The Journal Impact Factor 2020

On June 30, 2021, the Clarivate™ media group published the 2020 rankings of scientific journals with impact factor in its Journal Citation Reports. In the year under review, 12,279 of the 20,932 journals considered had a journal impact factor (JIF). The calculation of the JIF is shown in Figure 1. The current JIFs of dental journals are presented below, followed by the scientific journals with the highest JIF. The annual review is complemented by a critical discussion of the JIF.

Included journals and general development

As in the calculation years 2019 and 2020, there are 91 journals with a JIF in the category Dentistry, Oral Surgery & Medicine (Table 1). Included for the first time is the Japanese Dental Science Review; Brazilian Oral Research is no longer listed.

The 2020 JIF values range from 0.125 (the German-language journal Implantologie) to 8.728 (Journal of Clinical Periodontology). The latter value is the highest JIF ever achieved for a dental journal; the peak value of the previous year (7.718, Periodontology 2000) was exceeded by 1.01 points. Only two journals (Periodontology 2000; Journal of Adhesive Dentistry) have an (insignificantly) lower JIFs than in the previous year; for all other journals, the JIF has increased.

The first 3 places are shared by periodontology journals – a first in the history of the JIF ranking. Table 2 illustrates the JIF-related rise of the Journal of Clinical Periodontology; the jump of nearly 3.5 JIF points from 2019 to 2020 is remarkable.

To compare the JIF of dental journals with those of other scientific disciplines, Table 3 shows the 20 scientific journals with the highest JIF values.

JIF rank 2020	Journal	JIF 2020	JIF 2019	JIF rank 2019
1	Journal of Clinical Periodontology	8.728	5.241	2
2	Periodontology 2000	7.589	7.718	1
3	Journal of Periodontology	6.993	3.742	7
4	International Journal of Oral Science	6.344	3.047	12
5	Journal of Dental Research	6.116	4.914	3
6	Clinical Oral Implants Research	5.977	3.723	8
7	Oral Oncology	5.337	3.979	5
8	Dental Materials	5.304	4.495	4
9	Journal of Evidence-Based Dental Practice	5.267	2.426	22
10	International Endodontic Journal	5.264	3.801	6
11	Japanese Dental Science Review	5.093	---	---
12	Journal of Prosthodontic Research	4.642	2.662	17
13	Journal of Periodontal Research	4.419	2.926	13
14	Journal of Dentistry	4.379	3.242	10
15	Journal of Oral Pathology & Medicine	4.253	2.495	20
16	Journal of Endondontics	4.171	3.118	11
17	Caries Research	4.056	2.186	30
18	Clinical Implant Dentistry and Related Research	3.932	3.396	9
19	Journal of Oral Rehabilitation	3.837	2.304	25
20	Journal of the American Dental Association	3.634	2.803	16
21	Clinical Oral Investigations	3.573	2.812	15
22	Molecular Oral Microbiology	3.563	2.905	14
23	Oral Diseases	3.511	2.613	19

Table 1 Journal impact factor (JIF) for 2020 for the 91 journals listed in the category Dentistry, Oral Surgery & Medicine with comparison of the previous year's JIF (n=91)

$$\text{JIF} = \frac{\text{Number of citations of publications from journal A in journals in the calendar year x with respect to all publications in journal A in the previous 2 years}}{\text{Number of articles published in journal A in the calendar years (x − 1) and (x − 2)}}$$

$$\text{JIF} = \frac{\text{Number of citations of publications from journal A in journals in the year 2020 with respect to all publications in journal A in the years 2019 und 2018}}{\text{Number of articles published in journal A in 2019 und 2018}}$$

Figure 1 Formula for calculating the Journal Impact Factor (JIF) of a journal: general principle and, derived from it, calculation for the year 2020.

