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Single visit endodontics with associated myths: A review

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Abstract---A successful endodontic treatment depends upon localization, proper chemomechanical preparation of the root canal system, debridement, shaping, disinfection, and three-dimensional obturation of canal system. To achieve this, endodontic therapy used to be performed in multiple visits for complete disinfection of the canals in other words for the better success of endodontic therapy. One-visit endodontic therapy is defined as ‘the conservative non-surgical treatment of an endodontically involved tooth consisting of complete biomechanical cleansing, shaping and obturation of the root canal system during one visit’. The concept of single visit root canal treatment is predicted on the entombing theory, which states that the large number of microorganisms are removed during cleaning and shaping and therefore the remaining bacteria are entombed by the root canal obturation, and it’ll miss the essential elements to survive, nutrition and space. The recent advances, helps the dental practitioners and endodontists to perform the root canal treatment in single visit.

Keywords---endodontic treatment, single visit endodontics, multiple visit, root canal treatment.

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.¹

Single Visit Treatment

The concept of a single-visit root canal treatment was described as early as the 1880s.² The treatment techniques used at that time were very primitive, and the success rate of single-visit root canal treatment was low. The single-visit treatment was brought back in the 1950s by Ferranti who advocated the use of diathermy for pulpal disinfection and hydrogen peroxide for irrigation.³ This treatment differed significantly from today's techniques. However, Ferranti was able to describe how the most important criteria for achieving successful results were, in fact, the proper shaping and cleaning of the canals. In 1970, Tosti reported a satisfactory result in his clinical study using a single-visit approach, although the sample size of his study was small.⁴ The concept underlying single-visit techniques, as described by Oliet, is that there is no difference in the treatment criteria to ensure a successful result between multiple-visit and single-visit treatment.⁵

Oliets criteria

- Positive patient acceptance.
- Sufficient time to complete procedure.
- Absence of acute symptoms required drainage.
- Absence of anatomic obstacles and procedural difficulties.

Indications of Single Visit Root Canal Treatment

- Uncomplicated vital teeth, vital pulp exposures due to caries or trauma with symptomatic pulpitis.
- In physically challenged patients.⁶
- In patients having apprehension for treatment and requiring sedation for root canal treatment.
- Fractured anterior teeth with pulpal involvement and no periapical lesion or teeth with recent trauma
- where esthetics is the concern.⁷
- Non vital teeth with sinus tract where chances of post treatment flare up are less.⁷

Contraindications For Single Visit Root Canal Treatment

- Non vital tooth having acute inflammation; single-visit endodontic treatment should not be recommended.
- Single-visit endodontic treatment should not be performed in teeth with weeping canals.
- Teeth with anatomic anomalies for e.g. calcified and curved canals.
- Teeth with limited access.
- Symptomatic non vital teeth.
- Asymptomatic non vital teeth with periapical pathology and no sinus tract. ⁷

Advantages

- Patient comfort.
- Minimizes fear and anxiety.
- Familiarity of the canal anatomy. ⁸
- Reduced intra appointment pain.
- Restorative consideration.
- Economic. ⁸

Disadvantages

- Tiring for patient.
- Flare ups.
- Hemorrhage.
- Extremely fine, calcified, multiple canals cause stress for both the patient and the clinician.
- Inexperienced clinicians. ⁸

Steps In Single Visit Treatment

1. Access opening and cleaning and shaping:

Access opening done using a round and tapered fissure bur till a “drop” is felt indicating that the pulp chamber is entered. Cleaning and shaping is done using finger files or rotary files with intermittent irrigation. ⁹

2. Irrigation technique for single visit treatment:

Irrigation is done frequently to remove and loosen debris and microorganisms and to ensure that the debris are not pushed out the apex. Thus, this helps in flushing, lubrication, and smear layer removal. The most commonly used irrigants include: EDTA (Ethylene diaminetetraacetic acid) (17%), Chlorhexidine 0.2%, Sodium hypochlorite 5.25%, Citric acid 50%, Distilled water. ⁹

3. Obturation and post endodontic restoration:

Obturation is done using lateral or vertical compaction technique. The post endodontic restoration is done using GIC or temporary restoration and crowns can be given which can be either all metal, metal ceramic or all ceramic. ⁹

For many years, dentists have practiced single-visit endodontics on vital and nonvital teeth. However, a significant number of clinicians do not perform single visit treatment for various misconceptions.

Myths associated with single visit endodontics

There are three major reasons that patients once refused endodontic treatment and often chose tooth extraction instead: cost, fear of pain, and time. With so many advantages and few disadvantages, why don't more clinicians practice single-appointment endodontics? Reasons include widespread belief in myths associated with such treatment.

