EVALUATION OF SINGLE AND MULTIPLE VISIT ROOT CANAL THERAPY: A RANDOMIZED CLINICAL CASES

ABSTRACT

The purpose of this case report series was to evaluate the radiographic healing of teeth with periradicular disease treated in single-visit or multiple-visits with an inter-appointment dressing of Ca(OH)₂. A randomization procedure allocated five teeth in single-visit treatment and five teeth in multiple-visit treatment in Hacettepe University, Faculty of Dentistry, Department of Endodontics. The medical histories of the patients were noncontributory and the patients were asymptomatic at the time of treatment. The cases were completed by the same endodontist and evaluated radiographically as long as two year by three months intervals. The patients reported no symptoms at the end of the first year in both groups. The results were similar to healing of periapical radiolucency between teeth that were treated in single-visit and multiple-visit with inclusion of Ca(OH)₂. If the cleaning and shaping procedures are completed efficiently, good results may be observed in a single visit treatment.

Key words: Calcium Hydroxide, Root Canal Treatment, Single-Visit

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INTRODUCTION

Endodontic therapy essentially is directed toward two specific aims: to create an environment for good favorable healing eliminating bacteria from the infected root canal system and prevents apical periodontitis. A growing perception in endodontic circles is that endodontic therapy requires single-visit treatment only. However the number of visit to treat infected root canals is the most controversial issues in endodontics. Generally patients are requesting that their endodontic therapy is being completed in a single-visit. Treatment in single-visit certainly has many advantages to the both clinician and patient. It is less time-consuming, resulting in less cost for the patient, less painful and less traumatic than multi-visit treatment. And also it may prevent the risks of contamination or recontamination of the root canal system. In addition, numerous studies have shown that postoperative pain is lower when the treatment is performed in single-visit. The fact that some dentists object to single-visit therapy from the point of infection control, flare-ups and besides all those lack of possible pain control procedures after the single-visit root canal treatment and lack of the possibility for inter-appointment dressings and their benefits. However, some practitioners perform endodontic procedures in multiple-visit. It is generally believe that remaining bacteria can be eliminate or be prevented from repopulating by introducing an inter-appointment dressing such as calcium hydroxide (Ca(OH)_2) in the root canal. Therefore, if the pulp is necrotic and/or associated with periapical disease, the root canal system is infected, in these cases, the root canal system should ideally be cleaned, placed the intra-canal medication, and then the canal should be filled at multiple-visit. However it has been shown that Ca(OH)_2 fails to consistently produce sterile root canals and even allows regrowth in some cases. Thus root canal treatment with an inter-appointment Ca(OH)_2 dressing gives no guarantee of healing in all cases. The purpose of this case report series was to evaluate the radiographic healing of teeth with periapical disease treated in single-visit or multiple-visits with an inter-appointment dressing of Ca(OH)_2.

CASE REPORTS

The experimental study was conducted on ten adult patients aged between 25 and 35 years who were referred to the Hacettepe University, Department of Endodontics, Turkey, for endodontic treatment. During the first visit, ethical approval was requested and granted, and informed consent was obtained from all patients. The diagnosis was confirmed by clinical and radiographic examinations. The clinical findings include necrotic and/or associated with periapical disease, negative response to the pulp tests (electrical and cold), and without swelling or any symptoms were recorded along with the date of the treatment of the affected tooth. In the radiographic finding, the teeth which had got chronic apical lesion were selected. Each tooth was cleaned of plaque, calculus and attachments. All decay and unsupported tooth structure were removed, canal orifices were localized after access cavity preparation and the working length was established radiographically. Both of root canals in group single-visit and group multiple-visit were prepared between size ISO #40 and #60 with step-back technique, depending on size of the root. The canals were irrigated with 0.5 ml 2.5% NaOCl after each file. Chemo-mechanical preparation was completed at the same appointment in all cases. After the instrumentation, 5 ml 2.5 % NaOCl was applied as a final flush then the each canal was dried by using sterile paper point (Spident, Incheon, Korea). After chemo-mechanical preparation, for the single-visit group, the canals were obturated with gutta-percha (Diadent, Seoul, Korea) and AH 26 root canal sealer (Dentsply Detrey, Konstanz, Germany) using cold lateral compaction technique. For the multiple-visit group, root canals were filled with Ca(OH)_2 (SURE-Paste, Korea) in the first visit. Ca(OH)_2 paste was placed in the canals by means of lentulo spiral filler and packed with a cotton pellet at the level of canal entrance. A radiograph was taken to ensure proper placement of the paste in the canal. Then the access cavities were filled with at least 4 mm thickness of a temporary filling material (Nucavfil; PSP Dental, Belvedere, Kent, UK). The second appointment was scheduled for one week thereafter for multiple-visit teeth. At this time, the root isolated with rubber-dam, the operative field disinfected. Ca(OH)_2 paste rinsed out of the canal by using 2.5% NaOCl and master apical files. After the removing of Ca(OH)_2 paste, 5 ml 2.5% NaOCl was applied as a final flush. Subsequently, the canals were filled with gutta-percha and AH 26 root canal sealer using cold lateral compaction technique. The tooth was temporized with glass ionomer cement and a permanent restoration planned.
Radiographic Assessments and Follow-up

The pre/postoperative periapical radiographs were taken using an x-ray machine (Prostyle- Intra, Planmeca, Helsinki, Finland) and radiovisiography (Hilux xraymax, Benlioglu, Ankara, Turkey). All radiographs were evaluated two years postoperatively under optimal conditions where the surrounding light could be controlled for the best possible radiographic contrast (Figures 1 and 2). The size of periapical radiolucency was assessed by measuring with a ruler (to the nearest millimeter) its largest horizontal and vertical width.

