International Journal of Current Advanced Research
ISSN: O: 2319-6475, ISSN: P: 2319-6505, Impact Factor: 6.614
Available Online at www.journalijcar.org
Volume 8; Issue 10 (B); October 2019; Page No.20153-20157
DOI: http://dx.doi.org/10.24327/ijcar.2019.20157.3928

Review Article

A COMPARATIVE STUDY ON ENDODONTIC FLARE-UPS IN SINGLE VISIT VS MULTIPLE VISITS ENDODONTIC TREATMENT: A SYSTEMATIC REVIEW

Krishna Prasada L and Hithysh T Vidhyadhara*

Department of Conservative Dentistry and Endodontics, KVG Dental College and Hospital, Kurunjibagh, Sullia, Dakshina Kannada, Karnataka, Indi

A R T I C L E I N F O

Article History:
Received 4th July, 2019
Received in revised form 25th August, 2019
Accepted 23rd September, 2019
Published online 28th October, 2019

Key words:

Endodontic flare-ups, post-operative pain, calcium hydroxide, rotary files, single visit root canal treatment, multiple visits root canal treatment.

A B S T R A C T

Introduction: Endodontic treatment involves the complete removal of the dental pulp followed by shaping, cleaning, and obturation of a tooth. The use of contemporary endodontics techniques along with use of rubber dam, magnifying devices, electronic apex locators and engine-driven rotary nickel titanium files among other equipment's has increased the success rate of endodontic treatment by also shortening the time needed for the treatment. Hence, single visit endodontic treatment can therefore be done in most of the cases.Flare-ups is a subset of postoperative pain which is moderate to severe postoperative pain that begins 12 to 48 hours after treatment and lasts at least 48 hours which is disruptive to the patient's routine**.** It is anunpleasant situation for both the dentist and the patient requiring an unscheduled visit by the patient and active treatment by the dentist.

Aims and Objectives: The purpose of this review is to analyse the effect of certain factors like gender, teeth type, intracanal medicaments, vitality of the teeth and preoperative pain on the post Endodontic flare-ups in single visit and multiple visits root canal therapy.

Methodology: This review was conducted as per the PRISMA and JBI guidelines. A total of nine randomized clinical trials published over a period of past 6 years were included in qualitative synthesis.

Results: A total of 1652 vital and non-vital permanent teeth pooled from nine papers each reporting postoperative pain in single visit and multiple visits root canal therapy were studied. The evidence for an association between certain factors like gender, teeth type, intracanal medicaments, vitality of the teeth and preoperative pain, on the post Endodontic flare-ups in single visit and multiple visits root canal therapy appears conclusive. The study found that though there was a small association, there was no significant difference for an association between gender, teeth type, intracanal medicaments, vitality of the teeth and pre-operative pain on the post Endodontic flare-ups in single visit and multiple visits root canal therapy.

Conclusion: The study found that there is no significant association between certain factors like gender, teeth type, intracanal medicaments, vitality of the teeth and pre-operative pain on the post Endodontic flare-ups in single visit and multiple visits root canal therapy.

INTRODUCTION

Endodontic treatment involves the complete removal of the dental pulp followed by shaping, cleaning, and obturation of a tooth. The key to endodontic success is the complete debridement and neutralization of any tissue, bacteria, or inflammatory products within the root canal systemas described by Gutmann.[1] The use of contemporary endodontics techniques along with use of rubber dam, magnifying devices, electronic apex locators and engine-driven rotary nickel titanium files among other equipment's has increased the success rate of endodontic treatment by also shortening the time needed for the treatment. Hence, single visit endodontic treatment can therefore be done in most of the cases.[1]

Flare-ups is atype of postoperative pain, moderate to severe in nature, which disrupts patient's lifestyle that begins 12 to 48 hours after treatment and can least lasts 48 hours, requiring an unscheduled visit by the patient and active treatment by the dentist. Different literatures relate to many factors with the incidence of post endodontic pain which includes gender, type of tooth, preobturationpain or preoperative pain, single/multiple visits, various medications used, instrumentation and obturation techniques and the vitality of the teeth. [2, 3]

