



Single Visit Root Canal Treatment in Modern Dentistry

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ABSTRACT :

The location of canals, correct shape, cleaning, and 3D obturation of the canal system are all important factors in the effectiveness of endodontic treatment. According to the entombing theory, which holds that because so many microorganisms are eliminated during cleaning and shaping, the remaining bacteria are imprisoned by root canal obturation and are deprived of the nutrients they need to survive. This theory underlies the idea of single visit root canal therapy. The goal of endodontic therapy is to completely obturate the pulp cavity with static restorative material after thorough mechanical and chemical debridement of the whole pulp chamber. Recent improvements in endodontic technology have drawn dentists to conduct root canal therapy in a single appointment. Studies on postoperative pain and healing times reveal that whether treatment is finished in one visit or across several, the results are the same. The aim of this review article is to discuss about gross single visit root canal treatment along with advantages, disadvantages and procedural steps.

Keywords : single visit, patient comfort, healing, pain.

Introduction :

The term "root canal therapy in single visits" refers to a non-surgical, conservative method of managing an endodontically treated tooth that involves biomechanical anchoring and obturation of the root canal system in a single appointment.¹ The location of canals, correct shape, cleaning, and 3D obturation of the canal system are all important factors in the effectiveness of endodontic treatment. According to the entombing theory, which holds that because so many microorganisms are eliminated during cleaning and shaping, the remaining bacteria are imprisoned by root canal obturation and are deprived of the nutrients they need to survive. This theory underlies the idea of single visit root canal therapy. The merits and cons of single sitting versus multiple visit root canal therapy have been hotly debated within the dental industry for a very long time. With today's cutting-edge technologies, the introduction of innovative devices, evidence-based dentistry, and The idea of providing the best dental care in the fewest number of visits has prompted a new initiative in dental treatment methods. Modern dentistry's "maximum dentistry in minimum visits" mantra has grown in popularity in recent years, making single-appointment endodontics the ideal option in many situations. This requires fewer operations, which reduces the need for extra anaesthesia, reduces gingival damage from applying rubber dams, eliminates the chance of inter-appointment leaking through temporary restoration, and takes less time, all of which lowers the cost to the patients.²

Oliet's criteria for case selection :³

1. positive response from patients
2. There are no immediate symptoms
3. Absence of ongoing bleeding or exudation
4. Anatomical interferences are absent
5. Availability of enough time to finish the case.
6. Procedures are not tough.

There are some guidelines which should be followed during the Single visit endodontics. They include Experienced clinicians should perform one-appointment endodontics, There are no short cuts to achievement, You have 60 minutes to finish the case, Treatments that take a lengthy time should be administered in stages over several visits. Because there are fewer odds of flare-ups, vital teeth are a better candidate for SVE.

Indication :

- Simple essential teeth, anteriors, shattered or bicuspid teeth wherein aesthetics are a concern, and teeth that would benefit from endodontic surgery.
- Nonvital teeth along with sinus tract.
- Patients who need antibiotic prophylaxis due to a medical condition.
- Patients with physical limitations who are unable to routinely visit dental clinics
- Performing a root canal on intentionally.
- People who need complete mouth therapy.
- A few of the cases of re-treatment.
- Exposure pulp due to mechanical failure.
- Traumatic exposure of the vital pulp combined with symptomatic pulpitis.
- Exposure of the vital pulp due to caries and suggestive pulpitis
- Teeth that require urgent post-placement, with aesthetics being the worrisome factor everywhere.¹

Contraindication :

- Teeth with developmental defects, such as calcified and bent canals
- Teeth with periapical disease
- non-vital teeth and teeth without symptoms.
- sinus region.
- Cases of acute alveolar abscess with pus discharge.
- Severe pain on percussion and acute apical periodontitis.
- Sinus tract absent and symptomatic non-vital teeth.
- Most cases of re-treatment.
- Hypersensitivity to medicines or any type of restorative substance
- Access to teeth is restricted.
- Patients with conditions like TMJ issues who are unable to keep their mouths open for an extended period of time.⁴

Advantages :

Single visit endodontics is very popular now a days for some remarkable advantages in aspect of clinical as well as for patients .