Department of Oral Health & Medicine, University Center for Dental Medicine Basel UZB: Jens C. Türp, DDS, Dr med dent, MSc, M.A., Professor
Citation: Türp JC: The journal impact factor 2020. Dtsch Zahnärztl Z Int 2021; 3: 195–199
DOI.org/10.3238/dzz-int.2021.0023

JIF rank 2020	Journal	JIF 2020	JIF 2019	JIF rank 2019
24	International Journal of Paediatric Dentistry	3.455	1.993	35
25	Journal of Prosthetic Dentistry	3.426	2.444	21
26	Community Dentistry and Oral Epidemiology	3.383	2.135	31
27	Dental Traumatology	3.333	1.530	57
28	European Journal of Oral Implantology	3.123	2.619	18
29	European Journal of Orthodontics	3.075	2.202	28
30	Gerodontology	2.980	1.339	69
31	Journal of Esthetic and Restorative Dentistry	2.843	1.786	45
32	International Journal of Oral and Maxillofacial Implants	2.804	2.320	24
33	Oral and Maxillofacial Surgery Clinics of North America	2.802	1.554	55
34	International Journal of Oral and Maxillofacial Surgery	2.789	2.068	33
35	BMC Oral Health	2.757	1.911	38
36	Journal of Prosthodontics – Implant, Esthetic, and Reconstructive Dentistry	2.757	2.187	29
37	Progress in Orthodontics	2.750	1.822	42
38	Journal of Applied Oral Science	2.698	1.797	43
39	American Journal of Orthodontics and Dentofacial Orthopedics	2.650	1.960	36
40	Odontology	2.634	1.840	41
41	Archives of Oral Biology	2.633	1.931	37
42	Journal of Periodontal and Implant Science	2.614	1.847	40
43	European Journal of Oral Sciences	2.612	2.220	26
44	Oral Surgery, Oral Medicine, Oral Pathology and Oral Radiology	2.589	1.601	51
45	International Dental Journal	2.512	2.038	34
46	International Journal of Dental Hygiene	2.477	1.229	75
47	Implant Dentistry	2.454	1.452	64
48	Operative Dentistry	2.440	2.213	27
49	Dentomaxillofacial Radiology	2.419	1.796	44
50	International Journal of Implant Dentistry	2.384	2.111	32
51	Journal of Adhesive Dentistry	2.359	2.379	23
52	European Journal of Dental Education	2.355	1.050	82
53	Acta Odontologica Scandinavica	2.331	1.573	54
54	Australian Dental Journal	2.291	1.401	66
55	Journal of Dental Education	2.264	1.322	71
56	European Journal of Paediatric Dentistry	2.231	1.500	60
57	Head & Face Medicine	2.151	1.882	39
58	Dental Materials Journal	2.102	1.359	67
59	Journal of Dental Sciences	2.080	1.034	83

Table 1 Journal impact factor (JIF) for 2020 for the 91 journals listed in the category Dentistry, Oral Surgery & Medicine with comparison of the previous year's JIF (n = 91)

Jahr	JIF
2020	8.728
2019	5.241
2018	4.164
2017	4.046
2016	3.477
2015	3.915
2014	4.010
2013	3.610
2012	3.688
2011	2.996
2010	3.933
2009	3.549
2008	3.193
2007	2.678
2006	2.380
2005	2.225
2004	1.644
2003	1.582
2002	1.736
2001	1.641
2000	1.426
1999	1.873
1998	1.679
1997	1.812

Table 2 Development of the JIF of the Journal of Clinical Periodontology between 1997 and 2020.

"The present analysis disqualifies the JIF from adequately representing the citation frequency of a journal or article."

Priv.-Doz. Dr. Tobias Kisslich et al., Salzburg [4]

Criticism of the JIF

Reading and publishing behavior has changed fundamentally over the past few decades. Nestor et al. [6] note: "Apart from any personal subscriptions a researcher might have, performing a primary literature search used to involve a visit to the local library, sorting through each journal's table of contents and indices, finding

articles of interest, and making notes and copies for use. If a library didn't have a local copy of a particular journal, waiting days to weeks after requesting one was the next step. The JIF was quite useful during that era, as a library could best utilize its limited budget to keep a selection of journal subscriptions likely to meet most of the needs of its patrons."

