Lasers in Endodontics: An Online Study Guide

Abstract

The Editorial Board of the *Journal of Endodontics* has developed a literature-based study guide of topical areas related to endodontics. This study guide is intended to give the reader a focused review of the essential endodontic literature and does not cite all possible articles related to each topic. Although citing all articles would be comprehensive, it would defeat the idea of a study guide. This section will focus on the use of lasers in endodontics. *(J Endod 2008;34:e33–e36)*

Correspondence: *JOE* Editorial Board
JEndodontics@UTHSCSA.edu

0099-2399/$0 - see front matter
Copyright © 2008 by the American Association of Endodontists.
doi:10.1016/j.joen.2007.06.001

Introduction

The delivery of high quality clinical care requires a thorough understanding of the endodontic literature. The Editorial Board of the *Journal of Endodontics* has developed this online study guide for endodontists and fellow clinicians interested in endodontics.

There are several potential applications for an online study guide. First, an online study guide permits clinicians to focus in on particular areas of endodontics where they can quickly review key papers devoted to one particular topic. For example, this particular study guide focuses on the use of lasers in endodontics.

Second, a study guide permits speakers to efficiently review background material in preparation for future courses, lectures, or continuing educational events. Third, an online study guide permits students to review key papers in preparation for future examinations or for development of residency seminars. Fourth, an online study guide permits readers to quickly and efficiently access either the abstract or the entire paper cited in the Tables (see Discussion for details).

Methods

One potential problem in developing an online study guide was to provide a summary of major papers that contributed to a given topic area. The inclusion of all possible papers on a given topic would lead to an unwieldy collection that failed to clearly identify key papers in the area. Of course, exclusion of key papers is also problematic. To address this issue, the *JOE* Editorial Board developed the overall list of topics to be covered and then for each topic generated an initial tabulation of key historical and contemporary papers on that topic. This list was then sent to two outside reviewers who were both experienced educators and Diplomates of the American Board of Endodontics. These reviewers then recommended additions and deletions of papers to the proposed topic list.

To maintain currency, the *JOE* Editorial Board proposes to periodically update each topical study guide by using the same peer-reviewed process as described above.

Results

The results of the study guide (1–25) on the use of lasers in endodontics are organized into Table 1.

Discussion

The journey to clinical excellence requires not only outstanding clinical skills, but also that special knowledge that accrues from a study of the endodontic literature. The purpose of the *JOE* online study guide is to serve as one source for efficiently reviewing key papers that are organized by topic area and presented with the advantages of online Internet technology.

Although *JOE* readers are undoubtedly familiar with many aspects of the Internet, there are special features available at *JOE* online that provide particular advantages in their application for a study guide. For example, if this particular study guide is downloaded as a pdf, it provides a useful but static listing of the cited articles. On the other hand, if the reader navigates to the Table of Contents page for the Online Study Guide and then clicks on "Full Text" (Fig. 1), they will be taken to an HTML version of the Study Guide. This online version of the study guide has special capabilities including the fact that the references are hyperlinked. Thus, the reader can quickly obtain abstracts of nearly all cited papers and can review the entire paper of many of the cited papers with only a few clicks of their mouse (Fig. 2). Thus, combining a study guide with online capabilities provides particular benefits for efficiently reviewing key papers in the endodontic literature.

