

Flare-Up Rate in Pulpally Necrotic Molars in One-Visit Versus Two-Visit Endodontic Treatment

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This retrospective study compared one-visit versus two-visit endodontic treatment. The same technique and materials were used before and after making the sole change to one-visit endodontic treatment in 1991. Treatment records of 402 consecutive patients with pulpally necrotic first and second molars were compared. In 201 patients, treatment was provided by debridement and instrumentation, followed by obturation at a second visit; whereas the second group received single visit therapy. Flare-ups were defined as either patient reports of pain not controlled with over-the-counter medication or as increasing swelling. Sixteen flare-ups (8%) occurred in the two-visit group versus six flare-ups (3%) for the one-visit group. This showed an advantage for one-visit treatment at a 95% confidence level. In a second comparison, one-visit patients who had previously received two-visit treatment for a different pulpally necrotic molar served as their own control. No significant differences were present in this subgroup of 17 patients.

Considerable controversy exists over the question of whether it is preferable to complete endodontic therapy in one or multiple appointments. Many practitioners prefer a two-visit approach to ensure a post-debridement, symptom-free period before canal obturation. Leakage of the coronal filling, reinfection from periapical or periodontal pathogens, failure to kill intracanal or intratubular bacteria, and ease of treatment for ensuing infections are frequently mentioned in the controversy.

In our office, the technique was changed from two-visit to one-visit endodontic therapy in January 1991, without changing any other aspect of technique. This presented an opportunity to control for the variable of operator technique, for which other studies can be criticized.

MATERIALS AND METHODS

In this retrospective study, only first and second molars without detectable sinus tracts were considered because they have been

shown to be more prone to flare-up (1). Furthermore, only pulpally necrotic teeth were included because of their expected higher rate of flare-up (2-4).

Two hundred and one consecutive patients in each category were selected from patient records of the senior author for the years 1985 through 1996. A separate comparison was made when single-appointment treatment patients (1991-1996) had a previous two-visit necrotic molar treated endodontically by the endodontist author. This comparison allowed the patient to be his or her own control, because some patients may be more prone to infection or other cause of flare-up. Age, gender, antibiotic treatment, first versus second molar, and maxillary versus mandibular tooth were compared in flare-up and non-flare-up groups. Teeth were categorized as nonvital when there was no visible bleeding from the pulp. Only uncontrollable bleeding or drainage preventing canal drying precluded one-appointment treatment. Generally, a periapical radiolucency was visible. These situations were considered to be inflamed periapically.

Endodontic treatment was performed with step-back filing to at least a #30 diameter at the apex. During instrumentation, EDTA with urea peroxide (RC Prep, Premier Dental Products, Norristown, PA) and 0.5% buffered sodium hypochlorite were alternated to facilitate debridement and disinfection. Metacresylacetate (Sultan Chemists, Inc., Englewood, NJ) was used as an intracanal medication with two-visit therapy. The goal of instrumentation was to end 0.5 to 1.0 mm short of the radiographic apex. Any overinstrumentation was inadvertent.

Sealapex (Kerr, Romulus, MI) was used with laterally condensed gutta-percha. The patient served as his own control when the same individual qualified in both treatment groups.

If antibiotics were prescribed by the referring dentist, that therapy was generally continued for at least 2 days postoperatively. Five- to 7-day antibiotic treatment was often ordered if exudate was present.

Flare-up was described as postoperative pain not controlled with over-the-counter medication or as worsening swelling, as reported by the patient. Results were subjected to the χ^2 test for statistical significance. The Fisher exact χ^2 test was used to evaluate groups where cell counts were too small for standard χ^2 analysis.

RESULTS

Data from the consecutive patient portion of this report were summarized in Table 1. All two-visit flare-ups occurred after the

TABLE 1. 402 consecutive patient study

Treatment Visits	No.	Flare-ups	No Antibiotic	No Antibiotic Flare-up	Gender (M:F)	Average Age (yr)	Molars Maxillary: Mandibular	Molars First: Second
1	201	6 (3%)	22 (11%)	0	91:110	52.2	92:109	134:67
2	201	16 (8%)	17 (8%)	2 (12%)	77:124	48.4	90:111	140:61
Statistical significance*		S	NS	NS	NS	NS	NS	NS

Flare-ups in 402 Consecutive Patients

Treatment Visits	No.	No Antibiotic Flare-up	Gender (M:F)	Average Age (yr)	Molars Maxillary: Mandibular	Molars First: Second
1	6 (3%)	0	3:3	54.5	2:4	4:2
2	16 (8%)	2 (13%)	7:9	49.9	7:9	12:4

* S, statistically significant at the 95% confidence level; NS, not statistically significant at the 95% confidence level.