Myth No.1: Postoperative pain is greater when endodontic therapy is completed in a single visit, especially in nonvital teeth.

Fact: Overwhelming evidence shows that postoperative pain resulting from treatment of vital or nonvital teeth does not differ among patients treated in a single visit or in multiple visits.

The reported findings on postoperative pain differed between studies. Many studies like study done by Wang C et al. showed no significant differences in pain after single-visit and multiple-visit treatment.¹⁰

Study done by Risso PA et al, surprisingly described more postoperative pain developing with conventional multiple-visit treatment.¹¹

Study done by Oginni A reported significantly more postoperative pain for single-visit treatment.¹²

Myth No.2: There is less healing when endodontic therapy is completed in a single visit, especially in non-vital tooth.

Fact: One-year follow-up time is the soonest possible to determine whether or not the lesion has healed (Ørstavik 1996). No studies demonstrated a statistically significant difference in healing rate (therapeutic efficacy) between single- and multiple-visit treatment.

In a systematic review done by C. Sathorn found that single-visit root canal treatment appeared to be slightly more effective than multiple visit, i.e. a 6.3% higher healing rate.¹³

No significant difference in radiographic evidence of healing between singlevisit and multiple visit treatment was seen by study done by Paredes-Vieyra J.¹⁴

Myth No.3: Post operative flare up is greater when endodontic therapy is completed in a single visit.

Fact: Postoperative pain or swelling are collectively described as flare-up, which is probably one of the most concerning issues that dentists practicing single-visit treatment must deal with. Trope defined flare up as "intolerable pain and/or swelling".

Akbar et al in his study found that there was no significant difference in the flare-up rate between single and multiple visit groups.¹⁵

Myth No.4: Canals are cleansed if an antibacterial medicament such as Ca(OH)₂ is left in the tooth.

Fact: Efficacy of calcium hydroxide in controlling bacterial colonization has been debated.

Studies have reported that the clinical outcome of multiple-visit endodontic treatment was better for teeth treated with the intracanal calcium hydroxide than for those with root canals left empty.¹⁶

Despite the high alkalinity antibacterial properties of calcium hydroxide, some bacteria species, such as *E. faecalis* and *Candida albicans*, have been found to be

resistant to it. It is therefore generally considered that non setting calcium hydroxide should be used as a supplement to antibacterial irrigations.

Complete elimination of bacteria is not strictly necessary, and maximum reduction of bacteria and effective canal filling may be sufficient in terms of healing, rather than complete eradication.

Moreover, the tooth may also be susceptible to reinfection through the temporary filling and dressing during the interim period in case of multiple visits because of microleakage.

Gesi et al stated that with proper use of aseptic operating procedures, proper instrumentation, and filling, an inter-appointment dressing with calcium hydroxide does not seem to influence outcome.¹⁷

Myth No.5: Multiple-visit endodontics is safer than single-visit endodontics, and multiple visits mean more careful treatment.

Fact: For patients at the risk of contracting bacterial endocarditis AHA recommends as many procedures as possible during antibiotic prophylaxis. By limiting these patients to single appointment, they are at less risk of contracting endocarditis and of having an allergic reaction to the antibiotic. The small chance of a toxic reaction from medication (analgesics, antibiotics, or anesthetic) is reduced by not using them repeatedly (at multiple appointments) and by using a smaller dose (enough for one appointment).^{16,17}

Myth No.6: Patients do not mind multiple appointments and are likely to object to the fee if the procedure is completed in a single visit.

Fact:

Aside from cost, there are two other major barriers to patients visiting the dentist: fear of pain and time required. Completing root canal therapy in one appointment limits fear of pain to one incident and decreases the time required (the number of appointments and total treatment time). Patients are more likely to, accept single-visit treatment.^{14,15}

Myth No.7: After obturation, treating a flare-up is complicated; therefore, treatment should not be completed at the first appointment.

Fact: Fear of a post obturation flare-up prevents clinicians from performing single-visit endodontics, but such flareups generally are less common than inter appointment flare-ups.

Most flare-ups can be treated with occlusal reduction, analgesics, and antibiotics. In the unusual event that a problem continues, apical trephination (fistulization) can be performed. If the canals are cleaned and filled properly, a need to remove filling material is rare. Whether obturation is performed in a single visit or after multiple visits, removal of gutta-percha (if necessary) usually is straight forward.

¹⁷

Conclusion

The debate on single visit vs. Multiple visit endodontic treatment is one that's withstood time without a conclusion. The success rate and the amount of post operative complications depend on the selection criteria and the patient's conditions. They depend on the skill set of the clinician and the preparation

techniques. The success rate and prevalence of postoperative pain of single-visit or multiple-visit treatment had no significant difference.

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