One-appointment endodontic therapy: a nationwide survey of endodontists

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A questionnaire was sent to endodontists throughout the United States to survey their opinions about one-appointment endodontic therapy. The 71% response indicated that a greater number of endodontists are practicing one-appointment therapy but in only a few specific situations. Results of one- and multi-appointment therapy were tabulated according to responses regarding postoperative pain and successful healing. Some statistically significant correlations were found among endodontists, their age, and their geographic locations.

Endodontic therapy, which could be completed in a single appointment, gained popularity during World War II.[1] However, at that time the philosophy was that periapical surgery should be performed on all endodontically treated teeth.

However, recently, many practitioners have not opposed one-appointment therapy for teeth that have suffered traumatic or iatrogenic pulpal exposure, or intentional pulpectomy for restorative or periodontal reasons.[2] There was also little objection to one-visit therapy of necrotic teeth associated with a sinus tract or in conjunction with a surgical procedure. However, in situations of pulpal necrosis, consensus was that multiple appointments were necessary for successful treatment and for minimal periapical inflammation, resulting in less postoperative pain.

Endodontic treatment accomplished in a single appointment is being practiced, but it has received limited attention in the dental literature. The extent of this practice among endodontists is not evident in the published literature; nor have there been any reports on opinions concerning possible postoperative sequelae after one-appointment treatment.

The purpose of this paper is to report and discuss the views of endodontists across the nation, based on their responses to a questionnaire.

METHODS

Information was requested from a third of all endodontists within the United States listed in the American Association of Endodontists' 1977-1978 Revised Membership Roster. Only members with the practice identification code 15 (endodontist) or 80 (full-time faculty of dental school) were considered. The membership consisted of 1,287 members from which 429 names were randomly selected. The data were collected in the form of a short questionnaire (Fig 1), which requested approximately 30 responses. The questionnaires were mailed in March 1978, with a cover letter briefly explaining the objectives of the study. In the cover letter, one-appointment endodontic therapy was defined for investigative purposes as "conservative treatment consisting of complete biomechanical instrumentation and obturation of the root canal space with sealer and gutta-percha (and/or silver cones) accomplished during one visit."

The questionnaire was developed with three basic questions: the success of one-appointment endodontics in specific situations; postoperative pain; and the actual treatment methods of each endodontist.

Some general information was also requested, such as age of endodontists, years in specialty practice, and the estimated number of appointments necessary to complete an average case. The cards were coded so that geo-

graphic location could also be tabulated.

After analyzing the three basic questions, statistical tests were evaluated to determine the remaining correlations between the age of endodontists, years in practice, and the remaining responses. Contingency tables were analyzed with chi square at $P \leq .05$.

RESULTS

Of the 429 questionnaires sent, 304 (71%) were returned by the six-week deadline. The results are in sequential order, and the responses have been listed as percentages (Fig 1).

General information

Age. The age distribution, represented in Figure 2, indicated that no respondent was younger than 28; and 50% of the endodontists were between the ages of 30 and 40.

Years in specialty practice. This distribution closely corresponds to the age distribution (Fig 3). Fifty percent of the participating endodontists had been in practice less than eight years; one participant had practiced for 42 years.

Estimated number of appointments necessary to complete the average endodontic case. Fifty percent of the endodontists completed an average case in two appointments, 34%, in three appointments, 4%, in one appointment; 10% did not answer this question, and 2.5% gave multiple responses.

Geographic regions. The nation was arbitrarily divided into five geographic regions. Table 1 represents the percentage of endodontists responding from each region, as well as the return rate for each region.

Fig 1 – Questionnaire and results.

Age _____ Years in specialty practice _____ Estimated number of appointments necessary to complete the average endodontic case _____.

