

Endodontic Surgery: 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 indications and contraindications, surgical anatomy related to endodontics, flap design, root-end resection, the beveled root surface, root-end preparation techniques, root-end filling materials, endodontic surgical aids, endodontic surgical wound healing, incision and drainage, surgical trephination, intentional replantation, endodontic endosseous implants, submergence of roots, transplantation of teeth, and cystic decompression. (*J Endod* 2008; 34:e53–e63)

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.2007.06.019

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 surgical indications and contraindications, surgical anatomy related to endodontics, flap design, root-end resection, the beveled root surface, root-end preparation techniques, root-end filling materials, endodontic surgical aids, endodontic surgical wound healing, incision and drainage, surgical trephination, intentional replantation, endodontic endosseous implants, submergence of roots, transplantation of teeth, and cystic decompression.

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 (1–132) provide an overview of selected literature on surgical indications and contraindications, surgical anatomy related to endodontics, flap design, root-end resection, the beveled root surface, root-end preparation techniques, root-end filling materials, endodontic surgical aids, endodontic surgical wound healing, incision and drainage, surgical trephination, intentional replantation, endodontic endosseous implants, submergence of roots, transplantation of teeth, and cystic decompression. This information is organized into Tables 1–16.

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

Online Study Guide

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.

TABLE 1. Indications and Contraindications

Ref #	Title
1.	Gutmann JL, Harrison JW, eds. Surgical endodontics. Boston: Blackwell Scientific Publications, 1991:36–7.
2.	Kim S, Pecora G, Rubinstein R, eds. Microsurgery in endodontics. Philadelphia: WB Saunders Company, 2001:13–23.
3.	Abramovitz I, Better H, Schacham A, Shomi B, Metzger Z. Case selection for apical surgery: a retrospective evaluation of associated factors and rationale. <i>J Endod</i> 2002;28:527–30.

TABLE 2. Surgical Anatomy

Ref #	Title
4.	Gutmann JL, Harrison JW, eds. Surgical endodontics. Boston: Blackwell Scientific Publications, 1991: 123–49.
5.	Larato DC. Alveolar plate fenestrations and dehiscences of the human skull. <i>Oral Surg Oral Med Oral Pathol</i> 1970;29:816–9.
6.	Ericson S, Finne K, Persson G. Results of apicoectomy of maxillary canines, premolars, and molars with special reference to oroantral communication as a prognostic factor. <i>Int J Oral Surg</i> 1974;3:386–93.
7.	Lin L, Skribner J, Shovlin F, Langeland K. Periapical surgery of mandibular posterior teeth: anatomical and surgical considerations. <i>J Endod</i> 1983;9:496–501.
8.	Littner MM, Kaffe I, Tamse A, Dicapua P. Relationship between the apices of the lower molars and mandibular canal: a radiographic study. <i>Oral Surg Oral Med Oral Pathol</i> 1986;62: 595–602.
9.	Phillips JL, Weller RN, Kulild JC. The mental foramen: part I—size, orientation, and positional relationship to the mandibular second premolar. <i>J Endod</i> 1990;16:221–3.
10.	Eberhardt JA, Torabinejad M, Christiansen EL. A computed tomographic study of the distances between the maxillary sinus floor and the apices of the maxillary posterior teeth. <i>Oral Surg Oral Med Oral Pathol</i> 1992;73:345–6.
11.	Denio D, Torabinejad M, Bakland LK. Anatomical relationship of the mandibular canal to its surrounding structures in mature mandibles. <i>J Endod</i> 1992;18:161–5.
12.	Moiseiwitsch JRD. Position of the mental foramen in a North American, white population. <i>Oral Surg Oral Med Oral Pathol Oral Radiol Endod</i> 1998;85: 457–60.
13.	Jin G-C, Kim K-D, Roh B-D, Lee C-Y, Lee S-J. Buccal bone plate thickness of the Asian people. <i>J Endod</i> 2005;31:430–4.

TABLE 3. Endodontic Flap Design

Ref #	Title
14.	Gutmann JL, Harrison JW eds. Surgical endodontics. 1st ed. Boston: Blackwell Scientific Publications, 1991:153–82.
15.	Lubow RM, Wayman BE, Cooley RL. Endodontic flap design: analysis and recommendations for current usage. <i>Oral Surg Oral Med Oral Pathol</i> 1984;58:207–12.
16.	Kramper BJ, Kaminski EJ, Osetek EM, Heuer MA. A comparative study of the wound healing of three types of flap design used in periapical surgery. <i>J Endod</i> 1984;10:17–25.
17.	Moiseiwitsch JRD. Avoiding the mental foramen during periapical surgery. <i>J Endod</i> 1995;21:340–2.
18.	Velvart P. Papilla base incision: a new approach to recession-free healing of the interdental papilla after endodontic surgery. <i>Int Endod J</i> 2002;35:453–60.
19.	Velvart P, Peters CI. Soft tissue management in endodontic surgery. <i>J Endod</i> 2005;31:4–16.
20.	Velvart P, Peters CI, Peters OA. Soft tissue management: flap design, incision, tissue elevation, and tissue retraction. <i>Endo Topics</i> 2005;11:78–97.

TABLE 4. Root-End Resection

Ref #	Title
21.	Gutmann JL, Harrison JW, eds. Surgical endodontics. 1st ed. Boston: Blackwell Scientific Publications, 1991:208-16.
22.	Harrison JW, Todd MJ. The effect of root resection on the sealing property of root canal obturations. <i>Oral Surg Oral Med Oral Pathol</i> 1980;50:264–72.
23.	Cambuzzi JV, Marshall FJ. Molar endodontic surgery. <i>J Canad Dent Assoc</i> 1983;49:61–5.
24.	Craig KR, Harrison JW. Wound healing following demineralization of resected root ends in periradicular surgery. <i>J Endod</i> 1993;19:339–47.
25.	Gilheany PA, Figdor D, Tyas MJ. Apical dentin permeability and microleakage associated with root end resection and retrograde filling. <i>J Endod</i> 1994;20:22–6.
26.	Stropko JJ, Doyon GE, Gutmann JL. Root-end management: resection, cavity preparation, and material placement. <i>Endo Topics</i> 2005;11:131–51.

