

Endodontic Treatment in Single and Multiple Visits: An Overview of Systematic Reviews

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Abstract

Introduction: The effectiveness of endodontic treatment regarding the number of sessions to complete the therapy is still controversial. The aim of this study was to conduct an overview of published systematic reviews (SRs) comparing endodontic treatment in single and multiple visits. **Methods:** A systematic search was performed in the electronic databases MEDLINE/PubMed and Cochrane Central Register of Controlled Trials until August 18, 2016, without language restriction. The eligibility criteria were as follows: (1) SRs and (2) a focus on endodontic techniques in single or multiple visits. The phases of eligibility and analysis of risk of bias were conducted by 2 or 3 independent and calibrated examiners, and a fourth examiner was consulted to resolve inconsistencies. Assessment of Multiple Systematic Reviews was used to evaluate the risk of bias of the included SRs, which were assessed according to the risk to develop knowledge and the existing knowledge gap. **Results:** The main characteristics including healing rates, success, and clinical complications during and after endodontic treatment were extracted from the SRs. From the 20 SRs initially identified, 8 were included in the analysis. Of these, 6 SRs showed low to moderate risk of bias and were suitable as strong clinical evidence on the topic. **Conclusions:** Overall analysis indicated that single and multiple visits showed similar repair or success rates regardless of the precondition of the pulp and periapex. The apical periodontitis subgroup showed a slight positive trend toward a decreased incidence of postoperative complications and a higher effectiveness and efficiency for a single session. Based on the risk of bias, the current level of evidence for this clinical approach is high. (*J Endod* 2017; ■:1–7)

Key Words

Periapical disease, pulp disease, root canal therapy, systematic review

Endodontic treatment in multiple visits has been a traditionally accepted protocol. However, an alternative protocol comprising a single visit also has been proposed (1–12). Several factors such as automation, evolution of endodontic treatment techniques, and

advances in anatomic and biological knowledge of pulpal and periapical diseases have led to the treatment option entailing a single visit to the dental office (4, 7).

Both approaches have unique advantages and disadvantages. However, the approach of conventional therapy with the single-visit protocol is a paradigm shift from endodontic treatment in multiple visits (8, 11).

Endodontists determine the best approach by considering the immediate outcomes including complications after endodontic therapy (eg, flare-up, discomfort or pain, and swelling); results of microbiological analyses; instrumentation and root canal filling quality; and intermediate or later outcomes such as healing rates, success, effectiveness and efficiency, occurrence of newly developed or persistent periapical lesions, dental fractures, and indications for tooth extraction (6).

Despite the availability of systematic reviews (SRs), existing gaps in knowledge have resulted in the failure of guidelines for effective clinical practice; moreover, a consensus among professionals is lacking (6, 8). Hence, there is a need for robust scientific evidence to support clinical decision making.

The overview of SRs is a new study design proposed by the Cochrane Collaboration. The findings of multiple SRs are compiled in a single document with ease of access and use to synthesize and integrate information, reduce uncertainty for decision making, and create a new hierarchy of evidence, thus serving as a friendly front-end for health decision making (13–15). A clinical decision must be free of professional opinions that could bias selection of a technique. Therefore, this study was based only on SRs because these are considered as studies with the highest level of scientific evidence. We aimed to develop an overview of available SRs (15) to summarize evidence and the level of risk of bias and compile results related to single- and multiple-visit approaches.

The purpose of this overview was to identify all SRs on endodontic treatment in single and multiple visits, to interrogate the methodological quality (risk of bias) of these studies, and to evaluate the available evidence regarding the best clinical practices

Significance

The aim of this study was to form a consensus that guides clinical decision making in endodontics related to the number of sessions required for effective and safe endodontic treatment. This article is an original methodology design proposed by the Cochrane Collaboration and reports on a study of published systematic reviews.

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Review Article

in endodontic treatment. The null hypothesis was that the single-visit approach has similar performance to the traditional approach of multiple visits.

Materials and Methods

Search Strategy

We conducted advanced searches in the PubMed/MEDLINE and Cochrane Central Register of Controlled Trials databases until August 18, 2016, without language restriction for reviews that were within the scope of this overview. The search included SRs related to endodontic techniques in single or multiple visits as well as references included in the SRs. The overview was conducted according to the Preferred Reporting Items for Systematic Reviews and Meta-analyses guidelines (16). In addition, Assessment of Multiple Systematic Reviews (17) was used to evaluate the risk of bias of the included SRs.

The final strategy included a filter of the PubMed/MEDLINE database (clinical queries) and key words appropriate to the study (root canal therapy OR root canal treatment). The search strategy in the Cochrane Central Register of Controlled Trials included the following key words: “root canal therapy” and “single visit” and “multiple visits.”