1. In your opinion, can one-appointment endodontic therapy be successful for: (Please mark yes or no)
   - 58.2% Most vital cases
   - 77.6% Selected vital cases
   - 12.8% Most necrotic cases
   - 40.5% Selected necrotic cases
   - 13.5% Most teeth with periapical rarefactions
   - 33.5% Selected teeth with periapical rarefactions
   - 56.2% Teeth associated with a sinus tract
   - 81.9% Treatment in conjunction w/ periapical surgery
   - 2.0% No cases
2. When compared to cases treated in multiple-appointments will teeth treated in one-appointment have a difference in post operative pain?
   - 35.5 More, 4.6 Less, 51.6 No difference in vital cases
   - 57.6 More, 2.9 Less, 17.0 No difference in necrotic cases
   - 52.9 More, 4.2 Less, 15.1 No difference in teeth w/ rarefactions
   - 44.4 More, 4.9 Less, 20.0 No difference in teeth w/o rarefactions
   - 11.8 More, 11.9 Less, 52.9 No difference in teeth w/ a sinus tract
3. Do you ever complete treatment in one appointment?
   Yes 90%, No 7.9%, If "Yes" . . . .
   - 67.1% Vital cases only
   - 67.1% Cases treated surgically or trephinated following fillings
   - 44.0% Teeth associated with a sinus tract
   - 16.8% Necrotic cases
   - 16.8% Teeth associated with rarefactions
   - 26.3% Teeth without rarefactions
   - 51.6% Anterior teeth
   - 31.9% Posterior teeth

   If "No" check reason(s)
   - 16.7% Appointments would be too long
   - 8.2% The patient would feel as if he is not getting his money's worth if only seen once
   - 7.2% It is necessary to medicate the canals before filling
   - 20.7% It is simply more convenient to treat teeth in multiple appointments
   - 20.7% Other (Please specify)

Can one-appointment endodontic therapy be successful? Of the participating endodontists, 82% believed that one-appointment therapy, in conjunction with periapical surgery, would be successful. Considering selected vital cases, 77.6% thought that one-appointment treatment would be successful, and 58.2% thought that most vital cases would be successful. Most necrotic cases would be successfully treated in one appointment according to 12.8%; whereas, 40.5% considered that selected necrotic teeth would be successfully treated. Most teeth with a

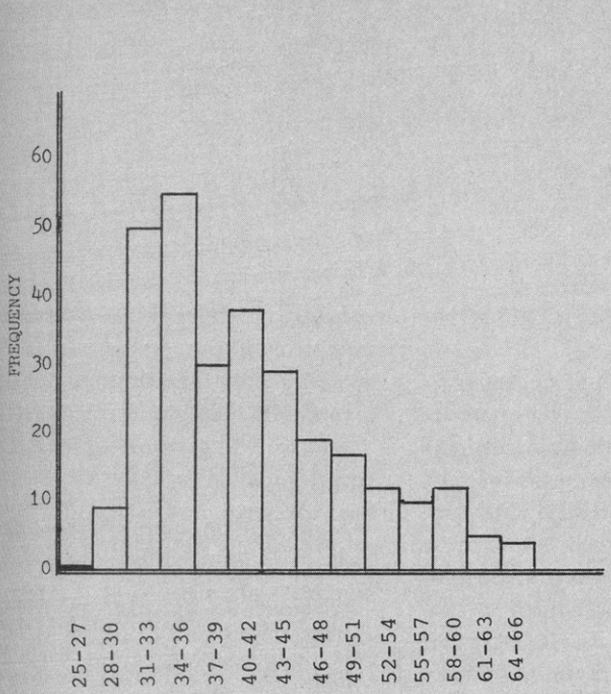

Fig 2—Age distribution.

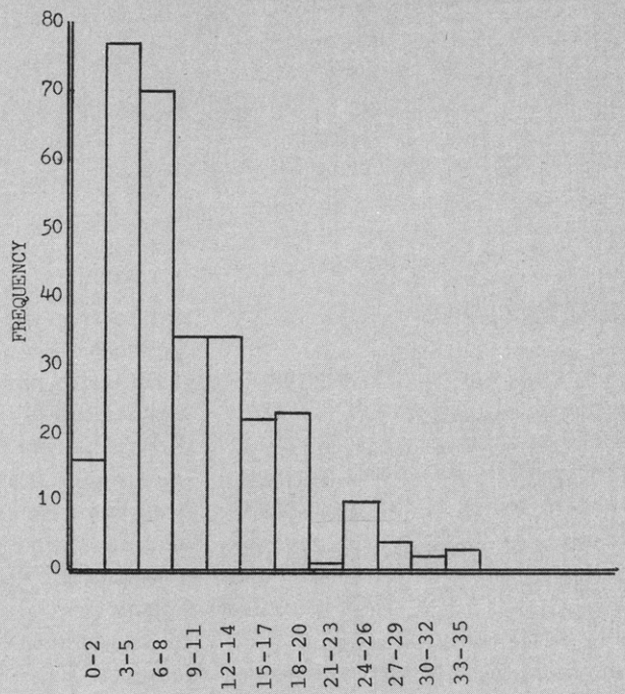

Fig 3—Years in speciality.

periapical rarefaction would be successfully treated according to 13.5%; whereas, 33.5% thought that selected teeth with rarefactions would be successfully treated. Teeth with a sinus tract would be successfully treated in one appointment according to 56.2% of the endodontists.

