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Faculdade de Odontologia
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Tese

Cenário atual e inserção internacional da pesquisa Odontológica brasileira

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Orientador: Prof. Dr. Rafael Ratto de Moraes

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Notas Preliminares

A presente tese foi redigida segundo o Manual de Normas para Dissertações, Teses e Trabalhos Científicos da Universidade Federal de Pelotas de 2013, adotando o Nível de Descrição em Capítulos não convencionais, descrito no Apêndice C do referido manual. <http://sisbi.ufpel.edu.br/?p=documentos&i=7> Acesso em: 08/02/2019.

O projeto de pesquisa que originou dissertação foi apresentado em sua forma final após qualificação realizada em 11 de setembro de 2017, tendo sido aprovado pela Banca Examinadora composta pelos Professores Doutores Rafael Ratto de Moraes, Marcos Britto Corrêa e Sonia Caregnato.

Resumo

GONÇALVES, Ana Paula Rodrigues. **Cenário atual e inserção internacional da pesquisa odontológica brasileira.** 2019. 100f. Tese (Doutorado em Odontologia) – Programa de Pós-Graduação em Odontologia. Universidade Federal de Pelotas, Pelotas, 2019.

O presente estudo teve como objetivo retratar o cenário atual da Odontologia brasileira, levando em consideração sua inserção internacional, além de aspectos da comunicação entre pesquisadores, como a escolha de periódicos para submissão de artigos científicos, a sua opinião sobre o processo de revisão por pares e a influência deste processo na qualidade científica dos artigos. Para isso, foram elaborados 3 estudos, utilizando diferentes abordagens sobre o tema: (1) analisar os 100 artigos com maior número de citações publicados por autores nacionais em periódicos de Odontologia com a finalidade de destacar as principais características destes estudos; (2) Investigar a presença de coautoria brasileira em artigos publicados por periódicos de Odontologia de diferentes áreas com os mais altos indicadores bibliométricos internacionais (Fator de Impacto JCR, CiteScore e Índice H) a fim de analisar a influência da colaboração internacional, tipo de artigo e presença ou não de financiamento nas taxas de citação e (3) Interrogar, por meio de questionário eletrônico, autores de artigos científicos afiliados a instituições nacionais acerca da seleção de periódicos para publicação de seus artigos científicos, além de sua opinião sobre o processo de revisão por pares e a influência deste na qualidade da versão final de um artigo. Normalmente os artigos com co-autoria brasileira estão publicados em periódicos de circulação internacional, reforçando a existência de uma rede de colaboração científica que se estende por diversos países. Autores brasileiros parecem levar em consideração indicadores bibliométricos na escolha de um periódico para submissão de seus artigos científicos. Adicionalmente, autores brasileiros relataram uma visão positiva sobre o processo de revisão por pares, uma vez que acreditam melhorar a redação final de um texto.

Palavras-chave: pesquisa odontológica; impacto; odontologia; comunicação científica; artigos científicos

Abstract

GONÇALVES, Ana Paula Rodrigues. **Current scenario and international insertion of Brazilian dental research.** 2019. 100p. Thesis (Doctoral Degree in Dentistry) - Graduate Program in Dentistry. Federal University of Pelotas, Pelotas, 2019.

This study aimed to observe the current scenario of Brazilian Dentistry, taking into account its international insertion, as well as aspects of communication among researchers, such as the choice of journals for submission of scientific articles, their opinion on the process of peer review and the influence of this process on the scientific quality of the articles. For this purpose, three studies were developed, using different approaches on the theme: (1) to analyze the 100 articles with the greatest number of citations published by national authors in Dental journals, in order to highlight the main characteristics of these studies; (2) To investigate the presence of Brazilian co-authorship in articles published by Dental journals from different areas in the top-tier list of international bibliometric indicators (JCR Impact Factor, CiteScore and H Index) in order to analyze the influence of international collaboration (3) To survey, through an electronic questionnaire, authors of scientific articles affiliated to national institutions about their selection of journals for the publication of their scientific articles, as well as their opinion on the process of peer review and its influence on the quality of the final version of an article. Usually the articles with Brazilian co-authorship are published in journals of international circulation, reinforcing the existence of a network of scientific collaboration that spans several countries. Brazilian authors seem to take into account bibliometric indicators in the selection of a journal for submission of their scientific articles. Additionally, Brazilian authors reported a positive view of the peer review process as they believe it improve the final writing of a text.

Keywords: dental research; impact; dentistry; science; scientific papers

Sumário

1 Introdução

A popularização da internet facilitou o acesso a todo tipo de conteúdo, inclusive cientifico. Atualmente, grande variedade de bases de dados e artigos publicados online está disponível. Logo, além do acesso, a disponibilização desses conteúdos também foi facilitada. Hoje em dia é muito mais fácil ter acesso eletrônico a periódicos e artigos científicos do que obter um exemplar convencional na forma impressa. Embora alguns leitores ainda possam preferir o uso de separatas, a popularização de smartphones e tablets, entre outros dispositivos, impulsiona a leitura de artigos científicos por meios eletrônicos (TENOPIR et al, 2005; ZHANG; MA, 2011).

O fato das bases de dados mais utilizadas atualmente disponibilizarem não só o acesso aos artigos como também métricas de uso e citação permite que se tenha olhar sobre o que está sendo publicado de forma mais completa, possibilitando avaliar os rumos que aquela área de interesse está tomando. Em sua maioria, essas métricas de publicação são baseadas no número de citações que os artigos recebem, funcionando de forma a verificar quais periódicos e artigos impactam a literatura no sentido de gerarem citações em outros veículos e textos. De forma geral, é possível sugerir que um artigo, quando citado, em parte atinge seu objetivo ao ser publicado. Isto porque, para gerar tal citação, o texto foi, pelo menos teoricamente, acessado, lido, entendido no contexto em que se enquadrava e utilizado como referência para outro autor ou grupo de autores, dando continuidade ao processo incremental da ciência.

Alguns ramos da ciência se dedicam à utilização do conhecimento e das publicações existentes como objeto de estudo. Estes também evoluíram bastante com a facilidade de acesso e registro eletrônico de artigos e citações. Podem ser citados o metaconhecimento, a cientometria, a bibliometria e a infometria. O metaconhecimento resulta de investigação minuciosa do que é produzido, como e por quem, analisando o conteúdo até mesmo implícito como crenças, preferências e estratégias de pesquisa que observam a direção, o ritmo e a forma que tomam as descobertas cientificas (EVANS; FOSTER, 2011). Já cientometria, bibliometria e infometria fazem parte das ciências sociais e da informação e estudam, de maneira

dinâmica, aquilo que é produzido, a maneira como a informação é veiculada e consumida (SANTOS; KOBASHI, 2009), além de aplicarem métodos estatísticos para analisar publicações de maneira quantitativa (HOOD; WILSON, 2001). Estudos relacionados ao que é publicado têm como vantagem permitir identificar padrões de publicação, além de mensurar a aplicabilidade daquilo que é publicado, podendo servir para estabelecer áreas para investimento.

Diversas ferramentas de análise de publicações científicas são baseadas no número de citações recebidas por autores, artigos ou periódicos. Dentre estas, podem ser citadas o índice H (KELLY; JENNIONS, 2006), o Fator de Impacto (Journal Impact Factor) (GARFIELD, 2006) e os recém lançados CiteScore (VAN NOORDEN, 2016) e Relative Citation Ratio (HUTCHINS et al, 2016). O número de citações pode ser utilizado de diversas formas, seja para condensar informações, sinalizar herança intelectual, rastrear o impacto de publicações ou autopromoção. O ato de citar um artigo é dinâmico, complexo e não segue modelo teórico pré-estabelecido. Envolve possíveis relações entre os autores ou textos que citam e aqueles que são citados (LEYDESDORFF, 1998). A decisão de um autor de citar determinado artigo, autor ou periódico é livre, em geral, e pode ser influenciada por diversos aspectos, como tipo de estudo, prestígio do periódico onde foi publicado, grau de inovação dos resultados, bem como a tradição científica na área (ERIKSON; ERLANDSON, 2014). Além disso, autores podem levar em consideração o corpo editorial do periódico que visam submeter o estudo quando da escolha de referências a serem citadas (BAKANIC et al, 1987; LIU et al, 1993; ERIKSON; ERLANDSON, 2014).

Com o grande número de artigos redigidos e periódicos científicos disponíveis para publicação, nas diversas áreas do conhecimento, nem sempre um artigo é publicado em sua primeira submissão (DONOVAN et al, 2007). Periódicos ocupando o topo das listas de indicadores bibliométricos, por exemplo, tendem a publicar mais artigos em sua primeira submissão, uma vez que não recebem de forma frequente artigos recusados por outros veículos (CALCAGNO et al, 2012). O fato de autores serem categorizados por suas publicações de alto impacto (ABBOT et al, 2010) pode ser o principal motivo para que ocorra este efeito, pois quanto mais artigos um periódico recebe, mais difícil se torna publicar neste mesmo periódico, uma vez que o corpo editorial precisa ser mais crítico com as obras em revisão. Ou seja, quanto

maior o fator de impacto de um periódico, por exemplo, maior a taxa de rejeição de artigos por este periódico (AARSEN et al, 2008).

Estudos que se propõem a analisar a produção das publicações científicas são importantes em um país como o Brasil que, desde 2006, ocupa o segundo lugar no ranking anual de países com maior publicação de documentos na área da Odontologia, segundo a base de dados Scimago (alimentada com dados da base Scopus). O sítio oferece diversas ferramentas de visualização de dados, como o Shape of Science (Figura 1), que organiza de forma gráfica os documentos publicados em diferentes áreas, permitindo que se observe a interação entre elas. A área de Odontologia, por ser muito especifica, ocupa posicionamento mais isolado das demais áreas, ficando próxima apenas das áreas médicas e biológicas (SCIMAGO, 2019).

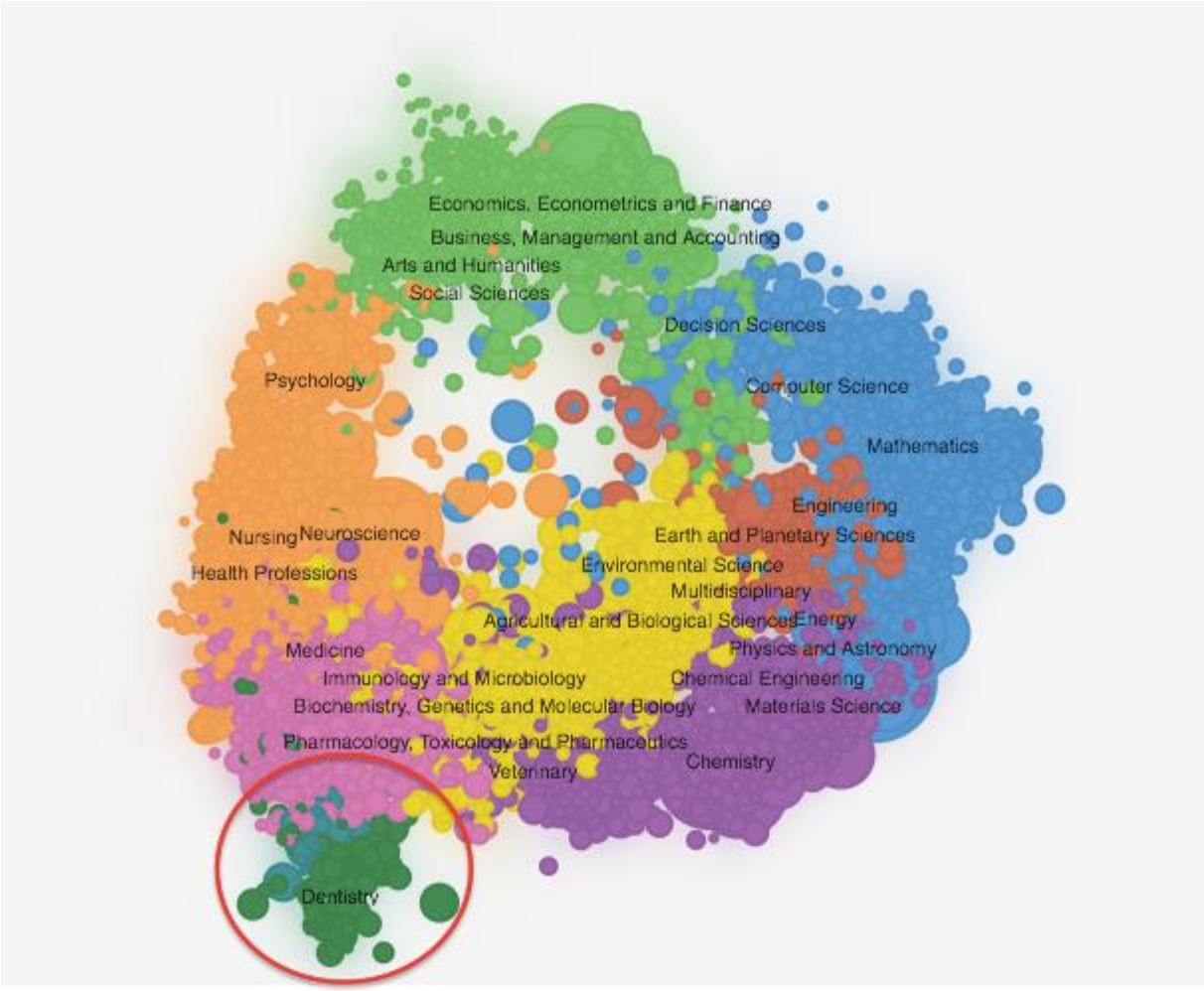

Figura 1: Shape of Science, com destaque para a área de Odontologia, que se posiciona de maneira mais isolada das demais, relacionando-se majoritariamente com áreas médicas e biológicas. Dados referentes ao ano de 2016.
Fonte: Scimago

No Brasil, a principal ferramenta utilizada para categorizar periódicos é o Qualis-CAPES, desenvolvido pela Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES) para avaliar a produção científica de programas de pós-graduação. A cada ano, comitês de consultores das diferentes áreas de avaliação da CAPES são responsáveis por atualizar a ferramenta com base em critérios específicos de cada área. Os periódicos são classificados em estratos, variando de A1 (topo) a C (base), muitas vezes com base em indicadores bibliométricos internacionais. Somente são contabilizados periódicos que publicaram artigos daquela área no ano ou período de avaliação. Portanto, a avaliação de um mesmo periódico pode ser diferente entre as áreas de avaliação (CAPES, 2017), o que pode gerar dificuldade de estimular cooperação interdisciplinar, por exemplo.

Uma forte base científica não necessariamente gera riqueza para um país, uma vez que traz benefícios adicionais tanto individualmente, para aquele pais em específico, quanto coletivamente, a nível mundial (KING, 2004). Países como os Estados Unidos e a Coréia do Sul possuem posições privilegiadas em relação às fronteiras científicas, isto porque os pesquisadores desses países baseiam-se em ideias inovadoras com maior frequência que pesquisadores de outras localidades (PACKALEN, 2018). Ou seja, a localização continua a exercer considerável influência sobre o tipo de ciência que é produzida, visto que nem os países mais desenvolvidos estão em pé de igualdade nesse sentido: pesquisadores de algumas nações aproveitam mais frequentemente oportunidades geradas pela chegada de novas ideias que pesquisadores de outras nações. (PACKALEN, 2018).

Acerca do processo de revisão pelos pares (peer review), este é considerado primordial para manutenção da qualidade das publicações científicas uma vez que permite olhar externo àquilo que é redigido e submetido para publicação. Embora tenha suas limitações, a revisão por pares ainda é amplamente utilizada na publicação científica. Um estudo mostrou que artigos revisados e re-submetidos possuem maior chance de serem aceitos (BAKANIC et al, 1987), mas pouco se sabe acerca da visão dos autores sobre o processo de revisão e sua contribuição no

aceite final do artigo. Ainda, poucos estudos se dedicas à analise de fatores que levam à escolha de um determinado periódico para submissão em detrimento de outro, ou do padrão de citação de artigos científicos na área de odontologia (FAGGION et al, 2016; EGHBAL et al, 2012; GRACIO et al, 2012).

O objetivo deste estudo foi retratar o cenário atual da odontologia brasileira, levando em consideração sua inserção internacional, além de alguns aspectos da comunicação entre pesquisadores, como a escolha de periódicos para submissão de artigos científicos, a sua opinião sobre o processo de revisão por pares e a influência deste processo na qualidade científica dos artigos publicados.

2 The 100 top-cited articles of Brazilian dentistry[1]

Running title: Top-cited dental articles

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[1]Artigo aceito para publicação no periódico *Brazilian Dental Journal* (Qualis/CAPES A2), sendo apresentado em estrutura conforme o referido periódico.

2.1 Summary

This article analyzes the characteristics of the 100 top-cited papers published in international dental journals with at least one co-author affiliated to Brazil. A search in Scopus database for articles published between 1996 and 2017 was carried out in the 178 journals belonging to the category “Dentistry” identified in SCImago Journals & Country Rank. From the top-100 cited articles, variables related to the journal, article, and authors were collected. Annual citation averages (ACA) and relative citation ratios (RCR) were calculated. Data were analyzed descriptively. There were 75 original reports and 25 reviews in the sample. The number of citations ranged between 124 and 657 (mean=202, median=168). The papers were published in 31 different journals (46% in only four journals), none based in Brazil. The most frequent subjects (61%) were Dental Materials, Endodontics, and Periodontology, which accounted for 63.6% of the total citations. The subject with the highest ACA was Oral and Maxillofacial Surgery and the subject with the highest RCR was Oral Radiology. Only 12 articles were cited more than 300 times. International collaboration was present in 61 articles and funding was reported in 49 articles. The first author was from Brazil in 70% and corresponding author in 55% of the papers. Southeast (83%) and South (20%) were the regions of Brazil with most presence of co-authors. This top-100 list is presented to provide a picture of the most cited articles and aid in fomenting further analyses regarding publication and citation behaviors of the Brazilian dentistry.

Key Words: journal article, bibliometrics, journal Impact Factor, database

2.2 Introduction

Bibliometric studies apply mathematics and statistics to quantitatively evaluate the scientific literature in many different ways and for a varied of purposes (1). Bibliometrics can be used to highlight publishing trends in a scientific field, for instance, or evaluate the impact of journals, articles, and researchers (2). Many bibliometric tools were developed in the last decades, most considering the number of citations received by an article in a given database and timeframe. The citation process has links with intellectual heritage (3) and it is part of the incremental

process of science. Research supporting agencies also use citation rates and other publication metrics to evaluate budgetary spending and distribute financial resources (4).

It has been debated whether the number of citations received by an article may reflect or not its actual influence in the literature or whether it is a fair appraisal since it does not represent the whole complexity of the research work (5,6). However, citations rates remain widely used as indicator of the influence of papers and journals in science. Other scientific indicators consider not only the absolute number of citations but also the length of time that an article has been available to possible citers (7) or the number of articles published in a given timeframe (8,9). The number of international peer-reviewed papers published with (co)-authors from Brazil has increased substantially in the last 20 years. According to data from SCImago (10), Brazil is the country in Latin America with the highest number of dental articles published yearly and the second most publishing country of dental articles in the world since 2006. In 2017, 1,876 dental citable documents were published in Scopus database with co-author(s) based in Brazil.

Different subareas in a particular field have different citation rates and co-authorship behaviors (11) because the chances of an article being cited depend on many variables such as the number of publications in that particular field. The number of investigators and journals in a subarea may also influence the number of papers published yearly. A recent survey with Brazilian researchers with recognized significant scientific output indicated that they consider four as the ideal number of co-authors in order to potentiate the scientific production (12). In addition, the study showed that dental articles have an average of 5.3 authors (12). The connection between authors has increased over time, leading to smaller distances between researchers in the network and a higher number of coauthors (13). The health sciences area is the collaboration network with the highest number of coauthors in Brazil (13).

A study published in 2013 analyzed the 100 top-cited papers in dentistry available in the Web of Science database (14). The study observed that articles with low evidence level, such as case series, expert opinions, and narrative reviews were predominant in the list. Most papers were published in dental journals with high bibliometric indicators in the field, particularly addressing topics in periodontology and implantology. There is no similar report in the literature analyzing the top-cited papers

published by authors affiliated to Brazilian institutions. Such analysis could aid in drawing the current panorama of the most cited articles from the Brazilian dentistry, areas and topics that attract international attention. The purpose of this study was to analyze the characteristics of the 100 top-cited dental papers published in scientific journals with international coverage with co-author(s) affiliated to Brazilian institutions. The study hypothesis was that most papers would be published in the top-tier, peer-reviewed dental journals and would derive from collaborations with international institutions.