DISCUSSION

Apical periodontitis is an inflammatory disease of microbial etiology caused by infection of the root canal system.\textsuperscript{13} The major aim of the root canal treatment is prevent to the apical periodontitis or treat to existing apical periodontitis. The healing of apical periodontitis are affected some factors such as different regimes of endodontic treatment,\textsuperscript{14} systemic disorders\textsuperscript{15} and the microbial factors.\textsuperscript{16} Apical periodontitis is caused by bacteria within root canals.\textsuperscript{17} It is widely accepted that reducing the bacterial count in

Figure 1. Pre/post-operative radiographs in single-visit treated root canals.

Figure 2. Pre/post-operative radiographs in multiple-visit treated root canals.
infected root canals is accomplished by a combination of mechanical instrumentation, various irrigation solutions, and antibacterial medicaments or dressings placed into the canal. Ca(OH)\textsubscript{2} is the most widely used intra-canal dressing material in endodontics due to its antibacterial and biological properties.\textsuperscript{18} However it has been shown that Ca(OH)\textsubscript{2} is not always effective and that it is action is unreliable in the some studies.\textsuperscript{19-21} In this present study, a randomization procedure allocated five teeth to single-visit treatment and five teeth to multiple-visit treatment. At the end of the study period, the present study gave evidence that similar healing results might be obtained through single-and multiple-visit treatment in the radiographic and clinical evaluations. The probability of success increased continuously over time for both treatment groups. Similar to the result of our study, there are some reports show that the healing potential of teeth that treated in single or multiple visits with placement of Ca(OH)\textsubscript{2} dressing appear similar.\textsuperscript{22,23} Other studies evaluating the healing of teeth with necrotic pulps, the success rate was between 75% and 90% for both one and two visit root canal treatment.\textsuperscript{24-26} In the literature base the controversies about number of visiting still not concluded. Those controversies generally have been focused on the applications efficiencies, their advantages and disadvantages and also chair-side time, possible complications and outcomes of treatment. However, recently the single-visit root canal therapy became more popularized clinically. It has been stressed that the case selection and accurate diagnosis are important factors for single visit treatment by most authorities. It is believed that the vital teeth with either a mechanical or traumatic pulp exposure are indicated for single visit treatment, while necrotic pulps with periapical pathosis or acute symptoms are contraindicaded for single visit treatment.\textsuperscript{27} In these clinical cases serial, we treated five teeth with necrotic pulps and without acute symptoms in single visit. The healing of periapical lesions can be established by radiographic, clinical and subjective measures. Long term healing was based mainly on the radiographic appearance of a periapical lesion. Under this condition, evaluation methods very depend on the investigator's visual perception. Most of the studies comparing the success rate of endodontic therapy performed in single or multiple visits have been poorly defined criteria of evaluation.\textsuperscript{28} In this study it was not defined criteria for evaluation of apical periodontitis. The size of periapical radiolucency was assessed by measuring with a ruler in the periapical radiographs and the clinical examination also was performed intraoral. Pekruhn\textsuperscript{29} concluded that there were significantly fewer failures in the multiple-visit treatment than in the single-visit treatment group. As in our study, this study used the undefined criteria. The study by Trope et al,\textsuperscript{12} the well-controlled study, it was investigated radiographic healing of teeth with periradicular disease treated in single or multiple visit. In the multiple visit group root canals were medicated with Ca(OH)\textsubscript{2} for at least one week. After one year follow up evaluation the additional disinfecting action of Ca(OH)\textsubscript{2} resulted in a 10% increase in healing rates.

**CONCLUSION**

Within the limitations of this study, the results were similar to healing of periapical radiolucency between teeth that were treated in single and multiple-visits with inclusion of Ca(OH)\textsubscript{2}. Indeed, if the cleaning and shaping procedures are completed efficiently, good results may be observed in a single visit treatment.

**REFERENCES**


Page 17. In the first paragraph of results section last two sentences should be replaced by the following:

“Most observed aerobic bacteria were alpha hemolitic streptococci with a ratio of 30.8%. Most observed anaerobe bacteria species was Veillonella spp with a ratio of 22.9%.”

Page 18. Table 1 should be replaced by the following table:

<p>| Table 1. The total distribution of bacterial types in the first visit and second visit |
|--------------------------------|---------------------------------|----------------|</p>
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<th><strong>Aerobic bacteria</strong></th>
<th><strong>Patient</strong></th>
<th><strong>Cfu</strong></th>
<th><strong>%</strong></th>
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</thead>
<tbody>
<tr>
<td><strong>Prevalance</strong> &amp; <strong>n</strong></td>
<td><strong>%</strong></td>
<td></td>
<td></td>
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<tr>
<td>Alpha hemolytic streptococci</td>
<td>39.96</td>
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<td>Coagulase negative staphylococci</td>
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<td>Neisseria spp.</td>
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<td>Diphtheroids</td>
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<td>Other</td>
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<td><strong>Total</strong></td>
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<th><strong>Patient</strong></th>
<th><strong>Cfu</strong></th>
<th><strong>%</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Prevalance (%)</strong> &amp; <strong>n</strong></td>
<td><strong>%</strong></td>
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<tr>
<td>Veillonella spp.</td>
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<td>Actinomyces spp.</td>
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<td>Fusobacterium spp.</td>
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<td>8200</td>
<td>11.13563</td>
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<td>Peptostreptococcus spp.</td>
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<td>11500</td>
<td>15.58999</td>
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<td>Bacteroides capillosus</td>
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<td>Prevotella spp.</td>
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<tr>
<td>Other</td>
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