One- and multiple-appointment therapy comparison of postoperative pain. Vital cases treated in one appointment were rated by 51.6% of the endodontists as having no difference in postoperative pain; 35.5% thought there would be more pain; 4.6%, less pain; and 7.8% did not respond.

If necrotic cases were treated in one visit, 57.6% of endodontists believed there would be more pain, 2.9% thought there would be less pain, 17% considered there was no difference in pain, and 22% did not respond.

When teeth with rarefactions treated in one appointment were considered, the responses were similar to the category of necrotic teeth: 52.9% of endodontists thought there would be more pain. Only 4.2% considered there would be less pain, 15.1% thought that there would be no difference in pain, and 27.3% did not respond.

When teeth without rarefactions were considered, 44.5% thought there would be more pain, 4.9%, less pain, 20%, no difference, and 30.2% did not respond.

In regard to teeth with an associated sinus tract, 52.9% of respondents were of the opinion that there was no demonstrative difference in postoperative pain. Only 11.8% thought there would be more pain, 11.8% believed there would be less pain, and 22.7% did not respond.

Do you ever complete treatment in one appointment? If so, what type of case? A majority of participants (90%) answered affirmatively. Sixty-seven percent of the endodontists treated both vital cases and those in conjunction with surgery in a single appointment. Teeth associated with the sinus tract could be treated in a single visit (44.4%). Only 16.8% of endodontists had been treating necrotic cases as well as teeth with periapical rarefactions in one appointment. Teeth without periapical rarefactions have been treated in a single visit according to 26.3% of the survey participants.

The last two responses in this category dealt with the location of teeth treated in one visit. Most of the endodontists (51%) treat anterior teeth in one appointment; whereas, only 31.9% treat posteriors in a single visit.

Of all the endodontists, 24 (7.9%) of them did not complete treatment in one appointment, and seven (2.1%) did not respond. There were five possible responses. However, a small number of endodontists (12.8%) who did complete treatment also checked some of the "no" responses (Fig 1).

On the final question, 63 responses (20.7%) were tabulated; many additional reasons were given for not treating patients in single visits, with regard to all cases or only selected cases. The reason given most often (by 24 of 63 endodontists) was the increase in incidence of postoperative pain or flareups.

Twelve of 63 endodontists were concerned with the difficulty in treating any postoperative flareups after the canal had been obturated on the initial visit. Five respondents thought the success rate would be lower; two did not treat patients in one appointment because initially they would take cultures.

CORRELATIONS

An attempt was made to determine any statistically significant correlations between the age of endodontist, years in practice, geographic location, and the responses to the three basic questions.

Age groups

For the purpose of correlation, the responding endodontists were divided into four age groups. Age group 1 consisted of those endodontists from 28 to 34 years (26.9% of total); group 2, 35 to 39 years (23% of total); group 3, 40 to 47 years (25.9% of the total); and group 4 was 48 years and older. Chi square analysis at $P < .05$ was used.

All four age groups were consistent with each other for all but two items. With regard to question 1 for selected necrotic cases, 39% in group 1 thought endodontic therapy could be successful for selected teeth; 50%, group 2; 46%, in group 3; whereas, only 26% thought so in group 4.

The second significant correlation related to how successful one-appointment endodontic therapy would be for most teeth with periapical rarefactions. In group 1, 9.8% of the endodontists believed one-appointment therapy would be successful, 24.3% in group 2 thought so; 8.9% in group 3; and 12.3% in group 4.

Years in specialty practice

Three groups were established based on the amount of time an endodontist was in endodontic practice. The range in group 1 was zero to five years in practice (32.9%); group 2 was five to ten years of practice (33.2%); group 3 was ten years and more (33.9%).

All groups were consistent with each other in their responses to all the questions.