Inclusion and Exclusion Criteria in Screening of SRs

The studies were initially selected for the title and abstract according to the following inclusion criteria:

1. SRs
2. Related to the endodontic techniques of single or multiple visits

Articles without an abstract or those without an adequate description were included for full-text evaluation. Eligibility was confirmed after access of the full text by following the previously defined exclusion criteria (ie, single- or multiple-visit approach not addressed, duplicated, and comments and editorials).

Data Collection Process

Data were collected by 2 independent examiners who were previously trained and calibrated (S.M. and M.S.N.A.M.) ($\kappa = 1.0$). Healing or success rate, clinical complications, and the characteristics of the included studies were extracted. Doubts and discrepancies were discussed and resolved by consensus; when necessary, a third examiner (M.S.) was consulted.

Assessment of Risk of Bias

Assessment of Multiple Systematic Reviews was used for the assessment of risk of bias as described by Shea et al (17). Eleven items were used to assess the methodological quality of the SR (Table 1). Finally, each article was given a score of high, moderate, or low risk of bias. An SR was considered as low risk when 8 to 11 positive responses were obtained from 11 items, moderate risk between 4 and 7 parameters, and high risk of bias ≤ 3 items (15). The assessment was performed by 3 examiners who were previously trained and calibrated (S.M., T.K.T., and M.S.N.A.M.) ($\kappa = 0.9$). Doubts and discrepancies were discussed, and if not resolved by consensus, a fourth examiner (M.S.) was consulted.

Results

Screening of SRs

Initially, 20 articles were identified including 13 from PubMed/MEDLINE, 5 from The Cochrane Central Register of Controlled Trials, and 2 references from the manual search. Thirteen studies were selected by eligibility assessment of the title and abstract based on the

inclusion criteria. After the eligibility step, 8 SRs (1–3, 5, 6, 8, 9, 11) were selected (Fig. 1). The data from the SRs were compiled into 2 parts with the number of visits for endodontic treatment as a secondary outcome. Data from Ng et al (2, 3) were viable; therefore, these 2 articles were considered as a single SR for both subsequent qualitative and quantitative analyses. Thus, the calculations were based on a total of 7 SRs. All other studies (1, 6, 5, 8, 9, 11) addressed the issue as a primary outcome. A total of 62 primary studies were originally analyzed by SRs included in this overview.

Assessment of Risk of Bias

The Assessment of Multiple Systematic Reviews tool was used to assess the risk of bias for all SRs included. The results of classification into high, moderate, or low risk of bias according to the number of positive responses are shown in Table 1.

Three SRs were at low risk of bias (6, 8, 11), 3 at moderate risk of bias (1, 2, 5), and 1 at high risk of bias (9). SRs with low and moderate risk of bias were considered as strong clinical evidence on the topic. The 6 SRs that were classified as low or moderate risk accounted for 85.6% of the studies analyzed (Table 1).

Characteristics of Systematic Reviews

Table 2 described the overall sample according to characteristics of each SR regardless of the preconditions of dental pulp and periapices as follows: authors, year of publication, number and type of primary studies included, languages, outcomes and period of follow-up, presence of statistical analysis/meta-analysis, and main results.

Analysis of the Overall Sample

Analysis of the Immediate Postoperative Complications (Flare-up, Pain, Swelling, Presence of Fistula, and Other), Tissue Repair, and Success Rate.

The 8 included SRs focused on root canal treatments by single or multiple visits. With regard to immediate outcomes, 4 of the 7 SRs reported postoperative complications and discomfort including the incidence of postoperative pain, swelling, flare-up, and fistula. Regarding the incidence of discomfort up to 72 hours after root canal obturation, the SRs showed contradictory results (6, 8). Figini et al (6) reported that the frequency of pain at 72 hours and 1 week was not significantly different between single and multiple visits; moreover, there were no reports of discomfort at 1 month after treatment. However, the meta-analysis of the use of painkillers after post root canal obturation obtained from 3 primary studies (559 patients) indicated that the use of painkillers was significantly more frequent in single-visit cases. Conversely, Su et al (8) showed that patients submitted to a single visit had a lower frequency of pain in the first 72 hours after root canal obturation; however, there was no significant difference in pain after 1 week between single and multiple visits, and none of the patients reported discomfort after 1 month of treatment. Wong et al (9) reported no difference in postoperative complications between single and multiple visits in their meta-analysis of 21 clinical trials.

Complications related to the frequency of flare-up, which is characterized by the development of pain, swelling, or both, were another immediate outcome. This complication occurs days or hours after endodontic intervention and, depending on the severity, requires an emergency visit for treatment (18). The exact definition of flare-up was not consistently comparable between studies (5, 6), which results in different clinical settings (19, 20). Figini et al (6) included 3 studies that considered flare-up as swelling (192 patients), but despite the lower frequency of complications in multiple compared with single visits, the significance was not statistically verified. In cases of mixed

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