

# Procedural Accidents: 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 cover procedural accidents, including perforation repairs, separated instrument, and accidents with irrigants and endodontic materials. (*J Endod* 2008;34:e65–e70)

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## 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 on particular areas of endodontics where they can quickly review key papers devoted to one particular topic. For example, this particular study guide provides a summary of key papers in the area of procedural accidents, including perforation repairs, separated instrument, and accidents with irrigants and endodontic materials.

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 (1–43) provide an overview of selected literature on procedural accidents, including perforation repairs, separated instrument, and accidents with irrigants and endodontic materials. This information is organized into Tables 1-3.

## 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.

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](mailto:JEndodontics@UTHSCSA.edu).

**TABLE 1.** Perforation Repairs

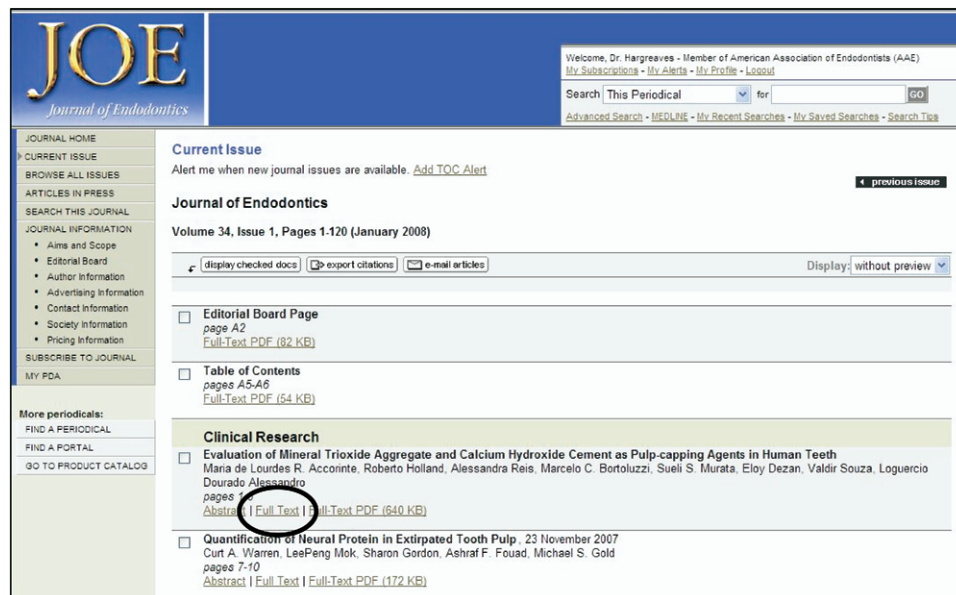
Ref #	Title
1.	Seltzer S, Sinai I, August D. Periodontal effects of root perforations before and during endodontic procedures. <i>J Dent Res</i> 1970;49:332–9.
2.	EIDeeb ME, EIDeeb M, Tabibi A, Jensen JR. An evaluation of the use of amalgam, Cavit, and calcium hydroxide in the repair of furcation perforations. <i>J Endod</i> 1982;8:459–66.
3.	Jew RCK, Weine FS, Keene JJ, Smulson MH. A histologic evaluation of periodontal tissues adjacent to root perforations filled with Cavit. <i>Oral Surg Oral Med Oral Pathol</i> 1982;54:124–35.
4.	Benenati FW, Roane JB, Biggs JT, Simon JH. Recall evaluation of iatrogenic root perforations repaired with amalgam and gutta-percha. <i>J Endod</i> 1986;12:161–6.
5.	Lemon RR. Nonsurgical repair of perforation defects: internal matrix concept. <i>Dent Clin North Am</i> 1992;36:439–57.
6.	Lee SJ, Monsef M, Torabinejad M. Sealing ability of a mineral trioxide aggregate for repair of lateral root perforations. <i>J Endod</i> 1993;19:541–4.
7.	Pitt Ford TR, Torabinejad M, McKendry DJ, Hong C, Kariyawasam SP. Use of mineral trioxide aggregate for repair of furcal perforations. <i>Oral Surg Oral Med Oral Pathol Oral Radiol Endod</i> 1995;79:756–62.
8.	Fuss Z, Trope M. Root perforations: classification and treatment choices based on prognostic factors. <i>Endod Dent Traumatol</i> 1996;12:255–64.
9.	Dragoo MR. Resin-ionomer and hybrid-ionomer cements: part II—clinical and histological wound healing responses in specific periodontal lesions. <i>Int J Perio Rest Dent</i> 1997;17:75–87.
10.	Alhadainy HA, Himel VT, Lee WB, Elbaghdady YM. Use of hydroxylapatite-based material and calcium sulfate as artificial floors to repair furcal perforations. <i>Oral Surg Oral Med Oral Pathol Oral Radiol Endod</i> 1998;86:723–9.
11.	Nakata TT, Bae KS, Baumgartner JC. Perforation repair comparing mineral trioxide aggregate and amalgam using an anaerobic bacterial leakage model. <i>J Endod</i> 1998;24:184–6.
12.	Sluyk SR, Moon PC, Hartwell GR. Evaluation of setting properties and retention characteristics of mineral trioxide aggregate when used as a furcation perforation repair material. <i>J Endod</i> 1998;24:768–71.
13.	Roda RS. Root perforation repair: surgical and nonsurgical management. <i>Pract Proced Aesthet Dent</i> 2001;13:467–72.
14.	Weldon JK, Pashley DH, Loushine RJ, Weller RN, Kimbrough WF. Sealing ability of mineral trioxide aggregate and Super-EBA when used as furcation repair materials: a longitudinal study. <i>J Endod</i> 2002;28:467–70.
15.	Main C, Mirzayan N, Shabahang S, Torabinejad M. Repair of root perforation using mineral trioxide aggregate: a long-term study. <i>J Endod</i> 2004;30:80–3.
16.	Ferris DM, Baumgartner JC. Perforation repair comparing two types of mineral trioxide aggregate. <i>J Endod</i> 2004;30:422–4.
17.	Hardy I, Liewehr FR, Joyce AP, Agee K, Pashley DH. Sealing ability of One-Up Bond and MTA with and without a secondary seal as furcation perforation repair materials. <i>J Endod</i> 2004;30:658–61.
18.	Yildirim T, Gencoglu N, Firat I, Perk C, Guzel O. Histologic study of furcation perforations treated with MTA or Super EBA in dogs' teeth. <i>Oral Surg Oral Med Oral Pathol Oral Radiol Endod</i> 2005;100:120–4.
19.	Regan JD, Witherspoon DE, Foyle DM. Surgical repair of root and tooth perforations. <i>Endod Topics</i> 2005;11:152–78.
20.	Tsesis I, Fuss Z. Diagnosis and treatment of accidental root perforations. <i>Endod Topics</i> 2006;13:95–107.