Keeping all the factors discussed above in mind, this systematic review was done to do a comparative systematic review on endodontic flare-ups in single visit and multiple

Corresponding author:* **Hithysh T Vidhyadhara
Department of Conservative Dentistry and Endodontics, KVG Dental College and Hospital, Kurunjibagh, Sullia, Dakshina kannada, Karnataka, India

visits endodontic treatment. Randomized controlled clinical trialis the most common and reliable method for evaluating the outcome of treatments (Elwood 1998), because of minimum confounders and maximum control over the trial environment.[4] Hence, only randomized controlled clinical trials were included to do this systematic review.

MATERIALS AND METHODOLOGY

This systematic review is conducted in accordance with the Preferred Reporting Items for Systematic reviews and Meta-Analysis (PRISMA) guidelines and the Joanna Briggs Institute critical appraisal checklist for systematic reviews. [5]

An initial electronic search of two databases, GOOGLE SCHOLAR and MEDLINE using the search terms (alone or in combination)(flare-up OR endodontic flare-ups OR postoperative pain OR post obturation pain) AND (root canal therapy OR endodontic therapy OR root canal treatment) AND (single visit OR 1 visit OR one visit) were carried out. All relevant titles, abstracts published in English over the past 6 years (2012 - 2018) were identified and retrieved by the first two authors. Out of 728 results obtained, a total of 240 relevant full text articles were obtained.

Table 1 Inclusion and exclusion criteria

Inclusion criteria	Exclusion criteria
1. Randomized controlled clinical trials done between 1st of January, 2012 and 31st of January, 2019. 2. Clinical studies only in English language.	1. Studies not in English language. 2. Case reports, case series, systematic reviews or any other studies other than Randomized controlled clinical trials.

At this level a total of 47 records were considered potentially eligible and sought for further assessment and full length articles were retrieved.

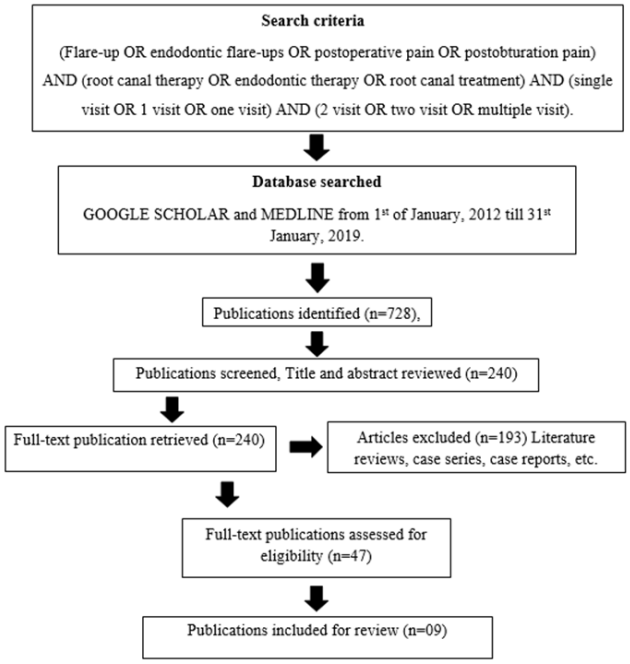

Diagram 1 Flowchart of the literature search

These full reports, were assessed independently by two authors with expertise in the content area, to establish whether the studies met the inclusion criteria and 38 records were excluded through unanimous decision of the group. Eventually, nine records were selected to be included in this review and sought for qualitative synthesis in this systematic review. Details of the search steps and the reasons for exclusion from the review were documented and are presented as in Diagram 1.The studies included are in the table 2.

