The Impact Factor: Its Use, Misuse, and Significance

Scientists and academics need instruments to measure the quality of their publications, since their careers may depend on it. Talking with many academics across the world, I have noticed that there is a widespread misconception: Too many institutions and people use the impact factor (IF) as a quality indicator of the articles published by a given author. Let me try to clarify this matter. IF is a measure of the citations of scientific journals. It was created by Eugene Garfield, the founder of the Institute for Scientific Information. IFs are calculated each year by Thomson Scientific for those journals that it indexes, and are published in *Journal Citation Reports* (http://www.thomsonreuters.com/products_services/science/science_products/a-z/journal_citation_reports/).

The publication of results for each year covered occurs in the summer of the following year (ie, IFs for 2008 will be published in the summer of 2009). IFs are calculated by taking the number of all current citations to source items published in a journal over the previous 2 years and dividing by the number of articles published in the journal during the same period. In other words, it is a ratio between citations and recent citable items published.

The IFs for the top 10 dental journals (dentistry, oral surgery, and medicine) calculated on citations from 2006 and 2007 and published in 2008 are listed in the table.

Rank	2007 impact factor
1. *Periodontology 2000*	3.58
2. *Journal of Dental Research*	3.50
3. *Journal of Endodontics*	3.37
4. *Dental Materials*	2.99
5. *Journal of Clinical Periodontology*	2.68
6. *Oral Oncology*	2.57
7. *Clinical Implant Dentistry*	2.41
8. *International Endodontic Journal*	2.15
9. *Clinical Oral Implants Research*	2.15
10. *Journal of Periodontal Research*	2.15

The IF is frequently used as an indicator of the importance of a journal to its field. The journal with the highest IF is the one that published the most commonly cited articles over a 2-year period. However, this is not synonymous with the quality of an individual article. The IF applies only to journals, not to individual articles or individual scientists (unlike the "H-index"). The relative number of citations an individual article receives is better evaluated as "citation impact."

It is possible to measure the IF of the journals in which a particular person has published articles. This use is widespread, but controversial. The inventor of the IF warned about the "misuse in evaluating individuals" because there is "a wide variation from article to article within a single journal." IFs have a large, but controversial, influence on the way published scientific research is perceived and evaluated. So please, let's not misuse the IF. Garfield[1] wrote, "In an ideal world, evaluators would read each article and make personal judgments," and I do agree with him.

In dentistry, the current "top" journal is *Periodontology 2000*, a journal that only publishes reviews (not necessarily systematic). Reviews are usually more read and cited, so it is not surprising that a journal that publishes only reviews would reach the top of the list. What would be misguided would be to think that the best articles in terms of quality are published in *Periodontology 2000* just because it has the highest IF. Popularity and quality are not necessarily the same.

Marco Esposito
Editor-in-Chief, *European Journal of Oral Implantology*

Reference

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

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