Highly cited orthodontic articles from 2000 to 2015

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Introduction: Identification of highly cited articles based on the h-index and its properties is important for the evaluation of the past, present, and future of any research discipline. In this study, we aimed to identify the h-classic articles in orthodontics. **Methods:** One search on the Web of Science identified all articles from 2000 to 2015 in the 89 journals indexed by the 2015 InCites Journal Citation Reports in the scientific area "dentistry, oral surgery, and medicine." A second search was performed in the Web of Science using all mesh terms related to orthodontics. Then, we applied the h-classic method to select the recent articles with the greatest scientific impact in orthodontics. **Results:** Eighty articles were considered as h-classic articles. They were published in 20 of the 89 dental journals of the 2015 InCites Journal Citation Reports list. Only 36 articles appeared in orthodontic journals: 23 in the *American Journal of Orthodontics & Dentofacial Orthopedics* (28.8%), 7 in *The Angle Orthodontist* (8.8%), and 6 in *European Journal of Orthodontics* (7.5%). Thirty-eight articles originated from Europe, 28 from the Americas, and 14 from the Middle East and Asia. **Conclusions:** More than half of fundamental orthodontic research is published in nonorthodontic journals showing that our field is currently limited, and interactions with other research fields should be sought to increase orthodontic research importance and appeal. (Am J Orthod Dentofacial Orthop 2018;153:61-9)

Orthodontic research has evolved and continues to evolve throughout time. Many studies have attempted to address the qualitative aspects of this progress, focusing on qualitative and quantitative analyses of the published output. The articles with the greatest impact in a given scientific area are termed "citation classics."[1] Such studies identify the highly cited articles setting thresholds of citations received, such as the 100 most cited cleft lip and palate-related articles,[2] the 100 most cited articles in periodontology,[3] or the 50 most cited articles in dentistry and medicine in general.[4,5] In orthodontics, Hui et al[6] published a study with the 100 most cited articles in orthodontics.

Arbitrary thresholds, however, take no account of the variability among research areas in the number of highly influential articles or the fact that the achievement of many hundreds of citations may be commonplace in some areas and difficult to attain in others.[7] To overcome this, Martinez et al[8] suggested the selection of classic articles based on the h-index proposed by Hirsch[9] and the h-core concept.[10] De la Flor-Martinez et al[7] further applied this method to identify classic articles in implant dentistry, periodontics, and oral surgery. There is no relevant information for h-classics in orthodontics. Despite the scarce attempts in evaluating articles with a significant impact in the orthodontic community, there is no previous evaluation of the "citation classics" for orthodontics using objective methodology.[2,6] The aim of this article was to identify the classic articles in orthodontics using the h-classic method.

MATERIAL AND METHODS

We applied the method of Martinez et al[8] to identify recent articles with a great impact on the scientific community in orthodontics. One search was performed using the Web of Science and included all publications in all databases (Web of Science Core Collection, KCI-Korean Journal Database, MEDLINE, BioSIS Citation Index, and SciELO Citation Index) from 2000 to 2015 in the 89 journals indexed by the 2015 InCites Journal Citation Reports in the scientific area "dentistry, oral surgery, and medicine." This was performed using the advanced search of Web of Science and applying the command WC = dentistry, oral

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Table I. The 80 h-classics in orthodontics

