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A Bibliometric Analysis of Orthodontics Articles in Periodical Dentistry Journals in Türkiye: A Cross-Sectional Research

Türkiye'de Düzenli Yayın Yapan Diş Hekimliği Dergilerindeki Ortodonti Yayınlarının Bibliyometrik Analizi: Kesitsel Bir Araştırma

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ABSTRACT Objective: The aim of this study was to make a bibliometric analysis of orthodontics articles in national periodical dentistry journals in last 15 years. **Material and Methods:** In this study, publications were downloaded by scanning the internet archives of the journals of the faculties of dentistry that published regularly in Türkiye between 2005-2020, the Turkish Clinics Journal of Dental Sciences and the Turkish Journal of Orthodontics (TJO). Among the 367 publications published in TJO between the specified years and a total of 4,137 publications in other dental journals included in the study, 408 articles that met the inclusion criteria and a total of 775 publications were examined bibliometrically. **Results:** In the distribution of orthodontic publications by years, the highest number was between 2010-2014, and when the publications were examined in terms of type, it was seen that the most publications in all journals were original research and the least were case reports. When the publications are examined in terms of the title of the corresponding author, the title of the publications in TJO is Assist. Prof./Dr. Lecturer. It has been determined that the rate of authors with higher education is higher, the university that contributes the most is Gazi University, and the authors who publish the most are India, after Türkiye. It was found that the departments which study the most with orthodontics were oral and maxillofacial surgery, in interdepartmental multidisciplinarity and in articles in TJO between orthodontists prefer studying with the orthodontists from different institutions. **Conclusion:** As a result, a bibliometric analysis of national and international orthodontics articles are needed in order to examine the essays in the field of orthodontics in terms of different characteristics.

Keywords: Bibliometry; dentistry journals; orthodontics articles

ÖZET Amaç: Bu çalışmanın amacı, son 15 yılda düzenli yayın yapan ulusal diş hekimliği dergilerindeki ortodonti yayınlarının bibliyometrik analizinin yapılmasıdır. **Gereç ve Yöntemler:** Bu çalışmada, 2005-2020 yılları arasında Türkiye'de düzenli yayın yapan diş hekimliği fakültelerinin dergileri, Türkiye Klinikleri Diş Hekimliği Bilimleri Dergisi ve Türk Ortodonti Dergisi'nin (TOD) internet arşivlerinin taranması ile yayınlar indirilmiştir. Belirlenen yıllar arasında TOD'da yayımlanan 367 yayın ve çalışmaya dâhil edilen diğer diş hekimliği dergilerindeki toplam 4.137 yayın içinden dâhil edilme kriterlerini karşılayan 408 makale ile toplam 775 yayın bibliyometrik açıdan incelenmiştir. **Bulgular:** Ortodonti yayınlarının yıllara göre dağılımında en yüksek sayının 2010-2014 yılları arasında olduğu, yayınlar tür yönünden incelendiğinde tüm dergilerde yayınların en fazla orijinal araştırma, en az ise olgu sunumu olduğu görülmüştür. Yayınlar sorumlu yazarın ünvanı yönünden incelendiğinde TOD'daki yayınlarda, ünvanı Yrd. Doç. Dr./Dr. Öğr. Ü. olan yazarların oranının daha yüksek olduğu ve en çok katkıda bulunan üniversitenin Gazi Üniversitesi olduğu en fazla yayın yapan yazarların Türkiye'den sonra Hindistan olduğu belirlenmiştir. Bölümlerin multidisiplinerliği incelendiğinde, ortodonti ile en fazla çalışma yapan bölümlerin, ağız diş ve çene cerrahisi olduğu ve TOD'daki yayınlarda ortodontistlerin daha çok farklı kurumlardaki ortodontistlerle çalışmayı tercih ettiği, aynı kurumda ve farklı bölümlerde uzmanlaşmış diş hekimleriyle daha az çalışma yaptıkları saptanmıştır. **Sonuç:** Sonuç olarak ülkemizde ortodonti alanındaki yayınların farklı özellikler bakımından incelenebilmesi için ulusal ve uluslararası ortodonti yayınlarının bibliyometrik analizinin yapılmasına ihtiyaç vardır.

