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# SVE- Fast lane endodontics - A review

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**Abstract**

With the emergence of improved armamentarium, techniques and better knowledge of endodontic microbiology, root canal therapy has undergone a revolutionary change in the past decade. This article aims to review scholarly articles, books and other sources relevant to the area of single visit endodontics. The myths, advantages, disadvantages and biologic objectives are compared with multivisit endodontics. Recent advances that favour single visit endodontics also have been discussed.

Materials. A broad search of published literature was performed using Medline and PubMed from 1978 till date. The keywords used for search was single visit and

multivisit endodontics. A search of text books and articles was also done.

Results: The ultimate aim of endodontic treatment is complete eradiation of the microbial infection.

Within the limits of the information obtained it can be inferred that the single visit endodontics has its own advantages. Single visit endodontics is a promising time saving treatment option if the clinician utilizes new advancements in endodontics and updated knowledge of endodontic microbiology. Reduced chair side time and less no of appointments are the most important advantages. Success of single visit endodontic therapy depends on the case selection, accuracy and precision in treatment protocol.

**Keywords:** root canal therapy, single visit endodontic therapy.

**Introduction**

Clinical endodontics have undergone rapid change over the past few years. Evidence based practice has become the new paradigm in all branches of medicine. “Maximum dentistry in minimum visits” has been the rule in modern Dental practice. Preference for single appointment endodontic treatment has gone through several periods of considerable popularity. Many articles endorsing single appointment treatment were described in the 1930”by endodontic pioneers Harold Maxmen of Detroit with periapical surgery and Isadore Wolsch of Manitoba with apical trephination.[1]

Single visit endodontic therapy is defined as the conservative non-surgical treatment of an endodontically involved tooth, consisting of complete cleaning, shaping and obturation of the root canal system in one visit.[2]

Once Single visit endodontic procedure were generally performed in conjunction with resection of the root apex immediately after the canals were filled. Trephination or artificial fistulation was also used in conjunction with single-visit endodontics to prevent or alleviate postoperative pain and swelling. The fear of post-obturation flare up prevents clinician from performing Single visit therapy. However better understanding of canal anatomy, advances in clinical research and armamentarium like NiTi rotary instruments, radiovisiography, endodontics, CBCT, endodontic microscopes and advanced obturation techniques etc helped in popularising single visit endodontics.[3]

The wide spread myths and facts associated with single visit endodontic treatment.

Myth No: 1

Post operative pain is greater when endodontic therapy is completed in a single visit, especially in non-vital teeth”.

Fact No:1

Over whelming evidence shows that post operative pain resulting from treatment of vital or non vital teeth does not differ among patients treated in a single visit or in multiple visits. In a comparative study of vital and nonvital teeth, Roane” showed that multiple visit endodontics patients have a higher Incidence of pain (2:1) than single visit patients[4]. Soltanoff showed that slightly more pain follows single visit treatment, but he used saline as an irrigating solution[5]. Irrigating with saline has been shown to cause more postoperative pain than irrigating with sodium hypochloride probably because saline is less effective than NAOCL for antibacterial cleansing. Bayram Ince et al studied the incidence of postoperative pain among vital and non-vital teeth and found no significant difference in pain in most of the patients in either group[6]. No study could be found that shows, more postoperative pain in single visit endodontics patients; compared to multiple visit patients (when an antibacterial irrigating solution was used), for vital or non vital teeth.

Myth No: 2

"There is a less healing when endodontic therapy is completed in a single visit, especially in non vital teeth".

Fact No: 2

In humans, over whelming evidence shows that healing is the same for single and multiple visit endodontic therapy, regardless of pulp vitality.

A study by Sathorn C et al, showed that, the single-visit root canal treatment showed to be more effective than multiple visit therapy, i.e. 6.3% greater healing percentage. But, the difference in healing rate between the two treatment procedures was not statistically significant[7]. Human studies have not shown less healing for single visit endodontic treatment of vital or non vital teeth.

Myth No:3

Post operative swelling is greater when endodontic therapy is completed in a single visit."

