



## SINGLE VISIT ENDODONTIC THERAPY: A REVIEW

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### ABSTRACT

Successful endodontic treatment depends upon localization, proper chemo-mechanical preparation of the root canal system, debridement, shaping, disinfection, and three dimensional obturation of canal system. Thus multiple sitting endodontic therapy was advocated and followed. Single visit endodontic treatment had various drawbacks mainly concerning with post-operative pain and failure of the treatment outcome. With the advent of newer technology, elimination of these various drawbacks of single visit endodontic therapy could be made possible in many scenarios. The present article discussed the various case selection, indications, contraindications, patient and practice advantages with respect to single visit endodontic therapy. Present article also discusses about the adjunct used for the faster and better treatment outcomes of single visit endodontics mainly pain control, isolation access cavity preparation, light and magnification, use of irrigants and use of Laser.

**KEYWORDS:** Single visit endodontic therapy, Post-operative pain.

### INTRODUCTION

Over the past decade, nickel titanium rotary instrumentation, more reliable apex locators, ultrasonics, microscopic endodontics, digital radiography, newer obturation systems, and biocompatible sealing materials have helped practitioners perform endodontic procedures more effectively and efficiently than ever before.

All of these advances increase the incidence of single-visit Endodontics in the dental clinics and the rationale for this treatment regime are less stressful and only one anesthesia is needed, which makes it very well accepted by the patient, less time-consuming, reduces the risk of inter-appointment contaminations, less expensive and more productive for the clinician.

In other words, Endodontic success depends upon localization, proper chemo mechanical preparation of the root canal system, debridement, shaping, disinfection, and three dimensional obturation of canal system. To achieve these goals, endodontic therapy used to be performed in multiple visits for complete disinfection of the canals, all together for the better success of endodontic therapy.

Multiple visit endodontics was an established norm in the field of endodontics, but it has certain disadvantages like inter appointment contamination and flare ups caused by leakage or loss of temporary seal, prolonged time taken leading to patient fatigue, operator fatigue,

inability to provide esthetic restorations in time in case of traumatically damaged crowns and discontinued treatment leading to failures.<sup>[2]</sup>

All these factors led to the shift in endodontic therapy from multiple visits to single visit endodontic therapy which is a conservative, non-surgical treatment of an endodontically involved tooth consisting of complete chemo-mechanical preparation and obturation of the root canal system in a single visit.<sup>[3]</sup>

### Indications for single visit endodontics are

- Patients requiring full mouth rehabilitation.<sup>[1-4]</sup>
- Physically disabled patients who cannot come to dental clinics frequently.
- Uncomplicated vital teeth.
- Patients in whom sedation is required.
- Fractured anterior or bicuspid teeth where esthetics is the concern.
- Teeth with accidental/mechanical pulp exposure.
- Intentional root canal therapy.
- Vital pulp exposures due to caries or trauma with symptomatic pulpitis.
- Teeth requiring immediate post placement, where esthetics is the concern.
- Teeth with sub-gingival breakdown, multiple coronal walls missing, where isolation and sealing is the problem.
- Non vital teeth with sinus tract.
- Some of the re-treatment cases.

**Contraindications for single visit endodontics are**

Patients having severe pain on percussion suffering from acute apical periodontitis.<sup>[1-3]</sup>

- Teeth with anatomic anomalies for e.g. calcified and curved canals.
- Patients with allergies.
- Acute alveolar abscess cases with pus discharge.
- Patients who are unable to keep mouth open for long duration for e.g. TMJ disorders.
- Teeth with limited access.
- Symptomatic non vital teeth and no sinus tract.
- Asymptomatic non vital teeth with periapical pathology and no sinus tract.
- For most of the re-treatment cases.

**Treatment protocol differences between single and multiple-visit**

A major goal of root canal treatment is the prevention or treatment of apical periodontitis, leading to the preservation of natural teeth. The presence of bacteria inside the root canal system results in the development of periapical lesions.<sup>[1]</sup>

Traditionally, root canal treatment was performed in multiple visits, with the use of extra disinfecting agents (intracanal dressing) besides the irrigants that is used during the cleaning and shaping procedure which mainly aims to reduce or eliminate microorganisms and their by-products from the root canal system before obturation.