**TABLE 2.** Separated Instruments

Ref #	Title
21.	Crump MC, Natkin E. Relationship of broken root canal instruments to endodontic case prognosis: a clinical investigation. J Am Dent Assoc 1970;80:1341-7.
22.	Fox J, Moodnik RM, Greenfield E, Atkinson JS. Filling root canals with files: radiographic evaluation of 304 cases. N Y State Dent J 1972;38:154-7.
23.	Frank AL. The dilemma of the fractured instrument. J Endod 1983;9:515-6.
24.	Mandel E, Adib-Yazdi M, Benhamou LM, Lachkar T, Mesgouez C, Sobel M. Rotary Ni-Ti Profile systems for preparing curved canals in resin blocks: influence of operator on instrument breakage. Int Endod J 1999;32:436-43.
25.	Hulsmann M, Schinkel I. Influence of several factors on the success or failure of removal of fractured instruments from the root canal. Endod Dent Traumatol 1999;15:252-8.
26.	Ward JR, Parashos P, Messer HH. Evaluation of an ultrasonic technique to remove fractured rotary nickel-titanium endodontic instruments from root canals: clinical cases. J Endod 2003;29:764-7.
27.	Saunders JL, Eleazer PD, Zhang P, Michalek S. Effect of a separated instrument on bacterial penetration of obturated root canals. J Endod 2004;30:177-9.
28.	Souter N, Messer HH. Complications associated with fractured file removal using an ultrasonic technique. J Endod 2005;31:450-2.
29.	Spili P, Parashos P, Messer HH. The impact of instrument fracture on outcome of endodontic treatment. J Endod 2005;31:845-50.
30.	Iqbal MK, Rafailov H, Kratchman SI, Karabucak B. A comparison of three methods for preparing centered platforms around separated instruments in curved canals. J Endod 2006;32:48-51.
31.	Iqbal MK, Kohli MR, Kim JS. A retrospective clinical study of incidence of root canal instrument separation in an endodontics graduate program: a PennEndo database study. J Endod 2006;32:1048-52.