Fact No:3

Trope[8]definedflare up as "intolerable pain and/or swelling". Using a similar definition, Walton and Fouad studied data from 946 patients visits for treatment of vital and non vital-teeth and found no significant difference in flare ups between single and multiple visit endodontics [inter appointment medicaments were not used]. Trope found a flare up rate of only 0.5 percent associated with single visit endodontic treatment of previously untreated vital and non vital teeth. The flare up rate was only 1.4% for previously untreated teeth with apical periodontics. The flare up rate associated with retreatment was considerably higher.

Myths No. 4

Canals are cleanest if an antibacterial medicament, such as Ca(OH)2 is left in the tooth until a later appointment for filling".

Fact No :4

Prolonging treatment to multiple appointments leads to bacterial regrowth in canals, with or without inter appointment medicaments like phenols and polyantibiotics.

Adequately concentrated (2.5 to 5.25%) NAOCL (without Ca(OH)2) has been shown to remove all pulpal remanants and predentin in root canals of extracted teeth, even in regions untouched by instruments. Root canals are never cleaner than immediately after proper instrumentation and irrigation with NaOCl in adequate concentration. Indiscriminate use of Ca(0H)2 can harm the periodontal membrane.[9]

Sjogren et al (1991) showed that Ca(OH) 2 eliminates bacteria more effectively when left for 7 days than when left for 10 minutes[10]. Because of this some may claim that multi visit endodontics is better than single visit endodontics. The proper comparison would be between Ca(OH)2 for 7 days and final filling for 7 days. No study has shown that the temporary filling material (egCa$(OH)_2$) is no more effective than permanent filling material (eg.Endodontic sealer and guttapercha) in eliminating bacteria.

Apical periodontitis is considered as a biofilm mediated infection, the microbes present in it are 1000 fold resistant to various intracanal medicaments and have the ability to overcome the host defense mechanisms. However lowering the biofilm load below a threshold that would initiate periapical healing to take place seems to be ultimate objective of root canal treatment. This is often considered as a difficult task due to the extremely complex intraradicular anatomy and partly because microbes in any biofilm are protected from externally induced stresses.[11]

Myth No :5

"Multiple visit endodontics is safer than single visit endodontics and multiple visit usually mean more careful treatment".

Fact No :5

According to Morse et al "Prolongation of treatment over several visits was a factor in several documented cases of septicemia, brain abscess, and cavernous sinus thrombosis" In contrast, there has been no documentation of serious sequelae arising from one visit endodontics[12].

Myth no. 6

After obturation ,treating a flare up is complicated; therefore, treatment should not be completed at the first appointment".

Fact no: 6

Fear of a post obturation flare up prevents clinician from performing single visit endodontics, but such flare ups generally are less common than inter appointment flare ups. Most flare-ups can be treated with occusal reduction, antibiotics and analgesics. If such a problem continues apical trephination (fistulisation) can be performed. Whether obturation is performed in a single visit or after multiple visits, removal of guttapercha (if necessary) usually is straight forward[9].

**Advantages**

Clinical advantages

There are numerous advantages of completing root therapy in a single appointment.

1.Clinicians have the most intimate awareness of canal morphology. They need not reorient themselves with the peculiarities of a particular tooth.

2.There is no risk of loosing landmarks between appointments.

3. The canal is nëver cleaner than immediately after proper instrumentation, irrigation and filling.

4. There is no risk of flare up due to bacterial regrowth and leakage of the temporary seal as obturation is completed at the first visit.

5.Risk of teeth fracture is reduced as the final restoration is done in the first appointment itself.

6. Repeating local anaesthetic injections can be avoided

7. For patients at risk of contracting bacterial endocarditis, the American Heart Association (AHA) recommends completing as many procedures as possible during antibiotics prophylaxis to reduce the risk of endocarditis and allergic reaction to the antibiotic.

8. Patients pre appointment anxiety and post operative discomfort are limited to one episode.

**Practice Management advantages**

1.Prosthetic work can begin without delay

2.Patients will not associate the clinician with multiple episodes of discomfort, but rather with a single healing response.

