



ASSESSING THE EFFICIENCY, POST-OPERATIVE PAIN AND COMPLICATIONS ASSOCIATED WITH SINGLE, ONE & MULTIPLE VISIT ENDODONTIC THERAPY

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ABSTRACT

There is a long standing dispute among the researchers between single & conventional multiple visit RCT procedure. RCT being a multi process treatment and so as to achieve the goal of endodontic therapy traditionally it was performed in multiple visit. However advent of modern and sophisticated endodontic instrument has not only simplified the process of RCT for dentist but has also reduced the duration required for endodontic therapy. Success of endodontic therapy mainly depends on the elimination of necrotic tissue from root canal. The present study was undertaken to assess the efficiency, post operative pain & complications associated with single, one & multiple visit RCT. Total of 170 patients who underwent endodontic therapy were assessed. Out of total 193 RCT treated tooth 57 tooth underwent single sitting RCT, 57 one sitting RCT and 59 conventional RCT while 20 RCT tooth were incomplete due to non turnout of patient after initial treatment. 39 individuals who underwent single sitting RCT had no pain post-operative while 34 & 28 subjects had no pain who underwent one sitting & conventional RCT respectively. Dentists who performed RCT found no problem in 130 subjects, among them highest 53 subjects had underwent single sitting RCT, were as total of 46 subjects who were selected for conventional RCT had missed or had problem with multiple visit. Purpose of any treatment is not just elimination of pain but also to reduce discomfort to the patient. Single sitting RCT considerably reduces the chair side time required for endodontic treatment, for tooth restoration & oral rehabilitation and ultimately being beneficial to the patients. It can be concluded from the present study that tooth with vital pulp and non infected root canals should undergo single sitting RCT where as those with infected canals should undergo one sitting RCT.

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INTRODUCTION

Root Canal Treatment (RCT) is the treatment of choice to maintain the functionality & originality of the human tooth. RCT is a multi process procedure which aims to eliminate the necrotic tissues of the tooth root canal through bio-mechanical preparation & constant irrigation & filling / obturation of the tooth root canal spaces with non bio-degradable material. The process involves proper diagnosis, access cavity preparation, establishing patency of canal, working length determination, bio-mechanical preparation, shaping, disinfection &

obturation of root canals. To achieve these goals, traditionally RCT was performed in multiple visits for desirous & successful endodontic therapy. However with advent of sophisticated endodontic instruments like endomotor, rotary Ni Ti files, magnifying devices, electronic apex locator, radiovisiography software etc has not only simplified the process of RCT for dentist but has also considerably reduced the duration required for endodontic therapy. Conventional or multiple visit endodontic therapy has certain disadvantages like inter appointment contamination & flare ups caused by leakage or loss of temporary seal, prolonged time taken leading to patient & operator fatigue, inability to provide aesthetic restorations in time in case of traumatically damaged crowns & discontinued treatment leading to failures [1]. In today's scenario taking out time for multiple visit

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endodontic therapy becomes very difficult for the population resulting in missed appointment & non turn out for treatment leading to failure of endodontic treatment. 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 [2].

There is a long standing dispute among the researchers between single & conventional multiple visit RCT procedure. Outcome & complications are the most important factor to be considered when making treatment plan [3]. However recent studies have demonstrated that there are no major differences between single & multiple visit treatment regarding to post-operative complications [4, 5]. Success of endodontic therapy mainly depends on the elimination of the necrotic tissue from the root canal. In case of non vital pulp, the root canals are usually infected, especially in the presence of apical periodontitis [6]. Effective control of intracanal microbial load before obturation is a key element that leads to a high success rate of RCT [7, 8]. Where as in case of vital pulps the intracanal tissues are not infected & consequently disinfection of root canals in these cases might not be needed when compared to infected pulp [9]. Therefore there is lot of confusion & debatable discussion among the dentist to perform single sitting RCT in case of necrotic or infected pulp teeth. Research have pointed out that the single most important step for successful endodontic treatment is the process of elimination of necrotic tissue from the root canal. But in cases of acute pulpitis or periapical lesions or long standing infection it is important to wait for the root canal healing before proceeding to filling of the canals even after successful removal of necrotic tissue from the canal. However there is no denial in the fact that those cases with fresh bleeding from the canal after access cavity is a good indication to carry out single sitting RCT as the root canals are not infected. In view of the above points a study was conducted with the aim & objective of (a) to ascertain the efficiency of single sitting RCT, 1 sitting RCT & conventional multiple visit endodontic therapy (b) to assess the post operative pain between single, 1 sitting & conventional RCT (c) to compare the complication & problems associated with single sitting, 1 sitting & conventional endodontic therapy.