The authors [6] further state: "With the proliferation of computers and the internet, we now can generate thousands of relevant results in a matter of milliseconds. Filtering by year of publication, keyword, authors, and various other options allows for fine-tuned querying. With a few clicks, nearly any article can then be downloaded and saved, although payment for access is often required. The granularity and breadth afforded by the modern literature search have shifted the search mechanics from journal-oriented to article-oriented, and with that shift, the JIF has diminished in value."

The prestigious University College London noted in an August 2020 announcement: "In the pre-digital era, the unit of distribution for science was the physical journal volume. Libraries needed to make decisions on which journals to purchase and retain, and so the JIF was developed with no intention of reflecting research quality – but rather research readership and use. A journal with a high impact factor likely had a large number of potential readers, and the journal was likely to be heavily used. […] Because the impact factor was for so long the only citation-based metric readily available, it became popular as a metric of quality […]. But metrics are now easily attributed directly to the individual articles – we can count how many people are reading, downloading, and citing a journal article. This means that we no longer need to estimate the impact of papers when we can get that data directly, more informatively, and more accurately." [10].

JIF rank 2020	Journal	JIF 2020	JIF 2019	JIF rank 2019
60	Angle Orthodontist	2.079	1.549	56
61	Journal of Cranio-Maxillofacial Surgery	2.078	1.766	46
62	Medicina Oral, Patología Oral y Cirugía Bucal	2.047	1.596	52
63	Cranio – The Journal of Craniomandibular Practice	2.020	1.173	78
64	Journal of Orofacial Orthopedics – Fortschritte der Kieferorthopädie	1.938	1.286	73
65	Journal of Advanced Prosthodontics	1.904	1.504	59
66	Journal of Oral and Maxillofacial Surgery	1.895	1.642	49
67	International Journal of Computerized Dentistry	1.883	1.714	48
68	Pediatric Dentistry	1.874	1.594	53
69	Journal of Oral Facial Pain & Headache	1.871	1.260	74
70	Oral Radiology	1.852	0.540	89
71	International Journal of Periodontics & Restorative Dentistry	1.840	1.513	58
72	Orthodontics & Craniofacial Research	1.826	1.455	63
73	Journal of Public Health Dentistry	1.821	1.743	47
74	Journal of Oral Implantology	1.779	1.424	65
75	International Journal of Prosthodontics	1.681	1.490	61
76	Quintessence International	1.677	1.460	62
77	Australian Endodontic Journal	1.659	1.120	80
78	British Journal of Oral & Maxillofacial Surgery	1.651	1.061	81
79	British Dental Journal	1.626	1.306	72
80	Journal of Stomatology, Oral and Maxillofacial Surgery	1.569	1.152	79
81	Journal of Oral Science	1.556	1.200	76
82	American Journal of Dentistry	1.522	0.957	84
83	Cleft Palate-Craniofacial Journal	1.433	1.347	68
84	Korean Journal of Orthodontics	1.372	1.326	70
85	Community Dental Health	1.349	0.679	87
86	Journal of the Canadian Dental Association	1.316	1.200	76
87	Oral Health & Preventive Dentistry	1.256	0.920	85
88	Journal of Clinical Pediatric Dentistry	1.065	0.798	86
89	Seminars in Orthodontics	0.970	0.625	88
90	Australasian Orthodontic Journal	0.226	0.113	91
91	Implantologie	0.125	0.123	90
---	Brazilian Oral Research	---	1.633	50

Table 1 Journal impact factor (JIF) for 2020 for the 91 journals listed in the category Dentistry, Oral Surgery & Medicine with comparison of the previous year's JIF (n = 91)

General Recommendation

There has been no doubt in the literature for years that the JIF developed by Eugene Garfield [3] has outlived its usefulness (Tables 4 and 5).