3.The risk of cancelled appointments and scheduled interruptions to replace dislodged temporary restorations are reduced.

4. Materials needed for separate visits (disposible bibs, suction tips, needles, rubber dam) are saved.

7.Time is saved by avoiding multiple appointments.

8.Medico-legal risk is reduced; AHA guidelines are followed. Since the invasive procedures are reduced, the likelihood of cross contamination is minimized.[13]

Disadvantages

1. In case of flare ups, emergency drainage requires removál of the root canal filling.

2. Clinician's and patient's fatigue and discomfort with extended operating time. The longer appointment may be tiring and uncomfortable for those patients with temperomandibular dysfunction and other medically compromised conditions.

4. Difficult case with extremely fine, calcified and multiple canals and those with haemorrhage or exudation may not be treatable in one appointment.

5. Lack of clinical expertise could result in failures, flare ups and legal repercussions.

**Guidelines**

Single appointment endodontics should not be undertaken by inexperienced clinicians. The endodontic competence of the practicing dentist is an overriding factor in understanding one visit treatment. As a guideline, the case should be completed in approximately 60 minutes.

Oliets Criteria for case selection[14]

Rudner and Oliet described a concept and clinical technique fortreating teeth in a single visit. They reported that postoperative pain and swelling as well as healing remained equivalent to that of multivisit endodontics, provided one had an accurate diagnosis, proper case selection and skill in technique.

1.Positive patient acceptance.

2.Sufficient treatment time available to complete the procedure properly.

3.Absence of acute symptoms requiring drainage through the canal and absence of persistent continuous flow of exudates or blood.

4.Absence of anatomic obstacles (calcified canals, fine tortuous canals, bifurcated or accessory canals) and procedural difficulties like ledge formations, perforation, inadequate fillings.

Table 1: Favourable and unfavourable cases for single sitting root canal therapy

| Sn. | Favourable cases | Unfavourable cases |
|---|---|---|
| 1 | Uncomplicated vital teeth. | Symptomatic non vital and necrotic teeth with no sinus tract. |
| 2 | Fractured anteriors in aesthetically concerned patient | Teeth with severe anatomic anomalies. |
| 3 | Patients with physical disability | Asymptomatic nonvital molars with periapical radiolucencies. |
| 4 | Medically compromised patients requiring prophylactic antibiotics. | Patients with allergies |
| 5 | Patients requiring sedation. | With inability to keep the mouth open for longer duration. |
| 6 | Necrotic teeth with draining sinus tracts | Necrotic teeth with no sinus tracts. |
| 7 | | Retreatment cases |

**Biologic objectives**

The biologic objectives of cleaning and shaping procedure are to remove all the pulp tissue, bacteria and their endotoxins from the root canal system. The mechanical objectives are invented to fulfil the biologic objectives and are additionally directed towards producing sufficient canal shape to achieve the hydraulics required for obtaining three dimensional obturation. Ongoing debate surrounds the question “can a root canal system be totally cleaned and disinfected in a single appointment?”. Mechanical instrumentation is the most important step in the antimicrobial treatment of a root canal. Intra canal antimicrobial agents will add significantly to its effectiveness.

In recent years rotary nickel-titanium systems have facilitated the mechanical instrumentation of the canal and made the procedure less time consuming Several authors have suggested such a rationale, whereas others have

questioned the antimicrobial efficacy of a single visit procedure.

Although calcium hydroxide is routinely used as an inter appointment dressing. It has been proven to be ineffective in short application (10 minutes) and should not be included in a single visit produce.Iodine, Potassium-iodide compounds had been suggested as short duration antimicrobial agents. To reduce the time necessary to achieve and enhance the disinfecting effect, removal of the smear layer is important.