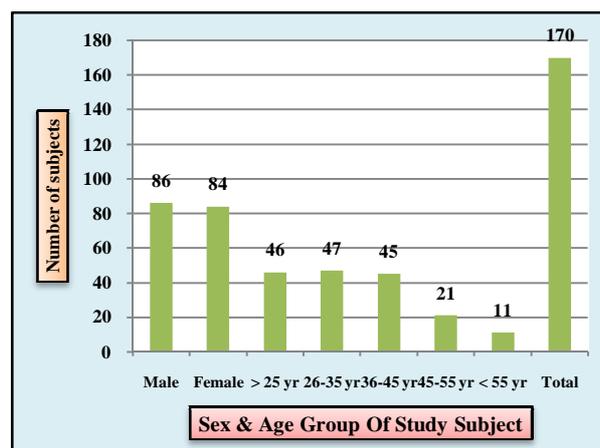
MATERIALS AND METHODS

The present study was carried out at dental centre of Indian Army and verbal approval for the same was taken from the concerned authority. 170 patients who underwent endodontic therapy at the dental centre were assessed. RCT was performed by 2 dental officer posted with the dental centre. The condition of the tooth determined the type of endodontic treatment carried out. Tooth with positive pulp vitality & fresh bleeding present underwent single sitting RCT process. While those with non vital pulp & infected canal underwent 1 sitting RCT process & those with acute pulpitis, long standing infection, periapical lesion underwent conventional multi process RCT. Working Length determination was done for all cases with the help of radioviography software. The root canals were cleaned & shaped using the step back technique using hand K Flex Ni Ti files instruments. After every file use the canal was irrigated with 2 ml sodium hypochlorite (5%) & sodium chloride .9% normal saline by a syringe with 27

gauge needle. Tooth with vital pulp & where fresh bleeding was present were obturated at the same sitting while those with necrotic root canal were obturated after 1 sitting with a gap of 2 to 3 days. While those teeth with periapical or intraoral sinus lesions etc were obturated after 2 asymptomatic closed dressing. Patients who underwent endodontic therapy were recalled after 1 week & 3 months time duration & post operative pain & complications were assessed. The teeth that underwent endodontic therapy were clinically examined and reasons for failure and complications associated while doing RCT if any were recorded. Patients were asked for pain or discomfort they felt post obturation and asked to rate the pain perception in terms of no pain, mild, moderate & high. The data for the present study was entered in the Microsoft Excel and processed using SPSS 19 Version. The descriptive statistics included calculation of the frequency (Percentages) and the chi square test was applied for the testing the significance of difference between the groups and subgroups. The level of significance for the present study was fixed at 95%.

RESULTS

A total of 170 study subjects requiring RCT of tooth were selected. Of these 86 were males & 84 were females (Graph 1) and the maximum 47 subjects of them belonged to 25-35 yrs group followed by 45 belonging to 35-45 yrs group.



Graph 1 Distribution of Study Subject According to Sex & Age Group (n=170)

A total of 193 RCT was performed. Certain subjects have undergone RCT of more than 1 tooth. 1st molar 78 was the most commonly treated RCT tooth followed by premolar 49 & anterior 29 & 2nd molar being 32. The most common reason for RCT was due to caries (147) followed by trauma (24) & attrition (19). Out of total 193 RCT treated tooth 57 tooth underwent single sitting RCT followed by 57 one sitting RCT and 59 underwent conventional RCT while a total of 20 tooth RCT was incomplete due to non turnout of patient after initial treatment Table 1.39 Individuals who underwent single sitting RCT had no pain post-operative while 34 & 28 subjects had no pain who underwent one sitting & conventional RCT respectively. Patients who felt moderate pain was highest among the individuals who underwent conventional RCT whereas 18 of the subjects felt mild pain after undergoing one sitting RCT Table 2. The difference was significant at p less than 0.05 when analyzed using chi square test.

Table 1 Relation between Tooth & RCT (n= 193)

		1) Type Of Tooth			
Anterior	Premolar	Molars		Total	
		1 st Molar	2nd & 3rd Molar		
29 (15%)	49 (25.4%)	78 (40.4%)	32 (16.5%) + 5 (2.6%)	193	
		2) Reason for RCT			
Carious	Trauma	Attrition	Others	Total	
					147(76.2%)
		3) Type of RCT			
Single Sitting	One Sitting	Conventional	Incomplete	Total	
57 (29.5%)	57 (29.5%)	59 (30.6%)	20 (10.4%)	193	

Comparison of success rate between the various methods was similar to the results of other studies. Successful RCT in the present study was high and identical irrespective of the method employed. In case of single sitting RCT 93%, one sitting 88% and conventional RCT 90% of the cases were successful. The difference in successful RCT comparing the various method is although very small but clinically significant. The results of this study are similar to the study conducted by Amy Wai-Yee Wong & *et al* [13] wherein the success rates of both single & conventional RCT were high (88.9 and 87.4 %, respectively).

Table 2 Relation between RCT & Post-Operative Pain (n=173)

Type Of RCT	Distribution Of Pain Level				Total	Chi Square	P value
	No Pain	Mild	Moderate	High			
Single Sitting	39 (38.6%)	13 (28.3%)	3 (15.8%)	2 (28.6%)	57	13.271	0.039 (Significant)
1 Sitting	34 (33.7%)	18 (39.1%)	3 (15.8%)	2 (28.6%)	57		
Conventional	28 (27.7%)	15 (32.6%)	13 (68.4%)	3 (42.8%)	59		
Total	101	46	19	7			

Dentists who performed RCT found no problem in 130 subjects and among them the highest 53 of the subjects had underwent single sitting RCT, were as a total of 46 subjects who were selected for conventional RCT had missed or had problem with multiple visit while only 2 subjects planned for one sitting RCT did not turn up for treatment Table 3. Dentist faced problem of broken file in 2 & bleeding canal in 2 subjects who underwent single sitting RCT. The difference was significant at p less than 0.05 when analyzed using chi square test.