**TABLE 3.** Irrigants and Materials

Ref #	Title
32.	Kopczyk RA, Cunningham CJ, Abrams H. Periodontal implications of formocresol medication. J Endod 1986;12:567–9.
33.	Sabala CL, Powell SE. Sodium hypochlorite injection into periapical tissues. J Endod 1989;15:490–2.
34.	Neaverth EJ, Swindle R. A serious complication following the inadvertent injection of sodium hypochlorite outside the root canal system. Compendium 1990;11:474–80.
35.	Ehrich DG, Brian JD, Walker WA. Sodium hypochlorite accident: Inadvertent injection into the maxillary sinus. J Endod 1993;19:180–2.
36.	Battrum DE, Gutmann JL. Implications, prevention and management of subcutaneous emphysema during endodontic treatment. Endod Dent Traumatol 1995;11:109–14.
37.	Mehra P, Clancy C, Wu J. Formation of a facial hematoma during endodontic therapy. J Am Dent Assoc 2000;131:67–71.
38.	Hulsmann M, Hahn W. Complications during root canal irrigation. Int Endod J 2000;33:186–93.
39.	Blanas N, Kienle F, Sandor GKB. Injury to the inferior alveolar nerve due to thermoplastic gutta-percha. J Oral Maxillofac Surg 2002;60:574–6.
40.	Lindgren P, Eriksson KF, Ringberg A. Severe facial ischemia after endodontic treatment. J Oral Maxillofac Surg 2002;60:576–9.
41.	Ahlgren FK, Johannessen AC, Hellem S. Displaced calcium hydroxide paste causing inferior alveolar nerve paraesthesia: report of a case. Oral Surg Oral Med Oral Pathol Oral Radiol Endod 2003;96:734–7.
42.	Gluskin AH. Mishaps and serious complications in endodontic obturation. Endod Topics 2005;12:52–70.
43.	Pogrel MA. Damage to the inferior alveolar nerve as the result of root canal therapy. J Am Dent Assoc 2007;138:65–9.



**Figure 1.** Navigation to HTML version.

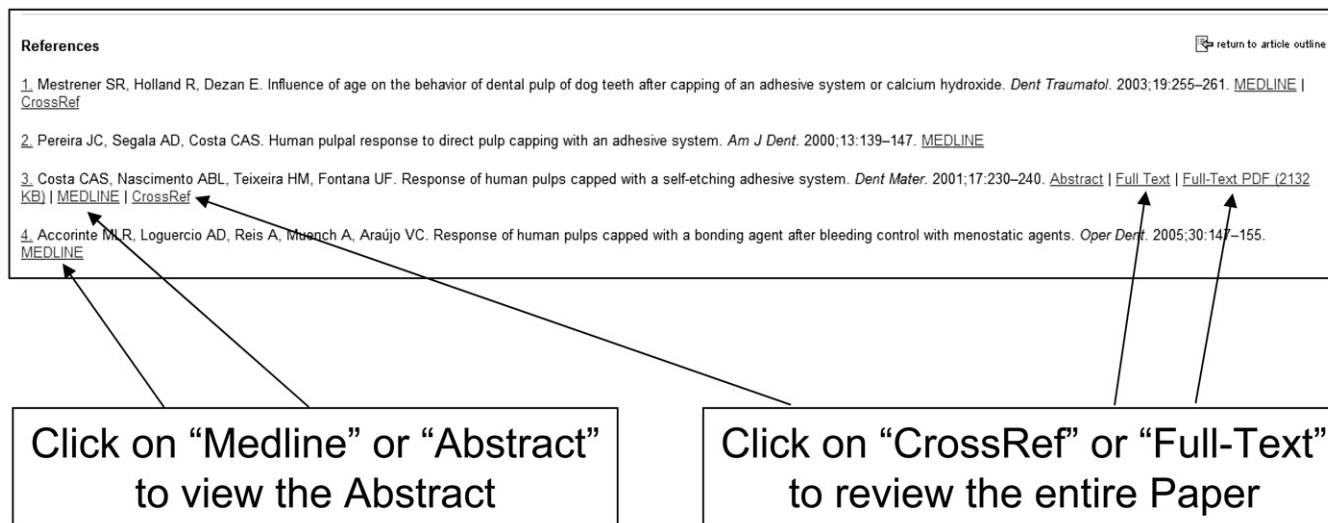


Figure 2. Hyperlink to References.

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2. ElDeeb ME, ElDeeb M, Tabibi A, Jensen JR. An evaluation of the use of amalgam, Cavit, and calcium hydroxide in the repair of furcation perforations. *J Endod* 1982;8:459–66.
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