the time of publication in this series.

More than half of the articles were published in journals with a high JIF, which are in the first quartile of the Dentistry, Oral Surgery & Medicine category of JCR. This supports the idea that journals attract authors and studies with the potential to be cited by others, keeping the high JIF [33]. Despite this, the present study showed no statistically significant association between the JIF and the number of citations. This can be observed in the article published by *Periodontology 2000* [34]. The JIF does not necessarily reflect the citations of all articles published in a journal. The calculation of JIF is done by dividing the number of citations by the number of citable items in the last two years, so few articles with high citations can be determinants for a high JIF.

The three most-cited authors published mainly studies *in vitro* about the dentinal tubule occlusion or its morphology. The VOSviewer map presented a high number of co-authorships among the authors. Brannstrom, an important researcher on the mechanism of dentinal pain, was the only one who published papers in the 1960s and 1970s. Perhaps, that is the reason he is not part of any cluster. Although the most-cited paper is authored by Holland, he does not appear in the list of authors with three or more articles published in the TOP 100.

Although Asian authors are in the majority compared to authors from Anglo-Saxon America, they received fewer citations. This finding may be due to the number of citations that may present a geographical bias, especially in countries with large scientific production, which tend to receive a substantial number of citations from the same local [35]. In contrast to some bibliometric studies in dentistry [9,18], the USA did not publish the most articles. There are several collaborative networks among researchers from different countries, which contributes strongly to the advancement of research.

It has been suggested that reviews are more frequently cited than original research articles [10]. In this study, the most common study design was laboratory research, but the review was the most-cited. Reviews are

not the highest level of evidence, but they play a significant role in the consolidation of knowledge [14]. On the other hand, systematic reviews, the highest level of scientific evidence, were less prevalent. Most of these systematic reviews were published in the last decade, indicating the growth of evidence-based dentistry, also described in another study [18].

Most of the studies focusing on *in vitro* analysis were published until 2000, while those focusing on the effectiveness of desensitizers were mostly published in the last two decades. This was expected because laboratory research serves as the basis for clinical investigations, and although there are several desensitizing agents, there is still no gold standard treatment for DH [36]. The most commonly used terms in the studies indicate a trend to use the Nd: YAG laser, oxalate, fluoride, and potassium.

The COI exists when professional judgment concerning a primary interest, such as the interpretation of the results of a study, tends to be influenced by a secondary interest, such as financial benefits [37]. A study showed that randomized clinical trials in which the authors present some types of COI are more likely to report positive results [38]. Transparent reporting of COI is important to allow the reader a correct interpretation of the results and a comprehensive view to judge whether other factors are involved [23]. Most of the studies in this series were not clear about the existence of COI, similar to another study [39]. Sponsorship was also analyzed. Although laboratory studies were the most sponsored type of study, only one article was clear about COI. These findings support the underreporting of sponsorship and potential COI information in dental journals reported by Faggion Jr et al. [23].

The present study has some limitations inherent to studies that apply this methodology. Self-citations are not excluded from the WoS citation count, and WoS does not account for citations received from journals that are not indexed in the Institute for Scientific Information database [40]. However, it is still the database most commonly recommended for bibliometrics. In this study, the quality of the research was not assessed. Although the prevalence of the report of COI was presented, it was not viable to investigate whether the COI influenced the results. Despite these limitations, this bibliometrics analysis provides a broad and important overview of DH research.

Conclusion

The most-cited papers in DH were original research and their topics of interest are mainly the clinical effectiveness of desensitizing agents and the *in vitro* analysis of dentin morphology. Reviews and method development studies presented more chances to receive more citations. This study provides an overview of the characteristics of research and scientific activity in the field of DH for researchers and clinicians.

Authors' Contributions

ABGN	https://orcid.org/0000-0002-8484-8169	Conceptualization, Methodology, Formal Analysis, Investigation, Data Curation, Writing - Original Draft and Writing - Review and Editing.
FIRL	https://orcid.org/0000-0002-3540-9178	Conceptualization, Methodology, Validation and Writing - Review and Editing.
KRHF	https://orcid.org/0000-0001-5880-1271	Writing - Original Draft and Writing - Review and Editing.
DCA	https://orcid.org/0000-0001-9220-987X	Conceptualization, Methodology, Validation, Formal Analysis, Writing - Review and Editing, Supervision, Project Administration and Funding Acquisition.

All authors declare that they contributed to critical review of intellectual content and approval of the final version to be published.

Financial Support

This study was financed by the Pró-reitoria de Pesquisa e Pós-graduação da Universidade Federal do Pará (UFPA).

Conflict of Interest

The authors declare no conflicts of interest.

Data Availability

The data used to support the findings of this study can be made available upon request to the corresponding author.