Rank	Times cited	Title	Publication type
1	274	Cardaropoli G, Araujo M, Lindhe J. Dynamics of bone tissue formation in tooth extraction sites—an experimental study in dogs. *Journal of Clinical Periodontology* 2003;30:809-18.	Article
2	221	Park HS, Jeong SH, Kwon OW. Factors affecting the clinical success of screw implants used as orthodontic anchorage. *American Journal of Orthodontics & Dentofacial Orthopedics* 2006;130:18-25.	Article
3	200	Matinlinna JP, Lassila LV, Ozcan M, Yli-Urpo A, Vallittu PK. An introduction to silanes and their clinical applications in dentistry. *International Journal of Prosthodontics* 2004;17:155-64.	Review
4	200	Hermann JS, Schoolfield JD, Schenk RK, Buser D, Cochran DL. Influence of the size of the microgap on crestal bone changes around titanium implants. A histometric evaluation of unloaded non-submerged implants in the canine mandible. *Journal of Periodontology* 2001;72:1372-83.	
5	196	Liou EJ, Pai BC, Lin JC. Do miniscrews remain stationary under orthodontic forces? *American Journal of Orthodontics & Dentofacial Orthopedics* 2004;126:42-7.	Review
6	188	Lavigne GJ, Kato T, Kolta A, Sessle BJ. Neurobiological mechanisms involved in sleep bruxism. *Critical Reviews in Oral Biology and Medicine* 2003;14:30-46.	Article
7	174	Yukna RA, Mellonig JT. Histologic evaluation of periodontal healing in humans following regenerative therapy with enamel matrix derivative. A 10-case series. *Journal of Periodontology* 2000;71:752-9.	Article
8	172	Lavigne GJ, Khoury S, Abe S, Yamaguchi T, Raphael K. Bruxism physiology and pathology: an overview for clinicians. *Journal of Oral Rehabilitation* 2008;35:476-94.	Review
9	171	Kuroda S, Sugawara Y, Deguchi T, Kyung HM, Takano-Yamamoto T. Clinical use of miniscrew implants as orthodontic anchorage: success rates and postoperative discomfort. *American Journal of Orthodontics & Dentofacial Orthopedics* 2007;131:9-15.	Review
10	170	Ausiello P, Apicella A, Davidson CL. Effect of adhesive layer properties on stress distribution in composite restorations—a 3D finite element analysis. *Dental Materials* 2002;18:295-303.	Review
11	167	Lobbezoo F, Naeije M. Bruxism is mainly regulated centrally, not peripherally. *Journal of Oral Rehabilitation* 2001;28:1085-91.	Article
12	163	Wise GE, King GJ. Mechanisms of tooth eruption and orthodontic tooth movement. *Journal of Dental Research* 2008;87:414-34.	Article
13	159	Bosshardt DD. Are cementoblasts a subpopulation of osteoblasts or a unique phenotype? *Journal of Dental Research* 2005;84:390-406.	Review
14	151	Bishara SE, VonWald L, Laffoon JF, Warren JJ. Effect of a self-etch primer/adhesive on the shear bond strength of orthodontic brackets. *American Journal of Orthodontics & Dentofacial Orthopedics* 2001;119:621-4.	Article
15	149	Ren YJ, Maltha JC, Kuijpers-Jagtman AM. Optimum force magnitude for orthodontic tooth movement: a systematic literature review. *Angle Orthodontist* 2003;73:86-92.	Systematic review
16	144	Ohmae M, Saito S, Morohashi T, Seki K, Qu H, Kanomi R, et al. A clinical and histological evaluation of titanium mini-implants as anchors for orthodontic intrusion in the beagle dog. *American Journal of Orthodontics & Dentofacial Orthopedics* 2001;119:489-97.	Article
17	143	Cattaneo PM, Dalstra M, Melsen B. The finite element method: a tool to study orthodontic tooth movement. *Journal of Dental Research* 2005;84:428-33.	Article
18	139	Wilcko WM, Wilcko T, Bouquot JE, Ferguson DJ. Rapid orthodontics with alveolar reshaping: two case reports of decrowding. *International Journal of Periodontics & Restorative Dentistry* 2001;21:9-19.	Article
19	136	Kanzaki H, Chiba M, Shimizu Y, Mitani H. Dual regulation of osteoclast differentiation by periodontal ligament cells through RANKL stimulation and OPG inhibition. *Journal of Dental Research* 2001;80:887-91.	Article
20	133	Meikle MC. The tissue, cellular, and molecular regulation of orthodontic tooth movement: 100 years after Carl Sandstedt. *European Journal of Orthodontics* 2006;28:221-40.	Article
21	133	Watts DC, Marouf AS, Al-Hindi AM. Photo-polymerization shrinkage-stress kinetics in resin-composites: methods development. *Dental Materials* 2003;19:1-11.	Article
22	130	Brezniak N, Wasserstein A. Orthodontically induced inflammatory root resorption. Part I: the basic science aspects. *Angle Orthodontist* 2002;72:175-9.	Review
23	129	Panula K, Finne K, Oikarinen K. Incidence of complications and problems related to orthognathic surgery: a review of 655 patients. *Journal of Oral and Maxillofacial Surgery* 2001;59:1128-36.	Article
24	128	Faccioni F, Franceschetti P, Cerpelloni M, Fracasso ME. In vivo study on metal release from fixed orthodontic appliances and DNA damage in oral mucosa cells. *American Journal of Orthodontics & Dentofacial Orthopedics* 2003;124:687-93.	Article