Anahtar Kelimeler: Bibliyometri; diş hekimliği dergileri; ortodonti yayınları

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Bibliometrics is a mathematical and statistical method used to measure and analyze scientific publications. The purposes of using bibliometric methods can be listed as measuring the scientific productivity of institutions, revealing the contribution of any institution to the world literature through citations to its publications, and evaluating inter-institutional cooperation efforts.[1]

It seems impossible for researchers to have all the necessary knowledge and technical skills in modern research techniques that are becoming more and more complex and covering different areas of expertise. For this reason, institutions, institutes and researchers from various fields of science are encouraged to conduct research in cooperation with each other in order to share information with each other and to produce different ideas among scientists working in different fields. Thus, examining the collaboration status in research has also become the focus of bibliometrics in recent years.[2]

The most prominent form of collaborative work in the field of bibliometrics is co-authored research.[3] In recent years, it has been observed that the number of co-authored articles, which are accepted as the most important indicator of cooperation in the international arena, has increased significantly in all countries and it is reported that Türkiye has a growth with a positive acceleration in terms of scientific publications.[1,4] The three most important criteria used to evaluate the academic performance of scientists in recent years are the number of articles in international scientific journals, the articles published in journals scanned in indexes, and the number of citations to articles.[5]

A bibliometric ranking is not related to a paper's quality but to its interest. It also shows the evolution and tendencies of research topics.[6] A frequently cited and commented article is more likely to be an essential paper to science, with a reliable methodology to provide a scientific basis for measuring the paper's impact.[7] The bibliometric study has been broadly employed in several subjects of dentistry.[7-9] Reasoning for this is rather straightforward, being represented by the necessity to provide clinical decision making toward the patients in a way that is the most benefcial and less harmful. A high degree of certainty is therefore anticipated.[10]

Bibliometrics, which is an analysis method used in the field of librarianship, is frequently used in the analysis of different journals in the scientific literature.[1] While there are bibliometric analysis studies of journals and publications belonging to different disciplines in the national literature, no such study has been found in the field of orthodontics in dentistry. Considering the contribution of the bibliometric analysis of orthodontic publications to the literature and the importance of this situation, it has been seen that this review is needed. The aim of this study is to make a bibliometric analysis of orthodontic publications published in nationally sourced dental faculty journals, Türkiye Klinikleri Journal of Dentistry Sciences and Turkish Journal of Orthodontics (TJO) published regularly between 2005-2020.

MATERIAL AND METHODS

The materials for this study comprise articles from dental faculty journals regularly published in Türkiye (European Annals of Dental Sciences, Current Research in Dental Sciences, Cumhuriyet Dental Journal, Ege University Faculty of Dentistry Journal, Acta Odontologica Turcica, Clinical Dentistry and Research, European Oral Research), as well as articles from the Türkiye Klinikleri Journal of Dentistry Sciences and TJO. In the study, it was aimed to evaluate the orthodontic articles published in the specified journals in a 15-year period between 2005-2020 in terms of bibliometrics. Following the planning of the study, ethics committee approval was obtained from the Van Yüzüncü Yıl University Faculty of Medicine Ethics Committee (date: October 16, 2020, no: 2020/07-23). This research was conducted in accordance with the principles of the Declaration of Helsinki.

The criteria taken into consideration while selecting the journals within the scope of the study; It is a nationally sourced journal, it has been published regularly in the last fifteen years, it has an archive open to internet access and it is a member of the TR Index.[11] In this direction, the mentioned journals were included in the study.

The articles were downloaded by scanning the internet archives of the selected journals. A total of 367 articles published in TJO between 2005 and 2020 were included, along with 4,137 articles from other dentistry journals examined in the study. While all articles in the TJO were included in the study, those that did not have orthodontic articles from other dental journals were excluded from the study, and accordingly, 408 orthodontic articles were included in the study. Among 775 articles, articles included "orthodontics" in the title, text or keyword, articles whose one of the authors was an orthodontist, and case reports which was based on orthodontic treatment were included in the study.

Articles are based on authors and multidisciplinary ("a" for artcicles made by authors working in the same institution, in the same department, "b" for articles by authors working in the same institution, different departments, "c" for articles by authors working in different institutions but in the same department, The data of the authors' articles "d") were analyzed separately on the basis of journals (TJO and other journals) and year (2005-2009, 2010-2014 and 2015-2020).

STATISTICAL REVIEW

Number Cruncher Statistical System (NCSS) 2007 (Kaysville, Utah, USA) program was used for analysis. While evaluating the research data, descriptive statistical methods such as mean, standard deviation, frequency, percentage, minimum and maximum were used. The conformity of the quantitative data to the normal distribution was tested with the Shapiro-Wilk test and graphical examinations. Independent Groups t-test was used for comparisons of normally distributed quantitative variables between two groups. One-way analysis of variance was used for comparisons between groups of more than two normally distributed quantitative variables. Pearson chi-square test and Fisher-Freeman-Halton exact test were used to compare qualitative data. All analyzes were performed at 95% confidence interval and statistical significance was accepted as $p<0.05$. When interpreting the results, it was determined that there was a statistically significant difference in the case of $p<0.05$, and there was no statistically significant difference in the case of $p>0.05$. The power of the study is expressed as 1-β (β=probability of Type II error) and in general, % of the studies They must have a power of 80. While all articles published in the 15-year TJO were included in this study, a simple random sampling method out of a total of 4,137 articles in journals other than the TJO, with G* power 3.1 software to obtain 80% power at the $\alpha=0.05$ level, was included in the study. The number of people was determined as 351, but considering the losses, it was seen that it would be more appropriate to take this number as 408.