TABLE 5. The Beveled Root Surface

Ref #	Title
27.	Vertucci FJ, Beatty RG. Apical leakage associated with retrofilling techniques: a dye study. <i>J Endod</i> 1986;12:331–6.
28.	Tidmarsh BG, Arrowsmith MG. Dentinal tubules at the root ends of apicected teeth: a scanning electron microscopic study. <i>Int Endod J</i> 1989;22:184–9.
29.	Gutmann JL, Pitt Ford TR. Management of the resected root end: a clinical review. <i>Int Endod J</i> 1993;26:273–83.
30.	Teixeria FB, Sano CL, Gomes BP, Zaia AA, Ferrez CCR, Souza-Filho FJ. A preliminary in vitro study of the incidence and position of the root canal isthmus in maxillary and mandibular first molars. <i>Int Endod J</i> 2003;36:276–80.
31.	von Arx T. Frequency and type of canal isthmuses in first molars detected by endoscopic inspection during periradicular surgery. <i>Int Endod J</i> 2005;38:160–8.

TABLE 6. Root-End Preparation Techniques

Ref #	Title
32.	Gutmann JL, Harrison JW, eds. Surgical endodontics. 1st ed. Boston: Blackwell Scientific Publications, 1991:216–30.
33.	Bertrand G, Festal F, Barailly R. Use of ultrasound in apicoectomy. <i>Quint Internat</i> 1976;7:9–12.
34.	Flath RK, Hicks ML. Retrograde instrumentation and obturation with new devices. <i>J Endod</i> 1987;13:546–9.
35.	Wuchenich G, Meadows D, Torabinejad M. A comparison between two root-end preparation techniques in human cadavers. <i>J Endod</i> 1994;20:279–82.
36.	Gutmann JL, Saunders WP, Nguyen L, Guo IY, Saunders EM. Ultrasonic root-end preparation part 1: SEM analysis. <i>Int Endod J</i> 1994;27:318–24.
37.	Saunders WP, Saunders EM, Gutmann JL. Ultrasonic root-end preparation part 2: microleakage of EBA root-end fillings. <i>Int Endod J</i> 1994;27:325–9.
38.	Gorman MC, Steiman HR, Gartner AH. Scanning electron microscopic evaluation of root-end preparations. <i>J Endod</i> 1995;21:113–7.
39.	Waplinton M, Lumley PJ, Walmsley AD, Blunt L. Cutting ability of an ultrasonic retrograde cavity preparation instrument. <i>Endod Dent Traumatol</i> 1995;11:177–80.
40.	Frank RJ, Antrim DD, Bakland LK. Effect of retrograde cavity preparations on root apexes. <i>Endod Dent Traumatol</i> 1996;12:100–3.
41.	Beling KL, Marshall JG, Morgan LA, Baumgartner JC. Evaluation for cracks associated with ultrasonic root-end preparation of gutta-percha filled canals. <i>J Endod</i> 1997;23:323–6.
42.	Mehlhoff DS, Marshall JG, Baumgartner JC. Comparison of ultrasonic and high-speed bur root-end preparations using bilaterally matched teeth. <i>J Endod</i> 1997;23:448–52.
43.	Carr GB. Ultrasonic root end preparation. <i>Dent Clin North Am</i> 1997;41:541–54.
44.	Von Arx T, Walker WA III. Microsurgical instruments for root-end cavity preparation following apicoectomy: a literature review. <i>Endod Dent Traumatol</i> 2000;16:47–62.

TABLE 7. Root-End Filling Materials

Ref #	Title
45.	Gutmann JL, Harrison JW, eds. Surgical endodontics. 1st ed. Boston: Blackwell Scientific Publications, 1991:230–77.
46.	Omnell K. Electrolytic precipitation of zinc carbonate in the jaw: an unusual complication after root resection. <i>Oral Surg Oral Med Oral Pathol</i> 1959;12:846–52.
47.	Moodnik RM, Levey MH, Besen MA, Borden BG. Retrograde amalgam filling: a scanning electron microscopic study. <i>J Endod</i> 1975;1:28–31.
48.	Oynick J, Oynick T. A study of a new material for retrograde fillings. <i>J Endod</i> 1978;4:203–6.
49.	Liggett WR, Brady JM, Tsaknis PJ, del Rio CE. Light microscopy, scanning electron microscopy, and microprobe analysis of bone response to zinc and non-zinc amalgam implants. <i>Oral Surg Oral Med Oral Pathol</i> 1980;49:254–62.
50.	Tanzilli JP, Raphael D, Moodnik RM. A comparison of the marginal adaptation of retrograde techniques: a scanning electron microscopic study. <i>Oral Surg Oral Med Oral Pathol</i> 1980;50:74–80.
51.	Bondra DL, Hartwell GR, MacPherson MG, Portell FR. Leakage in vitro with IRM, high copper amalgam, and EBA cement as retrofilling materials. <i>J Endod</i> 1989;15:157–60.
52.	Minnich SG, Hartwell GR, Portell FR. Does cold burnishing gutta-percha create a better apical seal? <i>J Endod</i> 1989;15:204–9.
53.	Dorn SO, Gartner AH. Retrograde filling materials: a retrospective success-failure study of amalgam, EBA and IRM. <i>J Endod</i> 1990;16:391–3.
54.	Friedman S. Retrograde approaches in endodontic therapy. <i>Endod Dent Traumatol</i> 1991;7:97–107.
55.	Rud J, Munksgaard EC, Andreasen JO, Rud V, Asumssen E. Retrograde root filling with composite and a dentin-bonding agent. <i>Endod Dent Traumatol</i> 1991;7:118–25.
56.	Frank AL, Glick DH, Patterson SS, Weine FS. Long-term evaluation of surgically placed amalgam fillings. <i>J Endod</i> 1992;18:391–8.
57.	Andreasen JO, Munksgaard EC, Fredebo L, Rud J. Periodontal tissue regeneration including cementogenesis adjacent to dentin bonded retrograde composite fillings in humans. <i>J Endod</i> 1993;19:151–3.
58.	Torabinejad M, Higa RK, McKendry DJ, Pitt Ford TR. Dye leakage of four root end filling materials: effects of blood contamination. <i>J Endod</i> 1994;20:159–63.
59.	Crooks WG, Anderson RW, Powell BJ, Kimbrough WF. Longitudinal evaluation of the seal of IRM root end fillings. <i>J Endod</i> 1994;20:250–2.
60.	Pitt Ford TR, Andreasen JO, Dorn SO, Kariyawasam SP. Effect of Super-EBA as a root end filling on healing after replantation. <i>J Endod</i> 1995;21:13–5.
61.	Torabinejad M, Rastegar AF, Kettering JD, Pitt Ford TR. Bacterial leakage of mineral trioxide aggregate as a root-end filling material. <i>J Endod</i> 1995;21:109–12.
62.	Torabinejad M, Pitt Ford TR. Root end filling materials: a review. <i>Endod Dent Traumatol</i> 1996;12:161–78.
63.	Bates CF, Carnes DL, del Rio CE. Longitudinal sealing ability of mineral trioxide aggregate as a root-end filling material. <i>J Endod</i> 1996;22:575–8.
64.	Yaccino JM, Walker WA III, Carnes DL Jr, Schindler WG. Longitudinal microleakage evaluation of Super-EBA as a root-end sealing material. <i>J Endod</i> 1999;25:552–4.
65.	Keiser K, Johnson CC, Tipton DA. Cytotoxicity of mineral trioxide aggregate using human periodontal ligament fibroblasts. <i>J Endod</i> 2000;26:288–91.
66.	Rud J, Rud V, Munksgaard EC. Periapical healing of mandibular molars after root-end sealing with dentine-bonded composite. <i>Int Endod J</i> 2001;34:285–92.
67.	Siqueira JF, Roccas IN, Abad EC, Castro AJR, Gahyva SM, Favieri A. Ability of three root-end filling materials to prevent bacterial leakage. <i>J Endod</i> 2001;27:673–5.
68.	Murray MJ, Loushine RJ, Weller RN, Kimbrough WF, Pashley DH. Use of self-etching adhesives to seal resected apices. <i>J Endod</i> 2004;30:538–40.
69.	Back SH, Plenck H, Kim S. Periapical tissue responses and cementum regeneration with amalgam, Super EBA, and MTA as root-end filling materials. <i>J Endod</i> 2005;31:444–9.
70.	Theodosopoulou JN, Niederman R. A systematic review of <i>In Vitro</i> retrograde obturation materials. <i>J Endod</i> 2005;31:341–9.
71.	Sumer M, Muglali M, Bodrumlu E, Guvenc T. Reactions of connective tissue to amalgam, intermediate restorative material, mineral trioxide aggregate, and mineral trioxide aggregate mixed with chlorhexidine. <i>J Endod</i> 2006;32:1094–6.

