

Current Trends in Endodontic Treatment by General Dental Practitioners: Report of a United States National Survey

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Abstract

Introduction: In the United States almost 70% of root canal treatment (RCT) is performed by general dentists (GPs), yet little is known about their treatment protocols. **Methods:** A paper survey was mailed to 2000 United States GPs with questions about the types of endodontic cases treated, routine treatment protocols, use of newer technologies, and endodontic continuing education (CE). **Results:** Completed surveys were returned by 479 respondents (24%). GPs who perform RCT (84%) reported providing anterior (99%), bicuspid (95%), and molar (62%) RCT and retreatment (18%). Rubber dam was used always (60%), usually (16%), sometimes (13%), and never (11%). Newer technologies used by GPs included digital radiography (72%), magnification (80%), electronic apex locator (70%), and nickel-titanium rotary instrumentation (74%). Compared with GPs with >20 years of experience, those in practice for ≤10 years were more likely to use rubber dam ($P < .05$), nickel-titanium rotary instrumentation ($P < .001$), apex locators ($P < .001$), and magnification ($P < .01$); in contradistinction, GPs in practice >20 years were more likely to perform retreatments ($P < .05$). Women were less likely to perform retreatment or molar RCT (both $P < .05$). GPs with >5 hours of CE were more likely to use rotary instrumentation ($P < .001$), irrigant activation devices ($P < .01$), and apex locators ($P < .001$) and perform molar RCT ($P < .001$) and retreatment ($P < .05$), but no more likely to use rubber dam. **Conclusions:** Recent GP graduates (≤10 years) were more likely to adopt new technologies and use rubber dam than those who practiced for >20 years. More experienced GPs were more likely to take on complicated cases than those with fewer years of practice. There was no association between hours of CE and compliance with rubber dam usage. (*J Endod* 2014;40:618–624)

Key Words

American Dental Association, endodontic therapy, endodontics, general practice, magnification, microscope, radiography, root canal, surveys, technology

Developments in technology and materials continue to influence the practice of endodontics and have had a considerable impact on the way root canal treatment (RCT) is practiced by endodontists (1). Although information on various treatment practices by United States endodontists is available in the literature, very little is known about their general practitioner (GP) colleagues who were reported to perform 68% of RCTs in the United States in 2007 (2).

Endodontists in the United States have been surveyed on armamentarium (1), irrigation regimens (3), intraosseous anesthesia (4), nickel-titanium (NiTi) rotary instrumentation (5), magnification (6), and one-appointment endodontics (7). Some of this information has been gathered in surveys of GPs practicing in other countries (8–13). For example, in Australia, only 22% of GPs were reported to use NiTi rotary instrumentation in 2004 (12), whereas in 2003, 75% of GPs used sodium hypochlorite, with more than 90% using 1% concentration (10). In the United Kingdom, rubber dam was always or frequently used by less than 20% of dentists who provided endodontic treatment under the National Health Service; among those who used rubber dam, 71% reported using sodium hypochlorite versus only 38% of those not using a rubber dam (13). Surveys of GPs practicing in Hong Kong and Denmark have shown that the majority perform RCTs over more than 1 visit (8, 14).

The purpose of this study was to collect information about the techniques and armamentarium currently used by GPs in the United States who perform endodontic treatment, with the intention of identifying areas where more recently developed techniques, technologies, or equipment are being used.

Materials and Methods

A questionnaire was designed on the basis of previously published surveys of endodontists and GPs (4, 6, 9, 13) (Fig. 1). The study received formal review and waiver from the appropriate institutional review board.

A pilot questionnaire was circulated to a group of GPs ($n = 20$) in Portland, OR. Eighty-five percent reported providing endodontic treatment, and this percentage was used to calculate the sample size for the current study. The estimated sample size with 95% significance and 5% type II error was 197. However, to compensate for nonresponse, the survey was sent to 2000 active members of the American Dental Association (ADA) practicing general dentistry throughout all 50 states. A list of mailing addresses of 2000 randomly selected GPs was purchased from the ADA via a third party, Hippo Direct (Cleveland, OH).

All survey participants were asked to provide demographic information on gender, years in practice, and geographic region of practice. Other questions addressed the types of cases treated, routine treatment protocols, use of newer technologies, and hours of endodontic continuing education (CE) taken in the last 5 years. All responses were anonymous. A postage-paid return envelope was provided. The survey was mailed

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The majority of endodontic treatment in the U.S. is performed by general dentists. While considerable information is available in the literature concerning the practice of endodontics by specialists, little is reported for general practitioners. Therefore, the aim of this study is to collect information about the techniques and materials currently utilized by general practitioners performing endodontic treatment. We hope to illuminate areas where more recently developed techniques, technologies, or materials are being utilized or possibly under-utilized.

Your participation in this brief survey would be of great value. Even if you do not perform endodontic treatment in your practice, your response to questions 1, 18, 19, 20 and 21 would be very helpful. The survey takes a few minutes to complete and you may return it via postage-paid mail. Please select the answers that most closely represent your routine practice as it pertains to endodontics.

Thank you for your time and assistance. We think this information will be interesting and helpful to the profession.

Questionnaire

1. **Do you perform endodontic treatment in your practice?**
 Yes No If No, please skip to question 18.
2. **On average, how many endodontic cases do you treat in your office per month?**
 1-5 6-10 11-15 16-20 >20
3. **Which types of cases do you routinely treat? (Check all that apply)**
 Anterior Bicuspid Molar Retreatment
4. **Of the following supplemental anesthesia techniques, indicate any you use routinely. (Check all that apply)**
 Stabident X-Tip Intrapulpal PDL injection
 Trans-septal injection Mandibular infiltration with 4% articaine
5. **How often do you use rubber dam isolation?**
 Always Usually Sometimes Never
6. **Do you use magnification?**
 No Loupes Microscope Other
7. **How do you determine working length?**
 Radiographs alone Electronic Apex Locator alone
 Electronic Apex Locator with radiographic confirmation
8. **Do you use digital radiography?** Yes No
9. **What instruments do you routinely use? (Check all that apply)**
 SS K-files C-files Hedstrom files NiTi Hand files
 Gates Glidden Peeso Reamers NiTi Rotary files

(Continued on back)

Figure 1. (A and B) Survey questionnaire.

once, participants were not compensated for responding, and no follow-up contact was made.

Statistical Methods

Data analysis was conducted by using SPSS (Statistics 20; IBM Corporation, Armonk, IL). First, the distribution of GPs performing endodontic treatment by gender, years of practice, ADA region, and endodontic-related CE was examined. The rest of the analysis was conducted for only those respondents who reported performing endodontic treatment and reported as a percentage of those who performed endodontic treatment. The χ^2 test was used to assess the binary relationship between endodontic-related CE with each of treatment of molars, endodontic retreatment, use of rubber dam, and use of adjunctive

irrigant activation device. A series of logistic regression models were constructed to assess the factors associated with routine endodontic treatment (use of rubber dam), more complicated treatment (molar RCT, retreatment), and the use of newer technologies (magnification, NiTi rotary instrumentation, adjunctive irrigant activation devices, apex locator). All models were adjusted for gender, hours of endodontic-related CE, and years in practice.

Results**Characteristics of GPs Who Participated in the Study**

Of the 2000 surveys sent to GPs, 479 completed surveys were returned for a 24% response rate. Because of the relatively low response

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