RESULTS

47.4% of the orthodontic articles included in this study were published in the TJO, and 52.6% were published in the group of other journals. In the group of other journals, the highest rate of orthodontic articles was the European Annals of Dental Sciences with a rate of 9.7%. Considering the distribution of the total number of articles by years, 29.9% of orthodontics articles with 232 articles between 2005-2009, 35.4% with 274 articles between 2010-2014 and 269 articles between 2015-2020. 34.7% of them were scanned. When the 1st, 2nd and 3rd keywords in these articles were examined, it was seen that the most used keyword was "orthodontics".

The evaluation of the articles according to the journals in terms of the original language of the article, the type of article, the subject of the article, the method of the article, the research method, the number of pages, the number of keywords and the type of citation can be seen in Table 1. In the evaluation made in terms of genre, 65.1% of the articles in the TJO and 48.1% of the orthodontic articles in the other journals group were found to be original research. It has been determined that there is a statistically significant difference in terms of the type rates of their articles ($p<0.001$) and the rate of articles in the TJO with original research ($p=0.000$) and review ($p=0.000$) type is higher than the group of other journals. When examined in terms of research methods, it was seen that 45.8% of the orthodontic articles in the TJO and 30.9% in the other journals group consisted of prospective studies. It was determined that there was a statistically significant difference in terms

TABLE 1: Evaluation of articles according to published journals.

	Turkish Journal of Orthodontics	Other	
	n (%)	n (%)	p value
Original language of articles			[a]<0.001**
Turkish	0 (0)	315 (77.2)	[a]0.000**
English	175 (47.7)	93 (22.8)	[a]0.000**
Turkish-English	192 (52.3)	0 (0)	[a]0.000**
Type of article			[a]<0.001**
Original research	239 (65.1)	198 (48.5)	[a]0.000**
Review	55 (15)	109 (26.7)	[a]0.000**
Case report	73 (19.9)	101 (24.8)	[a]0.000**
Subject of article			[b]<0.001**
Growth-development	16 (4.4)	36 (8.8)	[a]0.013*
Education	1 (0.3)	1 (0.2)	[b]1.000
Animal	5 (1.4)	1 (0.2)	[b]0.107
Service	26 (7.1)	14 (3.4)	[a]0.022*
Material	57 (15.5)	45 (11)	[a]0.064
Diagnosis	116 (31.6)	95 (23.3)	[a]0.009**
Treatment	146 (39.8)	216 (52.9)	[a]0.000**
Method of article			[a]<0.001**
Questionnaire	35 (9.5)	22 (5.4)	[a]0.027*
Computer	59 (16.1)	112 (27.5)	[a]0.000**
Clinical	103 (28.1)	141 (34.6)	[a]0.052
Laboratory	44 (12)	19 (4.7)	[a]0.000**
Measurement	126 (34.3)	114 (27.9)	[a]0.055
Research method			[a]<0.001**
Review	55 (15)	109 (26.7)	[a]0.000**
Prospective	168 (45.8)	126 (30.9)	[a]0.000**
Retrospective	71 (19.3)	72 (17,6)	[a]0.543
Case report	73 (19.9)	101 (24,8)	[a]0.105
Number of pages	8.65±3.3	7.41±2.22	[c]<0.001**
Number of keywords	3.42±0.97	3.44±1.17	[c]0.808
Total citation	27.99±13.06	31.35±18.22	[c]0.004**
Domestic citation	2.56±2.8	3.49±3.61	[c]<0.001**
Foreign citation	25.4±12.46	27.78±17.26	[c]0.030*
Citation to the journal	26.43±12.53	28.85±17.11	[c]0.027*
Citation to the thesis	0.12±0.43	0.31±0.82	[c]<0.001**
Citation to the book	1.2±1.77	1.89±2.32	[c]<0,001**
E-citation	0.09±0.4	0.08±0.36	[c]0.667
Other	0.11±0.44	0.23±1.33	[c]0.118

[a]Pearson chi-square test; [b]Fisher-Freeman-Halton exact test;
[c]Independent groups t test; *p<0.05; **p<0.01.

of research method rates (p<0.001) and the rate of orthodontic articles with a prospective research method (p=0.000) in the articles in the TJO was found to be higher than other articles. When the journals were examined in terms of citations, it was seen that the most cited journals in all journal groups were respectively American Journal of Orthodontics and Dentofacial Orthopedics (AJODO), Angle Orthodontist (AO) and European Journal of Orthodontics (EJO).