Clinical advantages :

- Following instrumentation, clinicians have the most thorough knowledge of canal anatomy and do not need to reposition themselves.
- There is no chance of bacterial regrowth and temporary seal leaking, regardless of the peculiarities of certain teeth.
- By refraining from repeating treatments like local anaesthetic injections, the small likelihood of a life-threatening reaction is decreased.
- The American Heart Association (AHA) has advised performing as many operations as feasible during the antibiotic course for patients at risk of developing bacterial endocarditis.
- Patients will only have one bout of anxiety and postoperative discomfort.
- Exudation or haemorrhage may make management challenging.
- Multiple calcified canals could not be treated in a single appointment without placing the patient and the doctor under unnecessary strain.
- It's possible that the clinician lacks the necessary expertise to handle a problem in a single visit.⁵

Practice management advantages :

- Work on prosthetics might start right away.
- There is a decreased chance of cancelled appointments.
- The number of teeth that patients can keep growing.
- A variety of tools and supplies for healing are required for Suction tips, disposable bibs, irrigation needles, anaesthetic needles, and rubber dams from a separate visit can be kept.
- Time is not wasted because patients do not need to be rescheduled and appointments do not need to be confirmed.
- There is less medical-legal risk because AHA recommendations are followed, there is less chance of cross-contamination, and there are fewer intrusive treatments.¹

Disadvantages:

- If there is a flare-up, gaining access to the apical canal will not be simple.
- Typically, physicians become fatigued with lengthy and recurrent working hours such as extended one -appointment operating time.
- Patient tiredness - The longer single appointment may be uncomfortable and exhausting for the patient.

Steps of Single Visit Endodontics :

1. Pain Control :

This is the first step of any endodontic procedure. Total procedure should be painless. It is preferable to use long acting local anesthetics like bupivacaine or etidocaine. Masoud Parirokh et al. in a study concluded that patients who had single-visit endodontic treatment for irreversible pulpitis in mandibular molars with bupivacaine experienced considerably less early postoperative discomfort and required fewer analgesics than those who underwent the procedure with lidocaine.⁶ In some cases supplemental anesthesia is beneficial along with standard procedure like intrapulpal, intraosseous, intraligamental etc. Recently electronic dental anesthesia is a good alternative. Wand is such a device where drop by drop injection solution (1.8 ml) is given slowly and patient feels minimum pain.

2. Isolation and magnification :

It is one of the important part for a successful root canal treatment. The use of a rubber dam is required during endodontic treatment. The following are ensured by the use of rubber dams in endodontics: The patient is restrained to prevent them from aspirating any necessary tools, dental debris, medications, or irrigation fluids. Saliva, haemorrhage, and other tissue fluids cannot enter a surgically sanitary operative field. Soft tissues are removed while being safeguarded. The site has better visual appeal. Moreover efficiency is improved.

Use of high quality magnification in dentistry improves both the quality and speed of treatment hence, suitable for single visit endodontics. Dental operating microscope, surgical loupes, A fiber-optic endoscope that is intended for intraoral use is a recent innovation in the visualisation sector. Using a fibre optic probe, the oroscope a medical-grade video monitor to provide a magnified image of the operation field, and a xenon light source.

3. Access cavity preparation :

Before access cavity preparation caries is removed early before the pulp chamber is entered. The roof of the pulp chamber is perforated with no. 2 round bur in case of anterior tooth and no.4 round bur in case of posterior tooth. Once ditch is made then non end cutting bur like endo Z bur is used to extend the cavity. To identify the canal orifices as well as canal angulation DG 16 and CK 17 endodontic explorer can be used. Once orifice have been located they should be flared or enlarged. GG drills can be used from smaller sizes. Now a days SX rotary endodontic files are available for flaring of the root canals. Ultrasonic tips specially designed for endodontic procedures can be valuable aids in the preparation of access cavity, refining the canals and locating canal orifices adjunct with microscopes. It provides excellent visibility compared to conventional handpieces.