An in vivo study by T.Kvist and A. Molander compared the microbiological outcome of a single visit treatment regime, including 10 minutes intraappointment dressing with 5% iodine- Potassium-iodide, after removal of the smear layer with a standard two-visit procedure, including an Interappointment dressing with calcium hydroxide. It was concluded that from a microbiological point of view, treatment of teeth with apical periodontitis performed in 2 appointments was not more effective than the investigated single-visit procedure[15].

The effectiveness of sodium hypochlorite in cleaning the root canal system within a short period of time is well documented in the literature. As early as 1941, Dr. Louis Grossman demonstrated in vitro that pulpal tissue will dissolve in 20-30 minutes while soaking in a 5.25% NaOCI solution. Then in 1971, Dr.Gery Grey demonstrated in clear section analysis that a 5.25% solution of NaoCl routinely dissolved organic tissue and cleaned both large and extremely fine ramifications[16].

Dr. Jeff Daughenbaugh demonstrated that a 5.25% solution of NaOCl is able to penetrate, dissolve and flush out organic tissue and related debris from inaccessible areas of the root canal system where files cannot reach. The tissue dissolving property of NaOCl when used at the correct temperature and concentration for an appropriate amount of time can be effectively utilised in single visit endodontics. A relatively nontoxic irrigant and an effective broad spectrum antimicrobial agent like Chlorhexidine gluconate, has an added advantage of extended period of action after instrumentation by its substantivity. The results of the study by Kuruvilla and Kamath have shown that alternate use of sodium hypochlorite and Chlorhexidine gluconate irrigants resulted in a greater reduction of microbial flora, when compared with the individual use of sodium hypochlorite (59.4%) or Chlorhexidine gluconate (70%) alone[17].

**Recent advances in favour of single visit endodontics**

The rapidly expanding market of new endodontic products and techniques has produced an extensive approach and favours single visit endodontics. The advent of nickel-titanium files, rotary instruments, apex locators, endosonics, radiovisiography, the endoscope and the clinical microscope are some of the innovations that have changed the way in which endodontics is practised. Critical thinking, based on independent longterm scientific studies, remains the bed rock of making sound choices.

**Light and Magnification**

Magnification improves both the quality and speed of treatment. The head light provides line of sight illumination, which is shadow less and hassle free. The combination of light and magnification is especially useful in single visit endodontics because the clinician must search for small calcified root canals following the completion of endodontic access. A recent addition to the field of visualization is a fiber optic endoscope designed for intra oral use. An orascope uses a fiber optic probe, Xenon light source and a medical grade video monitor to provide a magnified image of the operating field.2012 American Academy of Endodontics position statement on the use of microscopes and other magnification techniques asserts that microscope is integral to modern endodontic techniques[18].

**Digital Radiography**

Normally a minimum of 3-4 radiographic images are required for the completion of root canal therapy in a single tooth. This system eliminates the need for conventional films & dark room and images can be obtained immediately. Thus digital radiography reduces considerable treatment time. Cone beam computed tomography provides a more reliable and effective method for identification of missed anatomy and accessory canals as well as the nature and extension of a periapical lesion[19]. Recently CBCT has been used in conjunction with specially soft ware (3DEndo, Densply Sirona, Switzerland) to evaluate the complexity of root canals prior to root canal. [20]

**NiTi Rotary instruments**

Biomechanical preparation with the advent of greater taper nickel titanium instruments with least amount of debris extrusion, better cleaning efficiency and less chair side time have drastically improved the previously laborious cleaning and shaping procedure. Within the last decade, the nickel titanium rotary technique has become the standard of care.The University of Tennessee was the first to use these instruments.

The superelastic property makes nickel-titanium endodontic file more flexible and better able to conform to canal curvature, resist fracture and wear less than stainless steel files. Today, nickel-titanium instruments are precision ground into different Designs-K style, Hedstrom, Flex R, X-double fluted, S-double fluted U files and drills and are made in different sizes and tapers. In addition, spreaders and pluggers are also available. New prototype rotary motors now offer the potential for improved torque control with automatic reversal that may ultimately decrease rotary instrument breakage.