TABLE 8. Endodontic Surgical Aids

Ref #	Title
72.	Buckley JA, Ciancio SG, McMullen JA. Efficacy of epinephrine concentration in local anesthesia during periodontal surgery. <i>J Periodontol</i> 1984;55:653–7.
73.	Ibarrola JL, Bjorenson JE, Austin BP, Gerstein H. Osseous reactions to three hemostatic agents. <i>J Endod</i> 1985;11:75–83.
74.	Cambruzzi JV, Marshall FJ, Pappin JB. Methylene blue dye: an aid to endodontic surgery. <i>J Endod</i> 1985;11:311–4.
75.	Martin MV, Nind D. Use of chlorhexidine gluconate for pre-operative disinfection of apicoectomy sites. <i>Brit Dent J</i> 1987; 162:459–61.
76.	Jeansonne BG, Boggs WS, Lemon RR. Ferric sulfate hemostasis: effect on osseous wound healing—II: with curettage and irrigation. <i>J Endod</i> 1993;19:174–7.
77.	Schindler WG, Walker WA III. Transillumination of the beveled root surface: an aid to periradicular surgery. <i>J Endod</i> 1994; 20:408–10.
78.	Witherspoon DE, Gutmann JL. Haemostasis in periradicular surgery. <i>Int Endod J</i> 1996;29:135–49.
79.	Rubinstein R. Endodontic microsurgery and the surgical operating microscope. <i>Compendium</i> 1997;18:659–72.
80.	Kim S, Rethnam S. Hemostasis in endodontic microsurgery. <i>Dent Clin North Am</i> 1997;41:499–511.
81.	Pecora G, De Leonardis D, Ibrahim N, Bovi M, Cornolini R. The use of calcium sulphate in the surgical treatment of a through and through periradicular lesion. <i>Int Endod J</i> 2001;34:189–97.
82.	Vickers FJ, Baumgartner JC, Marshall G. Hemostatic efficacy and cardiovascular effects of agents used during endodontic surgery. <i>J Endod</i> 2002;28:322–3.
83.	Ardekian L, Gaspar R, Peled M, Brener B, Laufer D. Does low-dose aspirin therapy complicate oral surgery procedures? <i>J Am Dent Assoc</i> 2000;131:331–5.
84.	Wahl MJ. Myths of dental surgery in patients receiving anticoagulant therapy. <i>J Am Dent Assoc</i> 2000;131:77–81.
85.	Vy CH, Baumgartner JC, Marshall JG. Cardiovascular effects and efficacy of a hemostatic agent in periradicular surgery. <i>J Endod</i> 2004;30:379–83.
86.	Lindeboom JAH, Frenken JWH, Valkenburg P, van den Akker HP. The role of preoperative prophylactic antibiotic administration in periapical endodontic surgery: a randomized, prospective double-blind placebo-controlled study. <i>Int Endod J</i> 2005;38:877–81.
87.	Kim S, Kratchman S. Modern endodontic surgical concepts and practice: a review. <i>J Endod</i> 2006;32:601–23.

TABLE 9. Endodontic Surgical Wound Healing

Ref #	Title
88.	Gutmann JL, Harrison JW, eds. <i>Surgical endodontics</i> . Boston: Blackwell Scientific Publications, 1991: 300–37.
89.	Harrison JW. Healing of surgical wounds in oral mucoperiosteal tissues. <i>J Endod</i> 1991;17:401–8.
90.	Harrison JW, Jurosky KA. Wound healing in the tissues of the periodontium following periradicular surgery: I—the incisional wound. <i>J Endod</i> 1991;17:425–35.
91.	Harrison JW, Jurosky KA. Wound healing in the tissues of the periodontium following periradicular surgery: II—the dissectional wound. <i>J Endod</i> 1991;17:544–52.
92.	Harrison JW, Jurosky KA. Wound healing in the tissues of the periodontium following periradicular surgery: III—the osseous excisional wound. <i>J Endod</i> 1992;18:76–81.
93.	Craig KR, Harrison JW. Wound healing following demineralization of resected root ends in periradicular surgery. <i>J Endod</i> 1993;19:339–47.

TABLE 10. Incision and Drainage

Ref #	Title
94.	Gutmann JL, Harrison JW, eds. <i>Surgical endodontics</i> . 1st ed. Boston: Blackwell Scientific Publications, 1991:387–92.
95.	Laskin DM. Anatomic considerations in diagnosis and treatment of odontogenic infections. <i>J Am Dent Assoc</i> 1964;69:308–16.
96.	Morse DR. Oral pathways of infection: with special reference to endodontics. <i>J Brit Endo Soc</i> 1972:13–6.
97.	Guralnick W. Odontogenic infections. <i>Brit Dent J</i> 1984;156:440–7.