References

[1] West NX, Lussi A, Seong J, Hellwig E. Dentin hypersensitivity: pain mechanisms and aetiology of exposed cervical dentin. Clin Oral Investig 2013; 17(SUPPL.1):9-19. https://doi.org/10.1007/s00784-012-0887-x

[2] Nardi GM, Sabatini S, Acito G, Colavito A, Chiavistelli L, Campus G. The decision tree for clinical management of dentin hypersensitivity. a consensus report. Oral Health Prev Dent 2022; 20(1):27-32. https://doi.org/10.3290/j.ohpd.b2572997

[3] Favaro Zeola L, Soares PV, Cunha-Cruz J. Prevalence of dentin hypersensitivity: systematic review and meta-analysis. J Dent 2019; 81:1-6. https://doi.org/10.1016/j.jdent.2018.12.015

[4] Bartold PM. Dentinal hypersensitivity: a review. Aust Dent J 2006; 51(3):212-8.

[5] Douglas-de-Oliveira DW, Vitor GP, Silveira JO, Martins CC, Costa FO, Cota LOM. Effect of dentin hypersensitivity treatment on oral health related quality of life – a systematic review and meta-analysis. J Dent 2018; 71:1-8. https://doi.org/10.1016/j.jdent.2017.12.007

[6] Orchardson R, Gillam DG. Managing dentin hypersensitivity. J Am Dent Assoc 2006; 137(7):990-8. https://doi.org/10.1136/bmj.c4875.7

[7] van Leeuwen T. Descriptive versus evaluative bibliometrics. In: Moed, H.F., Glänzel, W., Schmoch, U. (eds) Handbook of quantitative science and technology research. Springer: Dordrecht; 2004. https://doi.org/10.1007/1-4020-2755-9_17

[8] Moed HF. New developments in the use of citation analysis in research evaluation. Arch Immunol Ther Exp 2009; 57(1):13-8. https://doi.org/10.1007/s00005-009-0001-5

[9] Ahmad P, Dummer PMH, Chaudhry A, Rashid U, Saif S, Asif JA. A bibliometric study of the top 100 most-cited randomized controlled trials, systematic reviews, and meta-analyses published in endodontic journals. Int Endod J 2019; 52(9):1297-1316. https://doi.org/10.1111/iej.13131

[10] Durieux V, Gevenois PA. Bibliometric indicators: quality measurements of scientific publication. Radiology 2010; 255(2):342-51. https://doi.org/10.1148/radiol.09090626

[11] Praveen G, Chaithanya R, Alla RK, Shammas M, Abdurahiman VT, Anitha A. The 100 most cited articles in prosthodontic journals: a bibliometric analysis of articles published between 1951 and 2019. J Prosthet Dent 2020; 123(5):724-30. https://doi.org/10.1016/j.prosdent.2019.05.014

[12] Thompson DF, Walker CK. A Descriptive and historical review of bibliometrics with applications to medical sciences. Pharmacotherapy 2015; 35(6):551-9. https://doi.org/10.1002/phar.1586

[13] Feijoo JF, Limeres M, Fernández-Varela M, Ramos I, Diz P. The 100 most cited articles in dentistry. Clin Oral Invest 2014; 18(3):699-706. https://doi.org/10.1007/s00784-013-1017-0

[14] Adan S, Ullah R. Top-cited articles in regenerative endodontics: a bibliometric analysis. J Endod 2018; 44(11):1650-64. https://doi.org/10.1016/j.joen.2018.07.015

[15] Pena-Cristóbal M, Diniz-Freitas M, Monteiro L, Dios PD, Warnakulasuriya S. The 100 most cited articles on oral cancer. J Oral Pathol Med 2018; 47(4):333-44. https://doi.org/10.1111/jop.12686

[16] Tarazona-Alvarez B, Lucas-Dominguez R, Paredes-Gallardo V, Alonso-Arroyo A, Vidal-Infer A. A bibliometric analysis of scientific production in the field of lingual orthodontics. Head Face Med 2019; 15(1):23. https://doi.org/10.1186/s13005-019-0207-7

[17] Hui J, Han Z, Geng G, Yan W, Shao P. The 100 top-cited articles in orthodontics from 1975 to 2011. Angle Orthod 2013; 83(3):491-9. https://doi.org/10.2319/040512-284.1

[18] Perazzo MF, Otoni ALC, Costa MS, Granville-Granville AF, Paiva SM. The top 100 most-cited papers in Paediatric Dentistry journals: a bibliometric analysis. Int J Paediatr Dent 2019; 29(6):692-711. https://doi.org/10.1111/ipd.12563

[19] Tarazona B, Vidal-Infer A, Alonso-Arroyo A. Bibliometric analysis of the scientific production in implantology (2009-2013). Clin Oral Impl Res 2017; 28(7):864-70. https://doi.org/10.1111/clr.12891

[20] Arshad AI, Ahmad P, Dummer PMH, Alam MK, Asif JA, Mahmood Z, et al. Citation classics on dental caries: a systematic review. Eur J Dent 2020; 14(1):128-43. https://doi.org/10.1055/s-0040-1703419

[21] Torres D, Normando D. Biostatistics: essential concepts for the clinician. Dental Press J Orthod 2021; 26(1):e21spe1. https://doi.org/10.1590/2177-6709.26.1.e21spe1

[22] Röhrig B, Du Prel JB, Wachtlin D, Blettner M. Studientypen in der medizinischen forschung - Teil 3 der serie zur bewertung wissenschaftlicher publikationen. Dtsch Arztebl 2009; 106(15):262-8. https://doi.org/10.3238/arztebl.2009.0262 [In German].