**Endodontics**

Ultra-Sonics has been found to be very effective in debriding and disinfecting the root canal system by cavitation, a physical property of ultrasound. It creates numerous shock waves and agitation within the root canal system dislodging tissue and dentin from the canal irregularities.

Removal of the debris from the canal is enhanced by the harmonic motion of the irrigant around the energized file and is known as acoustic streaming, another important physical property of the ultrasound. A higher percentage of tissue and debris will be removed from the canal with ultrasonics and NaOCl than with conventional hand instrumentation. Thus ultrasonics has a definitive role in single visit endodontics. MTAD, Tetraclean, Eletrochemically activated solutions, Photon activated disinfection, antimicrobial nanoparticles with targeted antibacterial efficacy etc are few potential new irrigants that could substitute the traditional endo irrigants.

**Quantitative fluorescence Spectroscopy**

It is used to detect the presence of microbial deposits in the root canal. Here long wave length ultra violet or visible light are used to elicit strong visible red emissions from bacterial biofilms which are analyzed by using quantitative fluorescence spectroscopy[21]

**Combination Apex Locators and Endodontic Handpieces**

Apex Locators

They also reduce the number of radiographs and treatment time. The Trio Auto ZX (J. Morita Mfg.Corp. USA) is a cordless electronic endodontic handpieces with a built in Root Zx apex locator. The handpiece uses nickel-titanium rotary instruments that rotate at 280 to 50 rpm. It has three automatic safety mechanisms[22].

Fortunately it is not easier and faster to create predictable endodontic results that it used to create mediocre

outcomes. Apex locators, handpiece-driven files, variably tapered shaping instruments and three dimensional filling techniques that can be accomplished in seconds are some of the new technologies that save time and improve the results.

**Combination of crown down technique and rotary endodontic system.** [23]

Clinical and biological benefits of the Crown-Down Technique and rotary endodontic system.

1. Straight-line access to root curves and canal junctions.
2. Enhanced tactile feedback with all instruments by removal of coronal interferences.
3. Enhanced movement of instruments apically into the canal.
4. Ease of removal of obstacles that prevent access to the root apex (e.g. Pulp stones)
5. Increased space for irrigant penetration and there by enhanced movement of dentinal debris coronally instead of pushing it apically.
6. Accurate working length determination due to minimal tooth contact in the coronal 1/3.
7. Decreased deviation of instruments in canal curvatures by reducing root wall contact.
8. Enhanced disinfection of canal irregularities due to irrigant penetration in patent canals and patent tubule orifices following smear layer removal.
9. Minimization of instrument separation by reducing contact with the canal walls.
10. Creat an ideal funnel shaped preparation that promote enhanced canal obturation.
11. Predictable levels of quality in canal cleaning & shaping for the practitioner.
12. Facilitation of one-visit root canal treatment within reasonable time periods.
13. Rapid removal of contaminated, infected tissue from the root canal system
14. Reduction in postoperative pain that may occur with the apical extrusion of debris.
15. Easier smear layer removal because of better contact of chelating agents with canal walls.

The protaper system of canal shaping is unique in the sense that it uses a crown down approach with the shaping files and step back approach with finishing files[24].

Various views regarding single visit endodontics.

The propogators of single visit endodontics quote the studies of GoranSundquist for a biological justification. In his article on the ecology of oralflora, he suggested that the root canal should ideally be completely cleaned at the initial visit when the bacteria are particularly vulnerable to eradication by a disturbance in their sensitive ecology. Between appointments and when the tooth is coronally sealed, the anaerobiosis is restored and an influx of tissue fluid into it, the canal can support the regrowth of bacteria. If an intra canal dressing is placed in the root canal, the resistant bacteria, which have survived the biomechanical treatment, may proliferate and resurrect inflections that are difficult to treat. Even though Sundquist at no point"of time had advised single visit endodontics but had given only a biological view point, the proponauts of single visit endodontics state that rather than placing an intra canal dressing to prevent regrowth of bacteria it would be better to obturate the root canal during the initial treatment visit as obturation with guttapercha and sealer is a superior method of obliterating the canal space. In this way any

bacteria that are left within the canal space are isolated from the source of nutrients and hence won't survive.