TABLE 11. Surgical Trephination

Ref #	Title
98.	Gutmann JL, Harrison JW, eds. Surgical endodontics. 1st ed. Boston: Blackwell Scientific Publications, 1991:392–5.
99.	Chestner SB, Selman AJ, Friedman J, Heyman RA. Apical fenestration: solution to recalcitrant pain in root canal therapy. <i>J Am Dent Assoc</i> 1968;77:846–8.
100.	Moos HL, Bramwell JD, Roahen JO. A comparison of pulpectomy alone versus pulpectomy with trephination for the relief of pain. <i>J Endod</i> 1996;22:422–5.
101.	Houck V, Reader A, Beck M, Nist E, Weaver J. Effect of trephination on postoperative pain and swelling in symptomatic necrotic teeth. <i>Oral Surg Oral Med Oral Pathol Oral Radiol Endod</i> 2000;90:507–13.
102.	Nist E, Reader A, Beck M. Effect of apical trephination on postoperative pain and swelling in symptomatic necrotic teeth. <i>J Endod</i> 2001;27:415–20.
103.	Henry BM, Fraser JG. Trephination for acute pain management. <i>J Endod</i> 2003;29:144–6

TABLE 12. Intentional Replantation

Ref #	Title
104.	Gutmann JL, Harrison JW, eds. Surgical endodontics. 1st ed. Boston: Blackwell Scientific Publications, 1991:449–61.
105.	Grossman LI. Intentional replantation of teeth. <i>J Am Dent Assoc</i> 1966;72:1111–8.
106.	Weine FS. The case against intentional replantation. <i>J Am Dent Assoc</i> 1980;100:664–8.
107.	Guy SC, Goerig AC. Intentional replantation: technique and rationale. <i>Quintessence Int</i> 1984;15:595–603.
108.	Bender IB, Rossman LE. Intentional replantation of endodontically treated teeth. <i>Oral Surg Oral Med Oral Pathol</i> 1993;76:623–30.
109.	Peer M. Intentional replantation: a 'last resort' treatment of a conventional treatment procedure? nine case reports. <i>Dent Traumatol</i> 2004;20:48–55.

TABLE 13. Endodontic Endosseous Implants

Ref #	Title
110.	Orlay HG. Splinting with endodontic implant stabilizers. <i>Dent Pract & Dent Rec</i> 1964;14:481–98.
111.	Frank AL. Improvement of the crown-root ratio by endodontic endosseous implants. <i>J Am Dent Assoc</i> 1967;74:451–62.
112.	Frank AL, Abrams AM. Histologic evaluation of endodontic implants. <i>J Am Dent Assoc</i> 1969;78:520–4.
113.	Seltzer S, Maggio J, Wollard R, Green D. Titanium endodontic implants: A scanning electron, electron microprobe, and histologic investigation. <i>J Endod</i> 1976;2:267–76.
114.	Madison S, Bjorndal AM. Clinical application of endodontic implants. <i>J Prosthet Dent</i> 1988;59:603–8.
115.	Larsen RM, Patten JR, Wayman BE. Endodontic endosseous implants: case reports and update of materials. <i>J Endod</i> 1989;15:496–500.
116.	Weine FS, Frank AL. Survival of the endodontic endosseous implant. <i>J Endod</i> 1993;19:524–8.

TABLE 14. Submergence of Roots

Ref #	Title
117.	Whitaker DD, Shankle RJ. A study of the histologic reaction of submerged root segments. <i>Oral Surg Oral Med Oral Pathol</i> 1974;37:919–35.
118.	Reames RL, Nickel JS, Patterson SS, Boone M, El-Kafrawy AH. Clinical, radiographic, and histological study of endodontically treated retained roots to preserve alveolar bone. <i>J Endod</i> 1975;1:367–73.
119.	O'Neal RB, Gound T, Levin MP, del Rio CE. Submergence of roots for alveolar bone preservation: I—endodontically treated roots. <i>Oral Surg</i> 1978;45:803–10.
120.	Garver DG, Fenster RK. Vital root retention in humans: a final report. <i>J Prosthet Dent</i> 1980;43:368–73.
121.	Garver DG, Muir TE. The retention of vital submucosal roots under immediate dentures: a surgical procedure. <i>J Prosthet Dent</i> 1983;50:753–6.

TABLE 15. Transplantation of Teeth

Ref #	Title
122.	Andreasen JO, Hjorting-Hansen E, Jolst O. A clinical and radiographic study of 76 autotransplanted third molars. <i>Scand J Dent Res</i> 1970;78:512–23.
123.	Massler M. Present status of tooth transplantation. <i>Dent Clin North Am</i> 1974;18:453–5.
124.	Hasselgren G, Larsson A, Rundquist L. Pulpal status after autogenous transplantation of fully developed maxillary canines. <i>Oral Surg Oral Med Oral Pathol</i> 1977;44:106–11.
125.	Conklin WW. Long-term follow-up and evaluation of transplantation of fully developed teeth. <i>Oral Surg Oral Med Oral Pathol</i> 1978;46:477–85.
126.	Smith JJ, Wayman BE. Successful autotransplantation. <i>J Endod</i> 1987;13:77–80.

TABLE 16. Cystic Decompression

Ref #	Title
127.	Gutmann JL, Harrison JW, eds. <i>Surgical endodontics</i> . 1st ed. Blackwell Scientific Publications, 1991:397–406.
128.	Patterson SS. Endodontic therapy: use of a polyethylene tube and stint for drainage. <i>J Am Dent Assoc</i> 1964;69:710–4.
129.	Freedland JB. Conservative reduction of large periapical lesions. <i>Oral Surg Oral Med Oral Pathol</i> 1970;29:455–64.
130.	Neaverth EJ, Burg HA. Decompression of large periapical cystic lesions. <i>J Endod</i> 1982;8:175–82.
131.	Kehoe JC. Decompression of a large periapical lesion: a short treatment course. <i>J Endod</i> 1986;12:311–4.
132.	Hoehn MM, LaBounty GL, Strittmater EJ. Conservative treatment of persistent periradicular lesions using aspiration and irrigation. <i>J Endod</i> 1990;16:182–6.