The most intracanal dressing researched and widely used is the calcium hydroxide (Ca (OH)<sub>2</sub>) paste.<sup>[3]</sup> Calcium hydroxide a strong alkaline substance, which has a pH of approximately 12.5. In an aqueous solution, Ca (OH)<sub>2</sub> dissociates into calcium and hydroxide ions. The hydroxyl ion OH<sup>-</sup> is even smaller and can penetrate through dentin to the cementum. Calcium hydroxide works by a hydrolysis reaction in which the OH<sup>-</sup> ion cuts protein chains and bacterial endotoxin into pieces as it breaks chemical bonds. It does this by inserting water molecules between the carbon-carbon bonds (and breaking C-C bonds by the process of hydrolysis), the backbone of proteins and endotoxin. So if the pearls on a pearl necklace represent atoms and the string between the pearls represents C-C bonds, Ca(OH)<sub>2</sub> is like a pair of scissors that cuts the string (hydrolyzes the bonds) between the atoms breaking the protein down into harmless non-functional pieces. It is a tissue solvent! It also kills bacteria and it dissolves the endotoxin (bacterial LPS).

However Ca (OH)<sub>2</sub> was not capable of eliminating all the bacteria, it helped to reduce the bacteria remaining in the canal after the irrigation.

The concept of single visit root canal treatment is based on the entombing theory, which the large number of microorganisms removed during cleaning and shaping and the remaining bacteria entombed by the root canal obturation, therefore it will miss the essential elements to

be survive nutrition and space. In addition, the antimicrobial activity of the sealer or the zinc (Zn) ions of gutta-percha can kill the residual bacteria.<sup>[4-10]</sup>

**Adjuncts to Render Efficient and Faster Treatment in Single Visit Endodontics****Isolation**

The use of the rubber dam is mandatory in root canal treatment because of its following advantages.

1. Patient is protected from aspiration of instruments, tooth debris, medicaments and irrigating solutions.
2. Soft tissues are retracted and protected.
3. A surgically operating field is isolated from saliva, blood and other tissue fluids. It also reduces the risk of cross contamination of the root canal system with the spread of infectious agents.
4. Visibility is improved. It provides a dry field and reduces mirror fogging.
5. Efficiency is increased.

**Magnification light**

Use of high quality magnification in dentistry improves both the quality and speed of treatment, hence suitable for single visit endodontics.<sup>[1]</sup> Santos Accioly Lins C, et al.<sup>[7]</sup> gave a systemic review on operating microscope stating that use of operating microscope provide a marked significant improvement in vision of operative field thereby offering better quality jobs and a higher success rate.<sup>[8-10]</sup>

**Use of irrigants**

Use of a suitable irrigant should be incorporated so as to improve the disinfection of the canal thereby enhancing the treatment outcome.

**Single Visit Endodontic Therapy: Acceptance**

The main concern among dentist that had probably held back the single visit endodontic therapy is the common association of its post-operative pain and the regular failure of the treatment outcome previously observed.

**Postoperative pain**

Postoperative or intraoperative flare-up and pain are often the measure of the success or failure of single visit treatment, although pain during treatment has been proved to have no effect on long-term outcomes. Postoperative pain at the mild level is common in root canal treatment which may be the result of over-instrumentation, over-filling, passage of medicine or infected debris into the periapical tissues, damage of the vital neural or pulp tissues or central sensitization. The preponderance of the research to date has shown no significant difference in postoperative pain has been found when one-visit RCT was compared with two-visit treatment, especially in teeth with vital pulps.

**SUMMARY**

With the advent of technological advancement and emergence of new gadgets, evidence based dentistry and

more scientific deliberations and the concept of maximum dentistry in minimum visits led to a resurgent impetus towards laying down of various protocols to enable dentists to venture into single visit endodontics with reasonable level of outcome.

Single visit root canal treatment versus the multiple visit root canal treatment has been the subject of a long standing debate within the dental community, when the clinicians are faced with choices of which treatment should be offered to patients, the central issues that should be considered are effectiveness, complication, cost and probably patient /operator satisfaction.

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