2.3 Materials and Methods

Search strategy and eligibility criteria

In this cross-sectional study, the 178 journals belonging to the category "Dentistry" that were identified in SCImago Journals & Country Rank, which is powered by the Scopus database, were investigated. In order to obtain the most cited papers published in these journals, a search in Scopus was carried out in January 2018 using the 178 journals as source titles, and limited to year of publication between 1996-2017. The starting publication year was 1996 because the citation records in Scopus start at that year; the citations were counted up to 2017 since this is the last year with complete citation counts. The resulting list of articles was organized from highest to lowest citation counts and the 100 top-cited papers with at least one author affiliated to any Brazilian institution were selected. Articles without authors linked to a Brazilian institution, letters, and editorials were excluded. The position of the author among the co-authors (i.e., first author or corresponding author, for instance) was not a reason for exclusion.

Data collection and analysis

Two independent reviewers analyzed each article for eligibility (APRG and ALOP). The opinion of a third reviewer (RRM) was decisive whenever a doubt was present. The following variables were collected and divided into variables related to the journal that published the article and variables related to the article and authors.

- Variables related to the journal: Journal Impact Factor (JIF) 2017 obtained from the Journal of Citation Reports (JCR); CiteScore 2017 obtained from

Scopus; publisher; access type (for subscribers, open access, or mixed); and journal subject.

- Variables related to the article and authors: affiliation of the first author (country); number of authors; presence of international collaboration (yes/no); year of publication; number of citations received up to 2017; relative citation ratio (RCR); annual citation average (ACA); type of title (descriptive, affirmative, or interrogative); number of characters in the title; number of pages; article type (original research/review); funding type (sponsorship, research grant, donation of materials, more than one); hypothesis type (null, alternative, or none); use of subtitles in the Experimental section (yes/no); existence of a conclusion statement as a separate section (yes/no); article subject.

ACA was the average number of citations received by an article each year since it was published until 2017. RCR was obtained using the iCite tool from the National Institute of Health, USA (icite.od.nih.gov). RCR is a field-normalized metric that uses citation rates to measure the influence at the article level by quantifying the influence of an article or group of articles based on their co-citation network. RCR has been reported to be less vulnerable to number effects than averaging the citation rates of articles in the co-citation network (7). The main subject of the articles and journals was categorized. Studies that addressed microbiology and cell biology were grouped in the Oral Biology category, while studies that addressed restorative and rehabilitation topics were categorized in the Restorative Dentistry category. Data were analyzed descriptively using the software Stata v.12.0 (StataCorp, College Station, TX, USA).

2.4 Results

Table 1 lists the top-100 cited papers along with ACA and RCR indicators. The oldest article in the sample was published in 1996 and the newest was published in 2013. The number of citations received by the articles ranged between 124 and 657 (mean=202, median=168). Table 1 also indicates the top-10 papers based on ACA and RCR. The RCR indicator was better aligned with the total citation counts: the top-10 RCR papers were in the top-18 total citation counts list. Evaluation of the number of citations corrected by the number of years since the article was published provided a different picture: the top-10 ACA articles were positioned up to #66 in the

total citation counts list. Table 1 also indicates the presence of international collaboration in the articles and whether the first author was from Brazil.

The 100 papers were published in 31 different journals, none of them based in Brazil. Nine journals published three or more papers in the list; these nine journals contained 69% of the articles in the sample (Table 2). Among the 100 top-cited papers, 46% were published in only four journals: Journal of Dental Research (14 articles), Journal of Endodontics (13 articles), International Endodontic Journal (10 articles), and Dental Materials (9 articles). These are top-tier dental journals, as shown by their bibliometric indicators in Table 2. Almost all journals in the sample have a mixed access type, i.e. they publish either closed or open-access papers. The publishers from the journals are based either in the Netherlands or in USA.

The journals were categorized according to their subject, which was defined based on the main topics of the articles published in the journals. Most journals containing articles from the sample had a specific subject, i.e. they publish articles that usually can be defined in a dental specialty, namely: Restorative Dentistry (4), Periodontology (3), Oral and Maxillofacial surgery (2), Endodontics (2), Implantology (2), Dental Materials (2), Cariology (1), Oral Biology (1), Orthodontics (1), Public Health (1), and Oral Radiology (1). Eleven journals in the sample were categorized as Multidisciplinary since they publish papers from many different topics.

The papers also were classified by their subject, as shown in Table 3. The most frequent subjects addressed were Dental Materials, Endodontics, and Periodontology (61% of the sample). These three subjects had 12649 citations, which represent 63.6% of the total citation counts for all articles included here. The subject with the highest ACA was Oral and Maxillofacial Surgery, whereas papers from Cariology had the least ACA. The subject with the highest RCR was Oral Radiology, whereas Oral Pathology had the lowest RCR in the sample. Only 12 articles were cited more than 300 times. The paper with the highest number of citations was published in 2005 and addresses dimensional ridge alterations after tooth extraction. However, the paper with the highest ACA and RCR was published in 2011 and addresses the state of art of dental adhesives. From these 12 top-cited papers, eight addressed dental materials topics and four articles are reviews.

Table 4 presents the findings for variables related to the article and authors. There were 75 original research reports, including clinical, epidemiological, and basic research, and 25 reviews, including narrative and systematic reviews. The first author

was affiliated to a Brazilian institution in 70% of the papers, whereas the corresponding author was affiliated to Brazil in 55%. The regions of Brazil with most presence in the top-100 papers were the Southeast and South, whereas the other three regions were present only 7 times. Most studies were written by a maximum of six authors (82%) and usually had less than 10 pages (66%). International collaboration was present in 61% of the articles. The main collaboration countries were USA (29 articles), Finland and Italy (8 articles each). The authors reported that the study was supported by funding in 49 articles. A descriptive title was used in 97 articles, 58% having 100 or less characters. Only 19 articles stated the hypothesis tested. Most articles used up to 5 tables (55%), no color figure (71%), and no separate conclusion section (64%).

Table 5 presents a list of the Brazilian universities and other institutions that co- authored the 100 top-cited articles. The five universities most often present were University of São Paulo (USP), State University of Campinas (UNICAMP), Estácio de Sá University, State University of Maringá (UEM), and São Paulo State University (UNESP). From the 138 institutions co-authoring the articles, 73.9% are public and 26.1% private institutions.

2.5 Discussion

This is the first study to draw attention to the top-cited articles of the Brazilian dentistry. The hypothesis tested was accepted, since most papers included in the list were published in top-tier dental journals and 61% presented co-authorship from authors affiliated to international institutions. In total, 70% of the papers had first authors based in Brazil, but 40% had corresponding authors affiliated to international institutions. This is an indication that these 40 articles derived from studies carried out majorly in other countries and may reflect collaborations between Brazilian and foreign research groups or even were generated by Brazilian researchers working as visiting scholars abroad. One may argue if those articles may actually reflect the work of the Brazilian dentistry. We believe they do because collaborations with international groups in the past were extremely important to place the Brazilian dental research in the position it is currently occupying in the dental literature. The foreign country most often present in the sample was the USA, which is a world leader in many scientific fields and the country with most papers published yearly in Dentistry (10). Studies suggest that the international collaborations might result in co-authored

publications with higher citation rates and increased visibility than purely domestic articles (15,16). A possible “country-of-origin” effect for article citations rates also may be in place, although this has yet to be validated. These findings have not been explored in the Brazilian dentistry so far and will be investigated in a future study.

A total of 83% of the sample was composed by articles with co-authors affiliated to institutions located in the Southeast region of Brazil. The North, Northeast, and Central-West regions were present in only 7% of the papers. This finding indicates an asymmetry in the Brazilian dental research and might be related to several aspects, including the lower density of researchers in North, Northeast, and Central-West, and the fact that these regions often present younger dental graduate programs compared to the South and Southeast. It has also been shown that most dentists, dental schools, graduate programs, and continuing education courses are located in the Southeast region (17,18). In addition, this region is known for presenting the major state research funding agencies in Brazil and investing more financial resources for research grants than other regions. Government funding is of utmost importance to foment independent research; 73.9% of the institutions co-authoring the articles in the present list are public. Science should be properly funded because it is good for the economy of the country, may benefit its society, and reduce inequalities (19). However, it is interesting to notice that a funding statement was reported in only 51% of the sample, which suggests that the presence of funding may not be associated with higher article citations counts. This is another finding worth being explored in a future investigation.

The three dental subareas most present in the sample were Dental Materials, Endodontics, and Periodontology. Most of the journals in the list with most articles I the sample (Table 2) publish articles on these three topics mainly. These findings corroborate those of a previous study that reported Operative Dentistry, Endodontics, and Periodontology as the most prolific subareas in the Brazilian dental research (20). In addition, this finding is in line with those reported by Feijoo et al. (14) when analyzing the 100 most cited articles in dentistry worldwide. One difference between the cited study (14) and the present report is that the articles present in the worldwide list had greater citation counts since there was no date of publication restriction, the studies were available in a different database, and even opinion articles were included. The presence of many *in vitro* studies in the present study is also interesting, as only 13 articles reported data from clinical trials.

Literature reviews are known for usually gathering more citations than regular research articles (21). However, 3/4 of the articles in the sample were original reports. Similarly, only 1/3 of papers with above 300 citations were reviews. These results, although not expected, might be considered positive because original reports are necessary for the incremental process of science and to promote further knowledge development. From the 75 original articles, only 19 articles stated the hypothesis tested clearly. This finding could be related to a more recent journal practice to ask authors to provide the study hypothesis along with its objective. In addition, 58% of the articles had titles with 100 or less characters. A recent study observed that papers with shorter titles received greater numbers of citations and that journals which publish papers with shorter titles tend to receive more citations *per* paper (22). This might be the case for the *Journal of Dental Research*, one of the main international dental journals, since it asks authors to use titles with up to 75 characters (including spaces) and was the journal with most articles figuring the present list. In corroboration, another study observed that articles with longer titles were downloaded slightly less than those with shorter titles and that titles with colon tended to be longer and receive fewer downloads and citations (23). The same study reported that the number of downloads and citations of articles were positively correlated.

Considering that the present study assessed the most cited papers published since 1996, the main limitation is that the total number of citations may favor older articles, as the total number of citations received by an article can only increase over time. This assumption is corroborated by differences observed in the top-10 papers when the articles were listed according to total citations, ACA, or RCR (Table 1). It has been reported that an article citation peak occurs between 2 and 6 years after its publication, and that the yearly citation number begins to decrease afterwards (24). The newest article in the sample has a lifespan of five years, thus it may not have reached its citation peak yet. Other limitations are the fact that only one database was used and that basic science studies related to dentistry were not included if the article was not published in dental journals. Although the sample is composed by articles co-authored by at least one author affiliated to Brazil, none of the included papers was published in Brazilian journals. This confirms that most of the evidence and information for domestic researchers in the health care area are available in international journals (25). The Brazilian dental research went international in the last

decades but an actual internationalization of the peer-reviewed Brazilian dental journals is still in progress. Many efforts have been recently made by scientific societies, editors, publishers, and even governmental agencies to speed up the internationalization process and attract attention from international authors. Another strategy would be to encourage national authors to see Brazilian journals with international coverage as main target journals to submit their principal studies.

In conclusion, this top-100 list is presented to provide a picture of the most cited articles and aid in fomenting further analyses regarding publication and citation behaviors of the Brazilian dentistry.

2.6 Resumo

Este artigo analisa as características dos 100 artigos mais citados publicados em periódicos internacionais de odontologia com ao menos um co-autor afiliado ao Brasil. Uma busca na base de dados Scopus por artigos publicados entre 1996 e 2017 foi realizada nos 178 periódicos pertencentes à categoria “Dentistry” identificados no SCImago Journals & Country Rank. Dos 100 artigos mais citados, variáveis relacionadas ao periódico, artigo e autores foram coletadas. Médias anuais de citação (MAA) e razões de citação relativa (RCR) foram calculadas. Os dados foram analisados descritivamente. A amostra foi composta por 75 artigos originais e 25 revisões. O número de citações variou entre 124 e 657 (média=202, mediana=168). Os artigos foram publicados em 31 periódicos diferentes (46% em apenas quatro periódicos), nenhum do Brasil. Os temas mais frequentes foram Materiais Dentários, Endodontia e Periodontia, somando 63,6% do total de citações. O tema com maior MAA foi Cirurgia Oral e Maxilofacial e o tema com maior RCR foi Radiologia Oral. Apenas 12 artigos foram citados mais de 300 vezes. Colaboração internacional estava presente em 61 artigos e financiamento foi reportado em 49 artigos. O primeiro autor era do Brasil em 70% e o correspondente em 55% dos artigos. As regiões do Brasil com mais co-autores presentes foram Sudeste (83%) e Sul (20%). Esta lista é apresentada para prover uma fotografia dos 100 artigos mais citados e ajudar a fomentar análises seguintes em relação a comportamentos de citação e publicação da odontologia brasileira.

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2.8 References

1. Hood WW, Wilson CS. The literature of bibliometrics, scientometrics and informetrics. Scientometrics 2001;52:291-314.
2. Santos RN, Kobashi NY. Bibliometrics, scientometrics, informetrics: concepts and applications [in Portuguese]. Pesq Bras Ci Inf 2009;2:155-172.
3. Leydesdorff L. Teories of citation? Scientometrics 1998;43:5-25.
4. Hicks D. Performance-based university research funding systems. Res Policy 2012;41:251-261.
5. Garfield E. Is citation analysis a legitimate evaluation tool? Scientometrics 1979;1:359-375.
6. Abbot A, Cyranoski D, Jones N, Maher B, Schiermeier Q, van Noorden R. Do metrics matter? Nature 2010;465:860-862.
7. Hutchins BI, Yuan X, Anderson JM, Santangelo GM. Relative citation ratio (RCR): a new metric that uses citation rates do measure influence at the article level. PLoS Biol 2016;14:e1002541.
8. van Noorden R. Impact factor gets heavyweight rival. Nature 2016;540:325326.
9. Garfield E. The history and meaning of journal impact factor. J Am Med Assoc 2006;295:90-93.
10. Scimago Journal & Country Rank. Available from: www.scimagojr.com [accessed September 2018].
11. Bornmann L, Daniel HD. What do citation counts measure? A review of studies on citing behavior. J Doc 2008;64:45-80.
12. Hilário CM, Gracio MCC. Scientific collaboration in Brazilian researches: a comparative study in the information science, mathematics and dentistry fields. Scientometrics 2017;113:929-950.
13. Mena-Chalco JP, Digiampietri LA, Lopes FM, Cesar Junior RM. Brazilian bibliometric coauthorship networks. J Assoc Inf Sci Technol 2014;65:1424-1445.

14. Feijoo JF, Limeres J, Fernández-Varela M, Ramos I, Diz P. The 100 most cited articles in dentistry. Clin Oral Invest 2013;18:699-706.
15. Glänzel W, Schubert A. Double effort = Double impact? A critical view at international co-authorship in chemistry. Scientometrics 2001;50:199-214.
16. Glänzel W, Schubert A. Analysing scientific networks through co-authorship. In: Moed, Glänzel, Schmoch: Handbook of quantitative science and technology research. Springer. 1st ed. Netherlands; 2005. p 257-276.
17. Aquino SN, Martelli DR, Bonan PRF, Laranjeira AL, Martelli Júnior H. Scientific production in dentistry and its relation with research funding agencies. [in Portuguese] Arq Odontol 2009;45:142-146.
18. Martins AS, Chisini LA, Martelli S, Sartori LR, Ramos EC, Demarco FF. Distribution of Dental Schools and dentists in Brazil: an overview of the labor market. Rev ABENO 2018;18:63–73.
19. Braun D. The role of funding agencies in the cognitive development of science. Res Policy 1998;27:807-821.
20. Dias AA, Narvai PC, Rêgo DM. Scientific output trends in oral health in Brazil [in Portuguese]. Pan Am J Public Health 2008;24:54-60.
21. Weale AR, Bailey M, Lear PA. The level of non-citation of articles within a journal as a measure of quality: a comparison to the impact factor. BMC Med Res Methodol 2004;4:14.
22. Letchford A, Moat HS, Preis T. The advantage of short paper titles. R Soc Open Sci 2015;26:150266.
23. Jamali HR, Nikzad M. Article title and its relation with the number of downloads and citations. Scientometrics 2011;88:553-661.
24. Amin M, Mabe M. Impact factors: use and abuse. Perspectives in Publishing 2000;1:1-6.
25. Mueller SP. Publishing science: research areas and channels preferences [in Portuguese]. DataGramaZero Rev Cien Inf 2005;6:1-12.

Table 1. The top-100 cited dental articles with co-authors from Brazil

Article	Cites*	ACA	RCR	Brazil alone?	First author?
1. Dimensional ridge alterations following tooth extraction. An experimental study in the dog. Araújo et al., J Clin Periodontol 32:212-8, 2005.	657	49.0□	17.5□	No	Yes
2. Collagen degradation by host-derived enzymes during aging. Pashley et al., J Dent Res 83:216-21, 2004.	524	40.3□	23.5□	No	No
3. Single-step adhesives are permeable membranes. Tay et al., J Dent 30:371-82, 2002.	400	26.7	18.2□	No	No
4. Ridge alterations following implant placement in fresh extraction sockets: an experimental study in the dog. Araújo et al., J Clin Periodontol 32:645-52, 2005.	389	32.4□	17.5□	No	Yes
5. The microtensile bond test: a review. Pashley et al., J Adhes Dent, 1(4):299-309, 1999.	382	21.2	14.4	No	No
6. Dentine permeability and dentine adhesion. Pashley et al., J Dent 25:355-72, 1997.	382	19.1	22.0□	No	No
7. Dynamics of bone tissue formation in tooth extraction sites: an experimental study in dogs. Cardaropoli et al., J Clin Periodontol 30:809-18, 2003.	341	24.3	12.6	No	No
8. An evaluation of microbial leakage in roots filled with a thermoplastic synthetic polymer-based root canal filling material (Resilon). Shipper et al., J Endod 30:342-7, 2004.	331	25.5	17.8□	No	No
9. Mechanisms of antimicrobial activity of calcium hydroxide: a critical review. Siqueira Jr et al., Int Endod J 32:361-9, 1999.	329	18.3	15.7□	Yes	Yes
10. Chlorhexidine arrests subclinical degradation of dentin hybrid layers in vivo. Hebling et al., J Dent Res 84(8):741-46, 2005.	324	27.0	15.6	No	Yes
11. State of the art etch-and-rinse adhesives. Pashley et al., Dent Mater 27:1-16, 2011.	318	53.0□	25.7□	No	No
12. The adhesion between fiber posts and root canal walls: comparison between microtensile and push-out bond strength measurements. Goracci et al., Eur J Oral Sci 112:353-61, 2004.	317	24.4	15.0	No	No
13. In vivo preservation of the hybrid layer by chlorhexidine. Carrilho et al., J Dent Res 86(6):529-33, 2007.	294	29.4□	15.5	No	Yes
14. Analysis of the accuracy of linear measurements obtained by cone beam computed tomography (CBCT-NewTom). Lascala et al., Dentomaxillofac Radiol 33(5):291-4, 2004.	294	22.6	15.6	Yes	Yes
15. Aetiology of root canal treatment failure: Why well-treated teeth can fail. Siqueira Junior, Int Endod J 34(1):1-10, 2001.	290	18.1	14.6	Yes	Yes
16. Water sorption/solubility of dental adhesive resins. Malacarne et al., Dent Mater 22(10):973-80, 2006.	279	25.3	15.7□	Yes	Yes
17. Factors involved in the development of polymerization shrinkage stress in resin-composites: A systematic review. Braga et al., Dent Mater 21(10):962-70, 2005.	278	23.2	13.3	No	Yes
18. A review of polymerization contraction: The influence of stress development versus stress relief. Carvalho et al., Oper Dent 21(1):17-24, 1996.	269	12.8	18.3□	No	Yes
19. Comparisons of subgingival microbial profiles of refractory periodontitis, severe periodontitis, and periodontal health using the human oral microbe identification microarray. Colombo et al., J Periodontol 80(9):1421-32, 2009.	261	32.6□	12.8	No	Yes
20. Microorganisms from canals of root-filled teeth with periapical lesions. Pinheiro et al., Int Endod J 36(1):1-11, 2003.	250	17.8	12.4	Yes	Yes
21. Clinical implications and microbiology of bacterial persistence after treatment procedures. Siqueira Jr et al., J Endod 34(11):1291-301, 2008.	248	27.5□	15.1	Yes	Yes