Success of single & conventional RCT with age & gender had not been compared in this study. In the present study the dropout rate was 10.4% much below than 14.1% reported in a study conducted by Amy Wai-Yee Wong & *et al* [13]. When compared to other studies, dropout rate of 10.4 % may be considered normal [14]. Single sitting RCT considerably reduces the chair side time required for endodontic treatment.

Table 3 Relation between Types of RCT & Complications (n= 193)

TYPE OF RCT	Common Complications					Chi Square	P value
	No Complication	Problem with Multiple Visit	Missed Appointment	Re-infection	Broken File		
Single Sitting	53	-	-	-	2	87.623	0.001 (Significant)
1 Sitting	51	2	-	1	1		
Conventional	26	20	26	3	1		
Total	130	22	26	04	4		

DISCUSSION

Purpose of any treatment is not just elimination of pain but also to reduce discomfort to the patient. RCT is a multiple process procedure & completion of every step is important for successful endodontic treatment. The outcome of endodontic treatment might be influenced by several factors such as clinical approaches, experience of operators & evaluators, locations & size of periapical lesion and follow up period [10]. Moreover, the pretreatment status of pulp has been suggested to have a considerable influence on the outcome of endodontic treatment [11, 12]. Hence present study was undertaken to assess the efficiency of single sitting RCT, one sitting & conventional RCT, post-operative pain & problems associated with single, one sitting & conventional RCT. Those tooth with vital pulp underwent single sitting RCT while those with infected pulp underwent 1 sitting RCT & another group with infected pulp underwent conventional RCT. In the present study the highest number of tooth that required endodontic therapy was 1st molar 40.4% of the total RCT treated tooth and the most common reason for RCT was dental caries 76.2% of the total tooth. This is in accordance with various studies that have been conducted before stating that 1st molar is the most common carious tooth and also that incidence of caries is very high among the Indian population.

This may be desirable for anxious patients in need of sedation, those who are medically compromised or those who have special needs, hoping for reduced stresses built up prior to a dental visit and reduced treatment-associated risks [15]. However in single sitting endodontic therapy dentist tend to rush through the treatment so as to complete the case within a time frame & also due to dentist fatigue it may lead to certain complications. In the present study there was complication of broken file/instrument in 2 cases in single sitting RCT group. Reasons for instrument breakage may also be due to curved canal, over usage of file, wrong choice of instrumentation etc. Together with this single sitting RCT also reduces the time required for tooth restoration & oral rehabilitation and ultimately being beneficial to the patients. In our present study 20 subjects did not turn up for the treatment after 1st sitting of endodontic therapy whereas 26 subjects had issues with multiple appointment time among patients undergoing conventional endodontic therapy.

The biggest factor for discouragement of doing single sitting RCT by dentist is the chances of development of post-operative pain & likely chances of flare-ups. However Yingying [16] in a systemic review has quoted that patients experience less frequency of short term post-obturation pain after single visit than those having undergone multiple visit root canal treatment. In the present study also 39 (68.4%)

teeth out of total of 57 single sitting RCT tooth had experienced no pain after obturation while only 28 (47.5%) out of total 59 conventional RCT tooth had experienced no pain. Till recently tooth undergoing RCT was not completed or obturation till the tooth was asymptomatic because of fear of post-obturation flare-up. However it is not recognized that most of the flare-ups patients experience occur between endodontic visits and not after his last visit when RCT was completed [17]. In present study also there were 3 cases of re-infection or flare-ups in tooth undergoing conventional RCT while no such case was reported among the patients who underwent single sitting RCT Table 3. At the University of Oklahoma however, Roane [18] and his associates found that treatment completed in multiple visits had a two to one higher frequency of pain when compared to those completed in one visit. Fara and Genet from Netherland and Brazil respectively found no difference in the incidence of pain between one and two visit cases. Trope [19] reported no flare ups in one appointment cases with no apical lesions. However retreatment of the failed cases with apical periodontitis did made the difference.

CONCLUSION

Single sitting RCT has got lot of advantages over multiple visit endodontic therapy in terms of patient comfort, economics, clinical time etc. However considering the effort required in Re-RCT and complication that develop due to failure of endodontic therapy the condition of the tooth undergoing RCT has to be ascertained before the start of the treatment. Proper diagnosis and assessing the condition of the tooth becomes the most important aspect. It can be concluded from the present study that tooth with vital pulp and non infected root canals should undergo single sitting RCT where as those with infected canals should undergo one sitting RCT. Conventional RCT should be used only in cases with periapical lesions or if there is any flare up in cases undergoing one sitting RCT. However the dentist performing the RCT should try to perform single sitting endodontic therapy considering the benefits associated with the therapy.

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