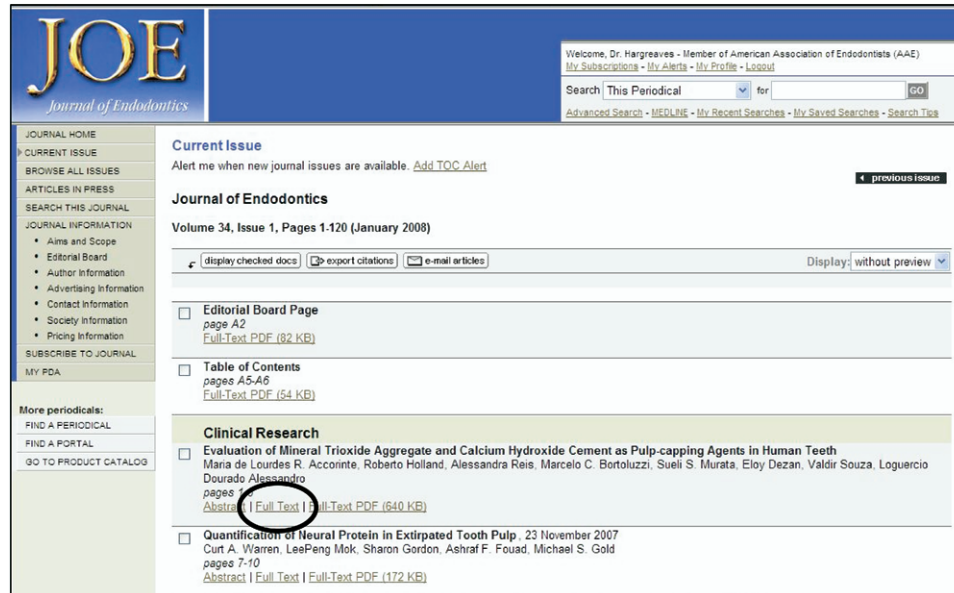


Figure 1. Navigation to HTML version.

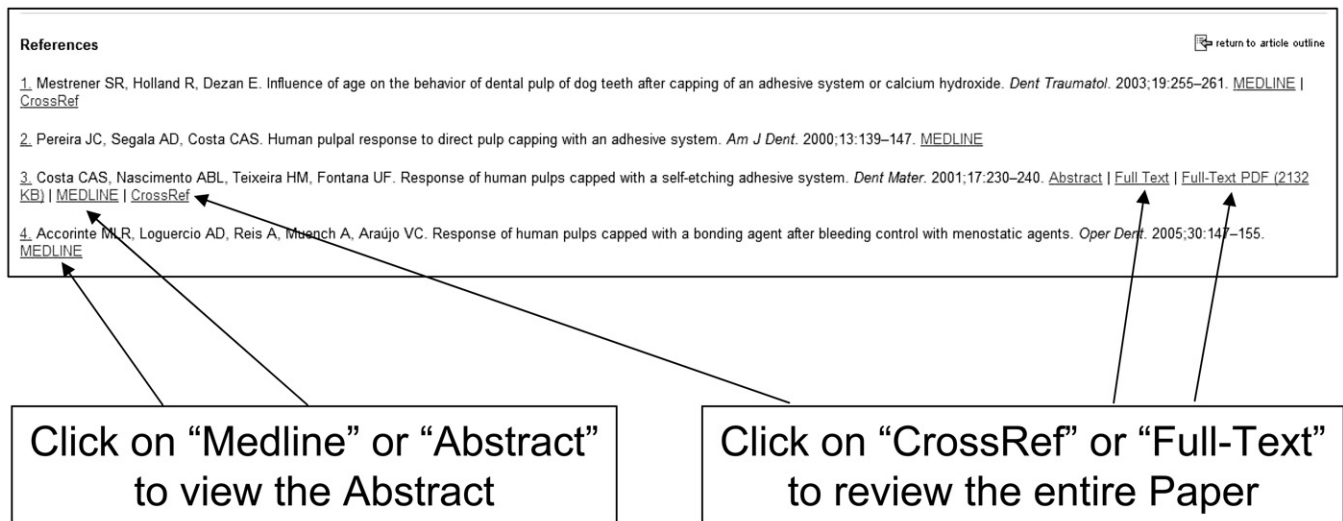


Figure 2. Hyperlink to References.

References

- Gutmann J, Harrison JW eds. Surgical endodontics. Boston: Blackwell Scientific Publications; 1991:7–36.
- Kim S, Pecora GR, Rubinstein R eds. Microsurgery in endodontics. Philadelphia: WB Saunders Company; 2001:13–23.
- Abramovitz I, Better H, Schacham A, Shomi B, Metzger Z. Case selection for apical surgery: a retrospective evaluation of associated factors and rationale. *J Endod* 2002;28:527–30.
- Gutmann J, Harrison JW eds. Surgical endodontics. Boston: Blackwell Scientific Publications; 1991:49–123.
- Larato DC. Alveolar plate fenestrations and dehiscences of the human skull. *Oral Surg Oral Med Oral Pathol* 1970;29:816–9.
- Ericson S, Finne K, Persson G. Results of apicoectomy of maxillary canines, premolars, and molars with special reference to oroantral communication as a prognostic factor. *Int J Oral Surg* 1974;3:386–93.
- Lin L, Skribner J, Shovlin F, Langeland K. Periapical surgery of mandibular posterior teeth: anatomical and surgical considerations. *J Endod* 1983;9:496–501.
- Littner MM, Kaffe I, Tamse A, Dicapua P. Relationship between the apices of the lower molars and mandibular canal: a radiographic study. *Oral Surg Oral Med Oral Pathol* 1986;62:595–602.
- Phillips JL, Weller RN, Kulild JC. The mental foramen: part I—size, orientation, and positional relationship to the mandibular second premolar. *J Endod* 1990;16:221–3.
- Eberhardt JA, Torabinejad M, Christiansen EL. A computed tomographic study of the distances between the maxillary sinus floor and the apices of the maxillary posterior teeth. *Oral Surg Oral Med Oral Pathol* 1992;73:345–6.
- Denio D, Torabinejad M, Bakland LK. Anatomical relationship of the mandibular canal to its surrounding structures in mature mandibles. *J Endod* 1992;18:161–5.
- Moiseiwitsch JRD. Position of the mental foramen in a North American, white population. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 1998;85:457–60.
- Jin G-C, Kim K-D, Roh B-D, Lee C-Y, Lee S-J. Buccal bone plate thickness of the Asian people. *J Endod* 2005;31:430–4.
- Gutmann J, Harrison JW eds. Surgical endodontics. 1st ed. Boston: Blackwell Scientific Publications; 1991:82–153.
- Lubow RM, Wayman BE, Cooley RL. Endodontic flap design: analysis and recommendations for current usage. *Oral Surg Oral Med Oral Pathol* 1984;58:207–12.
- Kramper BJ, Kaminski EJ, Osetek EM, Heuer MA. A comparative study of the wound healing of three types of flap design used in periapical surgery. *J Endod* 1984;10:17–25.
- Moiseiwitsch JRD. Avoiding the mental foramen during periapical surgery. *J Endod* 1995;21:340–2.