The analysis of the articles by years in terms of the original language, type of article, subject of the article, method of article, research method, number of pages and number of keywords is given in Table 2. According to the publication year, the rates of articles whose article type is study were found to be significantly lower in 2010-2014 than in other years. When examined in terms of method, 36.6% of the articles between 2005-2009 were measurement, 35% of the articles between 2010-2014 were clinical and 31.2% of the articles between 2015-2020 were measurement. It was observed that there was a statistically significant difference in terms of article method rates according to article year (p=0.033) and when detailed evaluation was made, it was observed that the rate of articles whose method was questionnaire was higher in 2015-2020, while the ratio of articles whose method was measurement was lower in 2010-2015. When examined in terms of research methods, it was seen that 42.2% of the articles between 2005-2009, 38% of the articles between 2010-2014 and 34.2% of the articles between 2015-2020 were prospective studies. It was found that there was a statistically significant difference in terms of research method rates of articles by years (p<0.001) and when detailed evaluation was made, the rate of retrospective articles was higher between 2015-2020.

Table 3 shows the evaluation of the articles in terms of the number of authors according to the journals, the fact that the corresponding author and first author are the same person, the title, nationality, gender and department of the corresponding author. It was determined that the number of authors in the articles in the TJO was statistically significantly higher than the number of authors in the group of other journals (p=0.001). When the corresponding author title was examined, it was determined that the highest proportion of the corresponding author title in the articles published in TJO was Assist. Prof./Dr. Lecturer with 46.3%, and in the group of other journals it was Dr. Dt. with 30.6%. While the proportion of authors at TJO who were Assoc Prof. and Dt. was lower, it was observed that the proportion of authors who were Assist. Prof./Dr. Lecturer was higher.

TABLE 2: Evaluation of articles according to the years they were published.

	2005-2009 n (%)	2010-2014 n (%)	2015-2020 n (%)	p value
Type of article				[a]0.105
Original research	135 (58.2)	137 (50)	165 (61.3)	[a]0.023*
Review	46 (19.8)	66 (24.1)	52 (19.3)	[a]0.334
Case report	51 (22)	71 (25.9)	52 (19.3)	[a]0.181
Subject of article				[a]0.000**
Growth-development	4 (1.7)	5 (1.8)	43 (16)	[a]0.000**
Education	1 (0.4)	1 (0.4)	0 (0)	[e]0.751
Animal	1 (0.4)	5 (1.8)	0 (0)	[a]0.034*
Service	8 (3.4)	10 (3.6)	22 (8.2)	[a]0.022*
Material	21 (9.1)	35 (12.8)	46 (17.1)	[a]0.028*
Diagnosis	80 (34.5)	68 (24.8)	63 (23.4)	[a]0.011*
Treatment	117 (50.4)	150 (54.7)	95 (35.3)	[a]0.000**
Method of article				[a]0.033*
Questionnaire	13 (5.6)	14 (5.1)	30 (11.2)	[a]0.012*
Computer	46 (19.8)	68 (24.8)	57 (21.2)	[a]0.367
Clinical	69 (29.7)	96 (35)	79 (29.4)	[a]0.288
Laboratory	19 (8.2)	25 (9.1)	19 (7.1)	[a]0.679
Measurement	85 (36.6)	71 (25.9)	84 (31.2)	[a]0.034*
Research method				[a]<0.001**
Review	46 (19.8)	66 (24.1)	52 (19.3)	[a]0.334
Prospective	98 (42.2)	104 (38)	92 (34.2)	[a]0.181
Retrospective	37 (15.9)	33 (12)	73 (27.1)	[a]0.000**
Case report	51 (22)	71 (25.9)	52 (19.3)	[a]0.181
	$\bar{X}$±SD	$\bar{X}$±SD	$\bar{X}$±SD	p value
Number of pages	8.91±2.78	8.2±3.24	7.01±2.1	[d]<0.001**
Number of keywords	3.23±0.96	3.4±1,11	3.64±1.11	[d]<0.001**

[a]Pearson chi-square test; [d]One-way analysis of variance;*p<0.05; **p<0.01; SD: Standard deviation.

When the authors are examined by years; In terms of the ratio of corresponding and first author being the same person, the rate of corresponding author and first author being the same person was determined as 84.9% between 2005-2009, 75.9% between 2010-2014 and 71.7% between 2015-2020. A statistically significant difference was found between the rates of the corresponding author and first author being the same person according to years and years (p=0.002). While this rate is higher between 2005-2009, it is lower between 2015-2020. In terms of the number of authors, the average number of authors per article was 2.87 between 2005-2009, 3.25 between 2010-2014 and 3.15 between 2015-2020. The years with the highest average number of authors per article are between 2010 and 2014. When examining the rank of the corresponding author, the rank of the corresponding author was 1.20 on average between 2005-2009, 1.36 between 2010-2014 and 1.47 between 2014-2020. It was observed that there was a statistically significant difference in terms of the order of the corresponding author according to the year of article (p=0.001).