22.	Association of Enterococcus faecalis with different forms of periradicular diseases. Rôças et al., J Endod 30(5):315-20, 2004.	246	18.9	9.5	Yes	Yes
23.	Polymerase chain reaction-based analysis of microorganisms associated with failed endodontic treatment. Siqueira Jr et al., Oral Surg Oral Med Oral Pathol Oral Radiol Endod 97(1):85-94, 2004.	237	18.2	10.5	Yes	Yes
24.	Regional measurement of resin-dentin bonding as an array. Shono et al., J Dent Res 78(2):699-705, 1999.	237	13.1	11.2	No	No
25.	Longevity of posterior composite restorations: Not only a matter of materials. Demarco et al., Dent Mater 28(1):87-101, 2012.	235	47.0	26.2	No	Yes
26.	In vitro antimicrobial activity of propolis and Arnica montana against oral pathogens. Koo et al., Arch Oral Biol 45(2):141-8, 2000.	234	13.8	8.0	Yes	Yes
27.	In vitro antimicrobial activity of several concentrations of sodium hypochlorite and chlorhexidine gluconate in the elimination of Enterococcus faecalis. Gomes et al., Int Endod J 34(6):424-8, 2001.	229	14.3	11.8	Yes	Yes
28.	Destructive and protective roles of cytokines in periodontitis: A re-appraisal from host defense and tissue destruction viewpoints. Garlet, J Dent Res 89(12):1349-63, 2010.	228	32.5	11.1	Yes	Yes
29.	Chlorhexidine preserves dentin bond in vitro. Carrilho et al., J Dent Res 86(1):90-4, 2007.	223	22.3	11.4	No	Yes
30.	Accuracy of cone beam computed tomography and panoramic and periapical radiography for detection of apical periodontitis. Estrela et al., J Endod 34(1):273-9, 2008.	222	24.7	13.5	No	Yes
31.	Saliva composition and functions: A comprehensive review. De Almeida et al., J Contemp Dent Pract 9(3):72-80, 2008.	218	24.2	8.7	Yes	Yes
32.	In vitro effects of therapeutic ultrasound on cell proliferation, protein synthesis, and cytokine production by human fibroblasts, osteoblasts, and monocytes. Doan et al., J Oral Maxillofac Surg 57(4):409-20, 1999.	212	11.8	6.4	No	No
33.	A study of the fate of the buccal wall of extraction sockets of teeth with prominent roots. Nevins et al., Int J Periodontics Restorative Dent 26(1):18-29, 2006.	211	19.2	8.2	No	No
34.	Fracture resistance of roots endodontically treated with a new resin filling material. Teixeira et al., J Am Dent Assoc 135(5):646-52, 2004.	211	16.2	11.8	No	Yes
35.	The role of sucrose in cariogenic dental biofilm formation - New insight. Paes Leme et al., J Dent Res 85(10):878-87, 2006.	206	18.7	8.9	No	Yes
36.	Modeling of the buccal and lingual bone walls of fresh extraction sites following implant installation. Araújo et al., Clin Oral Implants Res 17(6):606-14, 2006.	205	18.6	11.3	No	Yes
37.	Activation of gelatinolytic/collagenolytic activity in dentin by self-etching adhesives. Nishitani et al., Eur J Oral Sci 114(2):160-6, 2006.	201	18.3	10.0	No	No
38.	Impact of traumatic injuries to the permanent teeth on the oral health-related quality of life in 12-14-year-old children. De Sousa Cortes et al., Community Dent Oral Epidemiol 30(3):193-8, 2002	201	13.4	10.2	No	Yes
39.	Determinants of masticatory performance in dentate adults. Hatch et al., Arch Oral Biol 46(7):641-8, 2001.	201	12.6	9.7	No	No
40.	Reaction of rat connective tissue to implanted dentin tubes filled with mineral trioxide aggregate or calcium hydroxide. Holland et al., J Endod 25(3):161-6, 1999.	190	10.5	10.3	Yes	Yes
41.	Direct comparison of the bond strength results of the different test methods: A critical literature review. Scherrer et al., Dent Mater 26(2):e78-e93, 2010.	189	27.0	13.4	No	No
42.	Effectiveness of 2% chlorhexidine gel and calcium hydroxide against Enterococcus faecalis in bovine root dentine in vitro. Gomes et al., Int Endod J 36(4):267-75, 2003.	188	13.4	9.8	Yes	Yes
43.	Chemokines in oral inflammatory diseases: Apical periodontitis and periodontal disease. Silva et al., J Dent Res 86(4):306-19, 2007.	187	18.7	6.6	Yes	Yes

44.	The clinical success of all-ceramic restorations. Della Bona et al., J Am Dent Assoc 139(9s):8s-13s, 2008.	185	20.5	10.6	No	Yes
45.	Contraction stress related to degree of conversion and reaction kinetics. Braga et al., J Dent Res 81(2):114-8, 2002.	178	11.9	6.9	No	Yes
46.	The role of matrix metalloproteinases in the oral environment. Hannas et al., Acta Odontol Scand 65(1):1-13, 2007.	175	17.5	8.0	No	Yes
47.	Effect of etching and airborne particle abrasion on the microstructure of different dental ceramics. Borges et al., J Prosthet Dent 89(5):479-88, 2003.	174	12.4	9.6	No	Yes
48.	From dry bonding to water-wet bonding to ethanol-wet bonding. A review of the interactions between dentin matrix and solvated resins using a macromodel of the hybrid layer. Pashley et al., Am J Dent 20(1):7-20, 2007.	170	17.0	8.4	No	No
49.	Clinical application of stereolithographic surgical guides for implant placement: Preliminary results. Di Giacomo et al., J Periodontol 76(4):503-7, 2007.	169	14.1	7.9	Yes	Yes
50.	Chemomechanical reduction of the bacterial population in the root canal after instrumentation and irrigation with 1%, 2.5%, and 5.25% sodium hypochlorite. Siqueira Jr et al., J Endod 26(6):331-4, 2000.	168	9.9	8.6	Yes	Yes
51.	Prevalence and risk variables for peri-implant disease in Brazilian subjects. Ferreira et al., J Clin Periodontol 33(12):929-35, 2006.	167	15.2	8.7	Yes	Yes
52.	Response of the pulp of dogs to capping with mineral trioxide aggregate or a calcium hydroxide cement. Faraco Junior et al., Dent Traumatol 17(4):163-6, 2001.	167	10.4	7.0	Yes	Yes
53.	Cone-beam computed tomography for routine orthodontic treatment planning: A radiation dose evaluation. Silva et al., Am J Orthod Dentofacial Orthop 133(5):640e1-e5, 2008.	166	18.4	11.1	No	Yes
54.	Patterns of chemokines and chemokine receptors expression in different forms of human periodontal disease. Garlet et al., J Periodont Res 38(2):210-7, 2003.	166	11.8	4.9	Yes	Yes
55.	SHED differentiate into functional odontoblasts and endothelium. Sakai et al., J Dent Res 89(8):791-6, 2010.	164	23.4	7.4	No	Yes
56.	Bonding of self-etch and total-etch adhesives to carious dentin. Yoshiyama et al., J Dent Res 81(8):556-60, 2002.	164	10.9	6.7	No	No
57.	In vitro evaluation of the antimicrobial activity of chlorhexidine and sodium hypochlorite. Vianna et al., Oral Surg Oral Med Oral Pathol Oral Radiol Endod 97(1):79-84, 2004.	163	12.5	6.7	Yes	Yes
58.	Chlorhexidine stabilizes the adhesive interface: A 2-year in vitro study. Breschi et al., Dent Mater 26(4):320-5, 2010.	161	23.0	11.7	No	No
59.	Biofilms and apical periodontitis: Study of prevalence and association with clinical and histopathologic findings. Riucci et al., J Endod 36(8):1277-88, 2010.	158	22.6	9.7	No	No
60.	Tissue modeling following implant placement in fresh extraction sockets. Araújo et al., Clin Oral Implants Res 17(6):615-24, 2006.	158	14.4	8.2	No	Yes
61.	Biochemical composition and cariogenicity of dental plaque formed in the presence of sucrose or glucose and fructose. Cury et al., Caries Res 34(6):491-7, 2000.	153	9.0	6.7	Yes	Yes
62.	The influence of Bio-Oss collagen on healing of an extraction socket: An experimental study in the dog. Araújo et al., Int J Periodontics Restorative Dent 28(2):123-35, 2008.	152	16.9	8.0	No	Yes
63.	Endodontic infections: Concepts, paradigms, and perspectives. Siqueira Jr, Oral Surg Oral Med Oral Pathol Oral Radiol Endod 94(3)281-93, 2002.	152	10.1	6.1	Yes	Yes
64.	Effect of non-surgical periodontal therapy on glycemic control in patients with type 2 diabetes mellitus. Rodrigues et al., J Periodontol 74(9):1361-7, 2003.	151	10.8	5.6	Yes	Yes
65.	Disinfection of immature teeth with a triple antibiotic paste. Windley III et al., J Endod 31(6):439-43, 2005.	148	12.3	6.6	No	No
66.	Optimizing dentin bond durability: Control of collagen degradation by matrix metalloproteinases and cysteine	147	36.7	15.3	No	No

	cathepsins. Tjaderhane et al., Dent Mater 29(1):116-35, 2013.					
67.	Composition of supra- and subgingival biofilm of subjects with healthy and diseased implants. Shicli et al., Clin Oral Implants Res 19(10):975-82, 2008.	147	16.3	7.9	Yes	Yes
68.	PTCH gene mutations in odontogenic keratocysts. Barreto et al., J Dent Res 79(6)1418-22, 2000.	146	8.6	3.4	No	Yes
69.	Biomineralization ability and interaction of mineral trioxide aggregate and white portland cement with dentin in a phosphate-containing fluid. Reyes-Carmona et al., J Endod 35(5):731-6, 2009.	144	18.0	10.7	No	Yes
70.	Effect of smear layers on the bonding of a self-etching primer to dentin. Tay et al., J Adhes Dent 2(2):99-116, 2000.	144	8.5	5.3	No	No
71.	In vivo antimicrobial activity of 2% chlorhexidine used as a root canal irrigating solution. Leonardo et al., J Endod 25(3):167-71, 1999.	143	7.8	9.1	Yes	Yes
72.	Psychometric properties of the Brazilian version of the Oral Health Impact Profile - Short form. Oliveira et al., Community Dent Oral Epidemiol 33(4):307-14, 2005.	139	11.6	8.2	Yes	Yes
73.	Diversity of endodontic microbiota revisited. Siqueira Jr et al., J Dent Res 88(11):969-81, 2009.	138	17.2	8.2	Yes	Yes
74.	Fluid movement across the resin-dentin interface during and after bonding. Hashimoto et al., J Dent Res 83(11):843-8, 2004.	138	10.6	7.1	No	No
75.	Matrix metalloproteinases, their physiological inhibitors and osteoclast factors are differentially regulated by the cytokine profile in human periodontal disease. Garlet et al., J Clin Periodontol 31(8):671-9, 2004.	138	10.6	4.3	Yes	Yes
76.	Epidemiological analysis of maxillofacial fractures in Brazil: A 5-year prospective study. Brasileiro et al., Oral Surg Oral Med Oral Pathol Oral Radiol Endod 102(1):28-34, 2006.	136	12.4	11.1	Yes	Yes
77.	Causes and prevalence of traumatic injuries to the permanent incisors of school children aged 12 years in Jaragua do Sul, Brazil. Marcenes et al., Int Dent J 50(2):87-92, 2000.	136	8.0	8.5	No	No
78.	Microbial causes of endodontic flare-ups. Siqueira Jr. Int Endod J 36(7)453-63, 2003.	135	9.6	6.3	Yes	Yes
79.	In vitro assessment of the antimicrobial action and the mechanical ability of chlorhexidine gel as an endodontic irrigant. Ferraz et al., J Endod 27(7):452-5, 2001.	135	8.4	7.3	Yes	Yes
80.	Ridge preservation with the use of Bio-Oss collagen: A 6-month study in the dog. Araújo et l., Clin Oral Implants Res 20(5):433-40, 2009.	134	16.7	9.6	No	Yes
81.	Salivary gland tumors in a Brazilian population: A retrospective study of 496 cases. Ito et al., Int J Oral Maxillofac Surg 34(5):533-6, 2005.	134	11.2	4.6	Yes	Yes
82.	Calcium hydroxide pastes: Classification and clinical indications. Fava et al., Int Endod J 32(4):257-82, 1999.	134	7.4	7.4	No	Yes
83.	Histological evaluation of the effectiveness of five instrumentation techniques for cleaning the apical third of root canals. Siqueira Jr et al., J Endod 23(8):499-502, 1997.	134	6.7	8.6	Yes	Yes
84.	Root-coverage procedures for the treatment of localized recession-type defects: A Cochrane systematic review. Chambrone et al., J Periodontol 81(4):452-78, 2010.	133	19.0	9.5	Yes	Yes
85.	Evaluation of the effectiveness of sodium hypochlorite used with three irrigation methods in the elimination of Enterococcus faecalis from the root canal, in vitro. Siqueira Jr et al., Int Endod J 30(4):279-82, 1997.	132	6.6	4.5	Yes	Yes
86.	Evaluation of the adhesion of fiber posts to intraradicular dentin. Goracci et al., Oper Dent 30(5):627-35, 2005.	131	10.9	5.4	No	No
87.	Single-bottle adhesives behave as permeable membranes after polymerization. I. In vivo evidence. Tay et al., J Dent 32(8):611-21, 2004.	131	10.1	6.4	No	No
88.	Prognosis in periradicular surgery: A clinical prospective study. Zuolo et al., Int Endod J 33(2):91-8, 2000.	131	7.7	7.0	No	Yes
89.	Monolithic CAD/CAM lithium disilicate versus veneered Y-TZP crowns: Comparison of failure modes and reliability	129	18.4	9.2	No	No

	after fatigue. Guess et al., Int J Prosthodont 23(5):434-42, 2010.					
90.	The effect of material characteristics, of surface topography and of implant components and connections on soft tissue integration: A literature review. Rompen et al., Clin Oral Implants Res 17(S2):55-67, 2006.	128	11.6	5.1	No	No
91.	Microtensile bond strength of a resin cement to glass infiltrated zirconia-reinforced ceramic: The effect of surface conditioning. Amaral et al., Dent Mater 22(3):283-90, 2006.	128	11.6	7.5	No	Yes
92.	Prevalence and correlates of traumatic injuries to the permanent teeth of schoolchildren aged 9-14 years in Belo Horizonte, Brazil. Cortes et al., Dent Traumatol 17(1):22-6, 2001.	128	8.0	7.1	No	Yes
93.	Direct effect of intracanal medicaments on survival of stem cells of the apical papila. Ruparel et al., J Endod 38(10):1372-5, 2012.	127	25.4	13.0	No	No
94.	Bone reformation and implant integration following maxillary sinus membrane elevation: An experimental study in primates. Palma et al., Clin Implant Dent Relat Res 8(1):11-24, 2006.	127	11.5	7.5	No	Yes
95.	Overweight and obesity as risk indicators for periodontitis in adults. Vecchiaet al., J Periodontol 76(10):1721-8, 2005.	126	10.5	4.8	No	Yes
96.	Lipomas of the oral cavity: Clinical findings, histological classification and proliferative activity of 46 cases. Fregnani et al., Int J Oral Maxillofac Surg 31(1):49-53, 2003.	126	9.0	7.5	Yes	Yes
97.	Mechanical properties of resin cements with different activation modes. Braga et al., J Oral Rehabil 29(3):257-62, 2002.	126	8.4	6.5	Yes	Yes
98.	Healing of extraction sockets and surgically produced - Augmented and non-augmented - Defects in the alveolar ridge. An experimental study in the dog. Cardaropoli et al., J Clin Periodontol 32(5):435-40, 2005.	125	10.4	5.5	No	No
99.	Adhesion to tooth structure: A critical review of "micro" bond strength test methods. Armstrong et al., Dent Mater 26(2):e50-e62, 2010.	124	17.7	8.2	No	No
100.	The effect of mineral trioxide aggregate on the apexification and periapical healing of teeth with incomplete root formation. Felippe et al., Int Endod J 39(1):2-9, 2006.	124	11.3	5.7	Yes	Yes

*Number of citations in Scopus up to 2017.

□Top-10 list based on annual citation averages (ACA).

□Top-10 list based on relative citation ratios (RCR).

Table 2. Journals that published three or more papers included in the sample (N=100)

Journal	Articles	JCR IF 2017	CiteScore 2017	Access type	Journal subject	Publisher (country)
J Dent Res	14	5.38	5.05	Mixed	Multidisciplinary	SAGE Publications (USA)
J Endod	13	2.88	3.72	Mixed	Endodontics	Elsevier (Netherlands)
Int Endod J	10	3.01	3.08	Mixed	Endodontics	John Wiley & Sons (USA)
Dent Mater	9	4.03	4.53	Mixed	Dental Materials	Elsevier (Netherlands)
J Clin Periodontol	6	4.04	4.14	Mixed	Periodontology	John Wiley & Sons (USA)
Clin Oral Implant Res	5	4.30	3.81	Mixed	Implantology	John Wiley & Sons (USA)
J Periodontol	5	3.39	2.85	Closed	Periodontology	American Academy of Periodontology (USA)
Oral Surg Oral Med Oral Pathol Oral Radiol	4	1.71	1.47	Mixed	Multidisciplinary	Elsevier (Netherlands)
J Dent	3	3.77	4.13	Mixed	Multidisciplinary	Elsevier (Netherlands)

JCR IF: Journal Citation Reports, Impact Factor.

Table 3. Subject of the articles in the sample (N=100)

Subject	Articles	Cites		ACA	RCR (SEM)
		Total	Mean (SD)		
Dental Materials	27	5848	217 (88)	19.7	12.4 (1.1)
Endodontics	22	4096	186 (60)	14.5	9.6 (0.7)
Periodontology	12	2595	216 (107)	20.7	8.5 (1.1)
Oral Biology	11	2215	201 (76)	18.8	11.2 (1.5)
Oral and Maxillofacial Surgery	7	1825	261 (189)	23.0	9.2 (1.1)
Implantology	5	749	150 (21)	13.4	7.5 (0.6)
Oral Radiology	3	682	227 (64)	21.9	13.4 (1.3)
Restorative Dentistry	3	640	213 (100)	19.5	10.6 (2.9)
Pediatric Dentistry	3	465	155 (40)	9.8	8.6 (0.9)
Oral Pathology	3	359	120 (37)	13.9	5.2 (1.2)
Cariology	2	406	203 (10)	9.6	7.9 (1.1)
Public Health	2	275	138 (72)	12.0	9.6 (1.4)

SD: standard deviation; ACA: annual citation average; RCR (SEM): mean of relative citation ratio (standard error of the mean).

Table 4. Variables related to the article and authors (N=100)

Variable	Outcomes	n
Article type	Review	25
	Original research	75
First author affiliation	Brazil	70
	Other	30
Corresponding author affiliation	Brazil	55
	Other	40
	Not reported	5
Region of Brazil*	Central-West	3
	North	1
	Northeast	3
	South	20
	Southeast	83
Number of authors	1	4
	2-6	78
	≥7	18
Number of pages	<10	66
	>10-20	34
Collaboration with other countries	0	39
	1	35
	≥2	26
Main collaboration countries*	Finland	8
	Italy	8
	USA	28
Funding	Sponsorship	2
	Research grant	33
	Donation of materials	5
	More than one	9
	Not reported	51
Type of title	Descriptive	97
	Declarative	3
Number of characters in the tile	≤100	58
	>100	42
Hypothesis type	Null	8
	Alternative	11
	None	82
Use of subtitles in Experimental section	Yes	53
	No	47
Number of tables	0	18
	1-5	76
	≥ 6	6
Number of figures	0	19
	1-5	55
	≥6	26
Use of color figures	Yes	29
	No	71
Conclusion as separate section	Yes	36
	No	64

*The N is not 100 since more than one region or country could be present.

Table 5. Brazilian institutions co-authoring the 100 top-cited articles

Institution (acronym)*	n**
University of São Paulo (USP)	35
State University of Campinas (UNICAMP)	23
Estácio de Sá University	12
State University of Maringá (UEM)	9
São Paulo State University (UNESP)	8
Federal University of Minas Gerais (UFMG)	6
Federal University of Rio de Janeiro (UFRJ)	6
Other institutions (not universities or schools)	6
Bandeirante University of São Paulo (UNIBAN)	3
Federal University of Goiás (UFG)	3
Federal University of Santa Catarina (UFSC)	2
University of Ribeirão Preto (UNAERP)	2
University of Guarulhos (UNG)	2
Federal University of Amazonas (UFAM)	1
Federal University of Maranhão (UFMA)	1
Federal University of Pelotas (UFPEL)	1
Federal University of Rio Grande do Norte (UFRN)	1
Federal University of Rio Grande do Sul (UFRGS)	1
Federal University of Santa Maria (UFSM)	1
Federal University of São Paulo (UNIFESP)	1
Federal University of Uberlândia (UFU)	1
Fluminense Federal University (UFF)	1
Gama Filho University (UGF)	1
Lutheran University of Brasil (ULBRA)	1
Pontifical Catholic University of Minas Gerais (PUC-MG)	1
Pontifical Catholic University of Paraná (PUC-PR)	1
Pontifical Catholic University of Rio Grande do Sul (PUC-RS)	1
Sacred Heart University (USC)	1
State University of Rio de Janeiro (UERJ)	1
University of Cuiabá (UNIC)	1
University of Passo Fundo (UPF)	1
University of Santo Amaro (UNISA)	1
University of Taubaté (UNITAU)	1
University of Uberaba (UNIUBE)	1
Not reported	1

* Obtained from the institutional websites.