TABLE 1. Lasers in Endodontics

Ref #	Title
1.	Dederich DN, Zakariasen KL, Tulip J. Scanning electron microscopic analysis of canal wall dentin following neodymium-yttrium-aluminum-garnet laser irradiation. J Endod 1984;10:428–31.
2.	White JM, Goodis HE, Cohen JN. Bacterial reduction of contaminated dentin by Nd:YAG laser. J Dent Res 1991;70:412.
3.	Levy G. Cleaning and shaping the root canal with a Nd:YAG laser beam: a comparative study. J Endod 1992;18:123–7.
4.	Bahcall J, Howard P, Miserendino L, Walia H. Preliminary investigation of the histological effects of laser endodontic treatment on the periradicular tissues in dogs. J Endod 1992;18:47–51.
5.	Levy G, Rizoiu I, Friedman S, Lam H. Pressure waves in root canals induced by Nd:YAG laser. J Endod 1996;22:81–4.
6.	Ramskold LO, Fong CD, Stromberg T. Thermal effects and antibacterial properties of energy levels required to sterilize stained root canals with an Nd:YAG laser. J Endod 1997;23:96–100.
7.	McKinley IB Jr, Ludlow MO. Hazards of laser smoke during endodontic therapy. J Endod 1994;20:558–9.
8.	Ani I, Segovi S, Katane D, Prskalo K, Najzar-Fleger D. Scanning electron microscopic study of dentin lased with argon, CO_2, and Nd:YAG laser. J Endod 1998;24:77–81.
9.	Mehl A, Folwaczny M, Haffner C, Hickel R. Bacterial effects of 2.94 micron Er:YAG laser radiation in dental root canals. J Endod 1999;25:490–3.
10.	Armengol V, Jean A, Marion D. Temperature rise during Er:YAG and Nd:YAP laser ablation of dentin. J Endod 2000;26:138–41.
11.	Berkiten M, Berkiten R, Okar I. Comparative evaluation of antibacterial effects of Nd:YAG laser irradiation in root canals and dentinal tubules. J Endod 2000;26:268–70.
12.	Lan WH, Chen KW, Jeng JH, Lin CP, Lin SK. A comparison of the morphological changes after Nd-YAG and CO_2 laser irradiation of dentin surfaces. J Endod 2000;26:450–3.
13.	Shoji S, Hariu H, Horiuchi H. Canal enlargement by Er:YAG laser using a cone-shaped irradiation tip. J Endod 2000;26:454–8.
14.	Turkman C, Gunday M, Karacorlu M, Basaran B. Effect of CO_2, Nd:YAG, and ArF excimer lasers on dentin morphology and pulp chamber temperature: an in vitro study. J Endod 2000;26:644–8.
15.	Yamazaki R, Goya C, Yu DG, Kimura Y, Matsumoto K. Effects of erbium, chromium:YSGG laser irradiation on root canal walls: a scanning electron microscopic and thermographic study. J Endod 2001;27:9–12.
16.	Lin CP, Lee BS, Lin FH, Kok SH, Lan WH. Phase, compositional, and morphological changes of human dentin after Nd:YAG laser treatment. J Endod 2001;27:389–93.
17.	Kimura Y, Yonaga K, Yokoyama K, Matsuoka E, Sakai K, Matsumoto K. Apical leakage of obturated canals prepared by Er:YAG laser. J Endod 2001;27:567–70.
18.	Folwaczney M, Mehl A, Jordan C, Hickel R. Antibacterial effects of pulsed Nd:YAG laser radiation at different energy settings in root canals. J Endod 2002;28:24–9.
19.	Kimura Y, Yonaga K, Yokoyama K, Kinoshita JI, Ogata Y, Matsumoto K. Root surface temperature increase during Er:YAG laser irradiation of root canals. J Endod 2002;28:76–8.
20.	Stabholz A, Sahar-Helft S, Moshonov J. Lasers in endodontics. Dent Clin North Am 2004;48:809–32.
21.	Lan WH, Lee BS, Liu HC, Lin CP. Morphologic study of Nd:YAG laser usage in treatment of dentinal hypersensitivity. J Endod 2004;30:131–4.
22.	Esen E, Yoldas O, Kurkcu M, Dogan MC, Seydaoglu G. Apical microleakage of root-end cavities prepared by CO_2 laser. J Endod 2004;30:662–4.
23.	Lee MT, Bird PS, Walsh LJ. Photo-activated disinfection of the root canal: a new role for lasers in endodontics. Aust Dent J 2004;30:92–8.
24.	Karlovic Z, Pezelj-Ribaric S, Miletic I, Jukic S, Grgurevic J, Anic I. Erbium:YAG laser versus ultrasonic in preparation of root-end cavities. J Endod 2005;31:821–3.
25.	Altundasar E, Ozcelik B, Cehreli ZC, Matsumoto K. Ultramorphological and histochemical changes after ER,CR:YSGG laser irradiation and two different irrigation regimes. J Endod 2006;32:465–8.