But studies by By strom and Goran Sundquist"on the effect of mechanical instrumentation, 0.5% NaOCI and Ca(OH)2 on the bacteria of root canal space has shown that mechanical instrumentation alone cause a complete elimination in only 20-43% of cases, whereas 0.5% NaOCl provide disinfection in 40-60% of teeth. When

Ca(OH)2 was placed subsequent to mechanical instrumentation and irrigation with 0.5% NaOCl the percentage of bacteria free coat canal teeth was 90-100%[25]. This treatment regime is the current standard of root canal disinfection. This is the reason why people like Franklin Weine advise a two visit procedure when pulp exposure is present.[26,27]

According to Franklin Weine an endodontic educator single visit was preferred only in anteriors that met the following criteria's.

No apical radiolucency

No tenderness on percussion.

No open pulp exposure.

Over instrumentation.

So any estimation of the time that is required for root canal therapy without working physically on the patients is considered as a guide by Weine.

Stephen Buchanan believes that the unfilled root canal spaces after the initial visit harbour many chemical pain mediators. (Histamine, kininsetc) created as by-products of pulpal degeneration. Avascular root canal spaces become a safe harbour from immune cells and antibiotics in effect, the perfect perpetual infection machine. He correlates this to the reason for why most flare ups occur between endodontic visits, not after the last visit. He advices single visit treatment in all the canals in one root if one cannot finish treatment in multirooted molars[28].

Clinical studies by South hard and Rooney have shown that single visit root canal treatment is effective for acute periapical abscess[29].

**Flare- up rate**

Morse et al, define a flare up as swelling and pain combined or swelling alone that necessitates unscheduled emergency appointments. Pain by itself is not considered a flare up[30].

According to Walton flare up must be a problem of sufficient severity with pain or swelling that intiates contact with the dentist a few days after root canal treatment[31].

Morse and co-workers, in an exhaustive series of clinical studies covering a period of 24 years, concluded that single visit endodontics with prophylactic administration of antibiotics (penicillin or erythromycin) combined with intentional over instrumentation of the root canal into the approximate centre of the bony lesion reduced flare ups[30].Moderate over instrumentation past the apex in non-vital cases has long been taught to increase the likelihood of drainage and relief of pressure. However, the literature is clear that over instrumentation of vital cases is to be avoided because it crushes tissue and produce pain and inflammation.

Trope reported that the flare up rate for one appointment retreatment cases with apical periodontitis was unacceptably high and should be avoided[8]. Walton indicated that the overriding factor as to predicting a flare up was the presence of pain or other symptoms exist, it would be reasonable to administer antibiotics in an attempt to control a possible flare up. It also should be noted that single visit endodontic treatment of posterior teeth seems to produces more postoperative discomfort. [31].

A flare-up following a single visit endodontic treatment was investigated, and the incidence determined was minimal (1.9%).Their findings clearly demonstrate that strong predictive factors associated with a flare-up were necrotic teeth and history of preoperative pain. Endodontists should take risk factors into consideration before treatment in order to prevent the occurrence of flare-ups and improve patients' quality-of-life after treatment. Further studies in the microbiological and genetic fields are recommended for further establishing a

long term outcome and predictive factors of single-sitting endodontic treatment[32].

**Success Rate**

The proposed contemporary triad for success= diagnosis + anatomy+ debridement. A thorough working knowledge of external coronal and radicular tooth anatomy, along with debridement of the canal system through proper cleaning and treatments important. This does not necessarily negotiate the role of obturation because the reasons for obturation are to seal the vestiges of contaminants in the root canal system.