18. Velvart P. Papilla base incision: a new approach to recession-free healing of the interdental papilla after endodontic surgery. *Int Endod J* 2002;35:453–60.
19. Velvart P, Peters CI. Soft tissue management in endodontic surgery. *J Endod* 2005;31:4–16.
20. Velvart P, Peters CI, Peters OA. Soft tissue management: flap design, incision, tissue elevation, and tissue retraction. *Endo Topics* 2005;11:78–97.
21. Gutmann JH, Harrison JW eds. *Surgical endodontics*. 1st ed. Boston: Blackwell Scientific Publications; 1991:16–208.
22. Harrison JW, Todd MJ. The effect of root resection on the sealing property of root canal obturations. *Oral Surg Oral Med Oral Pathol* 1980;50:264–72.
23. Cambuzzi JV, Marshall FJ. Molar endodontic surgery. *J Canad Dent Assoc* 1983;49:61–5.
24. Craig KR, Harrison JW. Wound healing following demineralization of resected root ends in periradicular surgery. *J Endod* 1993;19:339–47.
25. Gilheany PA, Fidor D, Tyas MJ. Apical dentin permeability and microleakage associated with root end resection and retrograde filling. *J Endod* 1994;20:22–6.
26. Stropko JJ, Doyon GE, Gutmann JL. Root-end management: resection, cavity preparation, and material placement. *Endo Topics* 2005;11:131–51.
27. Vertucci FJ, Beatty RG. Apical leakage associated with retrofilling techniques: a dye study. *J Endod* 1986;12:331–6.
28. Tidmarsh BG, Arrowsmith MG. Dentinal tubules at the root ends of apicectived teeth: a scanning electron microscopic study. *Int Endod J* 1989;22:184–9.
29. Gutmann JL, Pitt Ford TR. Management of the resected root end: a clinical review. *Int Endod J* 1993;26:273–83.
30. Teixeira FB, Sano CL, Gomes BP, Zaia AA, Ferrez CCR, Souza-Filho FJ. A preliminary in vitro study of the incidence and position of the root canal isthmus in maxillary and mandibular first molars. *Int Endod J* 2003;36:276–80.
31. von Arx T. Frequency and type of canal isthmuses in first molars detected by endoscopic inspection during periradicular surgery. *Int Endod J* 2005;38:160–8.
32. Gutmann JH, Harrison JW eds. *Surgical endodontics*. 1st ed. Boston: Blackwell Scientific Publications; 1991:30–216.
33. Bertrand G, Festal F, Barailly R. Use of ultrasound in apicoectomy. *Quint Internat* 1976;7:9–12.
34. Flath RK, Hicks ML. Retrograde instrumentation and obturation with new devices. *J Endod* 1987;13:546–9.
35. Wuchenich G, Meadows D, Torabinejad M. A comparison between two root-end preparation techniques in human cadavers. *J Endod* 1994;20:279–82.
36. Gutmann JL, Saunders WP, Nguyen L, Guo IY, Saunders EM. Ultrasonic root-end preparation part 1: SEM analysis. *Int Endod J* 1994;27:318–24.
37. Saunders WP, Saunders EM, Gutmann JL. Ultrasonic root-end preparation part 2. microleakage of EBA root-end fillings. *Int Endod J* 1994;27:325–9.
38. Gorman MC, Steiman HR, Gartner AH. Scanning electron microscopic evaluation of root-end preparations. *J Endod* 1995;21:113–7.
39. Waplington M, Lumley PJ, Walmsley AD, Blunt L. Cutting ability of an ultrasonic retrograde cavity preparation instrument. *Endod Dent Traumatol* 1995;11:177–80.
40. Frank RJ, Antrim DD, Bakland LK. Effect of retrograde cavity preparations on root apices. *Endod Dent Traumatol* 1996;12:100–3.
41. Beling KL, Marshall JG, Morgan LA, Baumgartner JC. Evaluation for cracks associated with ultrasonic root-end preparation of gutta-percha filled canals. *J Endod* 1997;23:323–6.
42. Mehlhaff DS, Marshall JG, Baumgartner JC. Comparison of ultrasonic and high-speed bur root-end preparations using bilaterally matched teeth. *J Endod* 1997;23:448–52.
43. Carr GB. Ultrasonic root end preparation. *Dent Clin North Am* 1997;41:541–54.
44. Von Arx T, Walker WA III. Microsurgical instruments for root-end cavity preparation following apicoectomy: a literature review. *Endod Dent Traumatol* 2000;16:47–62.
45. Gutmann JH, Harrison JW eds. *Surgical endodontics*. 1st ed. Boston: Blackwell Scientific Publications; 1991:77–230.
46. Omnell K. Electrolytic precipitation of zinc carbonate in the jaw: an unusual complication after root resection. *Oral Surg Oral Med Oral Pathol* 1959;12:846–52.
47. Moodnik RM, Levey MH, Besen MA, Borden BG. Retrograde amalgam filling: a scanning electron microscopic study. *J Endod* 1975;1:28–31.
48. Oynick J, Oynick T. A study of a new material for retrograde fillings. *J Endod* 1978;4:203–6.
49. Liggett WR, Brady JM, Tsaknis PJ, del Rio CE. Light microscopy, scanning electron microscopy, and microprobe analysis of bone response to zinc and non-zinc amalgam implants. *Oral Surg Oral Med Oral Pathol* 1980;49:254–62.
50. Tanzilli JP, Raphael D, Moodnik RM. A comparison of the marginal adaptation of retrograde techniques: a scanning electron microscopic study. *Oral Surg Oral Med Oral Pathol* 1980;50:74–80.
51. Bondra DL, Hartwell GR, MacPherson MG, Portell FR. Leakage in vitro with IRM, high copper amalgam, and EBA cement as retrofilling materials. *J Endod* 1989;15:157–60.
52. Minnich SG, Hartwell GR, Portell FR. Does cold burnishing gutta-percha create a better apical seal? *J Endod* 1989;15:204–9.