** The number is higher than 100 because some articles are co-authored by more than one institution.

3 Brazilian articles in top-tier dental journals and influence of international collaboration on citation rates

Running title: Brazilian dental articles in top-tier journals

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3.1 Summary

This study investigated the presence of co-authorship from Brazil in articles published in top-tier dental journals and analyzed the influence of international collaboration, article type (original research or review), and funding on citation rates. Articles published between 2015 and 2017 in 38 selected journals from 14 dental subareas were screened in Scopus. Bibliographical information, citation counts, and funding details were recorded for all articles (N=15619). Collaboration with other top-10 publishing countries in dentistry was registered. Annual citations averages (ACA) were calculated. A linear regression model assessed differences in ACA between subareas. Multilevel linear regression models evaluated the influence of article type, funding, and presence of international collaboration in ACA. Brazil was a frequent co-author of articles published in the period (top 3: USA=25.5%; Brazil=13.8%; Germany=9.2%) and the country with most publications in two subareas. The subjects with the biggest share of Brazil are Operative Dentistry/Cariology, Dental Materials, and Endodontics. Brazil was second in total citations, but fifth in citation averages per article. From the total 2155 articles co-authored by Brazil, 74.8% had no co-authorship from other top-10 publishing countries. USA (17.8%), Italy (4.2%), and UK (3.2%) were the main co-author countries, but the main collaboration country varied between subjects. Implantology and Dental Materials were the subjects with most international co-authorship. Review articles and articles with international collaboration were associated with increased citation rates, whereas the presence of study funding did not influence the citations.

Key words: publishing; citation counts; country ranks; dentistry.

3.2 Introduction

In a country basis, Brazil is second with most international articles published in Dentistry since 2006, according to SCImago Journal & Country Rank (1). In 1996, the first year accounted in SCImago rankings, Brazil co-authored 56 dental publications and occupied position #17. In 2017, 1951 dental documents were co-authored by Brazil. USA was the country with most publications in 2017 (2677), whereas India (1326), United Kingdom (1227), and Japan (1052) followed Brazil in

the list. By comparison, the number of dental articles published by the USA increased 68% between 1996 and 2017, meanwhile Brazil showed a remarkable 3400% increase in the period. Brazil also occupied the second place in total number of citations in 2017. However, if one considers other metrics, Brazil appeared in position #8 in H-index and #58 in citations per document. These findings suggest that recent efforts to make the Brazilian research to go international were successful, but also that there is room for improving quality and impact.

Strategies to evaluate scientific knowledge are becoming more prevalent. Tools are used to map scientific fields, define the distribution of financial resources, and support the design and implementation of policies by stakeholders (2). Dentistry is a vast area within the health sciences, with a large number of subareas, i.e. subjects or specialties. Each subject has its own characteristics, such as number of researchers in the research network, quantity of journals and articles published yearly, and main topics investigated. These differences may lead to varied behaviors regarding publications, citation patterns, and collaborations established between domestic and international researchers (3-5). Bibliometric studies have shown that differences are present between dental subjects. For instance, the list of the most cited articles from Periodontology was reported to include narrative reviews more often than reproducible systematic reviews (6). In Pediatric Dentistry, the presence of a great number of case reports was noticed (7), whereas observational studies were reported as more prevalent in Oral and Maxillofacial Surgery (8).

Science, technology, and innovation are key in the economic performance and social well-being of a nation. It is increasingly global the recognition of the role that creating and using knowledge appropriately might have on international competitiveness (9). Bibliometric studies allow assessing the capability of a country and its researchers in publishing articles in the top-tier journals of a given area. Identification of citation patterns of those articles and associated variables is also helpful. Studies suggest that international co-authorship may result in publications with higher citation rates and greater visibility than purely domestic articles (10,11). This topic, however, has not received much attention in dentistry. Such analysis would allow drawing a current picture of the dental research internationally and the role of Brazil, an emerging powerhouse in dental science.

The purpose of this study was to investigate the presence of co-authorship from Brazil in articles published in top-tier dental journals, categorized according to their main subject, and analyze the influence of international collaboration, article type, and funding on citation rates. The hypothesis was that international co-authorship would be associated with increased citations.

3.3 Methods

This is the report of a cross-sectional study of articles published between 2015 and 2017 in selected international dental journals. The period of publication was determined in order to collect the most currently data. Dentistry was divided into 14 subareas (subjects): Dental Education, Dental Materials, Endodontics, Implantology, Multidisciplinary, Operative Dentistry/Cariology, Oral and Maxillofacial Surgery, Oral Pathology/Stomatology, Oral Radiology, Orthodontics, Pediatric Dentistry, Periodontology, Prosthodontics, and Public Health/Epidemiology. The separation by subjects had the goal to assess and compare the presence and impact of the Brazilian dental research in the different subareas of dentistry. The subjects were defined based on a classification used by the Brazilian public foundation CAPES (Coordination for the Improvement of Higher Education Personnel), Ministry of Education, for evaluating Brazilian Graduate Programs in Dentistry.

3.3.1 Sample selection and eligibility criteria

The top three dental journals in each subject were selected according to the following bibliometric indicators: Journal of Citation Reports Impact Factor 2017 (JCR-IF, Web of Science), CiteScore 2017 (Scopus), and H-Index (SCImago powered by Scopus). The most recent list of these bibliometric indicators was consulted. When there was a divergence between them in the top-3 list, the highest H-index was decisive for inclusion of a journal. A limited number of journals was used to restrict the sample to top-tier journals in each subject. In this study, top-tier journals were considered those that attract great attention from dental researchers internationally and publish articles in the frontiers of dental knowledge, having bibliometric indicators supporting those assumptions. When three journals were not considered representative of a given dental subject, only two journals were included. This was the case for Endodontics and Dental Materials, for instance, in which the

third journal identified had a national character in the title and publish only articles by members of a particular association respectively, what could induce selection bias. In addition, journals that publish articles by invitation only (e.g. Periodontology 2000) were excluded. A total of 38 journals was selected, as listed in Table 1. A document search for articles published in those journals was carried out in Scopus in April 2018. For each subject, the journals were searched as source titles and the publication data range (inclusive) was set between 2015 and 2017, including all documents (initially) and all access types. In the next screen, the years and source titles were confirmed when necessary to match the eligibility criteria. In addition, in this second screen the document types were restricted to articles and reviews. Editorials, articles in press, notes, errata, conference papers, letters, and other document types were excluded.

3.3.2 Data collection

A census was carried out with all articles that met the eligibility criteria. Information about the articles were exported from the database to a comma separated value file, including the following variables:

- Citation information: authors; document title; year; source title; volume/issue/pages; citation counts in the years 2015, 2016, and 2017; document type; and digital object identifier number;
- Bibliographical information: authors' affiliations;
- Funding details: number; acronym; sponsor; and funding text.

Details about the countries co-authoring the publications were obtained from the affiliations. The countries identified were restricted to the top-10 countries with most articles published in dentistry (all subject categories) according to SCImago Journal & Country Rank 2016. Thus, "international co-authorship" in this study refers exclusively to co-authorship from of one or more of the following countries: USA, Germany, China, United Kingdom, Japan, Italy, South Korea, Turkey, or India. The position of the country in the list of co-authors (i.e., first or corresponding author, for instance) was not registered. Funding was categorized as present or absent. From the total number of citations, early citation averages (ECA) were calculated, i.e. the

average number of citations received by an article each year since it was published up to 2017.

3.3.3 Data analysis

Data were submitted to descriptive statistics. In addition, Poisson regression models were used to verify differences of Brazilian participation in subareas considering all articles included, and differences of international co-authorship in papers that had at least one Brazilian author. A linear regression model was used to assess differences in ECA between the dental subjects in papers co-authored by Brazil. Multilevel linear regression models evaluated the influence of article type, funding, and presence/absence of international collaboration in the ECA separately for all articles and for Brazilian articles only. Articles (first level) were considered nested to dental subject (second level). In the first stage, an unconditional model ('null' model) estimated the basic partition of data variability between two levels before articles characteristics were taken into account; the second model (crude analysis) added each article independent variable at the individual level considering its nesting with the second level but not adjusted by other article characteristics; the "full" final model (adjusted analysis) included all articles characteristics at the same time and second level variability. All variables were retained in the final models; only those with p-value ≤ 0.05 were considered statistically significant in the final models.

3.4 Results and discussion

Table 1 lists the 38 journals included in the sample and their bibliometric indicators. Most journals are published monthly (42.1%) or bimonthly (31.6%). CiteScore varied between 0.49 and 5.05 (mean=2.29; median=2.17) and Impact Factor varied between 0.46 and 5.38 (mean=2.4; median=2.15). Two journals from Pediatric Dentistry had no Impact Factor reported. Oral Radiology was the subject with the lowest average Impact Factor and Dental Education had the lowest average CiteScore. H-index varied between 13 and 153 (median=73). The Multidisciplinary subject had the highest CiteScore and Impact Factor averages. This is likely explained by the fact that articles from all subareas may have the opportunity to quote references from Multidisciplinary journals, which may attract a broader

audience was compared with journals that publish on more specific subjects. As a consequence, more specific subareas such as Oral Radiology and Dental Education may have a lesser chance of being cited in other subareas. This is an interesting observation that may help to draw a current picture of the dental science published in top-tier journals.

3.4.1 Articles published by subject and participation of the top-10 publishing countries

The present study shows that Brazil is a frequent co-author of articles published in top-tier dental journals (Table 2). A total of 15619 articles was published in the selected journals between 2015 and 2017. The dental subject with most articles published overall was Oral and Maxillofacial Surgery (n=2762, 17.7%) whereas Oral Radiology was the subject with least articles (n=330, 2.1%). The country with most articles in the sample was USA (n=3986, 25.5%), followed by Brazil (n=2155, 13.8%), Germany (n=1140, 9.2%), China (n=1333, 8.5%), and UK (n=1081, 6.9%). Dental Education was the subject with least presence of Brazil as co-author (1.9%). The subject with most Brazilian participation was Operative Dentistry/Cariology (35.9% of all papers). Brazil was the country with most publications also in Endodontics (24.1%). USA was the country with most publications in almost all other subjects except Oral Radiology (Japan is first, 17.9%) and Implantology (Italy is first, 19.3%).

According to SCImago, Brazil is the second most publishing country in dental science since 2006, which means the second highest number of papers published in peer-reviewed articles. The present study indicates that when the dental subjects were analyzed separately, Brazil figured in the top-2 or top-3 countries by number of articles in almost all subjects. This finding shows that authors from Brazil are able to occupy spaces in the most rigorous dental journals, which theoretically adds quality to the high number of publications since only top-tier dental journals were included here. The role of research supporting funding agencies on improving the quality of dental research in the last decades has to be acknowledged. Figure 1 shows a comparison between the total number of articles co-authored by the top-10 publishing countries, number of citations gathered by those articles, and citation averages for each country. Brazil is the second country with most articles and

citations, but fifth in citation averages. During the last decade, which had a booming of international dental articles co-authored by Brazil, the need for the Brazilian science to have stronger quality indicators has been a topic of much discussion. When analyzing the data presented in Figure 1, one can observe that the citation average of Brazilian papers is still lower than USA, Germany, UK, and Italy, but higher than China, Japan, South Korea, Turkey, and India. These findings suggest that there is still room for improving the quality of Brazilian dental science and, to some degree, to exchange a bit of quantity over quality. However, authors from other countries often cite Brazilian dental research articles. A recent study (12), analyzing five different scientific fields, reported that country over-citation rates, i.e. the practice whereby researchers from a given country tend to over-cite articles from their own country are tending to become less pronounced in recent years, probably due to improved communication means and diffusion of knowledge internationally.

3.4.2 Collaboration between Brazil and other top-10 publishing countries

From the total 2155 articles co-authored by Brazil, 74.8% had no co-authorship from other top-10 publishing countries (Table 3). This finding indicates that the Brazilian dental science is not dependent on international collaboration to reach the main journals. Cooperation with other top-publishing countries in the past decades was important for the Brazilian dental science to achieve matureness, but it is positive to observe that no dependency on international collaboration is in place. Implantology (43.9%) and Dental Materials (42.6%) were the subjects with most co-authorship from other countries, whereas Dental Education (0%) and Pediatric Dentistry (9.6%) were the subjects with least international collaboration. The country most often present as co-author in Brazilian papers was USA (17.8%), followed by Italy (4.2%) and UK (3.2%), although the co-author country most often present varied among subjects. In Dental Materials, for instance, Germany was a more frequent co-author than Italy; Japan and UK were the second main contributors in Pediatric Dentistry; Italy was the country with most collaboration in Implantology, and UK in Public Health/Epidemiology. The differences regarding the countries that most often collaborate with Brazil may be explained by the stage of development of each subject in those countries leading to a greater production of research articles.

3.4.3 Citation rates

Table 4 shows the citation rates for articles co-authored by Brazil with or without other top-10 publishing countries. The 2155 articles published by Brazil between 2015 and 2017, with and without co-authorship from the other countries, gathered 6596 citations in the period. Dental Education was the subject accounting for less citation (0.1%), whereas Endodontics was the subject with the greatest absolute number of citations (17.3%). However, Implantology was the subject with highest ECA. For papers authored by Brazil alone, the ECA varied between 0.18 (Dental Education) and 2.41 (Implantology). The ECA in different subjects varied largely for papers co-authored by other countries. Overall, compared to Brazil alone, Brazilian articles co-authored by some top-10 countries showed increased ECA: papers with the UK had 44.4% average increase and 44.6% median increase; papers co-authored by the USA had 36.1% average and 27.3% median increase; papers co-authored by Germany had 49.5% average and 9% median increase; papers co-authored by Italy had 21.7% average and 3.6% median increase. In contrast, papers co-authored by China (median=-17.2%) and Japan (median=-76.2%) had decreased ECA.

Figure 2 shows a comparison of citation averages for all articles published in each subject, articles authored by Brazil alone, and articles co-authored by Brazil and at least one of the top-10 publishing countries. For most subjects, citation averages were higher when international collaboration was present. Articles authored by Brazil alone had lower citation average than overall articles in 64.3% of the subjects. At the same time, in 69.2% of the subjects, articles co-authored by Brazil with co-authorship from any of the other top-10 publishing countries had higher citations averages than overall articles. The association between international collaboration and citation rates was further investigated and the results are shown in Table 5, which presents the results for unadjusted and adjusted multilevel assessment of ECA. Considering all articles in the sample, the presence of co-authorship from Brazil was not associated with ECA after adjustment. However, the article type was associated with citation rates, with review articles presenting higher ECA than original research articles. In the analysis that considered only articles co-authored by Brazil, the presence of international co-authorship, i.e. at least one of the other top-10 publishing countries, and article type were both associated with

increased ECA after adjustment. The intercepts present in Table 5 should be used for understanding the comparisons. For instance, considering articles co-authored by Brazil alone, an original article with no funding and no international co-authorship had a mean ECA of 0.41 (95% CI 0.25-0.66) in the adjusted model. The presence of international co-authorship adds 0.39 to the ECA (95% CI 0.18–0.60), whereas a review article will have an additional 0.63 increase in the ECA (95% CI 0.32–0.95). It has been shown that diversity of research methods in different countries may lead to variations in the potential impact of the work in the literature (13).

The above findings reinforce the assumption that international collaboration generally tends to increase the citations rates. This is well documented in the literature for other science fields, but this is the first study to show the effect for dental articles. There are many points to be addressed in the explanation for this finding, including higher visibility and audience in the international community, and the possibility of international collaboration aiding in the validation of the articles by the science community. In addition, when the cooperation includes more experienced research groups, it is likely that the evidence generated is stronger and the article more likely would to be in the frontier of knowledge. It has been cited that the phenomenon of self-citation could be stronger for articles in collaboration since there are more authors to cite themselves (14). In corroboration to the present findings, a study analyzing a sample of articles co-authored by Brazil observed that international collaboration and network organization of work played a fundamental role in the resulting impact of the articles as measured by citation counts (15).

In contrast, another study reported that whether a paper was multinational had no significant effect on citation rates (13). According to the authors, previous work showing that multi-country papers are more highly cited reached that conclusion by ignoring the confounding effect of multiple funding sources. Inadequate funding is often cited as a reason for methodological shortcomings in health sciences research (16). In the current study, the presence of funding did not influence the citation rates. In corroboration, a study on bibliometric profile of four information science journals observed that citation counts appeared to be associated with journal of publication and authors' nationality, but not with funding (17). However, Reed et al. (18) observed that higher funding was associated with increased study quality, which was measured by means of applying a quality instrument in medical education research

articles. One limitation is that we took into consideration articles and citations from 2015 to 2017 to make the analysis as an update picture of the presence of Brazil as co-author in the main world class dental journals. This means that the articles had less than 3 years to gather citations and may have not achieved their citation peak yet, which usually occurs between two and six years after publication (19). Perhaps the relationship between funding and citation rates may be present if the window for citation is longer. This is an interesting topic for another study. Another limitation is that the articles were categorized according to their year of publication, thus articles published in the first months of the year had a higher window of opportunity for citations than articles published in the last months. However, the analysis did not consider articles in individual levels but rather clusters of countries co-authoring the articles and dental subareas to which the articles belong to. This means that the effects related to the date of publication affected articles from all countries and subareas in a similar way.

This study analyzed a piece of articles published between 2015 and 2017 in selected international dental journals. In the period, above 400 articles were published monthly, which means almost 15 articles published daily in those 38 journals only. If one considers articles with Brazilin co-authorship, in average two articles were published each and every day in those journals. According to SCImago, the dental science output in the last decade (2017-2008) had a 64.8% increase in citable documents compared to the period 1998-2007, reaching above 15,000 documents published yearly. How can a researcher and further, how can a dentist be well informed and up-to-date with so many articles published? It is increasingly discussed that large bodies of published research may be unreliable and hinder the separation between good from poor-quality science (20). Further, the widespread availability of bibliometric data from multiple sources makes it easy for scientists to obsess about their productivity and impact, and to compare their numbers with those of other scientists (20). However, encouraging the trendiest rather than the best, most important science to people in general may be harmful. Therefore, this report should be used mainly for understanding the current status and fomenting the progress of potential less developed areas of the Brazilian dental science.

In conclusion, Brazil is a frequent co-author and the second most publishing country of articles in top-tier international dental journals. The subjects with the

biggest share of Brazil are Operative Dentistry/Cariology, Dental Materials, and Endodontics. In contrast, Brazil is fifth in citation averages. From articles co-authored by Brazil, 74.8% had no co-authorship from other top-10 publishing countries. The most frequent co-author country was USA, but the main collaboration country varied between subjects. Implantology and Dental Materials were the subjects with most international co-authorship. The present study also shows that international collaboration was associated with increased citation rates and that review articles have higher citations than original research articles. However, the presence of funding was not associated with citation counts.

3.5 Resumo

Este estudo investigou a presença de coautoria do Brasil em artigos publicados nos principais periódicos odontológicos e analisou a influência da colaboração internacional, tipo de artigo (artigo original ou revisão) e financiamento nas taxas de citação. Artigos publicados entre 2015 e 2017 em 38 periódicos selecionados de 14 subáreas foram pesquisados no Scopus. Informações bibliográficas, número de citações e detalhes de financiamento foram registrados para todos os artigos (N=15619). Colaboração com outros países no top-10 de publicações em odontologia foi coletada. Médias anuais de citação (MAC) foram calculadas. Um modelo de regressão linear avaliou as diferenças de MAC entre as subáreas. Modelos multinível de regressão linear avaliaram a influência do tipo de artigo, financiamento e presença de colaboração internacional nas MAC. O Brasil foi coautor frequente de artigos publicados no período (top 3: EUA=25,5%; Brasil=13,8%; Alemanha=9,2%) e o país com mais publicações em duas subáreas. As subáreas com maior participação do Brasil foram Dentística/Cariologia, Materiais Dentários e Endodontia. O Brasil foi o segundo no total de citações, porém quinto em citações médias por artigo. Do total de 2155 artigos de coautoria do Brasil, 74,8% não tiveram coautoria de outros países do top-10 de publicação. EUA (17,8%), Itália (4,2%) e Reino Unido (3,2%) foram os principais países coautores, porém o principal país de colaboração variou entre as subáreas. Implantodontia e Materiais Dentários foram as subáreas com mais coautoria internacional. Artigos de revisão e artigos com colaboração internacional foram associados a maiores taxas

de citação, enquanto a presença de financiamento do estudo não influenciou as citações.