Table 2: Factors that will influences success or failure.

| Sn. | Factors that will influences success or failure in all cases. |
|---|---|
| 1 | Radiographic interpretation |
| 2 | Anatomy of the root canal system and external root. |
| 3 | Thoroughness of debridement and apical level of instrumentation. |
| 4 | Degree of apical seal at the cementum- dentin junction. |
| 5 | Degree of coronal seal and quality of coronal restoration |
| 6 | Asepsis and treatment regimen. |
| 7 | Health and Systemic status of patient |
| 8 | Operator Skill and expertise. |

Table 3: Factors that may influence the success or failure of a particular case has been enumerated below.

| | |
|---|---|
| 1. Pulpal status of particular tooth. | 7. Patient's pain threshold. |
| 2. Procedural accidents. (eg. Perforations or separated instruments) | 8. Level of canal obturation- over fill and over extension. |
| 3. Crown or root fracture. | 9. Time of post treatment evaluation. |
| 4. Periodontal status or disease process. | 10. Degree of canal calcification. |
| 5. Occlusal discrepancies and forces. | 11. Accessory communications. |
| 6. Size of peri radicular rarefaction. | 12. Presence of root resorption. |

**Clinical Assessments of success and failure**

The criteria for clinical success in the quality assurance guidelines published by the American Association of Endodontist (AAE) is based on clinical signs or symptoms.

The practitioner can classify the treatment into one of 3 categories.

Table 4: AAE criteria for success.

| Clinically Acceptable | Clinically Questionable | Clinically Unacceptable |
|---|---|---|
| 1. No tenderness to percussion or palpation. | 1. Sporadic vague symptoms often not reproducible. | Persistent subjective symptoms. |
| 2. Normal mobility. | 2. Pressure sensation or feeling of fullness. | Recurrent sinus tract or swelling. |
| 3. No sinus tracts or associated periodontal disease. | 3. Low grade discomfort after percussion, palpation or chewing. | Predictable discomfort to percussion or palpation |
| 4. Functional tooth. | 4. Discomfort when pressure is applied by tongue. | Evidence of irreparable tooth fracture. |
| 5. No signs of | 5. Superimposed | |

| | | |
|---|---|---|
| infection or swelling | sinusitis with forces on treated tooth. | Excessive mobility or progressive periodontal breakdown. |
| 6. No evidence of subjective discomfort. | 6. Occasional need for analgesics to relieve minimal discomfort. | Inability to chew with tooth. |

**Success rate in single visit endodontics.**

The number of prognosis studies of one appointment root canal treatment is less than the number of pain studies, but most studies indicate that there is no substantial difference in the success rate of one and 2 visit cases.

Soltanoff[5] reported considerably more pain in multiple visit endodontic treatment but he found that both techniques provided success rate exceeding 85%.

Ashkenza' claimed that one appointment root canal treatment succeeded 97% of the time, but he did not evaluate multiple visits[33]. Rudner and Oliet" compared one visit with multiple visit treatment and found that both leaked with a frequently approximating 88% to 99%[14].

Investigation was done to determine the flare up rates in single visit endodontics and was found to be very minimal (1.9%). Studies have shown that necrotic teeth and history of preoperative pain are predictive factors associated with flare up. These risk factors must be considered before treatment to prevent the occurrence of flare up and improve quality of treatment .Studies conducted by Peters LB, et al proved that there were no statistical differences in healing of periapical pathosis between single visit (without) and multiple visits with inclusion of calcium hydroxide for 4 weeks. The existence of a positive bacterial culture at the time of obturation did not have any effect on the outcome of treatment[34].

No statistically significant difference in success rates (healed lesion) was observed between the one- and two-visit endodontics. (Penesis, et al.,2008;Weiger, Rosendahl, Lost, 2000). Published studies including the present one have failed to show any statistically significant difference in the outcome between one- and two-visit root canal treatment[35,36].

**Conclusion**

Being able to practice using a variety of techniques and not being "married" to a single approach in every case greatly enhances one's capabilities[37]. One must ultimately develop confidence in one's own abilities. Careful case selection, proper and thorough adherence to standard endodontic principles with no shortcuts is the key to successful one appointment endodontics. Knowledge, experience and clinical skill form the basis for good prognosis. Practitioners should attempt one visit root canal treatment only after assessing their endodontic skills, training and ability.

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