TABLE 2. Same patient study

Treatment Visits	No.	Flare-ups	No Antibiotic	No Antibiotic Flare-up	Gender (M:F)	Average Age (yr)	Molars Maxillary: Mandibular	Molars First: Second
1	17	0	2 (12%)	0	8:9	50.7	9:8	15:17
2	24	2 (8%)	7 (29%)	1 (4%)	11:13	47.2	6:18	20:4

Same Patient Study—Flare-ups

Treatment Visits	No.	No Antibiotic Flare-up	Gender (M:F)	Average Age (yr)	Molars Maxillary: Mandibular	Molars First: Second
1	0	N/A	N/A	N/A	N/A	N/A
2	2	1	2:0	46	1:1	1:1

* N/A, numbers too few to determine statistical significance.

first treatment visit. Six of 201 patients treated in one visit experienced flare-up versus 16 of 201 in the two-visit set. This proved significant at better than the 95% confidence level. The Fisher exact test found no significant differences regarding age, gender, maxillary or mandibular molar, and first or second molar. No significant differences arose regarding antibiotic use.

Table 2 summarized results from 17 patients treated in one visit who also had previous two-visit treatment complying with experiment parameters. Some of these 17 had more than one single-visit pulpally necrotic molar. None of this group serving as their own control had a flare-up with one-visit treatment, whereas two had flare-up with the two-visit approach. The small number of patients in this group precludes determination of statistically significant differences.

DISCUSSION

Molar teeth are the most difficult teeth to manage endodontically due to limited access and canal variations, including multiple apices and lateral canals. Also, the preoperative status was alike in both groups, with necrotic pulps enhancing the likelihood of flare-up with their near certainty of infection (5). Fewer flare-ups in the one-visit group can perhaps be due to the fact that bacteria or other irritants are not allowed to remain in the empty canal isolated from the healing system. Another possible reason for fewer one-visit flare-ups is deletion of the intracanal medication, which may elicit an immune reaction. Still, another possibility is that early sealing of the canal eliminates bacterial ingress from a

leaky restoration, lateral canal, or caries. Isolation of areas of inadequate instrumentation and/or other irritants within the canals is yet another plausible reason for higher two-visit flare-up (6). As opposed to many previous studies, the sole operator using the same technique in this study should minimize variables of operator technique.

Fox et al. (7) and Morse et al. (8) independently found a higher incidence of flare-up in women. This study found no gender difference. Although more first molars experienced flare-up, compared with second molars, there were more first molars treated overall. The first:second molar ratio remained in the 2:1 to 3:1 range in the entire 402 patient study.

No significant relationships were discovered with age, antibiotic treatment, first versus second molars, or maxillary versus mandibular teeth. Antibiotic usage may explain the generally low incidence of flare-up. Whereas the two-visit group did receive greater antibiotic usage, the lack of significant difference seemingly negates this factor.

Balaban et al. (9) has studied the flare-up rate when pretreatment antibiotics were used and found no difference. This apparently removes any influence of antibiotic therapy by the referring doctor or patient taking antibiotics on their own.

The possibility of improved operator skills as the study progressed is minimized by the fact that the operator had practiced endodontics exclusively 11 yr before beginning the study. The same technique was used throughout the years of observation.

The use of the patient as their own control yielded low numbers, because patients with multiple necrotic pulps seeking treatment

within the time parameters of the study were few. Nonetheless, 17 such patients were found. In this subpopulation, 24 pulpally necrotic teeth were treated with two-visit endodontics, and then the patient received a one-visit treatment for another pulpally necrotic molar during the second phase of the study. This same patient comparison addressed the question of whether some patients might be more prone to flare-ups. In this small sample, only two teeth flared up, both in the two-appointment group and in different patients. This suggested that patient susceptibility to flare-up is not common.

Several investigators concluded that little or no difference occurred between single- and multiple-visit endodontic therapy (10–12). This investigation came to a similar conclusion from retrospective analysis of charts of a large group of endodontic treatments of necrotic molars treated by a sole operator using the same technique, except for the number of treatment visits.

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The Way It Was

In his famous series of lectures to entering law students, given about 70 years ago and compiled in 1930 as *The Bramble Bush*, Karl Llewellyn characterized the law as “the interference of officials in disputes” and noted that for the bulk of disputes . . . sooner or later the parties will iron out their own difficulties.

Perhaps this highlights the basic flaw in our present litigious society—lawyers seem not only to *not* view their activities as “interference” in disputes, they appear to foment disputes as a means to their own enrichment.

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