3.6 Acknowledgments

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3.7 References

1. Scimago Journal & Country Rank. Available from: www.scimagojr.com [Latest access March 2019].
2. Santos RN, Kobashi NY. Bibliometrics, scientometrics, informetrics: concepts and applications [in Portuguese]. Pesq Bras Cien Inf Bibliotec 2009;2:155-172.
3. Bornmann L, Daniel HD. What do citation counts measure? A review of studies on citing behavior. J Docum 2008;64:45-80.
4. Mena-Chalco JP, Digiampietri LA, Lopes FM, Cesar Junior RM. Brazilian bibliometric coauthorship networks. J Assoc Inf Sci Tech 2014;65:1424-1445.
5. Gonçalves AP , Pla AL, Rodolfo B, Pardo FN, Correa MB, Moraes RR. Top-100 Most Cited Dental Articles with Authors from Brazil. Braz Dent J 2019;30:1-10.
6. Faggion Jr CM, Málaga L, Monje A, Trescher AL, Listl S, Alarcón MA. The 300 most cited articles published in periodontology. Clin Oral Investig 2017;21:2021-2028.
7. Poletto VC, Faraco Junior IM. Bibliometric study of articles published in a Brazilian journal of pediatric dentistry. Braz Oral Res 2010;24:83-88.
8. Tahim A, Patel K, Bridle C, Holmes S. The 100 most cited articles in facial trauma: a bibliometric analysis. J Oral Maxillofac Surg 2016;74:2240.e1-2240.e14.
9. Baily M. Observer Policy Brief: Science, technology and innovation in the new economy. Available from: http://m.oecdobserver.org/news/archivestory.php/aid/349/Innovation_in_the_new_economy.html [Latest access September 2018].

10. Glänzel W, Schubert A. Double effort = Double impact? A critical view at international co-authorship in chemistry. Scientometrics 2001;50:199-214.
11. Van Raan AF. The influence of international collaboration on the impact of research results. Scientometrics 1998;42:423-428.
12. Bakare V, Lewison G. Country over-citation ratios. Scientometrics 2017;113:1199-1207.
13. Lewison G, Dawson G. The effect of funding on the outputs of biomedical research. Scientometrics 1998;41:17–27.
14. Van Raan AF. Statistical properties of bibliometric indicators: Research group indicator distributions and correlations. J Assoc Inf Sci Tech 2006;57:408-430.
15. Packer AL, Meneghini R. Articles with authors affiliated to Brazilian institutions published from 1994 to 2003 with 100 or more citations: I - the weight of international collaboration and the role of the networks. Anais Acad Bras Cien 2006;78:841-853.
16. Reed DA, Kern DE, Levine RB, Wright SM. Costs and funding for published medical education research. JAMA 2005;294:1052-1057.
17. Cronin B, Shaw D. Citation, funding acknowledgement and author nationality relationships in four information science journals. J Docum 1999;55:402-408.
18. Reed DA, Cook DA, Beckman TJ, Levine RB, Kern DE, Wright SM. Association between funding and quality of published medical education research. JAMA 2007;298:1002-1009.
19. Amin M, Mabe M. Impact factors: use and abuse. Medicina (B. Aires) 2003;63:347-354.
20. Sarewitz D. The pressure to publish pushes down quality. Nature 2016;533:147.

Table 1. Journals selected in each dental subject and their bibliometric indicators in two international databases*

Subject	Journal title (abbreviated)	Publication frequency (issues/year)	Scopus 2017		Web of Science 2017
			CiteScore	H-index	Impact Factor
Operative Dentistry/Cariology	Caries Res	6	2.20	83	2.18
	J Esthet Restor Dent	6	1.30	49	1.53
	Oper Dent	6	2.29	71	2.13
Dental Materials	Dent Mater	12	4.53	123	4.03
	J Adhes Dent	6	1.63	60	1.69
Endodontics	Int Endod J	12	3.08	101	3.01
	J Endod	12	3.72	123	2.88
Pediatric Dentistry	Eur Arch Paediatr Dent	6	1.09	28	-
	Int J Paediatr Dent	6	1.47	52	1.38
	Pediatr Dent	6	1.20	58	-
Multidisciplinary	Clin Oral Investig	7	2.25	64	2.38
	J Dent	12	4.13	95	3.77
	J Dent Res	13	5.05	153	5.38
Orthodontics	Am J Orthod Dentofacial Orthoped	12	1.20	100	1.84
	Angle Orthod	6	1.53	72	1.59
	Orthod Craniofac Res	4	2.20	48	2.07
Periodontology	J Clin Periodontol	12	4.14	126	4.04
	J Periodontal Res	6	2.70	73	2.87
	J Periodontol	12	2.85	138	3.39
Oral Radiology	Dentomaxillofac Radiol	8	1.88	61	1.84
	Oral Radiol	3	0.49	13	0.46
Prosthodontics	Int J Prosthodont	6	1.34	84	1.34
	J Oral Rehabil	12	2.28	81	2.05

	J Prosthet Dent	12	2.11	106	2.34
Implantology	Clin Implant Dent Relat Res	6	2.94	70	3.09
	Clin Oral Implants Res	12	3.81	140	4.30
	Eur J Oral Implantol	4	3.20	34	2.80
Oral Pathology/Stomatology	J Oral Pathol Med	10	2.13	73	2.23
	Oral Dis	8	2.11	74	2.31
	Oral Oncol	12	3.68	96	4.63
Public Health/Epidemiology	Community Dent Health	4	0.95	45	0.95
	Community Dent Oral Epidemiol	6	2.21	87	1.99
	J Public Health Dent	4	1.45	54	1.43
Oral and Maxillofacial	Int J Oral Maxillofac Surg	12	2.47	85	2.16
Surgery	J Craniomaxillofac Surg	12	2.03	64	1.96
	J Oral Maxillofac Surg	12	1.63	106	1.77
Dental Education	J Dent Educ	12	0.91	57	1.08
	Eur J Dent Educ	4	0.92	34	1.34

*Data retrieved August, 2018.

Table 2. Number of articles published between 2015 and 2017 in the selected journals of each dental subject and participation of the top-10 publishing countries (N=15619)

Subject*	Articles	Co-authorship of the top-10 publishing countries**, n (%)									
		Brazil	USA	Germany	China	UK	Japan	Italy	S Korea	Turkey	India
Oper Dent/Cariology	640	230 (35.9)	199 (31.1)	53 (8.3)	22 (3.4)	27 (4.2)	23 (3.6)	20 (3.1)	20 (3.1)	36 (5.6)	7 (1.1)
Dental Materials	713	190 (26.6)	207 (29.0)	128 (18.0)	58 (8.1)	85 (11.9)	52 (7.3)	40 (5.6)	18 (2.5)	11 (1.5)	4 (0.6)
Endodontics	1339	323 (24.1)	288 (21.5)	53 (4.0)	134 (10.0)	68 (5.1)	41 (3.1)	57 (4.3)	77 (5.8)	120 (9.0)	47 (3.5)
Pediatric Dentistry	668	115 (17.2)	128 (19.2)	18 (2.7)	2 (0.3)	58 (8.7)	8 (1.2)	7 (1.0)	7 (1.0)	15 (2.2)	46 (6.9)
Multidisciplinary	1902	277 (14.6)	488 (25.7)	365 (19.2)	171 (9.0)	204 (10.7)	147 (7.7)	62 (3.3)	71 (3.7)	53 (2.8)	19 (1.0)
Orthodontics	1128	162 (14.4)	380 (33.7)	25 (2.2)	80 (7.1)	56 (5.0)	71 (6.3)	66 (5.9)	91 (8.1)	85 (7.5)	25 (2.2)
Periodontology	1190	151 (12.7)	328 (27.6)	117 (9.8)	120 (10.1)	81 (6.8)	97 (8.2)	63 (5.3)	60 (5.0)	85 (7.1)	33 (2.8)
Oral Radiology	330	41 (12.4)	37 (11.2)	18 (5.5)	25 (7.6)	18 (5.5)	59 (17.9)	10 (3.0)	13 (3.9)	33 (10.0)	9 (2.7)
Prosthodontics	1326	160 (12.1)	329 (24.8)	101 (7.6)	85 (6.4)	45 (3.4)	124 (9.4)	70 (5.3)	96 (7.2)	55 (4.1)	36 (2.7)
Implantology	1220	132 (10.8)	215 (17.6)	163 (13.4)	97 (8.0)	58 (4.8)	53 (4.3)	235 (19.3)	47 (3.9)	15 (1.2)	11 (0.9)
Oral Pathol/Stomatol	1357	121 (8.9)	366 (27.0)	48 (3.5)	204 (15.0)	128 (9.4)	93 (6.9)	69 (5.1)	62 (4.6)	16 (1.2)	82 (6.0)
Pub Health/Epidemiol	472	36 (7.6)	167 (35.4)	13 (2.8)	5 (1.1)	102 (21.6)	11 (2.3)	2 (0.4)	13 (2.8)	3 (0.6)	9 (1.9)
Oral Maxillofac Surg	2762	206 (7.5)	586 (21.2)	318 (11.5)	322 (11.7)	101 (3.7)	175 (6.3)	136 (4.9)	129 (4.7)	110 (4.0)	81 (2.9)
Dental Education	572	11 (1.9)	268 (46.9)	20 (3.5)	8 (1.4)	50 (8.7)	11 (1.9)	3 (0.5)	3 (0.5)	4 (0.7)	6 (1.0)
Total	15619	2155 (13.8)	3986 (25.5)	1440 (9.2)	1333 (8.5)	1081 (6.9)	965 (6.2)	840 (5.4)	707 (4.5)	641 (4.1)	415 (2.7)

*Listed in descending order of co-authorship (%) from Brazil.

**Countries with most articles published in dentistry (all subject categories) according to SCImago Journal & Country Rank 2016.

Table 3. Collaboration between Brazil and other top-10 publishing countries in dental articles published between 2015 and 2017 (N=2155)

Subject	Brazil alone, n (%)	Co-authorship of the other top-10 publishing countries in dentistry, n (%)*								
		USA	Italy	UK	Germany	China	Japan	Turkey	India	S Korea
Oper Dent/Cariology	167 (72.6)	48 (20.9)	3 (1.3)	5 (2.2)	8 (3.5)	0	1 (0.4)	0	0	0
Dental Materials	109 (57.4)	72 (37.9)	9 (4.7)	12 (6.3)	10 (5.3)	5 (2.6)	5 (2.6)	0	0	0
Endodontics	262 (81.1)	44 (13.6)	9 (2.8)	5 (1.5)	0	2 (0.6)	2 (0.6)	3 (0.9)	1 (0.3)	0
Pediatric Dentistry	104 (90.4)	9 (7.8)	0	4 (3.5)	2 (1.7)	0	4 (3.5)	0	0	0
Multidisciplinary	195 (70.4)	58 (20.9)	6 (2.2)	12 (4.3)	9 (3.2)	6 (2.2)	2 (0.7)	0	0	0
Orthodontics	129 (79.6)	32 (19.8)	6 (3.7)	0	1 (0.6)	0	0	0	0	0
Periodontology	106 (70.2)	36 (23.8)	1 (0.7)	4 (2.6)	4 (2.6)	1 (0.7)	1 (0.7)	2 (1.4)	0	0
Oral Radiology	32 (78.0)	6 (14.6)	0	1 (2.4)	1 (2.4)	1 (2.4)	0	1 (2.4)	0	0
Prosthodontics	134 (83.8)	16 (10.0)	9 (5.6)	2 (1.3)	2 (1.3)	0	0	0	0	0
Implantology	74 (56.1)	15 (11.4)	37 (28.0)	3 (2.3)	4 (3.0)	8 (6.1)	2 (1.5)	0	0	0
Oral Pathol/Stomatol	90 (74.4)	17 (14.0)	6 (5.0)	12 (9.9)	1 (0.8)	1 (0.8)	0	0	1 (0.8)	0
Pub Health/Epidemiol	23 (63.9)	5 (13.9)	0	8 (22.2)	1 (2.8)	0	0	0	0	0
Oral Maxillofac Surg	175 (85.0)	25 (12.1)	4 (1.9)	1 (0.5)	1 (0.5)	2 (1.0)	2 (1.0)	1 (0.5)	0	0
Dental Education	11 (100)	0	0	0	0	0	0	0	0	0
Total	1611 (74.8)	383 (17.8)	90 (4.2)	69 (3.2)	44 (2.0)	26 (1.2)	19 (0.9)	7 (0.3)	2 (0.1)	0

*Percentage of participation in the total number of articles co-authored by Brazil.

Table 4. Early citation rates in Scopus for articles co-authored by Brazil published in the selected journals of each dental subject (N=2155 articles)

Subject	Total citations	Annual citation average (SD)**	Annual citation average of articles co-authored by Brazil with other countries						
			Brazil alone	USA	Italy	UK	Germany	China	Japan
Oper Dent/Cariology	663	1.35 (3.14) [cdef]	1.31	1.57	0.87	0.33	3.02	0	14.67
Dental Materials	725	1.52 (1.85) [bcd]	1.27	1.92	2.98	2.06	1.90	3.93	1.37
Endodontics	1142	1.72 (2.19) [b]	1.65	2.10	2.39	1.47	0	0	0.83
Pediatric Dentistry	179	0.81 (1.26) [g]	0.70	1.60	0	1.75	0.50	0	0.37
Multidisciplinary	1065	1.68 (2.20) [bc]	1.51	2.09	1.33	2.57	1.65	1.36	2.5
Orthodontics	273	0.73 (0.96) [g]	0.71	0.85	1.08	0	0	0	0
Periodontology	455	1.41 (1.63) [bcdef]	1.41	1.38	7	4.50	4.00	0	0
Oral Radiology	90	0.85 (1.28) [defg]	0.92	0.72	0	0	1.00	0	0
Prosthodontics	472	1.36 (2.34) [bcdef]	1.26	1.51	2.04	4.50	7.00	0	0
Implantology	577	2.46 (1.74) [a]	2.41	2.07	2.87	3.06	1.58	2.08	3.33
Oral Pathol/Stomatol	260	1.00 (1.41) [efg]	0.85	1.56	1.56	1.58	2.00	0	0
Pub Health/Epidemiol	61	0.73 (0.84) [eg]	0.51	0.93	0	1.23	0	0	0
Oral Maxillofac Surg	628	1.46 (2.64) [bcde]	1.41	1.93	0.79	1.33	4.00	9.5	0.67
Dental Education	6	0.18 (0.34) [fg]	0.18	0	0	0	0	0	0

*Total number of citations divided by the number of articles in each dental subject.

**Average number of citations *per* year (standard deviation) considering all articles in the subject. P-value from linear regression <0.001. Same letters represent no statistical difference.

Table 5. Multilevel assessment of annual citation averages associating variables in the individual level (articles) considering all articles in the sample or only articles co-authored by Brazil (contextual level = dental subject)

Mixed effect	Null model β (95% CI)	Crude analysis β (95% CI)	Adjusted model β (95% CI)
All articles in the sample			
Intercept	1.25 (0.97–1.54)		0.54 (0.37–0.79)
Individual level (articles)			
Brazilian co-authorship			
Absence		ref.	ref.
Presence		-0.01 (-0.11–0.10)	-0.01 (-0.12–0.09)
Funding			
Absence		ref.	ref.
Presence		0.03 (-0.07–0.13)	0.06 (-0.04–0.16)
Document Type			
Original article		ref.	ref.
Review		0.75 (0.62–0.88)	0.75 (0.62–0.89)
Deviance (-2loglikelihood)	70995.076	-	70868.172
Articles co-authored by Brazil			
Intercept	1.31 (1.05–1.56)		0.41 (0.25–0.66)
Individual level (articles)			
International co-authorship			
Absence		ref.	ref.
Presence		0.39 (0.18–0.60)	0.39 (0.18–0.60)
Funding			
Absence		ref.	ref.
Presence		0.02 (-0.20–0.25)	0.01(-0.21–0.24)
Document Type			
Original article		ref.	ref.
Review		0.63 (0.31–0.94)	0.63 (0.32–0.95)
Deviance (-2loglikelihood)	9364.6648	-	9296.2634

CI: confidence interval; ref: reference.

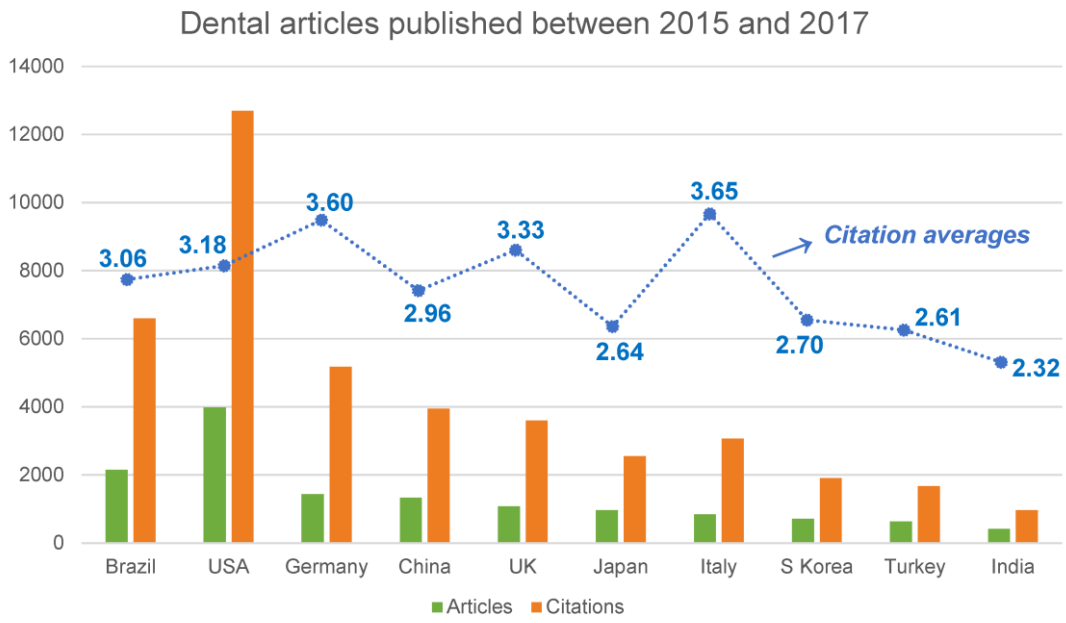

Figure 1. Total number of articles co-authored by the top-10 publishing countries between 2015 and 2017 (green bars), number of citations gathered by those articles up to 2017 (orange bars), and citation averages for each country (blue circles). Brazil is the second country with most articles and citations, but fifth in citation averages.

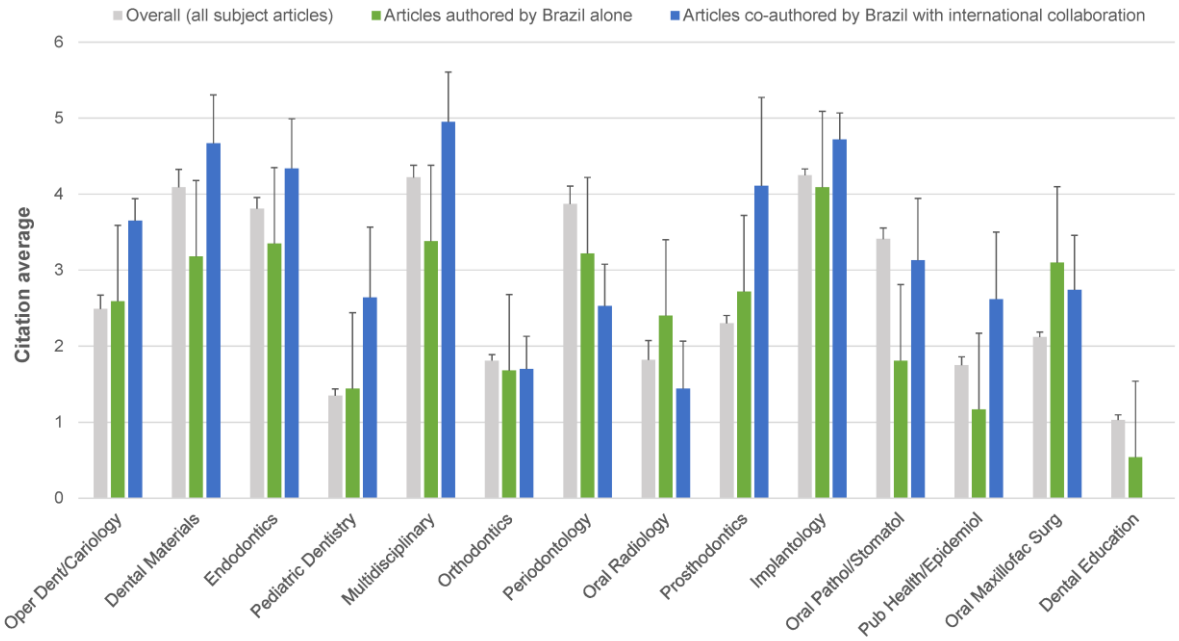

Figure 2. Citation averages for all articles published in each subject (gray bars), articles authored by Brazil alone, i.e. no other top-10 publishing country (green bars), and articles co-authored by Brazil and at least one of the top-10 publishing countries (blue bars). For most subjects, the citation averages are higher when international collaboration is present. Bars are averages + standard errors.

4 Selecting a journal to submit and how good was the article peer review: A survey with authors in dentistry

Behavioral Sciences

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[1]Artigo estruturado segundo as normas do periódico *Brazilian Oral Research* (Qualis/CAPES: A2)

4.1 Abstract

The aim of this study was to analyze the scientific communication practices of dental authors affiliated to Brazilian institutions regarding their selection of journals to submit research articles and their appraisal about the peer review process. An electronic survey containing 15 questions was sent via email to dental researchers that have recently published at least one article in dental journals. The findings show that the main factors considered when choosing a manuscript to submit their articles are Journal Impact Factor (JCR), journal reputation and the scope of the journal. Publishing in the first journal to which the article was submitted was associated with a positive view of the review process and its improvement in the quality of the article.