53. Dorn SO, Gartner AH. Retrograde filling materials: a retrospective success-failure study of amalgam, EBA and IRM. *J Endod* 1990;16:391–3.
54. Friedman S. Retrograde approaches in endodontic therapy. *Endod Dent Traumatol* 1991;7:97–107.
55. Rud J, Munksgaard EC, Andreasen JO, Rud V, Asumssen E. Retrograde root filling with composite and a dentin-bonding agent. *Endod Dent Traumatol* 1991;7:118–25.
56. Frank AL, Glick DH, Patterson SS, Weine FS. Long-term evaluation of surgically placed amalgam fillings. *J Endod* 1992;18:391–8.
57. Andreasen JO, Munksgaard EC, Fredebo L, Rud J. Periodontal tissue regeneration including cementogenesis adjacent to dentin bonded retrograde composite fillings in humans. *J Endod* 1993;19:151–3.
58. Torabinejad M, Higa RK, McKendry DJ, Pitt Ford TR. Dye leakage of four root end filling materials: effects of blood contamination. *J Endod* 1994;20:159–63.
59. Crooks WG, Anderson RW, Powell BJ, Kimbrough WF. Longitudinal evaluation of the seal of IRM root end fillings. *J Endod* 1994;20:250–2.
60. Pitt Ford TR, Andreasen JO, Dorn SO, Kariyawasam SP. Effect of Super-EBA as a root end filling on healing after replantation. *J Endod* 1995;21:13–5.
61. Torabinejad M, Rastegar AF, Kettering JD, Pitt Ford TR. Bacterial leakage of mineral trioxide aggregate as a root-end filling material. *J Endod* 1995;21:109–12.
62. Torabinejad M, Pitt Ford TR. Root end filling materials: a review. *Endod Dent Traumatol* 1996;12:161–78.
63. Bates CF, Carnes DL, del Rio CE. Longitudinal sealing ability of mineral trioxide aggregate as a root-end filling material. *J Endod* 1996;22:575–8.
64. Yaccino JM, Walker WA III, Carnes DL Jr, Schindler WG. Longitudinal microleakage evaluation of Super-EBA as a root-end sealing material. *J Endod* 1999;25:552–4.
65. Keiser K, Johnson CC, Tipton DA. Cytotoxicity of mineral trioxide aggregate using human periodontal ligament fibroblasts. *J Endod* 2000;26:288–91.
66. Rud J, Rud V, Munksgaard EC. Periapical healing of mandibular molars after root-end sealing with dentine-bonded composite. *Int Endod J* 2001;34:285–92.
67. Siqueira JF, Roccas IN, Abad EC, Castro AJR, Gahyva SM, Favieri A. Ability of three root-end filling materials to prevent bacterial leakage. *J Endod* 2001;27:673–5.
68. Murray MJ, Loushine RJ, Weller RN, Kimbrough WF, Pashley DH. Use of self-etching adhesives to seal resected apices. *J Endod* 2004;30:538–40.
69. Back SH, Plenk H, Kim S. Periapical tissue responses and cementum regeneration with amalgam, Super EBA, and MTA as root-end filling materials. *J Endod* 2005;31:444–9.
70. Theodosopoulou JN, Niederman R. A systematic review of in vitro retrograde obturation materials. *J Endod* 2005;31:341–9.
71. Sumer M, Muglali M, Bodrumlu E, Guvenc T. Reactions of connective tissue to amalgam, intermediate restorative material, mineral trioxide aggregate, and mineral trioxide aggregate mixed with chlorhexidine. *J Endod* 2006;32:1094–6.
72. Buckley JA, Ciancio SG, McMullen JA. Efficacy of epinephrine concentration in local anesthesia during periodontal surgery. *J Periodontol* 1984;55:653–7.
73. Ibarrola JL, Bjorenson JE, Austin BP, Gerstein H. Osseous reactions to three hemostatic agents. *J Endod* 1985;11:75–83.
74. Cambuzzi JV, Marshall FJ, Pappin JB. Methylene blue dye: an aid to endodontic surgery. *J Endod* 1985;11:311–4.
75. Martin MV, Nind D. Use of chlorhexidine gluconate for pre-operative disinfection of apicoectomy sites. *Brit Dent J* 1987;162:459–61.
76. Jeansson BG, Boggs WS, Lemon RR. Ferric Sulfate hemostasis: effect on osseous wound healing: II—with curettage and irrigation. *J Endod* 1993;19:174–7.
77. Schindler WG, Walker WA III. Transillumination of the beveled root surface: an aid to periradicular surgery. *J Endod* 1994;20:408–10.
78. Witherspoon DE, Gutmann JL. Hemostasis in periradicular surgery. *Int Endod J* 1996;29:135–49.
79. Rubinstein R. Endodontic microsurgery and the surgical operating microscope. *Compendium* 1997;18:659–72.
80. Kim S, Rethnam S. Hemostasis in endodontic microsurgery. *Dent Clin North Am* 1997;41:499–511.
81. Pecora G, De Leonardi D, Ibrahim N, Bovi M, Cornolini R. The use of calcium sulphate in the surgical treatment of a through and through periradicular lesion. *Int Endod J* 2001;34:189–97.
82. Vickers FJ, Baumgartner JC, Marshall G. Hemostatic efficacy and cardiovascular effects of agents used during endodontic surgery. *J Endod* 2002;28:322–3.
83. Ardekian L, Gaspar R, Peled M, Brenner B, Laufer D. Does low-dose aspirin therapy complicate oral surgery procedures? *J Am Dent Assoc* 2000;131:331–5.
84. Wahl MJ. Myths of dental surgery in patients receiving anticoagulant therapy. *J Am Dent Assoc* 2000;131:77–81.
85. Vy CH, Baumgartner JC, Marshall JG. Cardiovascular effects and efficacy of a hemostatic agent in periradicular surgery. *J Endod* 2004;30:379–83.
86. Lindeboom JAH, Frenken JWH, Valkenburg P, van den Akker HP. The role of pre-operative prophylactic antibiotic administration in periapical endodontic surgery: a

