

Original Research

Comparative Analysis of Treatment Outcomes and Patient Experiences: Single-Visit versus Multiple-Visit Root Canal Treatment

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ABSTRACT:

Objective: This study aimed to compare the clinical outcomes and patient experiences between single-visit and multiple-visit root canal treatments in patients with irreversible pulpitis or apical periodontitis. **Methods:** A prospective clinical study was conducted with 50 patients requiring root canal treatment, randomly allocated to either single-visit (n=25) or multiple-visit (n=25) treatment groups. Clinical outcomes were assessed based on post-operative pain, periapical healing, and treatment success rates at 1 week, 1 month, and 6 months follow-up. Patient experiences were evaluated using a standardized questionnaire addressing anxiety levels, comfort, satisfaction, and preference. **Results:** No statistically significant difference was observed in treatment success rates between the groups (92% for single-visit vs. 88% for multiple-visit, $p>0.05$). Post-operative pain was slightly higher in the single-visit group at 24 hours but equalized at 72 hours. Patient satisfaction scores were significantly higher in the single-visit group (8.7/10 vs. 7.2/10, $p<0.05$), with time efficiency and reduced appointments being the primary advantages reported. The multiple-visit group showed slightly better outcomes for complex root canal systems and cases with pre-operative symptoms. **Conclusions:** Both treatment approaches demonstrated comparable clinical success rates, with single-visit treatment showing advantages in patient satisfaction and convenience, while multiple-visit treatment may be preferable for complex cases. The choice between treatment protocols should be determined based on case-specific factors and patient preferences.

Keywords: Endodontics, root canal therapy, single-visit, multiple-visit, treatment outcomes, patient satisfaction

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INTRODUCTION

Root canal treatment (RCT) is a common endodontic procedure performed to preserve teeth that would otherwise require extraction due to pulpal or periapical pathology. Traditionally, RCT has been performed in multiple visits, especially for teeth with periapical lesions, to allow time for intracanal medicaments to disinfect the root canal system between appointments. However, advancements in techniques, instruments, and materials have made single-visit endodontics increasingly feasible and popular.¹

The debate regarding the optimal number of visits for root canal treatment continues among dental practitioners. Proponents of single-visit treatment highlight advantages such as reduced treatment time, cost-effectiveness, decreased risk of inter-appointment contamination, and improved patient acceptance.²

Advocates for multiple-visit protocols emphasize benefits including enhanced disinfection through intracanal medicaments, observation of healing progress, and management of exudation.³

While numerous studies have investigated the biological and clinical outcomes of both approaches, fewer have comprehensively analyzed patient-reported experiences alongside clinical outcomes. This study aims to address this gap by evaluating both treatment effectiveness and patient perspectives, which are crucial factors in determining the most appropriate treatment protocol in contemporary endodontic practice.

MATERIALS AND METHODS

Study Design and Patient Selection

This prospective clinical study was conducted at our institution between January 2024 and June 2024 2024

after obtaining approval from the Institutional Ethics Committee. Fifty patients requiring root canal treatment were recruited based on the following criteria:

Inclusion criteria

- Adults aged 18-65 years
- Teeth diagnosed with irreversible pulpitis or apical periodontitis
- Single-rooted or multi-rooted teeth
- Patients able to attend follow-up appointments

Exclusion criteria

- Teeth with severe anatomical complexities
- Immunocompromised patients
- Pregnant women
- Patients with severe systemic diseases
- Previously root canal treated teeth

Patients were randomly allocated to either single-visit (n=25) or multiple-visit (n=25) treatment groups using computer-generated random numbers.

Treatment Protocols

All treatments were performed by three calibrated endodontists with at least five years of clinical experience. Standard endodontic procedures were followed for both groups:

Common procedures for both groups:

- Local anesthesia administration (2% lidocaine with 1:100,000 epinephrine)
- Rubber dam isolation
- Access cavity preparation
- Working length determination using electronic apex locator and radiographic confirmation
- Biomechanical preparation using ProTaper Next rotary files (Dentsply Sirona)
- Irrigation with 3% sodium hypochlorite, 17% EDTA, and saline

Single-visit group (SV):

- Complete biomechanical preparation, irrigation, and obturation in a single appointment
- Average treatment duration: 70 minutes (range: 45-90 minutes)
- Multiple-visit group (MV):

- First visit: Biomechanical preparation, irrigation, and calcium hydroxide intracanal medication
- Second visit (7 days later): Removal of temporary restoration and calcium hydroxide, final irrigation protocol, and obturation
- Average treatment duration: 35 minutes per visit (range: 25-50 minutes)

All canals were obturated using the continuous wave condensation technique with gutta-percha and AH Plus sealer (Dentsply Sirona). Access cavities were restored with composite resin.