Keywords: Dentistry; Periodicals as Topic; Publishing; Surveys and Questionnaires.

4.2 Introduction

The first studies assessing the practice of scientific communication were published in the 1940's because of a significant, disorderly growth of scientific publication[1]. The scientific communication system comprises all activities related to the production and dissemination of scientific content, from the idea inception of a study through its publication[2]. The system works by several formal and informal ways, which act synergistically in the transmission of knowledge[3]. Formal means usually include books and articles published in peer-reviewed journals[1]. Informal means involve transmission of information by interpersonal contact such as lectures, poster presentations, and academic or professional associations[1]. The scientific advances thus become known in the community, fomenting new questions or more in-depth analysis of pre-existing knowledge[4].

In addition to the main objective of disseminating relevant information in the community, the scientific communication plays a pivotal role in the visibility of journals, authors, and even institutions. The publication of articles in peer reviewed journals is routinely used for purposes such work promotions, academic prestigious, and achievement of power positions[5]. The process of communication between authors also encourages debate as part of knowledge validation[4]. The scrutiny of articles by experts before publication, the so-called peer review process, is an

integral part of scientific publishing and is still regarded as necessary for validating the science reported[6].

Specific scientific communities exhibit certain behavior patterns that define an ideal to follow in either professional activity in science or communication of research results[7]. Peer-communication is the information flow between specialists of the same or similar field, while extra-peer communication involves a different target audience, such as specialists of several study areas[8]. Before choosing a journal for publication, health researchers take into account several factors related to the journal, including its audience, database indexing, bibliometric indicators, quality and rigor of peer-review, among others[9]. There is no information about this issue among Brazilian dental researchers who produce the second largest volume of scientific articles in the field worldwide[10].

The purpose of this study was to analyze, by means of an electronic survey, the scientific communication practices of dental authors affiliated to Brazilian institutions regarding their selection of journals to submit research articles and their appraisal about the peer review process. The hypotheses tested were that the authors (i) usually choose journals with high bibliometric indicators and (ii) that they consider the peer review process important to improve the quality of the published information.

4.3 Methodology

The Research Ethics Committee of Federal University of Pelotas, Brazil, approved this cross-sectional study (protocol: 2.534.628). An online survey was conducted with correspondent authors of international dental research articles published in 2016 that were affiliated to any Brazilian institution.

4.3.1 Questionnaire development

A previous version of the self-administered questionnaire was sent to 20 experienced dental researchers in order to pre-test it. The questions were analyzed qualitatively in terms of wording, sequence, internal consistency, and content relevance. The participants of the pre-test were selected by convenience and excluded from the final sample. The final questionnaire was hosted online in Google Forms and contained 14 questions (12 categorical, 2 open-ended). The cover e-mail

as well as the initial page of the survey invited the authors to participate, mentioned why they were a part of the sample, presented the questionnaire purpose, estimated time for response (5 min), and guaranteed anonymity of respondents, who were not identified. The responsible researchers and their e-mail addresses were also presented.

4.3.2 Sample selection

The 178 journals belonging to “Dentistry” category on SCImago Journal & Country Rank (www.scimagojr.com) at the time of the search (September 2017) were identified. A search strategy containing the source title of the journals, the authors’ affiliation country (Brazil) and year (2016) was developed and applied on the advanced search section of Scopus. Citation information, affiliations, and correspondence address (e-mail) of the 1,804 resulting articles were exported from the database as a comma-separated values file. The following inclusion/exclusion criteria were applied:

- Inclusion criteria: correspondent author affiliated to a Brazilian institution, presence of correspondence e-mail, original research reports or reviews (n=1540);
- Exclusion criteria: corresponding author affiliated to other countries (n=180), absence of correspondence e-mail (n=46), articles that were letters to the editor (n=28), conference papers (n=13), book chapters (n=8), editorials (n=6), errata (n=3), or short survey (n=1).

After applying the eligibility criteria, the duplicates (authors who have published more than one article in the period) were removed (n=543) and the final sample comprised 997 different articles and correspondent authors. Figure 1 represents the flow diagram of the sample selection.

4.3.3 Subject recruitment

The link of the survey was sent directly to the personal electronic address of the correspondent authors. The first page of the questionnaire clarified several aspects of the study and requested the consent to collaborate with the study. The respondent had to click on the link and agree to participate in order to access the

survey. Therefore, no informed consent form was required. The e-mails were sent in July 2018 through MailChimp mail service (https://mailchimp.com). This service allows the identification of how many emails were open and how many were lost. A reminder was sent to all emails in the sample (since it was not possible to identify which of the open emails had been answered) three weeks later. The responses were received until August 2018.

4.3.4 Survey content

Although the authors were selected based on articles published in a given year (2016), they were asked about their last article published at the time they received the questionnaire in order to reduce memory bias. The questions included three main groups: aspects referring to the choice of journals to submit research articles for publication (11 questions), choice of articles for the reference list (1 question), and aspects related with their opinion about the relevance of articles in science (2 questions). All of these items were asked based on corresponding author last publication. The first question asked the main factor that authors take into account when choosing a journal to submit a paper. This question was a multiple-choice type, which provided several alternatives, including bibliometric indicators, country of origin, reputation issues and scope of the journal. Right after the authors were asked about the last joural in which they published a scientific article, besides questions involving the number of submissions of this paper and the choice of references.

The main variables of interest were: (i) the main factor taken into account when choosing a journal to submit studies for publication, such as bibliometric indicators, subject and editorial board aspects; (ii) the order of preference of journals, that is, the list of all journals to which they submitted their last article prior the one which it was accepted, (iii) the number of submissions until the acceptance for publication and (iv) their opinion about the peer-review process. About the choosing of references, the variables were: significance of the results (statistically significant or not), reputation aspects (either of the journal in it was published or the authors who wrote the paper), attractive title, study type and be a current or innovative reference. The last main aspect approached was assessed in variables that try to measure the

science relevance, such as number of citations and their consequences (bibliometric indicators and the reputation coming from it).

4.3.5 Data analysis

Data were submitted to descriptive statistics using StataMP 13 (StataCorp, College Station, TX, USA). Associations among variables were tested using logistic regression analyses (α=0,05). Results with p-value ≤ 0.05 were considered statistically significant.

4.4 Results

From the 997 e-mails sent to unique authors, 29 e-mails (2.9%) bounced, i.e., were not successfully delivered because they were rejected by the recipient's email server. A total of 968 e-mails were successfully delivered, from which 688 (71.1%) were opened by authors. A total of 251 responses were, which represents a response rate of 26% considering the total number of e-mails successfully delivered and a response rate of 36.5% considering the number of e-mails opened by authors. Those emails that were opened but not answered were considered as refusals (45%); those emails that were bounced or not opened were considered as losses (29%).

A total of 106 different journals were cited, many of them from other areas than Dentistry (n=27, 25%), such as medicine (n=13), microbiology (n=6) and others. Among the dental journals (n=79), the more frequently cited were: Operative Dentistry (n=11, 14%), Clinical Oral Investigations, Journal of Endodontics and Oral Diseases, with ten mentions each, Archives of Oral Biology (n=9, 11%), Dental Materials and Journal of Dentistry (both mentioned 7 times, 9%), Dentomaxillofacial Radiology and Journal of Clinical Periodontology (appearing 6 times each, 7%).

Table 1 shows the main factor authors take into account when choosing a journal to submit papers. About 62% of the sample reported that the main factor they took into account is the Impact Factor (JCR) of the journal they intend to submit an article. Then, the journal reputation was the second top cited element (12%), followed by the scope of the journal (8%) and Qualis/CAPES (6%). Other factors were also

well cited even less frequently, such as the indexing database (5%) and the target audience (3%) of the journal.

Regarding their submission patterns, most authors consulted declare that their last paper was published at the first submission (67%), as shown in Table 2. Those who respond that their article was not accepted to the first journal it was submitted (N=82) claim that the article was denied before because the review process was not adequate (26%) or because their paper was not in the scope of the journal (24%). Besides that, some authors state that they submitted their article first to a more rigorous journal to improve the quality of the writing (17%).

The authors were also consulted about their vision about the peer-review process. About 52% said that the peer-review process improved a little bit the scientific quality of their manuscript, while 31% said that it became the paper much better and 14% believe that peer-review did not improve the quality of their papers. Besides that, 14.3% have affirmed that peer-review did not improve its scientific quality. The majority of the papers were published in the first year after its first submission, 34% between 3-6 months, while 31% between 6-12 months and 31% between 1-3 months after their first submission. When asked about their satisfaction with the time between submission of the article and its acceptance, 56% reported being satisfied with this time highlighting that the time was not fast but was adequate, while 25% consider that the time between submission/acceptance was fast, which led to authors satisfaction. The authors have reported that their articles were submitted on average to 2 different journals (72%) before being accepted, as shown in Figure 2.

Regarding the indicators of the relevance of research articles in science, 75% of the respondent authors consider that the citation number received by a paper is the main aspect that reflects its importance. Furthermore, other aspects were well chosen as main factor, such as Impact Factor of the Journal of Citation Reports (17%) and reputation both authors or journals (14%). When asked about the criteria they consider when to choose whether article to cite in they manuscripts, 37% have affirmed they consider the evidence level (37%), followed by the reputation of the authors or the journal (21%), the statistic significance of the results (13%) and be current evidence (11%). When asked about how many submissions on average their

articles were accepted for publication, the respondents answered, mostly that they usually need to submit to 2 different journals (54%), as shown in Figure 3.

The logistic regression assessment (Table 5) shown that the chance of being unsatisfied with the time of publication of an article is 9.7 (CI95% = 4.2-22.8) times higher for individuals who had the time of publication over 6 months compared to those who published within 6 months, adjusted by the number of journals to which they have submitted the paper before the final accept. Those who published their paper in the first journal have a 2.38 higher chance of considering that the review process has improved the paper, adjusted by the authors opinion about what's to consider in the relevance of its publication (Table 6). The other variables collected did not presented associations between them.

4.5 Discussion

This study is the first to address the opinion of Brazilian dental authors about the peer-review process and the choice of a journal to submit an article. Except for the limitations inherent to this type of study, such as low response rate[11], the results may be helpful to identify the behavior and some communication practices of Brazilian researchers. Considering that we reached only a part of the Brazilian dental researchers, it is possible to affirm that the opinion about these issues may vary in this area or its subareas. Both researchers in dental and medical areas have similar views regarding the criteria for evaluating scientific journals[9]. Little information is available in the literature regarding the profile of dental researchers in Brazil, possibly due to the difficulty in gathering such a data in a country that published 21324 documents in the period between 1996-2017, being behind only the United States, with 50230 documents published in this same period[10].

Although the approached researchers were chosen based on their publications in dental journals, the survey ask them about their last published scientific paper, thus many different answers appeared with journals other than dentistry, such as medicine and microbiology, since they are areas with which dentistry usually relates[12] In addition, some journals from different areas, such as technology and physics, have been mentioned, emphasizing that the interdisciplinary collaboration with other areas has been occurring, even if in a discrete way. The most frequently cited dental journals are at the top of bibliometric indicators; in

addition, 62% interviewed authors reported choosing journals by their JCR impact factor, revealing a preference for high-profile journals. Nowadays, Brazilian dentistry has been occupying a good part of the specialized literature in the area, publishing in its main journals, with regard to its bibliometric indicators.

The submission to more journals was associated with the perceived improvement in the quality of the review process, which may reinforce that review process really works and that authors should not only want a quick publication but waiting the natural course of the process in order to generate a effective publication. About 17% of respondents have the practice of attempting to publish in more rigorous journals aiming to improve the quality of writing based on peer-review, overloading the revision system as a consequence of this. Moreover, it is speculated that this practice can be considered even a form of plagiarism hidden by a blind review process[13].

A recent study that surveyed faculty members of medical and dental institutions of India showed that health researchers cite several factors when choosing journals to submit their studies, such as indexing of the journal, high impact factor, presence of peer-review and low publication costs to choose a journal for publication[9]. The criteria used for the first submission usually remain the same for subsequent submissions, although other factors become more prominent, for example, high acceptance rates, short time for a final decision and recommendations of colleagues[14]. The review process enables the monitoring of our own work and helps to decide trends in the scientific communication[6], therefore it should be as suitable as possible. Many authors hope to publish their article in the first journal to which it has been submitted and, when this happens, it may lead them to believe that the review process was fair and even improved the scientific quality of their paper. Meanwhile, criticism that may lead to the rejection of the paper can negatively influence the author's view of the peer-review process.

Most of interviewees reported that the peer review process improved the scientific quality, unlike the results found by Frank, who, through his questionnaire, concluded that the authors interviewed by him seemed not to believe that their articles took any substantial advantage of the review process. 25% of respondents who reported having their articles denied after the first submission considered that the review was not adequate or fair. Peer review has evaluation procedures that are

linked to how the journal's production is organized[15]. Having well-defined editorial practices is important so that the reviewers do not have the need to comment on the appropriateness of themes to the scope of the journal, besides the pertinence of a subject, being only with questions of consistency, organization and correction of the text.[15]. The quality of a review may increase with the time it takes to complete it[16]. The challenge of the peer review process is to develop mechanisms that can actually assess the quality of an article[17].

4.6 Conclusion

The present findings indicate that the main factors that dental authors from Brazil take into account when choosing a journal to submit their articles are Journal Impact Factor (JCR), journal reputation and the scope of the journal, in descending order. In addition, most authors believe that the peer review process was positive in improving the final manuscript. Publishing in the first journal to which the article was submitted was associated with believing that the review process has improved the quality of the article.

4.7 Acknowledgments

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4.8 References

1. Targino MG.[Scientific communication: the journal article in the teaching and research activities of Brazilian university professor in graduate studies [PhD thesis defended at the University of Brasilia, Brasilia/DF, on 12/14/1998]. Portuguese.
2. Garvey WD, Griffith BC. Scientific Communication as a Social System. Science. 1967 Sep 1; 157(3792):1011-16.
3. Menzel H. Scientific communication: five themes from social science research. Am Psychol. 1966;21(11):999-1004.
4. Bueno W. Scientific communication and scientific propagation: conceptual approaches and ruptures. Inf Inf Londrina. 2010; 15 Spec Iss 1:1-12. Portuguese.

5. Ziman JM. Community and communication. In: Public knowledge [book chapter]. São Paulo: EDUSP; 1979:115-138. Portuguese.
6. Gannon F. The essential role of peer review. EMBO Rep. 2001; 2(9):743.
7. Mueller SPM. The growth of Science, scientific behavior and scientific communication: some reflections. R Esc Biblioteconomia UFMG. 1995 Jan-Jun; 24(1):63-84. Portuguese.
8. Miranda DB, Pereira MNF. The scientific jornal as a communication vehicle: a literature review. Ci. Inf. 1996 Sep-Dec; 25(3): 375-82.
9. Sandesh N, Wahrekar S. Choosing the scientific jornal for publishing research work: perceptions of medical and dental researchers. Clujul Med. 2017; 90(2): 196-202.
10. Scimago Journal & Country Rank [homepage on the internet]. Country Rankings; 2019 [cited 2019 Mar 20]. Available from: https://www.scimagojr.com/countryrank.php
11. Sax LJ, Gilmartin SK, Bryant AN. Assessing response rates and nonresponse bias in web and paper surveys. Res High Educ. 2003; 44(4): 409-32.
12. Scimago Journal & Country Rank [homepage on the internet]. Viz Tools; 2019 [cited 2019 Mar 20]. Available from: https://www.scimagojr.com/viztools.php
13. Della-Bona A, Moraes RR. A reflection on the current state of the review system of scientific articles. RFO UPF. 2018 Sep-Dec; 23(3): 260-1. Portuguese.
14. Frank E. Authors' criteria for selecting journals. J Am Med Assoc. 1994 Jul; 272(2): 163-4.
15. Stumpf I. Peer evaluation in communication journals: view of editors, authors and evaluators. Perspec Ci Inf. 2008 Jan-Apr; 13(1): 18-32.
16. Black N, van Rooyen S, Godlee F, Smith R, Evans S. What makes a good reviewer and a good review for a general medical journal? J Am Med Assoc. 1998 Jul; 280(3): 231-3.
17. Wood SG. Evidence on peer review-scientific quality control or smokescreen? BMJ Jan; 318(1): 44-5.

Table 1. Main factor that authors take into account when choosing a journal to submit articles (N=251)

Variable	**N (%)**
Journal Impact Factor (JCR)	157 (62.5)
Journal reputation	29 (11.5)
Scope of the journal	21 (8.4)
Qualis CAPES*	14 (5.6)
Indexing database	12 (4.8)
Target audience	8 (3.2)
H-index	3 (1.2)
CiteScore	2 (0.8)
Language of publication	1 (0.4)
Journal if published by a recognized association	1 (0.4)
Prestige of the editorial board	1 (0.4)
Reputation of the editor-in-chief	1 (0.4)
Adoption of Open Access policy	1 (0.4)

*Qualis/CAPES is a system that stratifies journals based on bibliometric indicators, Brazilian publications, among other factors. It was creates to evaluate Brazilian graduate programs

Table 2. Authors opinion regarding their behavion when selecting a journal

Variable	**N (%)**
Published in the first submission (N=251)	
Yes	169 (67.3)
No	79 (31.5)
Not sure	3 (1.2)
Reason the article was rejected in previous submission(s) (N=82)	
Peer review was not adequate	21 (25.6)
Article was not within the scope of the journal	20 (24.4)
Submitted to a more rigorous journal to improve the manuscript	14 (17.1)
Methodology was limited or not well written	11 (13.4)
Results were confirmatory	4 (4.9)
Results were not statistically significant	3 (3.6)
The journal receives many articles for review	3 (3.6)
The journal was not interested in the topic of my paper	3 (3.6)
Not sure	3 (3.6)

Table 3. Aspects related to peer-review process (N=251)

Variable	**N(%)**
Did peer review improve the article quality?	
Yes, a little bit	131 (52.2)
Yes, a lot	79 (31.5)
No	36 (14.3)
Not sure	5 (2.0)
Time between first submission and final acceptance	
3 to 6 months	86 (34.3)
6 to12 months	78 (31.1)
1 to 3 months	54 (21.5)
1 to 2 years	22 (8.8)
2 to 3 years	5 (2.0)
Less than a month	4 (1.6)
Not sure	2 (0.8)
Satisfied with the time between first submission and final acceptance?	
Yes, it was not fast but it was adequate	140 (55.8)
Yes, it was fast	62 (24.7)
No, it took too long	47 (18.3)
Not sure	2 (0.8)

Table 4. Author's opinion about relevance of articles in science and aspects related to their choice of articles for bibliographic reference (N=251)

Variable	**N (%)**
Consider that citation number reflects the importance of an article?	
Yes	189 (75.3)
No	56 (22.3)
Not sure	6 (2.4)
Main indicator of the relevance of an article	
Number of citations	135 (53.8)
Impact factor (JCR)	42 (16.7)
Journal or author reputation	35 (14.0)
Journal or author H-index	11 (4.4)
Clinical relevance and methodological quality of the study	10 (4.0)
None	7 (2.8)
Article repercussion in conventional media	6 (2.4)
Depends on the area	2 (0.8)
CiteScore	2 (0.8)
Cites per doc	1 (0.4)
Citation criteria used by authors	
Evidence level of the study	94 (37.4)
Reputation of the journal or authors	53 (21.1)
Statistical significance of results	32 (12.7)
It is current evidence	29 (11.5)
Showing results related to the topic addressed in my article	20 (8.0)
The study is well designed and written	12 (4.8)
Other	11 (4.4)

Table 5. Crude and Adjusted Logistic regression assesment of factors associated with unsatisfaction in time of publication of an article

	Crude		Adjusted	
	OR (95% CI)	p	OR (95% CI)	p
Time of Publication				
≤ 6 months	1.00		1.00	
> 6 months	9.79 (4.32 – 22.16)	<0.001	9.77 (4.18 – 22.84)	<0.001
Number of Journals which the article was submited				
1	1.00		1.00	
2	1.25 (0.60 – 2.62)	0.558	0.72 (0.32 – 1.62)	0.433
3	2.20 (0.71 – 6.79)	0.170	1.77 (0.46 – 6.90)	0.408
4	10.56 (1.83 – 60.79)	0.008	3.44 (0.58 – 20.42)	0.174

Table 6. Crude and Adjusted Logistic regression assesment of factors associated with the improvement of the scientific quality of an article after peer-review

	Crude		Adjusted	
	OR (95% CI)	p	OR (95% CI)	p
Number of Journals which the article was submited				
1 Journal	1.00		1.00	
> 1 Journal	2.48 (1.18 – 5.18)	0.015	2.38 (1.13 – 5.00)	0.022
Main fator of relevaance				
Number of citations	1.00		1.00	
Other factors	2.36 (1.13 – 4.91)	0.022	2.08 (0.98 – 4.41)	0.057

Figure legends

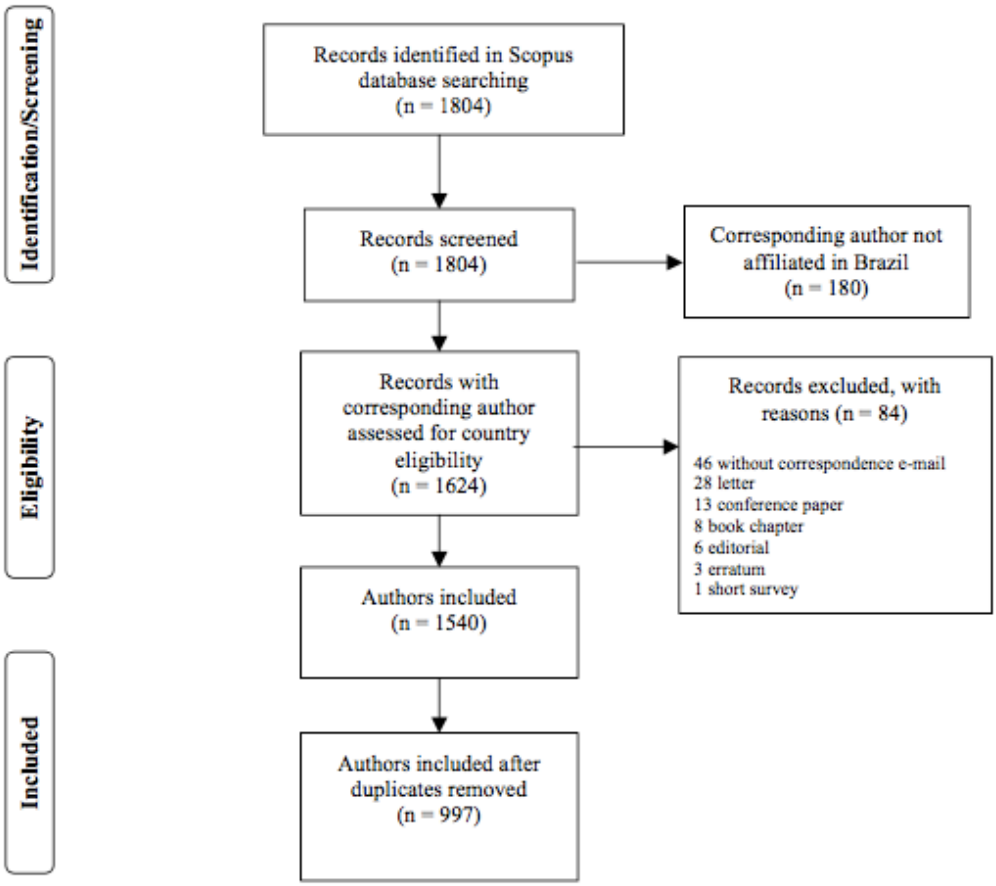

Fig.1. Authors selection flow diagram.