Estimated number of appointments necessary to complete the average endodontic case. In this category, all the age groups and the years-in-practice groups were consistent with each other in their responses to all the questions. However, there was a considerable lack of consistency of responses among the five geographic locations. Table 2 lists the number of appointments needed to complete the average case according to responses from endodontists in various geographic regions. The Northeast region was the only region in which the greatest percentage of participants completed the average case in three appointments. The number of participants who did not respond (10% to 15%), or who gave multiple responses were not listed in Table 2.

Can one-appointment endodontic therapy be successful? There were a number of significant correlations among the questions from this category and the geographic regions (Table 3).

Comparison of one-appointment and multiple-appointment therapy in regard to postoperative pain. In this category no statistically significant inconsistencies were found among the

Table 1 • Return rate and percentage of participating endodon regions.

Geographic location	Participating endodontists (%)
Northeast	35.5
Southeast	16.1
Northcentral	19.4
Southcentral	7.2
West	21.7

Table 3 • Can one-appointment endodontic therapy be successful? with geographic regions. (Percentage of "yes" responses.

Type of case	North-east	South-east	North-central	South-central
Most vital cases	52.7%	61.2%	50.8%	40.9%
Selected vital cases	NC*	NC	NC	NC
Most necrotic cases	NC	NC	NC	NC
Selected necrotic cases	38.0%	51.0%	20.3%	22.7%
Most teeth with periapical rarefactions	NC	NC	NC	NC
Selected teeth with periapical rarefactions	32.4%	40.8%	18.6%	18.2%
Teeth associated with a sinus tract	49.0%	69.4%	39.0%	54.%
Treatment in conjunction with periapical surgery	NC	NC	NC	NC
No cases	NC	NC	NC	NC

*NC = no correlation.

endodontists in each of the geographic regions.

Do you ever complete treatment in one appointment? If so, what type of case? There were a number of statistically significant correlations among the geographic regions. From the Western region, 100% of the participating endodontists had completed some type of treatment in one appointment, 91.8% from the Southeast, 88.9% from the Northeast, 81.8% from the Southcentral, and 81.4% from Northcentral regions. Table 4 shows the correlations among the specific types of cases and between the geographic regions.

DISCUSSION

Many uncontrollable variables and errors are inherent in an opinion survey which is mailed to participants. Ideally, all questions were understood and answered objectively. However, each person's perception of a particular question or word is different; therefore, design of the questionnaire is the most critical and difficult aspect of the survey.

Seventy-one percent of the endodontists contacted returned the questionnaire, fulfilling one of our expectations.

le 2 • Number of appointments to complete the average case by geographic region.

ographic cation	One appointment %	Two appointments %	Three appointments %
theast	2.0	34.3	51.5
heast	4.3	61.7	19.1
hcentral	3.8	47.2	35.8
hcentral	5.0	40.0	35.0
	6.3	71.4	15.9

le 4 • Do you ever complete treatment in one appointment? If so, what type case? Correlation with geographic regions. (Percentage of "yes" responses.)

Type of case	North-east	South-east	North-central	South-central	West
l cases	NC	NC	NC	NC	NC
rotic cases	NC	NC	NC	NC	NC
th with periapical refactions	13.0%	16.3%	8.5%	27.3%	27.3%
th without periapi- l rarefactions	NC	NC	NC	NC	NC
th with sinus track	35.2%	49.0%	33.9%	45.4%	63.3%
ment in conjunc- on with periapical rgery	NC	NC	NC	NC	NC
erior teeth	NC	NC	NC	NC	NC
erior teeth	27.8%	34.7%	20.3%	45.4%	42.4%

C = no correlation.

Success rate and postoperative symptoms. Research is needed to verify the status of opinions regarding postoperative sequelae, success rate, and prognosis for healing. To our knowledge, only one publication exists that compares the success rate of single- with multiple-visit therapy. Soltanoff[3] evaluated 232 teeth, and 80 of them were completed in a single visit. His findings indicated no significant difference in healing. However, only vital teeth or nonvital teeth with associated fistulous tract were included in the single-visit procedure, and no attempt was made to randomize the selection of cases.

Ashkenaz[4] evaluated the success rate of vital cases treated in one appointment after one year and two years. Although he did not compare single- and multiple-visit therapy, he found 97% of 101 cases returning after one year were considered successful; whereas, 97.7% of 43 cases returning after two years were considered successful.