Table 2 list of studies included in this systematic review

Sl. NO	Author	Year of publication	Sample size	Population	Factors checked	Intracanal medicament	Remark
1	Singh S, Garg A.	2012	200	Both vital and non vital single rooted teeth	Incidence of post obturation pain, post obturation pain level in vital and non vital teeth and effect of intracanal medicament between appointments in single visit and multiple visit root canal treatment.	Not used	No significant difference for all the three factors.
2	Riaz A, Maxood A, et al.	2018	60	Non vital single rooted teeth	Incidence of post obturation pain, effect of calcium hydroxide intracanal medicament between appoinments and association of pre operative pain on post operative pain in single visit and multiple visit root canal treatment	Calcium hydroxide	No significant difference for all the three factors.
3	Patil A A, Joshi S B, et al.	2016	66	Both vital and non vital single rooted maxillary central incisors	Incidence of post obturation pain,association of pre operative pain on post operative pain and post obturation pain level of vital and non vital teeth in single visit and multiple visit root canal treatment	Not used	No significant difference for all the three factors.
4	Wong A W, Zhang S, et al	2015	538	Both vital and non vital teeth	Incidence of post obturation pain and association of pre operative pain on post operative pain in single visit and multiple visit root canal treatment	Calcium hydroxide	No significant difference for both the factors.
5	Rao K N, Kandaswamy R, et al	2014	148	Non vital single rooted teeth	Incidence of post obturation pain in single visit and multiple visit root canal treatment	Not used	No significant difference
6	Bhagwat S A, Patel A, et al.	2012	80	Both vital and non vital teeth	Effect of variation in interappointment time on incidence of post obturation pain in single visit and multiple visit root canal treatment	Not mentioned	No significant difference.
7	Tarale K	2013	60	Both vital and non vital first molars.	Incidence of post obturation pain and effect of calcium hydroxide intracanal medicament between appoinments	Calcium hydroxide	No significant difference for both the factors .
8	Akbar I, Iqbal A, et al.	2013	100	Non vital molars	Incidence of flare-up rate, gender, patients age, tooth type in single visit and multiple visit root canal treatment	Calcium hydroxide	No significant difference for all the four factors.
9	Prasada L K, Kumar V , et al	2013	400	Non vital molars	Incidence of flare-up rate in single visit and multiple visit root canal treatment	Not mentioned	No significant difference.

RESULTS

A total of nine studies published from 2012 to 2018 were included in this review. A total of 1652 vital and non-vital permanent teeth pooled from nine papers each reporting postoperative pain in single visit and multiple visits root canal therapy were studied. The evidence for an association between certain factors like gender, teeth type, intracanal medicaments, vitality of the teeth and preoperative pain, on the post Endodontic flare-ups in single visit and multiple visits root canal therapy appears conclusive. The study found that though there was a small association, there was no significant difference for an association between gender, teeth type, intracanal medicaments, vitality of the teeth and pre-operative pain on the post Endodontic flare-ups in single visit and multiple visits root canal therapy.

DISCUSSION

Post-operative painor flare-ups after treatment is inventible in some patients even after performing a root canal treatment with the outmost care which is an unpleasant situation for both the dentist and patient. Postoperative pain is considered as a poor indicator for the long term success of a case. So, the integral part of endodontic treatment must be prevention and management of this post endodontic pain. The frequency of post endodontic pain ranges from 1.4 to 16% and sometimes up to 50% in some studies (Ehrmann *et al*., 2003; Oliveira, 2010). This difference is due to the difference in definitions of post endodontic pain. Different literatures relate to many factors with the incidence of post endodontic pain which includes gender, type of tooth, preobturation pain or preoperative pain, single/multiple visits, various medications used, instrumentation and obturation techniques and the vitality of the teeth.[3, 4]

From the total of 9 articles found suitable in the inclusion criteria, the articles were broadly classified into different variables or factors affecting post endodontic pain like: gender;

type of teeth; relation between preoperative or pre-obturation pain and post endodontic pain; single/multiple visits and vital and non-vital teeth.