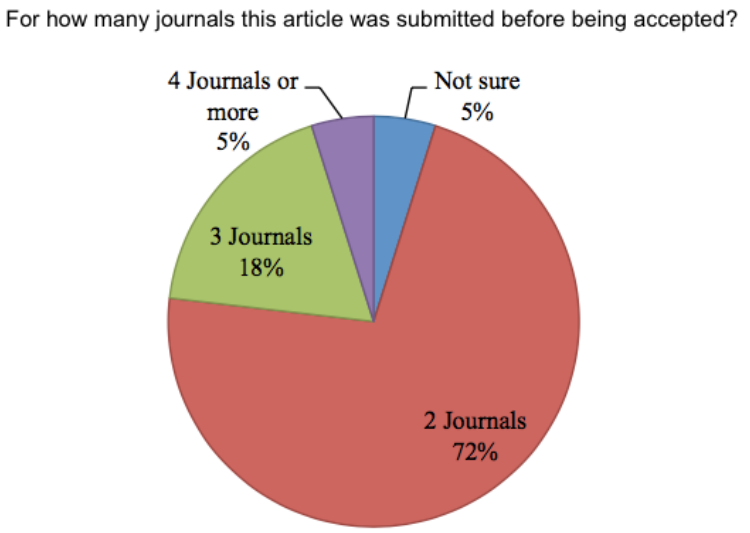

Fig.2. Responses regarding the number of submissions before the acceptance of authors' last published article.

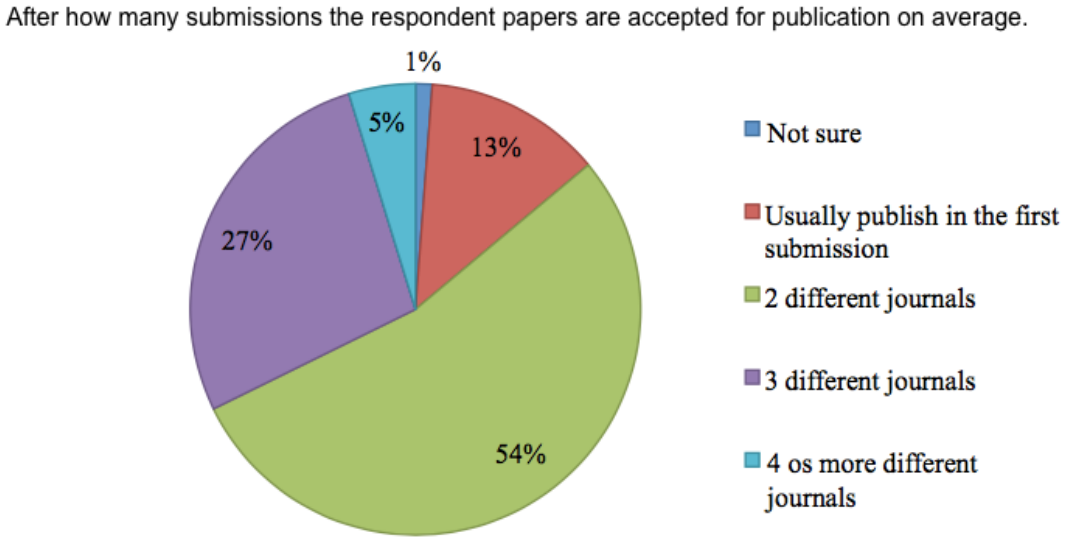

Fig.3. Responses regarding the average of submissions until the publication of author's articles (in general).

5 Considerações Finais

Os resultados deste estudo fornecem uma visão global da pesquisa Odontológica nacional. Os artigos mais citados da área de odontologia possuem um alto número de citações, o que de certa forma reflete o cumprimento do papel de um artigo cientifico quando publicado: consolidar o conhecimento adquirido, além de servir como base para posterior desenvolvimento na área, dando sequência ao processo incremental da ciência. Além disso, os artigos com maior número de citações da Odontologia nacional estão publicados em vários periódicos, de diferentes subáreas, nenhum deles nacional. Isso pode demonstrar que nossos estudos são reconhecidos também pela comunidade internacional por agregar conhecimento ao tema.

Entretanto, a inserção internacional da pesquisa nacional vai além de apenas publicar artigos científicos em periódicos internacionais. Existe uma rede de relacionamento internacional em pesquisa onde a comunicação e a colaboração científica entre pares de diferentes países frequentemente originam artigos científicos. Dos artigos científicos publicados por autora afiliados a instituições brasileiras nos últimos anos, a maior parte possui co-autoria internacional. A pesquisa brasileira possui co-autoria de países distintos em subáreas distintas, sendo os Estados Unidos, de maneira geral, nosso colaborador mais frequente. A apresentação do conteúdo publicado em diferentes tipos de artigo, além da presença de colaboração internacional são fatores refletem nas taxas de citação recebidas por um artigo.

Ao considerar um periódico para submissão de seus artigos, autores brasileiros parecem dar importância para indicadores bibliométricos (quase todos baseados no numero de citações recebidas por artigos publicados nesses periódicos), além de outros fatores relacionado à reputação dos periódicos no meio acadêmico. O processo de revisão por pares parece ser visto positivamente por estes autores, uma vez que eles alegam notar melhorias na qualidade científica de seus artigos após a revisão.

Referências

AARSEN L.W.; TREGENZA T.; BUDDEN A.E.; LORTIE C.J.; KORICHEVA J.; LEIMU R. Bang for your buck: rejection rates and impact factors in ecological journals. **The Open Ecology Journal**, v.1, n.1, p.14-19, 2008.

ABBOT A.; CYRANOSKI D.; JONES N.; MAHER B.; SCHIERMEIER Q.; VAN NOORDEN R. Do metrics matter? **Nature**, v.465, n.12, p.860-862, 2010.

AMIN M.; MABE M. Impact factors: use and abuse. **Medicina (B. Aires)**, v. 63, n.1, p. 347-54, 2003.

AQUINO S.N.; MARTELLI D.R., BONAN P.R.F.; LARANJEIRA A.L.; MARTELLI JÚNIOR H. Produção científica odontológica e relação com agênciasde financiamento de pesquisa. **Arquivos de Odontologia**, v. 45, n.1, p. 142-146, 2009.

Baily M. Observer Policy Brief: Science, technology and innovation in the new economy. Disponível em: <http://m.oecdobserver.org/news/archivestory.php/aid/349/Innovation_in_the_new_economy.html>, acessado em 21/03/19.

BAKANIAC V.; MCPHAIL C.; SIMON R.J. The manuscript review and decisionmaking process. **American Sociological Review**, v.52, n.5, p.631-642, 1987.

BAKARE V.; LEWISON G. Country over-citation ratios. **Scientometrics**, V.113, N.1, P. 1199-1207, 2017.

BLACK N.; van ROOYEN S.; GODLEE F.; SMITH R.; EVANS S. What makes a good reviewer and a good review for a general medical journal? **Journal of American Medical Association**, v. 280, n.3, p. 231-3, 1998.

BORNMANN L.; DANIEL H.D. What do citation counts measure? A review of studies on citing behavior. **Journal of Documentation**, v.64, n.1, p.45-80, 2008.

BRAUN D. The role of funding agencies in the cognitive development of science. **Research Policy**, v.27, n.1, p.807-821,1998.

BUENO W. Comunicação científica e divulgação científica: aproximações e rupturas conceituais. **Informação & Informação**, v.15, n. 1, p. 1-12, 2010.

CALCAGNO V.; DEMOINET E.; GOLLNER K.; GUIDI L.; RUTHS D.; MAZANCOURT C. Flows of research manuscripts among scientific journals reveal hidden submission patterns. **Science**, v.338, n.6110, p.1065-1068, 2012.

Coordenação de Aperfeiçoamento de Pessoal de Nível Superior – CAPES, disponível em: <http://www.capes.gov.br/images/stories/download/avaliacaotrienal/Docs_de_area/qualis/odontologia.doc>, acessado em 21/03/19.

CRONIN B.; SHAW D. Citation, funding acknowledgement and author nationality relationships in four information science journals. **Journal of Documentation**, v. 55, n. 1, p.402-8, 1999.

DELLA-BONA A.; MORAES RR. Uma reflexão sobre o estágio atual do sistema de revisão de artigos científicos. **RFO UPF**, v. 23, n. 3, p. 260-1, 2018.

DIAS A.A.; NARVAI P.C.; RÊGO D.M. Tendências da produção científica em odontologia no Brasil. **Revista Panamericana de Salud Publica**, v. 24, n. 1, p.54-60, 2008.

EGHBAL M.J.; ARDAKANI N.D.; ASGARY S. A scientometric study of PubMedindexed endodontic articles: a comparison between Iran and other regional countries. **Iranian Endodontic Journal** v.7, n.2, p.56-59, 2012.

ERIKSON M.G.; ERLANDSON P. A taxonomy of motives to cite. **Social Studies of Science**, v.44, n.4, p.625-637, 2014.

EVANS J.A.; FOSTER J.B. Metaknowledge. **Science**, v.331, n.6018, p.721-725, 2011.

FAGGION JR C.M.; MALAGA L.; MONJE A.; TRESCHER A.L.; LISTL S.; * ALARCON M.A. The 300 most cited articles published in periodontology. **Clinical Oral Investigations**, n.21, v.6, p.2021-2018, 2017.

FEIJOO J.F.; LIMERES J.; FERNÁNDEZ-VARELA M.; RAMOS I.; DIZ P. The 100 most cited articles in dentistry. **Clinical Oral Investigations**, v. 18, n. 1, p. 699-706, 2013.

FRANK E. Authors' criteria for selecting journals. **Journal of the American Medical Association**, v.272, n. 2, p. 163-4, 1994.

GANNON F. The essential role of peer review. **EMBO Reports**, v. 2, n. 9, p.743, 2001.

GARFIELD E. Is citation analysis a legitimate evaluation tool? **Scientometrics**, v. 1, n.1, p. 359-375, 1979.

GARFIELD E. The history and meaning of Journal Impact Factor. **Journal of American Medical Association**, v.295, n.1, p.90-93, 2006.

GARVEY W.D.; GRIFFITH B.C. Scientific Communication as a Social System. **Science**, v.157, n.3792, p. 1011-16, 1967.

GLÄNZEL W.; SCHUBERT A. Analysing scientific networks through co-authorship. em: Moed, Glänzel, Schmoch: Handbook of quantitative science and technology research. Springer. 1st ed. Netherlands, p 257-276, 2005

GLÄNZEL W, SCHUBERT A. Double effort = Double impact? A critical view at international co-authorship in chemistry. **Scientometrics**, v.50, n.1, p.199-214, 2001.
.

GONÇALVES A.P.; PLA A.L.; RODOLFO B.; PARDO F.N.; CORREA M.B.; MORAES R.R. Top-100 Most Cited Dental Articles with Authors from Brazil. Brazilian Dental Journal, v. 30, n. 2, p. 1-10, 2019.

GRACIO M.C.C.; OLIVEIRA E.F.T.; GURGEL J.A.; ESCALONA M.I.; GUERRERO A.P. Dentistry scientometric analysis: a comparative study between Brazil and other most productive countries in the area. **Scientometrics**, v.96, n.2, p.753-769, 2013.

HICKS D. Performance-based university research funding systems. Research Policy, v.41, n.1, p.251-61, 2012.

HILÁRIO C.M.; GRACIO M.C.C. Scientific collaboration in Brazilian researches: a comparative study in the information science, mathematics and dentistry fields. **Scientometrics**, v.113, n.1, p. 929-50, 2017.

HOOD W.W.; WILSON C.S. The literature of bibliométricos, scientometrics and informetrics. **Scientometrics**, v.52, n.2, p.291-314, 2001.

HUTCHINS B.I.; YUAN X.; ANDERSON J.M.; SANTANGELO G.M. Relative Citation Ratio (RCR): a new metric that uses citation rates to measure influence at the artivle level. **PLOS Biology**, v.14, n.9, e:1002541, 2016.

JAMALI H.R.; NIKZAD M. Article title and its relation with the number of downloads and citations. **Scientometrics**, v. 88, n. 1, p. 553-661, 2011.

KELLY C.D.; JENNIONS M.D. The h index and carreer assessment by numbers. **TRENDS in Ecology and Evolution**, v.21, n.4, p.167-170, 2006.

KING D.; The scientific impact of nations. **Nature**, v. 430, n. 1, p. 311-6, 2004.

LETCHFORD A.; MOAT H.S.; PREIS T. The advantage of short paper titles. **Royal Society of Open Science**, v.26, n.1, epub 150266, 2015.

LEWISON G, DAWSON G. The effect of funding on the outputs of biomedical research. **Scientometrics**, v. 41, n. 1, p. 17-27, 1998.

LEYDESDORFF L. Teories of citation? **Scientometrics**, v.43, n.1, p.5-25, 1998.

LIU M. Progress in documentation the complexities of citation practice: a review of citation studies. **Journal of Documentation**, v.49, n.4, p.370-408, 1993.

MARTINS A.S.; CHISINI L.A.; MARTELLI S.; SARTORI L.R.; RAMOS E.C.; DEMARCO FF. Distribution of Dental Schools and dentists in Brazil: an overview of the labor market. **Revista ABENO**, v. 18, n. 1, p. 63-73, 2018.

MENA-CHALCO J.P.; DiGIAMPIETRI L.A.; LOPES F.M.; CESAR JUNIOR R.M. Brazilian bibliometric coauthorship networks. **Journal of the Association of Information Science and Technology**, v. 65, n. 1, p. 1424-45, 2014.

MENZEL H. Scientific communication: five themes from social science research. **American Psychologist**., v. 21, n. 11, p. 999-1004, 1966.

MIRANDA D.B.; PEREIRA M.N.F. The scientific jornal as a communication vehicle: a literature review. **Ciencia e Informação**, v. 25, n. 3, p. 375-82, 1996.

MUELLER S.P. A publicação da ciência: áreas científicas e seus canais preferenciais. **DataGramaZero Revista de Ciencia da Informação**, v. 6, n. 1, p. 1-12, 2005.

MUELLER S.P.M. O crescimento da ciencia, o comportamento cientifico e a comunicacao cientifica: algumas reflexoes, **Revista da Escola de Biblioteconomia da UFMG**, v. 24, n.1, p. 63-84, 1995.

PACKALEN M.; Edge factors: scientific frontier positions of nations. **Scientometrics**, v. 118, n. 3, p. 787-808, 2019.

PACKER A.L.; MENEGHINI R. Articles with authors affiliated to Brazilian institutions published from 1994 to 2003 with 100 or more citations: I - the weight of international collaboration and the role of the networks. **Anais da Academia Brasileira de Ciência**, v. 78, n. 1, p. 841-53, 2006.

POLETTO V.C.; FARACO JUNIOR I.M. Bibliometric study of articles published in a Brazilian journal of pediatric dentistry. **Brazilian Oral Research**, v. 24, n. 1, p.83-8, 2010.

REED D.A.; COOK D.A.; BECKMAN T.J.; LEVINE R.B.; KERN D.E.; WRIGHT S.M. Association between funding and quality of published medical education research. **Journal of American Medical Association**, v.298, n. 3, p.1002-9, 2007.

REED D.A.; KERN D.E.; LEVINE R.B.; WRIGHT S.M. Costs and funding for published medical education research. **Journal of American Medical Association**, v.294, n. 1, p.1052-7, 2005.

SANDESH N.; WAHREKAR S. Choosing the scientific jornal for publishing research work: perceptions of medical and dental researchers. **Clujul Medicine**, v. 90, n. 2, p. 196-202, 2017.

SANTOS R.N.M.; KOBASHI N.Y. Bibliometria, Cientometria, Infometria: Conceitos e Aplicações. **Pesquisa Brasileira em Ciência da Informação e Biblioteconomia**, v.2, n.1, p.155-172, 2009.

SAREWITZ D. The pressure to publish pushes down quality. **Nature**, v. 533, p.147, 2016.

SAX L.J.; GILMARTIN S.K.; BRYANT A.N. Assessing response rates and nonresponse bias in web and paper surveys. **Research in High Education**, v. 44, n. 4, p. 409-32, 2003.

Scimago Journal & Country Rank. Country Rankings; 2019 [cited 2019 Mar 20]. Disponível em <https://www.scimagojr.com/countryrank.php>, acesso em 20/03/19.

Scimago Journal & Country Rank. Viz Tools; 2019 [cited 2019 Mar 20]. Disponível em: <https://www.scimagojr.com/viztools.php>, acesso em 20/03/19.

STUMPF I. Avaliacao pelos pares nas revistas de comunicação: visão dos editores, autores e avaliadores. **Perspectivas em Ciência da Informação**, v. 13, n. 1, p. 18-32, 2008.

TAHIM A.; PATEL K.; BRIDLE C.; HOLMES S. The 100 most cited articles in facial trauma: a bibliometric analysis. **Journal of Oral and Maxillofacial Surgery**, v.74, p. 2240.e1-2240.e14, 2016.

TARGINO, Maria das Graças. **Comunicação científica: o artigo de periódico nas atividades de ensino e pesquisa do docente universitário brasileiro na pós-graduação,** 1998. 387f. Tese (Doutorado em Ciência da Informação). Universidade de Brasília, Brasília, 1998.

TENOPIR C.; KING D.W.; BOYCE P.; GRAYSON M.; PAULSON K.L. Relying on electronic journals: Reading patterns of astronomers. **Journal of American Society of Information Science and Technology**, v.56, n.8, p.786-802, 2005.

VAN NOORDEN R. Impact fator gets heavyweight rival. **Nature**, v.540, n.1, p. 325326, 2016**.**

VAN RAAN A.F. Statistical properties of bibliometric indicators: Research group indicator distributions and correlations. **Journal of the Association of Information Science and Technology**, v.57, n. 1, p. 408-30, 2006.

VAN RAAN A.F. The influence of international collaboration on the impact of research results. **Scientometrics**, v. 42, n. 1, p. 423-428, 1998.

WEALE A.R.; BAILEY M.; LEAR P.A. The level of non-citation of articles within a journal as a measure of quality: a comparison to the impact factor. BMC Medical Research Methodoly, v. 4, p. 14, 2004.