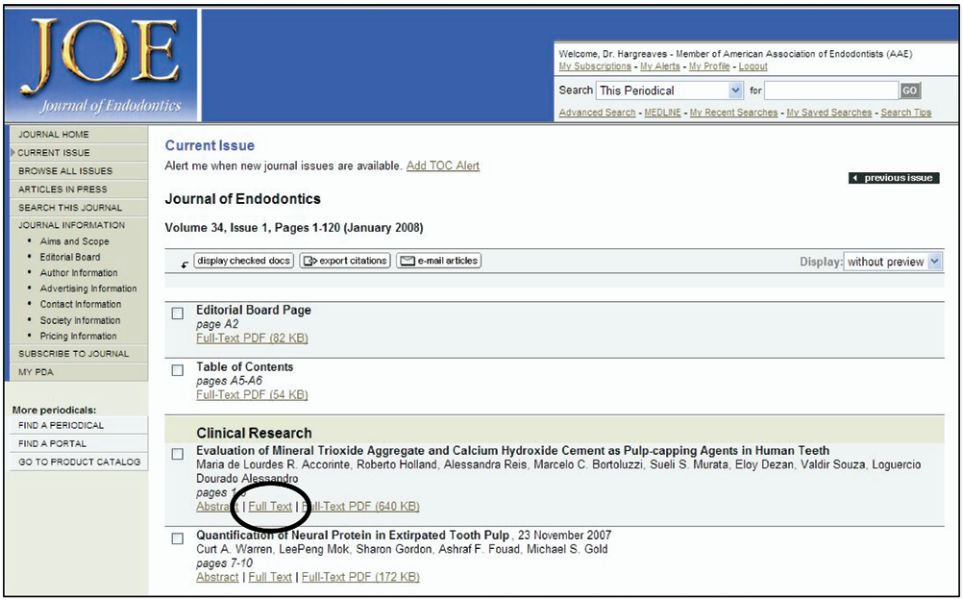

Figure 1. Navigation to HTML version.

We hope that this Study Guide will prove useful to you as one source for developing a focused and special base of endodontic knowledge. As always, we are interested in your thoughts on this initiative and how the *JOE* can better serve you, our readers. Feel free to email us at: JEndodontics@UTHSCSA.edu.

References

1. Dederich DN, Zakariasen KL, Tulip J. Scanning electron microscopic analysis of canal wall dentin following neodymium-yttrium-aluminum-garnet laser irradiation. J Endod 1984;10:428–31.
2. White JM, Goodis HE, Cohen JN. Bacterial reduction of contaminated dentin by Nd:YAG laser. J Dent Res 1991;70:412.
3. Levy G. Cleaning and shaping the root canal with a Nd:YAG laser beam: a comparative study. J Endod 1992;18:123–7.
4. Bahcall J, Howard P, Miserendino L, Walia H. Preliminary investigation of the histological effects of laser endodontic treatment on the periradicular tissues in dogs. J Endod 1992;18:47–51.
5. Levy G, Rizoiu I, Friedman S, Lam H. Pressure waves in root canals induced by Nd:YAG laser. J Endod 1996;22:81–4.
6. Ramskold LO, Fong CD, Stromberg T. Thermal effects and antibacterial properties of energy levels required to sterilize stained root canals with an Nd:YAG laser. J Endod 1997;23:96–100.
7. McKinley IB Jr, Ludlow MO. Hazards of laser smoke during endodontic therapy. J Endod 1994;20:558–9.
8. Ani I, Segovi S, Katane D, Prskalo K, Najzar-Fleger D. Scanning electron microscopic study of dentin lased with argon, CO_2, and Nd:YAG laser. J Endod 1998;24:77–81.
9. Mehl A, Folwaczny M, Haffner C, Hickel R. Bacterial effects of 2.94 micron Er:YAG laser radiation in dental root canals. J Endod 1999;25:490–3.
10. Armengol V, Jean A, Marion D. Temperature rise during Er:YAG and Nd:YAP laser ablation of dentin. J Endod 2000;26:138–41.
11. Berkiten M, Berkiten R, Okar I. Comparative evaluation of antibacterial effects of Nd:YAG laser irradiation in root canals and dentinal tubules. J Endod 2000;26:268–70.
12. Lan WH, Chen KW, Jeng JH, Lin CP, Lin SK. A comparison of the morphological changes after Nd-YAG and CO_2 laser irradiation of dentin surfaces. J Endod 2000;26:450–3.