A number of studies have been published about sequelae after one-appointment treatment. Ashkenaz[4] reported a 4% incidence of postoperative pain in 195 vital teeth that were treated in a single visit. Adrian[5] reported 63% of his patients were uncomfortable after treatment. Wolch[2] did not observe any significant difference in postoperative discomfort between filled and unfilled vital pulpectomy cases. Without any attempt at case selection, Fox[6] reported of 247 teeth, 82% had slight or no postoperative pain, and 5% had severe pain. Lörincsy-Landgraf and Palocz[7] studied 1,200 single-rooted teeth with gangrenous pulps that had been treated in one visit and found that only 3% required supplemental trephination; 90% of the patients had few problems.

Three studies have been published that compared postoperative symptoms after treatment was completed in a single visit and multiple visits. Ferranti,[8] in comparing severe postoperative pain, found a 2.5% incidence of pain after two-appointment procedures, and 5% reported pain after one-appointment procedures. Soltanoff[3] reported 19% of the cases had moderate to severe pain after single-visit therapy, and 14%, after multiple-visit root canal therapy. These results may not be valid because only vital teeth and teeth with associated fistulous tract were included in the single-visit group. O'Keefe,[9] observing postoperative pain levels and specific tooth groups, found no significant differences in the total postoperative pain responses after one-visit or two-visit endodontic therapy. However, these results may be invalid, because the primary consideration for the choice of treatment was the availability of time. Therefore, a larger percentage of difficult cases or multi-rooted cases could not be included in the single visit group.

CORRELATIONS

Few statistically significant correlations were found among age groups, years in practice, and the questions listed. This may be the result of a number of factors. The philosophy and treatment methods regarding one-appointment root canal therapy may have changed very little over the years, resulting in a rather uniform philosophy throughout the different age groups. Or, although the philosophy changed over the years, it was acceptable to all the age groups. No generation gaps seem to exist regarding these questions.

However, differing philosophies do exist in the five geographic regions regarding these questions. This may be a result of the education system or the various life styles of people in the regions. The endodontists in the Western region seemed to be the most liberal in these philosophies. The West had the highest affirmative response to having success with one-appointment root canal therapy (Table 3) and to the actual treatment of specific cases in one appointment (Table 4).

SUMMARY

The opinions of endodontists across the nation regarding one-appointment endodontic treatment were gathered and tabulated. The three basic questions concerned the success rate of one-appointment procedures, the incidence of postoperative sequelae, and the actual treatment methods of the individual endodontist.

The majority of endodontists who responded to the questionnaire (81.9) thought that one-appointment root canal treatment in conjunction with surgery would be successful. Only 12.8% of those surveyed thought that necrotic teeth would be successful with one-appointment therapy.

The majority of endodontists thought there would be more pain if treatment was completed in one appointment. The exception would be vital cases and teeth with sinus tract, in which they believed there would be no difference in postoperative pain.

Ninety percent of the endodontists indicated that they treat certain types of cases in one appointment; 67% indicated they treat vital teeth in one appointment; whereas, only 16.8% treat necrotic cases in one appointment. There were numerous statistically significant correlations between the questions and the different geographic regions; however, there were very few inconsistencies between different age groups, the number of years-in-practice, and the questions listed.

More research is needed to verify opinions regarding those questions concerning one-appointment endodontic therapy.

The views expressed herein are those of the authors and do not necessarily reflect the views of the US Air Force or the Department of Defense.

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References

1. Sommer, R.F.; Ostrander, F.D.; and Crowley, M.C. Clinical endodontics, Philadelphia, W.D. Sanders, 1956, p 363.

2. Wolch, I. One-appointment endodontic treatment. J Can Dent Assoc 41 (11):613, 1975.

3. Soltanoff, W. A comparative study of the single-visit and multiple-visit endodontic procedure. J Endod 4:278, 1978.

4. Ashkenaz, P.J. One-visit endodontics—a preliminary report. Dent Surv 55:62 1979.

5. Adrian, S.A., Tufts Dent Outlook 35:5, 1959.

6. Fox, J., and others. Incidence of pain following one-visit endodontic treatment. Oral Surg 30:123, 1970.

7. Lörincsy-Landgraf, F., and Palocz, G. Kontrollergebnisse von in einer sitzung versorgten Gangränzähen. Dtsch Zahnaerztl Z 10:742, 1955.

8. Ferranti, P. Treatment of the root canal of an infected tooth in one-appointment: a report of 340 cases. Dent Digest 65:490, 1959.

9. O'Keefe, E.M. Pain in endodontic therapy: preliminary study. J Endod 2:315, 1976.