JIF-Rang 2020	Zeitschrift	JIF 2020
1	CA-A Cancer Journal for Clinicians	508.702
2	Nature Reviews Molecular Cell Biology	94.444
3	New England Journal of Medicine	91.245
4	Nature Reviews Drug Discovery	84.694
5	Lancet	79.321
6	Nature Reviews Clinical Oncology	66.675
7	Nature Reviews Materials	66.308
8	Nature Energy	60.858
9	Nature Reviews Cancer	60.716
10	Nature Reviews Microbiology	60.633
11	Chemical Reviews	60.622
12	MMWR Surveillance Summaries	58.769
13	Journal of the American Medical Association	56.272
14	MMWR Recommendations and Reports	55.857
15	Nature Biotechnology	54.908
16	Chemical Society Reviews	54.564
17	Reviews of Modern Physics	54.494
18	Nature Medicine	53.440
19	Nature Reviews Genetics	53.242
20	Nature Reviews Immunology	53.106
…	…	…
12,279	Sen-I Gakkaishi (Journal of the Society of Fiber Science and Technology, Japan)	0.013

Table 3 The 20 scientific journals with the highest journal impact factor (JIF) and the tail end of the ranking of 2020.

Citation	Source
"Despite recognition of many disadvantages and misuses of JIF, it is still prominently used in journal ranking and calculation of research productivity, leading to inaccuracies in these assessments."	Mech et al. [5]
"Journal impact factor may have little to no association with study results, or methodological quality."	Saginur et al. [7]
"The JIF is an extraordinarily poorly used metric, which has led some commentators to suggest it may be the cornerstone of an unhealthy research culture with the potential to distort the scientific process."	University College London [10]
"The average number of citations per paper in a journal over two years sounds straightforward – except that's not quite how the JIF is calculated. Averages are usually calculated by dividing the sum of the values for a sample of observations (numerator) by the number of those observations (denominator). Note simple averages are usually symmetrical – which means the sum of the sample is based only on the observations counted in the denominator. But the JIF isn't calculated in this way. Instead, the numerator – sum of citations – is based on all of the citations received by items in a given journal. This includes articles and reviews, but also letters to the editor, comments, and other front matter that aren't primary research articles – even news and obituaries; while the denominator is based not on the number of cited documents, but only articles and reviews. Hence, a journal's impact factor is driven not only by their research articles, but inflated by the other accompanying material in the journal. While this doesn't always get very heavily cited, it does usually add some extra citations."	University College London [10]
"The JIF is an unreliable, biased, and inherently flawed method of measuring the quality, accessibility, and value of a research journal. While it has played an important and valuable role in helping scientists find and acquire knowledge over the last six decades, our movement into the digital and cross-specialty age has depreciated the value of the JIF as the manner in which we seek and obtain knowledge has fundamentally changed."	Nestor et al. [6]
"The JIF should not be used to assess the quality and impact of individual scientific work."	Asaad et al. [1]

Table 4 Critical statements about the JIF.

Tab. 1–5, Fig. 1: J. C. Türp

Therefore, the first academic institutions have now drawn consequences. The renowned University College London, for instance, has announced that it will no longer use the JIF as an indicator of the quality of an article.

German-speaking universities have also reacted in the meantime. For example, according to the habilitation regulations of the Medical Faculty of the Swiss University of Bern (dated November 2019), neither the journals in which candidates have published their work nor their respective JIF will be taken into account when evaluating their scientific performance [8]. Instead, the evaluation is based "on the scientific content of the work" [9]. Recently, no JIF may be listed in applications to the European Research Council either.