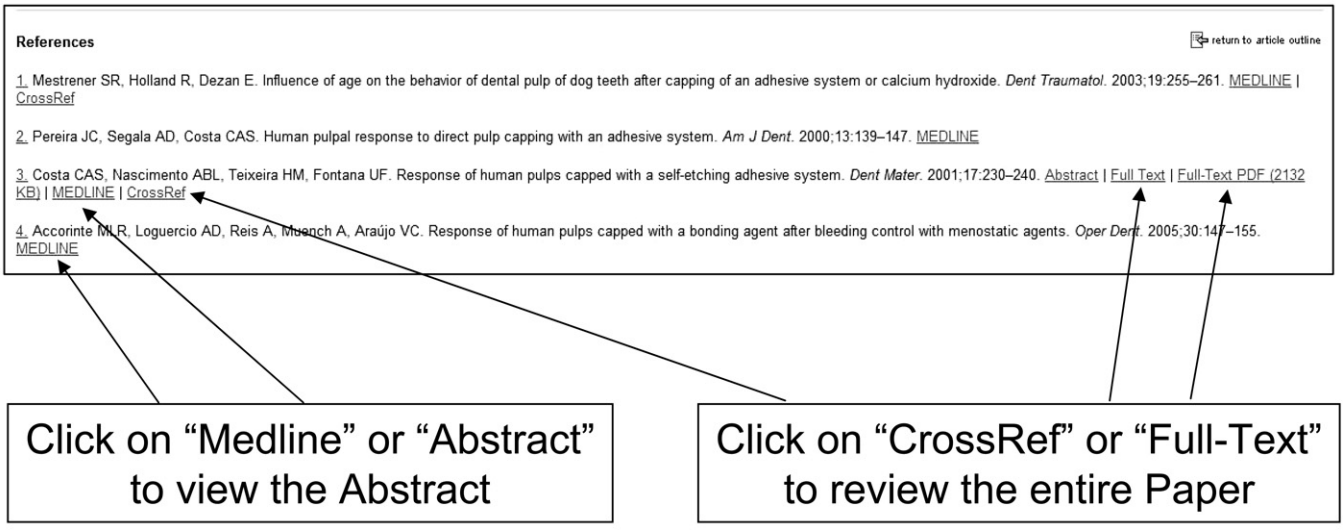

Figure 2. Hyperlink to References.

13. Shoji S, Hariu H, Horiuchi H. Canal enlargement by Er:YAG laser using a cone-shaped irradiation tip. J Endod 2000;26:454–8.
14. Turkman C, Gunday M, Karacorlu M, Basaran B Effect of CO_2, Nd:YAG, and ArF excimer lasers on dentin morphology and pulp chamber temperature: an in vitro study. J Endod 2000;26:644–8.
15. Yamazaki R, Goya C, Yu DG, Kimura Y, Matsumoto K. Effects of erbium, chromium: YSGG laser irradiation on root canal walls: a scanning electron microscopic and thermographic study. J Endod 2001;27:9–12.
16. Lin CP, Lee BS, Lin FH, Kok SH, Lan WH. Phase, compositional, and morphological changes of human dentin after Nd:YAG laser treatment. J Endod 2001;27:389–93.
17. Kimura Y, Yonaga K, Yokoyama K, Matsuoka E, Sakai K, Matsumoto K. Apical leakage of obturated canals prepared by Er:YAG laser. J Endod 2001;27:567–70.
18. Folwaczney M, Mehl A, Jordan C, Hickel R. Antibacterial effects of pulsed Nd:YAG laser radiation at different energy settings in root canals. J Endod 2002;28: 24–9.
19. Kimura Y, Yonaga K, Yokoyama K, Kinoshita JI, Ogata Y, Matsumoto K. Root surface temperature increase during Er:YAG laser irradiation of root canals. J Endod 2002;28:76–8.
20. Stabholz A, Sahar-Helft S, Moshonov J. Lasers in endodontics. Dent Clin North Am 2004;48:809–32.
21. Lan WH, Lee BS, Liu HC, Lin CP. Morphologic study of Nd:YAG laser usage in treatment of dentinal hypersensitivity. J Endod 2004;30:131–4.
22. Esen E, Yoldas O, Kurkcu M, Dogan MC, Seydaoglu G. Apical microleakage of root-end cavities prepared by CO_2 laser. J Endod 2004;30:662–4.
23. Lee MT, Bird PS, Walsh LJ. Photo-activated disinfection of the root canal: a new role for lasers in endodontics. Aust Dent J 2004;30:92–8.
24. Karlovic Z, Pezelj-Ribaric S, Miletic I, Jukic S, Grgurevic J, Anic I. Erbium:YAG laser versus ultrasonic in preparation of root-end cavities. J Endod 2005;31:821–3.
25. Altundasar E, Ozcelik B, Cehreli ZC, Matsumoto K. Ultramorphological and histochemical changes after ER,CR:YSGG laser irradiation and two different irrigation regimes. J Endod 2006;32:465–8.