Working length determination done using hand K files No. 10 or 15 with the help of apex locator and should be confirmed with radiograph.

4. Biomechanical preparation :

Cleaning and shaping of the canal is the core part of the root canal treatment. There is lots of techniques proposed in endodontics for bmp but the most favourable technique is crown down technique because it avoids problems of apical extrusion of debris, excellent visibility & passing of irrigants upto apical region.

Heat treated rotary NiTi files should be used for excellent flexibility and cutting efficiency. Most of the rotary files are multiple file systems. The current trend is to reduce the number of files for shaping procedures so as to reduce the shaping time and improve patient comfort. Endox endodontic system an innovative method to treat bacterial infection is a good machine which can be used. It is effective in the elimination of *E. fecalis* from infected single

rooted canals. Proper sequence of the files should be maintained during bmp and recapitulation of smaller files and irrigation of the canals should be done in total bmp procedure.

5. Irrigation :

The entombing idea serves as the foundation for the theory of single visit root canal care. Even if instrumentation of the root canal is the primary technique for canal debridement Since there is no opportunity to use intracanal medications in single visit endodontics, irrigation is especially important. Irrigation acts as a body flush to remove smear layer, debris, as well as acting as a tissue solvent, antibacterial agent, and lubricant.⁷ Sodium hypochlorite looks to be the best material currently being used. NaOCl solutions are employed in a concentration range of 0.5% to 5.25% to kill endodontic germs, including difficult-to-kill *Enterococcus*, *Actinomyces*, and *Candida* species. With other solutions like calcium hydroxide, EDTAC, or chlorhexidine, there is growing evidence that NaOCl's effectiveness as an antiseptic agent is enhanced. With chlorhexidine- Kuruvilla and Kamath 1998 in a study combined alternating use of sodium hypochlorite and Chlorhexidine gluconate irrigants and found a superior fall of microbial flora (84.6%).⁸ NaOCl irrigation alone does not detach the remaining layer; instead, EDTA-Goldman et al. demonstrated how to do so. sodium hypochlorite is activated by ultrasound As it would "accelerate chemical reactions, create cavitation effects, and achieve a superior cleansing action," it has also been recommended.⁹ Mechanical activation of irrigants helps to clean the canal more effectively as well as helps to reduce post operative pain.

6. Obturation & post obturation restoration :

After completion of bmp all the canals should be dried with absorbable paper points. Then proper master cone should be selected for obturation of the canals. There are different types of sealers are available in the market like calcium hydroxide based, zinc oxide eugenol based, resin based etc. But in modern dentistry bioceramic sealers are gold standard because of its biocompatibility. Obturation can be done by different techniques like lateral condensation, warm vertical condensation, single cone etc. Use of thermoplasticized gutta percha is another option. After completing obturation the cavity should be restored with static restorative material like GIC or composite. Proper restoration should be done for a successful root canal treatment because if microleakage occurs it can cause secondary caries which can occur failed RCT.

Conclusion :

The benefits and drawbacks of single visit root canal care have been the topic of a protracted debate within the dental community. Compared to endodontic management requiring many visits modern improved technologies, the creation of new devices, evidence-based dentistry, and the idea of performing the maximum amount of dentistry in the fewest number of sessions have all sparked a new initiative in dental treatment procedures. With no quick cuts, proper and full use of basic endodontic principles and careful case selection should lead to effective endodontic treatment in one visit. Practitioners should only attempt one-visit root canal therapy after thoroughly evaluating their endodontic knowledge, training, and proficiency.

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