[23] Faggion CM Jr, Pandis N, Cardoso GC, Rodolfo B, Morel LL, Moraes RR. Reporting of conflict of interest and sponsorship in dental journals. J Dent 2020; 102:103452. https://doi.org/10.1016/j.jdent.2020.103452

[24] van Eck NJ, Waltman L. Software survey: VOSviewer, a computer program for bibliometric mapping. Scientometrics 2010; 84(2):523-38. https://doi.org/10.1007/s11192-009-0146-3

[25] Holland GR, Narhi MN, Addy M, Gangarosa L, Orchardson R. Guidelines for the design and conduct of clinical trials on dentine hypersensitivity. J Clin Periodontol 1997; 24(11):808-13. https://doi.org/10.1111/j.1600-051x.1997.tb01194.x

[26] Brannstrom M. Dentin sensitivity and aspiration of odontoblasts. J Am Dent Assoc 1963; 66:366-70. https://doi.org/10.14219/jada.archive.1963.0104

[27] Zhu M, Li J, Chen B, Mei L, Yao L, Tian J, et al. The effect of calcium sodium phosphosilicate on dentin hypersensitivity: a systematic review and meta-analysis. PLoS One 2015; 10(11):e0140176. https://doi.org/10.1371/journal.pone.0140176

[28] Gogos C, Kodonas K, Fardi A, Economides N. Top 100 cited systematic reviews and meta-analyses in dentistry. Acta Odontol Scand 2020; 78(2):87-97. https://doi.org/10.1080/00016357.2019.1653495

[29] Mattos FF, Perazzo MF, Vargas-Ferreira F, Martins-Junior PA, Paiva SM. Top 100 most-cited papers in core dental public health journals: a bibliometric analysis. Community Dentist Oral Epidemiol 2020; 49(1):40-6. https://doi.org/10.1111/cdoe.12572

[30] Bohannon RW, Roberts D. Core journals of rehabilitation: identification through index analysis. Int J Rehabil Res 1991; 14(4):333-6.

[31] Ahmad P, Dummer PMH, Noorani TY, Asif JA. The top 50 most-cited articles published in the International Endodontic Journal. Int Endod J 2019; 52(6):803-18. https://doi.org/10.1111/iej.13083

[32] Absi EG, Addy M, Adams D. Dentin hypersensitivity. A study of the patency of dentinal tubules in sensitive and non-sensitive cervical dentine. J Clin Periodontol 1987; 14(5):280-4. https://doi.org/10.1111/j.1600-051X.1987.tb01533.x

[33] Paladugu R, Schein M, Gardezi S, Wise L. One hundred citation classics in general surgical journals. World J Surg 2002; 26(9):1099-1105. https://doi.org/10.1007/s00268-002-6376-7

[34] West NX. Dentine hypersensitivity: Preventive and therapeutic approaches to treatment. Periodontol 2000 2008; 48:31-41. https://doi.org/10.1111/j.1600-0757.2008.00262.x

[35] Pasterkamp G, Rotmans JI, Kleijn DVP, Borst C. Citation frequency: a biased measure of research impact significantly influenced by the geographical origin of research articles. Scientometrics 2007; 70:153-65. https://doi.org/10.1007/s11192-007-0109-5

[36] West NX, Seong J, Davies M. Management of dentine hypersensitivity: efficacy of professionally and self-administered agents. J Clin Periodontol 2015; 42(Suppl 16): S256-S302. https://doi.org/10.1111/jcpe.12336

[37] Thompson DF. Understanding financial conflicts of interest. N Engl J Med 1993; 329(8):573-6. https://doi.org/10.1056/NEJM199308193290812

[38] Brignardello-Petersen R, Carrasco-Labra A, Yanine N, Ulloa C, Araya I, Pintor F, et al. Positive association between conflicts of interest and reporting of positive results in randomized clinical trials in dentistry. J Am Dent Assoc 2013; 144(10):1165-70. https://doi.org/10.14219/jada.archive.2013.0035

[39] Beyari MM, Strain D, Li CS, Lamfon HA. Conflict of interest reporting in dentistry meta-analyses: a systematic review. J Clin Exp Dent 2014; 6(3):e280-5. https://doi.org/10.4317/jced.51225

[40] Yang K, Meho LI. Citation analysis: a comparison of Google Scholar, Scopus, and Web of Science. Proc Am Soc Info Sci Tech 2006; 43(1):1-15. https://doi.org/10.1002/meet.14504301185