When the authors in orthodontic articles are examined according to the journals; In terms of the distribution of the number of authors, the rate of authors per article was found to be the highest in the Clinical Dentistry and Research with an average of 3.35±1.18 authors, while it was found in the Journal of Ege University Faculty of Dentistry of with a minimum of 2.69±1.12. Gazi University Faculty of Dentistry, which contributed 9.5% of the total number of articles with 79 articles, ranked first in the examination of universities that contributed the most to articles,

TABLE 4: Evaluation of authors according to journals.

	Turkish Journal of Orthodontics	Other	p value
Number of authors	3.27±1.3	2.95±1.33	[c]0.001**
Is the corresponding-first author the same?			[a]0.024*
Yes	270 (73.6)	328 (80.4)	
No	97 (26.4)	80 (19.6)	
Title of corresponding author			[a]<0.001**
Not dentist	3 (0.8)	1 (0.2)	[b]0.350
Associate professor	29 (7.9)	61 (15)	[a]0.002**
Doctorate of dentistry	98 (26.7)	125 (30.6)	[a]0.227
Dentist	38 (10.4)	79 (19.4)	[a]0.000**
Prof. Dr.	25 (6.8)	21 (5.1)	[a]0.327
Specialist dentist	4 (1.1)	7 (1.7)	[a]0.462
Assist. Prof./Dr. Lecturer	170 (46.3)	114 (27.9)	[a]0.000
Nationality of corresponding author			[a]0.001**
Citizens of Turkish Republic	338 (92.1)	398 (97.5)	
Other	29 (7.9)	10 (2.5)	
Gender of corresponding author			[a]0.461
Female	204 (55.6)	216 (52.9)	
Male	163 (44.4)	192 (47.1)	
Department of corresponding author	**n**	**%**	
Oral and maxillofacial surgery	11	1.4	
Endodontics	5	0.6	
Oral and maxillofacial radiology	5	0.6	
Orthodontics	714	92.1	
Pediatric dentistry	13	1.7	
Periodontology	8	1.0	
Prothetic dentistry	11	1.4	
Restorative dentistry	3	0.4	
Not dentist	5	0.6	

aPearson chi-square test; bFisher-Freeman-Halton exact test; cIndependent groups t test; *p<0.05; **p<0.01.

and Ankara University Faculty of Dentistry, which contributed 7.1% of the total number of articles with 59 articles, ranked second. When the distribution of the number of articles made by the corresponding authors in the articles is analyzed according to the regions, Central Anatolia Region ranks first with 44.6% (n=370) of the total articles. When the countries of the corresponding authors are analyzed, it is seen that the authors are from 16 different countries, 88.8% (n=736) of the articles are in Türkiye, 1.4% (n=12) India, 0.5% (n=4). It has been seen that it was made by authors living in the United States, Azerbaijan and Brazil.

When we look at the distribution of the number of self-citations made by the author according to journals, we see that the journal European Oral Research comes first with 0.57 citations per publication. In addition, when looking at the number of citations to the published journal, it was seen that the journal Current Research in Dental Sciences ranked first with 0.65 citations per publication.

The evaluation of the total number of articles over the years in journals other than the TJO is given in Table 4. Looking at the total number of articles by years, it was seen that a total of 1,113 articles were published between 2005-2009, 1,463 articles were published between 2010-2014, and 1,561 articles were published between 2015-2020. It was observed that there were a total of 101 orthodontic articles between 2005-2009, 141 between 2010-2014 and 166 between 2015-2020, and the number of articles and orthodontic articles increased with the years.

TABLE 4: Total number of articles over the years in journals other than the Turkish Journal of Orthodontics.

	Total number of articles		Total number of orthodontic articles	
Journals	**X̄±SD**	**Total**	**X̄±SD**	**Total**
European Annals of Dental Sciences	8.14±1.81	350	1.74±1.35	75
Current Research in Dental Sciences	18.49±7.36	1128	1.23±1.23	75
Cumhuriyet Dental Journal	11.87±2.53	546	1.07±0.93	49
Journal of Ege University Faculty of Dentistry	7.94±1.04	286	0.89±119	32
Acta Odontologica Turcica	8.89±2.12	400	1.00±1.09	45
Clinical Dentistry and Research	8.78±2.99	430	0.94±1.13	46
European Oral Research	9.57±1.13	402	0.57±0.89	24
Türkiye Klinikleri Journal of Dental Sciences	12.66±4.29	595	1.32±2.4	62

SD: Standard deviation.