- randomized, prospective double-blind placebo-controlled study. *Int Endod J* 2005;38:877–81.
87. Kim S, Kratchman S. Modern endodontic surgical concepts and practice: a review. *J Endod* 2006;32:601–23.
 88. Gutmann J, Harrison JW eds. *Surgical endodontics*. Boston: Blackwell Scientific Publications 1991:37–300.
 89. Harrison JW. Healing of surgical wounds in oral mucoperiosteal tissues. *J Endod* 1991;17:401–8.
 90. Harrison JW, Jurosky KA. Wound healing in the tissues of the periodontium following periradicular surgery: I—the incisional wound. *J Endod* 1991;17:425–35.
 91. Harrison JW, Jurosky KA. Wound healing in the tissues of the periodontium following periradicular surgery: II—the dissectional wound. *J Endod* 1991;17:544–52.
 92. Harrison JW, Jurosky KA. Wound healing in the tissues of the periodontium following periradicular surgery: III—the osseous excisional wound. *J Endod* 1992;18:76–81.
 93. Craig KR, Harrison JW. Wound healing following demineralization of resected root ends in periradicular surgery. *J Endod* 1993;19:339–47.
 94. Gutmann J, Harrison JW, eds. *Surgical endodontics*. 1st ed. Boston: Blackwell Scientific Publications, 1991:92–387.
 95. Laskin DM. Anatomic considerations in diagnosis and treatment of odontogenic infections. *J Am Dent Assoc* 1964;69:308–16.
 96. Morse DR. Oral pathways of infection: with special reference to endodontics. *J Brit Endo Soc* 1972;13–6.
 97. Guralnick W. Odontogenic infections. *Brit Dent J* 1984;156:440–7.
 98. Gutmann J, Harrison JW eds. *Surgical endodontics*. 1st ed. Boston: Blackwell Scientific Publications; 1991:5–392.
 99. Chestner SB, Selman AJ, Friedman J, Heyman RA. Apical fenestration: solution to recalcitrant pain in root canal therapy. *J Am Dent Assoc* 1968;77:846–8.
 100. Moos HL, Bramwell JD, Roahan JO. A comparison of pulpectomy alone versus pulpectomy with trephination for the relief of pain. *J Endod* 1996;22:422–5.
 101. Houck V, Reader A, Beck M, Nist E, Weaver J. Effect of trephination on postoperative pain and swelling in symptomatic necrotic teeth. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 2000;90:507–13.
 102. Nist E, Reader A, Beck M. Effect of apical trephination on postoperative pain and swelling in symptomatic necrotic teeth. *J Endod* 2001;27:415–20.
 103. Henry BM, Fraser JG. Trephination for acute pain management. *J Endod* 2003;29:144–6.
 104. Gutmann J, Harrison JW, eds. *Surgical endodontics*. 1st ed. Boston: Blackwell Scientific Publications, 1991:449–61.
 105. Grossman LI. Intentional replantation of teeth. *J Am Dent Assoc* 1966;72:1111–8.
 106. Weine FS. The case against intentional replantation. *J Am Dent Assoc* 1980;100:664–8.
 107. Guy SC, Goerig AC. Intentional replantation: technique and rationale. *Quintessence Int* 1984;15:595–603.
 108. Bender IB, Rossman LE. Intentional replantation of endodontically treated teeth. *Oral Surg Oral Med Oral Pathol* 1993;76:623–30.
 109. Peer M. Intentional replantation: a 'last resort' treatment of a conventional treatment procedure? nine case reports. *Dent Traumatol* 2004;20:48–55.
 110. Orlay HG. Splinting with endodontic implant stabilizers. *Dent Pract & Dent Rec* 1964;14:481–98.
 111. Frank AL. Improvement of the crown-root ratio by endodontic endosseous implants. *J Am Dent Assoc* 1967;74:451–62.
 112. Frank AL, Abrams AM. Histologic evaluation of endodontic implants. *J Am Dent Assoc* 1969;78:520–4.
 113. Seltzer S, Maggio J, Wollard R, Green D. Titanium endodontic implants: a scanning electron, electron microprobe, and histologic investigation. *J Endod* 1976;2:267–76.
 114. Madison S, Bjorndal AM. Clinical application of endodontic implants. *J Prosthet Dent* 1988;59:603–8.
 115. Larsen RM, Patten JR, Wayman BE. Endodontic endosseous implants: case reports and update of materials. *J Endod* 1989;15:496–500.
 116. Weine FS, Frank AL. Survival of the endodontic endosseous implant. *J Endod* 1993;19:524–8.
 117. Whitaker DD, Shankle RJ. A study of the histologic reaction of submerged root segments. *Oral Surg Oral Med Oral Pathol* 1974;37:919–35.
 118. Reames RL, Nickel JS, Patterson SS, Boone M, El-Kafrawy AH. Clinical, radiographic, and histological study of endodontically treated retained roots to preserve alveolar bone. *J Endod* 1975;1:367–73.
 119. O'Neal RB, Gound T, Levin MP, del Rio CE. Submergence of roots for alveolar bone preservation: I—endodontically treated roots. *Oral Surg* 1978;45:803–10.
 120. Garver DG, Fenster RK. Vital root retention in humans: a final report. *J Prosthet Dent* 1980;43:368–73.
 121. Garver DG, Muir TE. The retention of vital submucosal roots under immediate dentures: a surgical procedure. *J Prosthet Dent* 1983;50:753–6.
 122. Andreaesen JO, Hjorting-Hansen E, Jolst O. A clinical and radiographic study of 76 autotransplanted third molars. *Scand J Dent Res* 1970;78:512–23.
 123. Massler M. Present status of tooth transplantation. *Dent Clin North Am* 1974;18:453–5.
 124. Hasselgren G, Larsson A, Rundquist L. Palpal status after autogenous transplantation of fully developed maxillary canines. *Oral Surg Oral Med Oral Pathol* 1977;44:106–11.
 125. Conklin WW. Long-term follow-up and evaluation of transplantation of fully developed teeth. *Oral Surg Oral Med Oral Pathol* 1978;46:477–85.
 126. Smith JJ, Wayman BE. Successful autotransplantation. *J Endod* 1987;13:77–80.
 127. Gutmann J, Harrison JW eds. *Surgical endodontics*. 1st ed. Boston: Blackwell Scientific Publications; 1991:397–406.
 128. Patterson SS. Endodontic therapy: use of a polyethylene tube and stint for drainage. *J Am Dent Assoc* 1964;69:710–4.
 129. Freedland JB. Conservative reduction of large periapical lesions. *Oral Surg Oral Med Oral Pathol* 1970;29:455–64.
 130. Neaverth EJ, Burg HA. Decompression of large periapical cystic lesions. *J Endod* 1982;8:175–82.
 131. Kehoe JC. Decompression of a large periapical lesion: a short treatment course. *J Endod* 1986;12:311–4.
 132. Hoen MM, LaBounty GL, Strittmater EJ. Conservative treatment of persistent periradicular lesions using aspiration and irrigation. *J Endod* 1990;16:182–6.