All these institutions are thus following the "San Francisco Declaration on Research Assessment" from 2012, which states as a general recommendation: "Do not use journal-based metrics, such as Journal Impact Factors, as a surrogate

General statements
The JIF is only a limited accurate predictor of journal quality.
The JIF is not a valid measure of the quality of individual publications and/or authors.
The JIF does not account for the skewed citation distribution that results from individual highly cited articles. Therefore, it cannot make reliable statements about how often a published article will be cited in the future.
The JIF misleads readers to reject "low-impact" journals that have no perceived higher "net quality" compared to "high-impact" journals, but may still contain a number of "high-quality" articles.
Validity and reliability of the JIF for cross-discipline comparison are limited.
Calculation of the JIF
The database used to calculate the JIF (Science Citation Index) does not include citations from journals outside its own database.
The selection of journals to be included in the database is not transparent.
The definition of what counts as "citable" in the JIF calculation is unclear.
Numerator and denominator have different contents.
The JIF can be easily manipulated to inflate the values: □□Editors or peer reviewers send authors articles to include in citations. □□The denominator is minimized by removing certain publications from the total number of articles published. □□The "type" of an article is changed to increase the likelihood that it will be excluded from the denominator.
Withdrawn articles are still included in the JIF score.
Misreferenced articles can account for up to one-third of references, reducing the chances of correctly counted citations.
Bias due to language and article type
There is a preference for English-language journals published in the United States and the United Kingdom.
Articles published in English or by an author with a conventional English name increase the likelihood of being cited.
There is a preference for review articles.
The JIF encourages self-citation (self-reference) without correcting such a strategy.
Time-related bias
The JIF score is influenced by publication timing.
The measured 2-year window does not account for variance in publication processes among scientific fields.
The measured 2-year window does not account for the variation in citation rates among publication types and favors faster dissemination of "hot topics."

Table 5 Disadvantages of the JIF [5–6, 10].

measure of the quality of individual research articles, to assess an individual scientist's contributions, or in hiring, promotion, or funding decisions." [2].

Conflict of interest

The author declares that there is no conflict of interest as defined by the guidelines of the International Committee of Medical Journal Editors.

References

1. Asaad M, Kallarackal AP, Meaike J, Rajesh A, de Azevedo RU, Tran NV: Citation skew in plastic surgery journals: Does the Journal Impact Factor predict individual article citation rate? Aesthet Surg J 2020; 40: 1136–1142

2. Cagan R: The San Francisco Declaration on Research Assessment. Dis Model Mech 2013; 6: 869–870

3. Garfield E: The history and meaning of the journal impact factor. JAMA 2006; 295: 90–93

4. Kisslich T: Citation inequality and the Journal Impact Factor: median, mean, (does it) matter? Scientometrics 2021; 126: 1249–1269

5. Mech E, Ahmed MM, Tamale E, Holek M, Li G, Thabane L: Evaluating Journal Impact Factor: a systematic survey of the pros and cons, and overview of alternative measures. J Venom Anim Toxins Incl Trop Dis 2020; 26: e20190082

6. Nestor MS, Fischer DL, Arnold D, Berman B, Del Rosso JQ: Rethinking the Journal Impact Factor and publishing in the digital age. J Clin Aesthet Dermatol 2020; 13: 12–17

7. Saginur M, Fergusson D, Zhang T, Yeates K, Ramsay T, Wells G, Moher D: Journal impact factor, trial effect size, and methodological quality appear scantly related: a systematic review and meta-analysis. Syst Rev 2020; 9: 53

8. Steck N, Stalder L, Egger M: Journal- or article-based citation measure? A study of academic promotion at a Swiss university. F1000Res 2020; 9: 1188

9. Universität Bern: Habilitationsreglement der Medizinischen Fakultät der Universität Bern vom November 2019. [URL: https://www.medizin.unibe.ch/unibe/portal/fak_medizin/content/e17203/e529687/e907140/200604_Habilitationsreglement_Neuerlass_def_ger.pdf; last access: September 1, 2021]

10. University College London: Metrics to avoid – the impact factor. 2020. [URL: https://www.ucl.ac.uk/research/sites/research/files/metrics_to_avoid_-_the_impact_factor.pdf; last access: September 1, 2021]

Photo: Basilisk, Basel

JENS C. TÜRP
DDS, DR MED DENT, MSc, M.A., PROFESSOR
Department of Oral Health & Medicine
University Center for Dental Medicine
Basel UZB
Mattenstrasse 40
CH-4058 Basel, Switzerland
jens.tuerp@unibas.ch