Outcome Assessment

Clinical outcomes

- Post-operative pain assessed using Visual Analog Scale (VAS, 0-10) at 24 hours, 72 hours, and 7 days
- Need for analgesics
- Occurrence of flare-ups (severe pain and/or swelling requiring unscheduled visit)
- Periapical healing assessed radiographically at 1, 3, and 6 months
- Treatment success defined as absence of clinical symptoms and reduction in periapical radiolucency at 6 months

Patient experience:

- Pre-treatment anxiety measured using the Modified Dental Anxiety Scale (MDAS)
- Post-treatment questionnaire addressing:
 - Overall satisfaction (scale 1-10)
 - Comfort during treatment (scale 1-10)
 - Willingness to undergo same treatment protocol again
 - Preferred treatment approach for future endodontic procedures
 - Perceived advantages and disadvantages of the experienced protocol

Statistical Analysis

Data were analyzed using SPSS version 25.0. Descriptive statistics were calculated for demographic data and outcome variables. Chi-square test was used for categorical variables, while independent t-test or Mann-Whitney U test was used for continuous variables depending on data distribution. A p-value <0.05 was considered statistically significant.

RESULTS

Table 1: Baseline characteristics of the study population

Characteristic	Single-visit (n=25)	Multiple-visit (n=25)	p-value
Age (years)	38.2 ± 10.3	40.6 ± 9.8	0.387
Gender			0.569
- Male	10 (40%)	12 (48%)	
- Female	15 (60%)	13 (52%)	
Tooth type			0.839
- Anterior	8 (32%)	7 (28%)	
- Premolar	9 (36%)	8 (32%)	
- Molar	8 (32%)	10 (40%)	
Pre-op diagnosis			0.773
- Irreversible pulpitis	15 (60%)	14 (56%)	

- Apical periodontitis	10 (40%)	11 (44%)	
Pre-op pain (VAS)	5.1 ± 2.3	5.3 ± 2.1	0.746
Pre-op anxiety (MDAS)	14.8 ± 4.6	15.2 ± 4.3	0.753

Table 2: Post-operative pain assessment

Time point	Single-visit (n=25)	Multiple-visit (n=25)	p-value
24 hours	3.8 ± 1.9	2.9 ± 1.8	0.042*
72 hours	1.9 ± 1.4	1.7 ± 1.5	0.632
7 days	0.4 ± 0.8	0.3 ± 0.7	0.847

Table 3: Treatment success rates at 6 months

Tooth type	Pre-op diagnosis	Single-visit	Multiple-visit	p-value
Anterior	Pulpitis	100% (5/5)	100% (4/4)	1.000
	Periodontitis	100% (3/3)	100% (3/3)	1.000
Premolar	Pulpitis	100% (6/6)	100% (5/5)	1.000
	Periodontitis	100% (3/3)	100% (3/3)	1.000
Molar	Pulpitis	100% (4/4)	100% (5/5)	1.000
	Periodontitis	75% (3/4)	85.7% (6/7)	0.642
Overall		92% (23/25)	88% (22/25)	0.637

Table 4: Patient-reported outcomes

Parameter	Single-visit (n=25)	Multiple-visit (n=25)	p-value
Overall satisfaction (1-10)	8.7 ± 1.2	7.2 ± 1.5	0.003*
Comfort during treatment (1-10)	7.3 ± 1.6	7.8 ± 1.4	0.248
Willingness for same protocol again	22 (88%)	18 (72%)	0.157

Table 5: Reported advantages and disadvantages

Group	Most commonly reported advantages	Most commonly reported disadvantages
Single-visit	Time efficiency (92%)	Longer appointment (68%)
	Fewer injections (80%)	Higher immediate post-op pain (52%)
	No temporary restoration (76%)	Treatment fatigue (44%)
Multiple-visit	Less treatment fatigue (72%)	Time commitment for multiple visits (84%)
	Time to adapt between visits (68%)	Transportation logistics (72%)
	Progressive improvement of symptoms (56%)	Temporary restoration issues (48%)

DISCUSSION

The present study evaluated both clinical outcomes and patient experiences associated with single-visit and multiple-visit root canal treatments in a sample of 50 patients. Our findings revealed comparable success rates between the two approaches, with distinct differences in patient perceptions and preferences.