The examination of the multidisciplinary type of orthodontic articles according to journals and years is given in Table 5. There is a statistically significant difference ($p<0.001$) between the TJO and the group of other journals in terms of multidisciplinary type, and the rate of articles with multidisciplinary type "b" in the TJO is lower ($p=0.006$). It was determined that the rate of articles with ($p=0.000$) was higher. When evaluated according to years, there is a statistically significant difference ($p=0.033$) and when detailed evaluation is made, there is a difference in terms of articles with "a" and "b" types between years, and the rate of articles with multidisciplinary type "a" is higher between 2005-2009. In the same period, it was determined that the rate of articles with multidisciplinary type "b" was lower.

Examination of the departmental and inter-institutional multidisciplinarity is shown in Table 6. The network map of interdepartmental collaboration studies in dentistry in orthodontic articles are shown in Figure 1. It has been determined that the orthodontics department has made multidisciplinary publications with all other dentistry departments. It is also possible to see the departments that do not work together on the map. For example, dentists in the pedodontics department did not contribute to the publication of orthodontics with other departments other than orthodontics, restorative dental treatment and oral and maxillofacial surgery.

DISCUSSION

It is known that scientific studies are rapidly increasing in all fields of science in Türkiye.[1] We think that there is an increase in this direction also in the field of orthodontics. The bibliometric evaluation of scientific articles addressed to Türkiye at the national

TABLE 5: Examination of the multidisciplinary type of orthodontic articles according to journals and years.

	Turkish Journal of Orthodontics n (%)	**Other n (%)**	**p value**	
Type of multidisciplinary			[a]<0.001**	
a-Same institution, same department	169 (46)	210 (51.5)	[a]0.132	
b-Same institution, different departments	32 (8.7)	62 (15.2)	[a]0.006**	
c-Different institutions, same department	106 (28.9)	70 (1.2)	[a]0.000**	
d-Different institutions, different department	60 (16.3)	66 (16.2)	[a]0.948	
	2005-2009 n (%)	**2010-2014 n (%)**	**2015-2020 n (%)**	**p value**
Type of multidisciplinary				[a]0.013*
a-Same institution, same department	136 (58.6)	117 (42.7)	126 (46.8)	[a]0.001**
b-Same institution, different departments	18 (7.8)	36 (13.1)	40 (14.9)	[a]0.043*
c-Different institutions, same department	45 (19.4)	72 (26.3)	59 (21.9)	[a]0.171
d-Different institutions, different department	33 (14.2)	49 (17.9)	44 (16.4)	[a]0.538

[a]Pearson chi-square test; [d]One-way analysis of variance; *p<0.05; **p<0.01.

TABLE 6: Distribution of multidisciplinary articles in the field of orthodontics by department and institution.

Multidisciplinary department	Number of articles (n)	Percentage of articles (%)
Orthodontics-Oral and Maxillofacial Surgery	36	4.6
Orthodontics-Pediatric Dentistry	16	2.1
Orthodontics-Prosthetic Dental Treatment	16	2.1
Orthodontics-Periodontology	14	1.8
Orthodontics-Oral and Maxillofacial Radiology	12	1.5
Orthodontics-Plastic Surgery	11	1.4
Orthodontics-Biostatistics	9	1.2
Orthodontics-Restorative Dental Treatment	8	1.0
Orthodontics-Oral and Maxillofacial Surgery-Prosthetic Dental Treatment	6	0.8
Orthodontics-Endodontics	6	0.8
Multidisciplinary institution	**(n)**	**(%)**
Marmara University-Free Practice	8	1.0
Hacettepe University-Free Practice	7	0.9
Ege University-Free Practice	6	0.8
Gazi University-Free Practice	6	0.8
Ankara University-Free Practice	5	0.6
Dicle University-Free Practice	5	0.6
İstanbul University-Free Practice	5	0.6
Yeditepe University-Free Practice	5	0.6
Abant University-Atatürk University	4	0.5
Ankara University-Public employee	4	0.5
Atatürk University-Free Practice	4	0.5
Başkent University-Free Practice	4	05
GATA-Public employee	4	0.5
Public employee-Public employee	4	0.5
Necmettin Erbakan University-Selçuk University	4	0.5

level is important in terms of determining the profile of the national literature. Considering the contribution of the bibliometric analysis of orthodontic articles to the literature and the importance of this situation, it has been seen that there is a need for bibliometric analysis.

When the distribution of the total number of articles by years in this study is examined, it is seen that the most articles (35.4%) were scanned between 2010-2014. Patil et al., in their study stated that the articles were mostly published between 2006-2009.[12] Mikelis and Koletsi reported in their study that there was an increase in the number of orthodontic articles published after 2020.[10] We think that the difference between the results of this study and other studies is due to the difference in the density of researchers according to years and the journals examined.