WOOD S.G. Evidence on peer review-scientific quality control or smokescreen? British Medical Journal, v.318, n.1, p. 44-5, 1998.

ZHANG L.; MA W. Correlation analysis between users' educational level and mobile reading behavior. **Library Hi Tech**, v.29, n.3, p.424-435, 2011.

ZIMAN, J.M. Comunidade e comunicação. In: ___. *Conhecimento público.* São Paulo: EDUSP, 1979. p. 115-138.

Apêndices

Apêndice A – Questionário aplicado no terceiro estudo

Questionário: Práticas de comunicação científica na Odontologia brasileira

Estamos estudando as práticas de comunicação científica na Odontologia brasileira. O objetivo é analisar fatores que influenciam a escolha de periódicos, bibliografia utilizada como referência, entre outras práticas. Este projeto foi aprovado pelo Comitê de Ética em Pesquisa da UFPel (parecer 2.534.628).

Você está recebendo este questionário por ser autor correspondente de um ou mais artigos publicados em periódicos da área de Odontologia. Gostaríamos de convidá-lo(a) a responder as perguntas a seguir. Não há identificação do respondente, garantimos que os entrevistados permanecerão em completo anonimato.

O tempo médio de resposta é de 5 minutos.

Os resultados desta enquete serão divulgados em uma Tese de Doutorado, bem como em outras mídias para o conhecimento da comunidade científica nacional. Desde já contamos com sua colaboração e nos colocamos à disposição para eventuais dúvidas.

Pesquisadores responsáveis:
Ana Paula Gonçalves - Doutoranda (anaprgoncalves@hotmail.com)
Prof. Rafael Ratto de Moraes - Orientador (rafael.moraes@ufpel.edu.br)

Programa de Pós-Graduação em Odontologia
Universidade Federal de Pelotas

*Obrigatório

1. **Você aceita participar de nossa pesquisa?** *
   Marcar apenas uma oval.

   ◯ Sim
   ◯ Não *Pare de preencher este formulário.*

Com base na sua atitude como autor de um artigo científico, responda:

2. **Qual o principal fator que você leva em consideração na escolha de um periódico para a primeira submissão de um artigo?** *
   Marcar apenas uma oval.

   - ◯ Base de dados em que o periódico está indexado
   - ◯ Fator de impacto (JCR) do periódico
   - ◯ Cites per doc (Scimago) do periódico
   - ◯ CiteScore (Scopus) do periódico
   - ◯ Índice H do periódico
   - ◯ Idioma em que o artigo será publicado
   - ◯ País de origem do periódico
   - ◯ Reputação do periódico no meio acadêmico
   - ◯ A reputação da editora responsável pela publicação do periódico
   - ◯ Temática abordada pelo periódico
   - ◯ O periódico ser de uma associação científica reconhecida na área
   - ◯ Público atingido pelo periódico
   - ◯ Prestígio do corpo editorial do periódico
   - ◯ Reputação do editor-chefe do periódico
   - ◯ Adoção de política Open Access pelo periódico
   - ◯ Nenhum dos fatores listados
   - ◯ Outro: _____

Considere o último artigo publicado por você como autor correspondente em periódico internacional da área de Odontologia e responda:

3. **Este artigo foi publicado em qual periódico?** *
   Se possível, insira o nome do periódico por extenso

   _____

Considere o último artigo publicado por você como autor correspondente em periódico internacional da área de Odontologia e responda:

4. **Este artigo foi publicado no primeiro periódico ao qual foi submetido?** *
   Marcar apenas uma oval.

   - ◯ Não
   - ◯ Sim *Ir para a pergunta 6.*
   - ◯ Não sei responder

Considere o último artigo publicado por você como autor correspondente em periódico internacional da área de Odontologia e responda:

5. **Qual o principal motivo pelo qual você acredita que seu artigo tenha sido negado na primeira submissão?** *
Marcar apenas uma oval.

- ◯ Não se encaixava no escopo da revista
- ◯ Não estava bem redigido
- ◯ A metodologia apresentava limitações
- ◯ Não apresentava resultados estatisticamente significantes
- ◯ Os resultados eram apenas confirmatórios
- ◯ Submeti a uma revista mais rigorosa para melhorar a qualidade do artigo com base na revisão
- ◯ O artigo tinha potencial mas a revisão pelos pares não foi adequada ou justa
- ◯ Outro: _____

Considere o último artigo publicado por você como autor correspondente em periódico internacional da área de Odontologia e responda:

6. **Para quantos periódicos diferentes este artigo foi submetido até ser aceito?** *
Marcar apenas uma oval.

- ◯ Publicado na primeira submissão *Ir para a pergunta 9.*
- ◯ 2 periódicos
- ◯ 3 periódicos
- ◯ 4 ou mais periódicos
- ◯ Não sei responder

Considere o último artigo publicado por você como autor correspondente em periódico internacional da área de Odontologia e responda:

7. **Para quais periódicos este artigo foi submetido antes de sua publicação final?** *
Por favor, liste em ordem de submissão

_____

_____

_____

_____

_____

Considere o último artigo publicado por você como autor correspondente em periódico internacional da área de Odontologia e responda:

8. **O principal fator assinalado na questão 1 mudou na escolha do periódico para as submissões subsequentes?** *
(Questão 1: Qual o principal fator que você leva em consideração na escolha de um periódico para a primeira submissão de um artigo?)
Marcar apenas uma oval.

- ◯ Não, mantive o critério utilizado na primeira submissão
- ◯ Sim, submeti a periódico(s) com indicadores bibliométricos mais baixos (ex.: Fator de impacto, CiteScore)
- ◯ Sim, deixei de levar em consideração a base de dados em que o periódico estava indexado
- ◯ Sim, deixei de levar em consideração a reputação da editora responsável pela publicação do periódico
- ◯ Sim, deixei de levar em consideração o país de origem do periódico
- ◯ Sim, deixei de levar em consideração o idioma em que o artigo seria publicado
- ◯ Sim, deixei de levar em consideração o público abrangido pelo periódico
- ◯ Sim, deixei de levar em consideração a temática abordada pelo periódico
- ◯ Sim, deixei de levar em consideração o prestígio do corpo editorial do periódico
- ◯ Sim, deixei de levar em consideração a reputação do editor-chefe do periódico
- ◯ Sim, deixei de levar em consideraçãoo a reputação do periódico no meio acadêmico
- ◯ Sim, deixei de considerar a adoção ou não de política Open Access pelo periódico
- ◯ Não sei responder
- ◯ Outro: _____

Considere o último artigo publicado por você como autor correspondente em periódico internacional da área de Odontologia e responda:

9. **Você considera que o processo de revisão melhorou a qualidade científica do artigo antes de sua publicação final?** *
Marcar apenas uma oval.

- ◯ Não melhorou a qualidade científica
- ◯ Sim, melhorou muito a qualidade científica
- ◯ Sim, melhorou um pouco a qualidade científica
- ◯ Não sei responder

Considere o último artigo publicado por você como autor correspondente em periódico internacional da área de

Odontologia e responda:

10. **Você ficou satisfeito com o tempo entre a submissão e o aceite do artigo no periódico em que o artigo foi publicado?** *

Marcar apenas uma oval.

- ◯ Não, demorou muito
- ◯ Sim, não foi rápido porém o tempo foi adequado
- ◯ Sim, foi rápido
- ◯ Não sei responder

Considere o último artigo publicado por você como autor correspondente em periódico internacional da área de Odontologia e responda:

11. **Quanto tempo aproximadamente levou entre a submissão e o aceite do artigo, considerando o tempo desde a primeira submissão (primeiro periódico) até o aceite final (último periódico)?** *

Marcar apenas uma oval.

- ◯ Menos de 1 mês
- ◯ Entre 1 e 3 meses
- ◯ Entre 3 e 6 meses
- ◯ Entre 6 e 12 meses
- ◯ Entre 1 e 2 anos
- ◯ Entre 2 e 3 anos
- ◯ Mais de 3 anos
- ◯ Não sei responder

Considere agora, de forma geral, todas suas publicações internacionais em periódicos da área de Odontologia

12. **Em média, seus artigos são publicados depois de quantas submissões a periódicos diferentes?** *

Marcar apenas uma oval.

- ◯ Normalmente são publicados na primeira submissão
- ◯ Preciso submeter a 2 periódicos diferentes, em média
- ◯ Preciso submeter a 3 periódicos diferentes, em média
- ◯ Preciso submeter a 4 ou mais periódicos diferentes, em média
- ◯ Não sei responder

Sobre a seleção de referências a serem citadas quando você está redigindo um artigo:

13. **Qual o principal critério que você utiliza ao selecionar um artigo para ser citado como referência em seus estudos?** *
Marcar apenas uma oval.

- ◯ Significância estatística dos resultados do artigo
- ◯ Reputação do periódico em que foi publicado
- ◯ Renome de um ou mais autores do estudo
- ◯ País de origem dos principais autores do estudo
- ◯ Ter sido publicado no periódico ao qual vou submeter meu artigo
- ◯ O resumo conter informações suficientes para o artigo ser citado
- ◯ O artigo possuir um título atrativo
- ◯ Tipo de estudo ou nível de evidência do estudo
- ◯ Ser uma referência atual
- ◯ Ser um estudo já bem citado na literatura
- ◯ Ser o primeiro estudo a mostrar determinado resultado
- ◯ Outro: _____

14. **Você considera que o número de citações recebidas por um artigo científico reflete sua importância ou impacto na área?** *
Marcar apenas uma oval.

- ◯ Não
- ◯ Sim
- ◯ Não sei responder

15. **Qual dos itens abaixo você considera o principal indicador da relevância e/ou impacto de um artigo científico na literatura:** *
Marcar apenas uma oval.

- ◯ Número de citações que o artigo recebeu
- ◯ Índice H do periódico em que foi publicado
- ◯ Índice H dos autores do artigo
- ◯ Fator de Impacto do periódico
- ◯ CiteScore do periódico
- ◯ Cites per doc do periódico
- ◯ Renome do periódico em que está publicado
- ◯ Renome dos autores na área
- ◯ Repercussão do artigo na mídia convencional
- ◯ Nenhum dos itens citados
- ◯ Outro: _____

Apêndice B – Nota da Tese

Cenário atual e inserção internacional da pesquisa Odontológica brasileira

Current scenario and international insertion of Brazilian dental research

A presente tese de doutorado buscou retratar o cenário atual da pesquisa odontológica brasileira, bem como sua inserção internacional. Autores brasileiros rotineiramente publicam artigos em periódicos internacionais e, além disso, fazem parcerias com pesquisadores de outros países, o que resulta em publicações de alto impacto acadêmico, quando considerados os principais indicadores bibliométricos. Adicionalmente, este estudo mostrou que pesquisadores brasileiros levam em consideração esses indicadores quando da escolha de um periódico para submissão de seus artigos. Parece haver uma satisfação com relação ao processo de revisão por pares, uma vez que, na opinião dos autores brasileiros, este acaba por melhorar a qualidade científica das informações que sao veiculadas na área.

Campo da pesquisa: Comunicação científica
Candidato: Ana Paula Rodrigues Gonçalves, cirurgiã-dentista pela Universidade Federal de Pelotas (2013), mestre em Odontologia pela mesma instituição (2016).

Data da defesa e horário: 29/03/2019 às 14h

Local: Auditório do Programa de Pós-graduação em Odontologia da Universidade Federal de Pelotas. 5º andar da Faculdade de Odontologia de Pelotas. Rua Gonçalves Chaves, 457.

Membros da banca: Prof. Dr. Maximiliano Sérgio Cenci, Profª. Drª Marina da Rosa Kaizer, Prof. Dr. Alexandre Severo Masotti, Dra Cristina Isolan, Dra Mariana González Cademartori

Orientador: Prof. Dr. Rafael Ratto de Moraes
Co-orientadores: Profª. Drª Tatiana Pereira Cenci, Prof Dr Rafael Sarkis Onofre

Informação de contato: Ana Paula Rodrigues Gonçalves, anaprgoncalves@hotmail.com, Rua Gonçalves Chaves, 457, sala 515, 96015-560, Pelotas-RS, Brasil.

Apêndice C – Súmula do currículo do candidato

Súmula do currículo

Ana Paula Rodrigues Gonçalves nasceu em 15 de julho de 1989, em Pelotas, Rio Grande do Sul. Cursou ensino médio no Centro Federal de Educação Tecnológica, atual Instituto Federal Sul-rio-grandense, na mesma cidade. No ano de 2008 ingressou na Faculdade de Odontologia da Universidade Federal de Pelotas (UFPel), tendo sido graduada cirugiã-dentista em 2013. Durante o período de graduação, foi bolsista de Iniciação Científica do Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq) por 3 anos consecutivos. Em 2014 ingressou no Mestrado do Programa de Pós-graduação em Odontologia da Universidade Federal de Pelotas (UFPel), área de concentração Dentística, sob orientação do Prof. Dr. Rafael Ratto de Moraes, tendo defendido sua dissertação em fevereiro de 2016. Em março do mesmo ano, ingressou no Doutorado em Odontologia, área de concentração em Dentística. Durante o período de doutoramento foi bolsista da Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES), desenvolvendo trabalhos nas linhas de bibliometria e cientometria aplicadas à Odontologia bem como práticas de comunicação científica na área de Odontologia.

Publicações:

Use of scientific evidence by dentists in Brazil: room for improving the evidence-based practice. Gonçalves APR, Correa MB, Nahsan FPS, Soares CJ, Moraes RR. Plos One, 2018.

Photoinitiator system and water effects on C=C conversion and solubility of experimental etch-and-rinse dental adhesives. Salgado VE, Cavassoni D, Gonçalves APR, Pfeifer C, Moraes RR, Schneider LF. International Journal of Adhesion and Adhesives, 2017.

Repair bond strength of dental composites: systematic review and meta-analysis. International Journal of Adhesion and Adhesives. Valente LL, Sarkis-Onofre R,

Gonçalves APR, Fernández E, Loomans B, Moraes RR. International Journal of Adhesion and Adhesives, 2016.

Silica coating of non-silicate nanoparticles for resin-based composite materials. Kaizer MR, Almeida JR, Gonçalves APR, Zhang Y, Cava SS, Moraes RR. Journal of Dental Research, 2016

Mono or polycrystalline alumina-modified hybrid ceramics. Kaizer MR, Gonçalves APR, Soares PBF, Zhang Y, Cesar PF, Cava SS, Moraes RR. Dental Materials. 2016.

Short exposure to 1% hydrofluoric acid to improve the repair bond strength of dental resin composites. Gonçalves AP, Lima FG, Hidalgo GE, Moraes RR. The Journal of Adhesion. 2014.

Chemical cleaning agents and bonding to glass-fiber posts. Gonçalves AP, Ogliari AO, Jardim PS, Moraes RR. Brazilian Oral Research. 2013.

Thermal silicatization: a new approach for bonding to zirconia ceramics. Ogliari AO Vasconcelos CS, Bruschi RC, Gonçalves AP, Ogliari FA, Moraes RR. Internati Journal of Adhesion and Adhesives. 2013.

Anexos

PARECER CONSUBSTANCIADO DO CEP

DADOS DO PROJETO DE PESQUISA

Título da Pesquisa: Práticas de comunicação científica na Odontologia brasileira
Pesquisador: Rafael Ratto de Moraes
Área Temática:
Versão: 1
CAAE: 80339417.2.0000.5317
Instituição Proponente: Universidade Federal de Pelotas
Patrocinador Principal: Financiamento Próprio

DADOS DO PARECER

Número do Parecer: 2.534.628

Apresentação do Projeto:
A popularização da internet facilitou o acesso a todo tipo de conteúdo, inclusive científico. Atualmente, grande variedade de bases de dados e artigos publicados online está disponível. Logo, além do acesso, a disponibilização desses conteúdos também foi facilitada. Hoje em dia é muito mais fácil ter acesso eletrônico a periódicos e artigos científicos do que obter um exemplar convencional na forma impressa. O fato da bases de dados mais utilizadas atualmente disponibilizarem não só o acesso aos artigos como também métricas de uso e citação permite que se tenha olhar sobre o que esta sendo publicado de forma mais completa, possibilitando avaliar os rumos que aquela área de interesse está tomando. Em sua maioria, essas métricas de publicação são baseadas no número de citações que os artigos recebem, funcionando de forma a verificar quais periódicos e artigos impactam a literatura no sentido de gerarem citações em outros veículos e textos.

Objetivo da Pesquisa:
Objetivo Primário:
O objetivo deste estudo será abordar as práticas de comunicação científica, envolvendo a publicação e a citação de artigos científicos na área de odontologia, incluindo a identificação de padrões de submissão, destino e citação de periódicos nacionais e internacionais convencionais ou de acesso aberto, na tentativa de traçar uma relação entre estes fatores. Esta análise envolverá três estudos, nos quais aspectos relacionados à

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escolha de referências para serem citadas ou de periódicos para submissão de artigos, bem como para onde estudos são reenviados em caso de rejeição serão abordados.
Objetivo Secundário:
Observar como ocorre a definição do periódico para a primeira submissão do artigo, identificando, do ponto de vista do autor, os fatores que influenciam na ordem de escolha por periódicos e sua satisfação com o processo de revisão. Além disso, este estudo se propõe a verificar as razões que levam à decisão de citar um artigo e a observar como ocorre a definição do periódico para submissões subsequentes, em caso de rejeição.
Assim, objetiva-se traçar um perfil de submissão e citação de artigos na área de Odontologia.
Verificar se a alteração do Qualis/CAPES da revista alterou a ordem de preferência para submissão do artigo por parte dos autores e, com isso, verificar se estes periódicos se tornaram primeira escolha para submissão de artigos, por exemplo. Além disso, este estudo se propõe a identificar os motivos que levam os autores a submeterem seus estudos aos referidos periódicos.
Analisar os motivos que levam autores de instituições brasileiras a submeterem artigos a periódicos de acesso livre não-indexados nas bases de dados internacionais mais rigorosas (SciELO; Scopus; MEDLINE/PubMed; Web of Science).

Avaliação dos Riscos e Benefícios:
Riscos:
Por se tratar de um estudo realizado por questionário eletrônico individual em que o indivíduo participa do estudo respondendo ao questionário unicamente se o assim quiser, este estudo não oferece riscos potenciais aos participantes, que permanecem no anonimato.
Benefícios:
Este estudo permitirá identificar as práticas de comunicação científica na área de Odontologia, buscando entender melhor como ocorre a comunicação de resultados de pesquisas científicos, muitas vezes financiadas com recursos públicos para a melhoria de evidências na área.

Comentários e Considerações sobre a Pesquisa:
Pesquisa de importância científica para a própria comunidade científica do país. Este estudo será do tipo observacional transversal e será realizado por meio de inquérito com autores correspondentes de artigos publicados em periódicos de odontologia em anos específicos. A análise será realizada por meio de três sub-estudos, todos de caráter transversal descritivo e envolvendo o envio de questionário eletrônico para autores correspondentes de artigos previamente selecionados em uma base de dados internacional. Serão abordados fatores como a escolha de periódicos para a submissão de artigos científicos na área de Odontologia, a escolha de

referências para serem citadas, além de abordar aspectos referentes ao impacto dessas publicações. Além disso, serão investigados fatores que levam à escolha de periódicos do tipo Open Access para a submissão de artigos na referida área. Antecipa-se que este estudo, que aborda uma temática não muito comum na área de Odontologia, permita maior entendimento de fatores relacionados à publicação e citação de artigos científicos na área.

Considerações sobre os Termos de apresentação obrigatória:

OK

Recomendações:

OK

Conclusões ou Pendências e Lista de Inadequações:

OK

Este parecer foi elaborado baseado nos documentos abaixo relacionados:

Tipo Documento	Arquivo	Postagem	Autor	Situação
Outros	Projeto_CEP_revisado.pdf	09/03/2018 10:09:37	Patricia Abrantes Duval	Aceito
Outros	Projeto_CEP_revisado.pdf	09/03/2018 10:09:37	Patricia Abrantes Duval	Aceito
Outros	Carta_de_resposta_CEP.pdf	09/03/2018 10:09:03	Patricia Abrantes Duval	Aceito
Outros	Carta_de_resposta_CEP.pdf	09/03/2018 10:09:03	Patricia Abrantes Duval	Aceito
Informações Básicas do Projeto	PB_INFORMAÇÕES_BÁSICAS_DO_PROJETO_1033457.pdf	16/11/2017 10:40:17		Aceito
Folha de Rosto	Folhaderosto.pdf	16/11/2017 10:39:25	Rafael Ratto de Moraes	Aceito
Projeto Detalhado / Brochura Investigador	Projeto_APRG_FINAL.pdf	15/11/2017 11:13:34	Rafael Ratto de Moraes	Aceito

Situação do Parecer:

Aprovado

Necessita Apreciação da CONEP:

Não

PELOTAS, 09 de Março de 2018

Assinado por:
Patricia Abrantes Duval
(Coordenador)

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