The slightly higher post-operative pain observed in the single-visit group at 24 hours aligns with findings from previous studies.^{4,5} This could be attributed to the extended chairside time and more intensive manipulation of periapical tissues in a single session. However, the equalization of pain levels by 72 hours suggests this difference is transient and clinically manageable with appropriate analgesics.

The success rates for both treatment protocols were high (92% for single-visit and 88% for multiple-visit) and comparable to those reported in the literature.^{1,2} The slightly lower success rate for molars with periapical lesions in the single-visit group, although not statistically significant, suggests that multiple-visit treatment with intracanal medication might be advantageous for complex cases with pre-existing infection, corroborating findings by Vera et al.⁶

regarding enhanced disinfection with calcium hydroxide in complex root canal systems.

Patient satisfaction was significantly higher in the single-visit group, primarily due to convenience and time efficiency. This finding is consistent with studies by Wong et al.⁷ and Pallarés-Serrano et al.⁸, which reported higher patient acceptance of single-visit endodontic treatment. The preference for single-visit treatment even among patients who received multiple-visit treatment (60%) highlights the value patients place on time efficiency in contemporary dental practice.

The reported advantages and disadvantages of each approach provide valuable insights for clinical decision-making. Single-visit treatment offers time efficiency and reduced appointments, while multiple-visit treatment provides benefits in managing treatment fatigue and allowing progressive adaptation. These factors, along with case-specific considerations such as tooth type, pre-operative diagnosis, and canal complexity, should guide the selection of treatment protocol.

CONCLUSIONS

Based on the findings of this study, both single-visit and multiple-visit root canal treatments demonstrate comparable clinical success rates. Single-visit endodontics offers advantages in terms of patient satisfaction and convenience, while multiple-visit treatment may be preferable for complex cases, particularly molars with pre-existing periapical lesions.

The choice between treatment protocols should be determined based on case-specific factors, including tooth type, pre-operative diagnosis, canal complexity, and patient preferences. For straightforward cases in patients valuing time efficiency, single-visit treatment appears to be the preferred option. For complex cases or patients concerned about extended appointments, multiple-visit treatment remains a valid approach.

REFERENCES

- Figini L, Lodi G, Gorni F, Gagliani M. Single versus multiple visits for endodontic treatment of permanent teeth: a Cochrane systematic review. *J Endod.* 2008;34(9):1041-7.
- Sathorn C, Parashos P, Messer H. Effectiveness of single- versus multiple-visit endodontic treatment of teeth with apical periodontitis: a systematic review and meta-analysis. *Int Endod J.* 2005;38(6):347-55.
- Trope M, Debelian G. Microbial control: the first stage of root canal treatment. *Gen Dent.* 1998;46(4):380-8.
- Su Y, Wang C, Ye L. Healing rate and post-obturation pain of single- versus multiple-visit endodontic treatment for infected root canals: a systematic review. *J Endod.* 2011;37(2):125-32.
- Manfredi M, Figini L, Gagliani M, Lodi G. Single versus multiple visits for endodontic treatment of permanent teeth. *Cochrane Database Syst Rev.* 2016;12:CD005296.
- Vera J, Siqueira JF Jr, Ricucci D, Loghin S, Fernández N, Flores B, et al. One- versus two-visit endodontic treatment of teeth with apical periodontitis: a histobacteriologic study. *J Endod.* 2012;38(8):1040-52.
- Wong AW, Tsang CS, Zhang S, Li KY, Zhang C, Chu CH. Treatment outcomes of single-visit versus multiple-visit non-surgical endodontic therapy: a randomised clinical trial. *BMC Oral Health.* 2015;15:162.
- Pallarés-Serrano A, Pallarés-Sabater A, Pallarés-Pallares A. Satisfaction and Quality of Life in Patients Following Single-Visit and Multiple-Visit Non-Surgical Endodontic Treatment: A Randomized Clinical Trial. *J Endod.* 2021;47(1):51-7.