In our study, when the most cited journals in journal citations were evaluated, the most cited journals in all journals group were AJODO. Quıntão et al. reported the orthodontic journals presenting the highest CiteScores were the EJO (4.3) in their study.[6] Since the highest cited journal group in our study was AJODO, the result of our study differs. When the articles were examined in terms of type by journal, it was seen that 65.1% of the articles in TJO and 48.1% in the other journals group were original research. Assari and Ahmadyar, Meriç and Ozan, Gutiérrez-Vela et al., Baumgartner et al., Onat et al., Adobes Martin et al., Corrales et al. and Bilgiç et al. stated that the most common article type in their studies in which they conducted bibliometric analysis in the field of dentistry was original research. For these reasons, our results are similar.[13-20]

When the orthodontic articles examined in this study were evaluated in terms of research methods, it was seen that the most used method in all journal groups was prospective research. Our study is similar to the study of Assari and Ahmadyar, in which they conducted a bibliometric analysis of dentistry articles, and it was observed that the rate of articles with a prospective research method was higher than other research methods.[13] When orthodontic articles were examined in terms of research methods by year, it was determined that the rate of retrospective articles was higher between 2015-2020. Based on these findings, we think that researchers have focused on retrospective studies in recent years. When the literature was examined, no study was found that evaluated orthodontic articles in terms of research methods by year.

In the study, when orthodontic articles are evaluated in terms of citation rates used as sources according to journals, the total number of citations per article in TJO is 27.99, while this number is 31.35 in the other journals group. When the literature is examined, it is seen that the number of studies conducted in this field is insufficient. In the study by Aydın and Bulut in which they conducted a biblio-

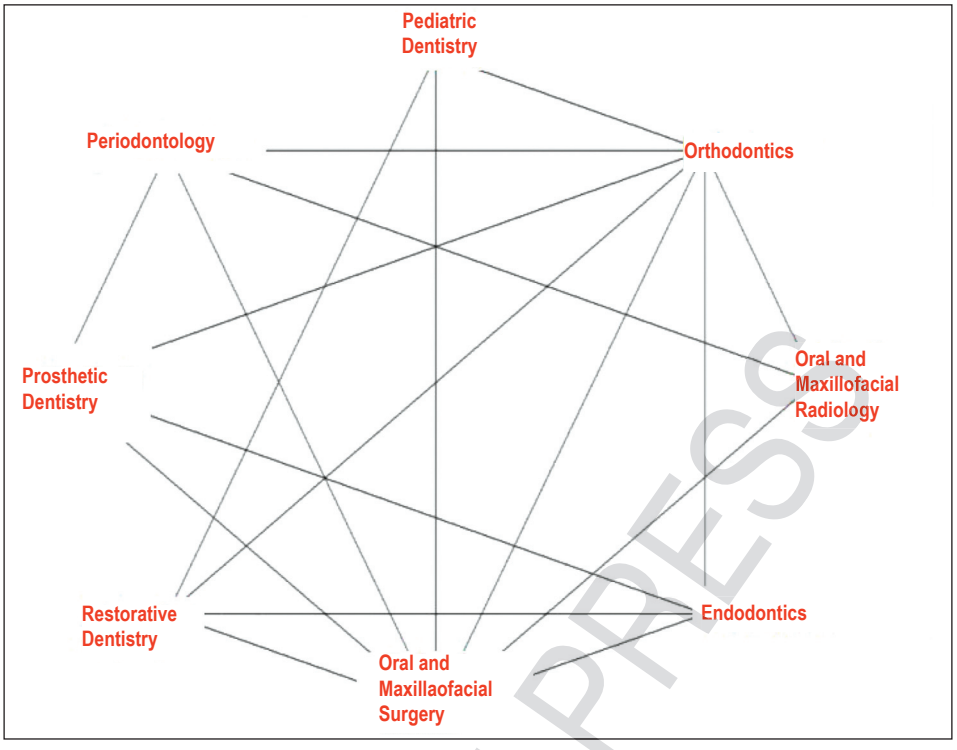

FIGURE 1: The network map of interdepartmental collaboration.

metric analysis of dentistry articles, the total number of references cited per article was 30.2.[21] Our findings are similar to the results of this study.

When the original languages of the articles included in this study were examined according to the journals, it was seen that 52.3% of the articles published in TJO were in Turkish-English, while 77.2% of the articles in other journals were in Turkish. When the studies that conduct bibliometric analysis in the literature are examined in terms of language; Assari and Ahmadyar reported that the articles were mostly in Persian, and Aydın and Bulut reported that it was Turkish.[13,21] Considering that the results are compatible with the article languages of the examined journals, the findings of this study are similar to the stated results.

As a result of other data examination, when the articles were examined in terms of the number of authors by journal, it was observed that while the number of authors per article was 3.27 in TJO, this number was 2.95 in the other journal group, and the years with the highest number of authors per article were between 2010-2014. When the literature is examined, Mikelis and Koletsi, Assari and Ahmadyar, Gutiérrez-Vela et al., Adobes Martin et al., Dharuman et al. and Onat et al. stated in their study that the articles were mostly prepared by more than one author.[10,13,15,17,18,22] The findings of this study are similar to the results of these studies.

In this study, when the articles were examined according to the journals in terms of the nationality of the responsible author, it was determined that 92.1% of the authors of the articles in TJO and 97.5% of the authors of the articles in the other journal groups were citizens of the Republic of Türkiye. It was observed that the responsible authors of the articles were from 16 different countries, 1.4% of the articles were prepared by authors living in India, and 0.5% were prepared by authors living in the United States, Azerbaijan and Brazil. In the literature, Quıntão et al., Baumgartner et al., Dharuman et al., Aura-Tormos et al. and Adobes Martin et al. reported that the most productive country was the United States of America in their study in which they conducted bibliometric analysis of dental articles.[6,16,22-24] Adobes Martin et al., reported that there was an increase in the number

of Asian and South American authors in their studies.[18] In this case, the findings of this study are consistent with those of our own research.

When the universities that contributed the most to orthodontic articles were examined in this study, it was seen that Gazi University Faculty of Dentistry ranked first with 79 (9.5%) articles. When the literature is examined, it has been reported that Gazi University is the most productive university in the studies of Aydın and Bulut.[21] In this respect, the findings of this study are compatible with the results of the studies of Aydın and Bulut.[21] In this study, when the articles on orthodontics were examined in terms of the fields of the responsible authors according to the journals, it was seen that 714 (92.1%) authors were from the orthodontics department. Examining the literature, Onat et al. reported in their study of the bibliometric analysis of the Current Research of Dental Sciences that the greatest contribution to the journal was made by prosthodontists.[17]

In our study, when the articles in the journals were analysed in terms of corresponding author titles, the most common corresponding author title in the articles in TJO was Assist. Prof. with 46.3%, and in the other journals group, it was Dr. Dt. with 30.6%. When the literature was examined, it was seen that the number of studies evaluating the academic titles of the authors was insufficient. Assari and Ahmadyar reported in their bibliometric analysis that the highest number of authors were Assist. Prof. and the findings of this study are similar to this study.[13]

In the study, when orthodontic articles were evaluated according to the gender of the corresponding author according to the journals, it was seen that 55.6% of the authors of the articles in TJO and 52.9% in the other journals group were female. When the literature was examined, it was seen that there were insufficient studies in terms of the gender of the corresponding author. Aura-Tormos et al. similarly reported that the number of female authors was higher than the number of male authors, while Assari and Ahmadyar reported that 66.7% of the authors were male.[13,23] When the literature is examined, no study has been found in the articles that examines department and institution-based multidisciplinarity according to journals and years. We think that the chapters of the authors that orthodontists prefer to work in during the research and article preparation process are important in today's multidisciplinary studies.

CONCLUSION

While approximately half of the orthodontic articles included in the research were published in TJO, the largest number of articles was published between 2010 and 2014. It was observed that the most used keywords in the articles were "orthodontics" and it was concluded that the most published article type was original research. It was determined that the most cited journals in all journals were AJODO, AO and EJO, and the relevant authors were mostly from India after Türkiye. It was determined that as the years progressed, the number of pages of the articles decreased and the number of keywords increased. While the title of the responsible author in the articles published in TJO was determined to be Dr. Lecturer, it was observed that the proportion of female authors was higher in all journals and the ranking of the corresponding author decreased over the years. In the articles in TJO, it has been seen that orthodontists prefer to work with orthodontic specialists in different institutions.

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Conflict of Interest

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

Authorship Contributions

Idea/Concept: *Gönül Dinç;* ***Design:*** *Gönül Dinç;* ***Control/Supervision:*** *Saadet Çınarsoy Ciğerim, Gönül Dinç;* ***Data Collection and/or Processing:*** *Gönül Dinç;* ***Analysis and/or Interpretation:*** *Saadet Çınarsoy Ciğerim, Gönül Dinç;* ***Literature Review:*** *Gönül Dinç;* ***Writing the Article:*** *Gönül Dinç;* ***Critical Review:*** *Saadet Çınarsoy Ciğerim, Gönül Dinç;* ***References and Fundings:*** *Gönül Dinç;* ***Materials:*** *Gönül Dinç;*

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