Gender

We found 5 studies have been done to evaluate the influence of gender on post endodontic pain. Results of studies are summarized in Table 3.

Table 3 Studies on the influence of Gender on post endodontic pain in single visit and multiple visit root canal therapy

Sl.No	Author	Sample	Conclusion
1.	Riaz A, Maxood A, *et.al*.[6]	60	Even though the incidence was more in female, there was no significant difference between the genders.
2.	Wong A W, Zhang S, *et.al*.[7]	538	Even though the incidence was more in female, there was no significant difference between the genders.
3.	Akbar I, Iqbal A, *et.al*.[2]	100	No significant difference between the genders.
4.	Prasada L K, Kumar V. *et.al*.[3]	400	No significant difference between the genders.
5.	Bhagwat S A, Patel A, *et.al*.[8]	80	No significant difference between the genders.

Various studies shows that women are more sensitive to root canal treatment and also have higher incidence of post endodontic pain when compared with men. This is associatedto the two fluctuating hormones, serotonin and non-adrenalin which is the biological differences between genders. Cortisolhormone regulates the feeling of pain which is responsible for pain, which is excreted in higher amount in male than in females**.** Hormonal cyclicity of women complicates in determining whether women have different sensitivity topain or analgesia compared with men. Men have been used as subjects and women have been largely excluded in most clinical research studies (Greenspan and Craft, 2007).This can be also be warranted by the effect of estrogen and the women's menstrual cycle.[11-15]

Type of teeth

We found 4 studies have been done to evaluate the influence of type of teeth on post endodontic pain. Results of studies are summarized in Table 4.

Table 4 Studies on the influence of type of teeth on post endodontic pain in single visit and multiple visit root canal therapy

SL.NO	Author	Sample	Conclusion
1.	Wong A W, Zhang S, *et.al*.[7]	538	Even though the incidence was more in mandibular teeth, there was no significant difference between the maxillary and mandibular teeth.
2.	Akbar I, Iqbal A, *et.al*. [2]	100	Even though the incidence was more in mandibular teeth, there was no significant difference between the maxillary and mandibular teeth.
3.	Prasada L K, Kumar V. *et.al*.[3]	400	No significant difference.
4.	Tarale K.[9]	60	No significant difference.

The incidence of post-operative pain is higher in mandibular teeth as compared to maxillary teeth due to many reasons. One of the reason might be the dense trabeculae pattern in mandible which leads to reduced blood flow. It also leads to localization of infection which hampers healing and lead to delayed healing patterns. This difference along with greater incidence of post endodontic pain in posterior teeth may be also explained due to the number of canals and complex root canal morphology. The number of canals and apical complex root canal morphology is higher in mandible and posterior teeth. [11, 16-19]

Calcium hydroxide intracanal medicament

We found 5 studies have been done to evaluate the influence of Calcium hydroxide intracanal medicament on post endodontic pain. Results of studies are summarized in Table 5.

Table 5 Studies on the influence of intracanal medicament on post endodontic pain in single visit and multiple visit root canal therapy

SL.NO	Author	Sample	Conclusion
1.	Tarale K.[9]	60	No significant difference.
2.	Wong A W, Zhang S, *et.al*.[7]	538	No significant difference.
3.	Singh S, Garg A. *et.al*.[10]	200	No significant difference.
4.	Riaz A, Maxood A, *et al*.[6]	60	No significant difference.
5.	Akbar I, Iqbal A, *et.al*. [2]	100	No significant difference.

Inclusion of calcium hydroxide renders the canal sterile and ready for obturation, which is widely accepted. Some studies have however shown that calcium hydroxide is not always effective, and has unreliable action. All the above studies showed that the comparison of success rate between two-visit endodontics with calcium hydroxide, and one-visit endodontic treatment of teeth showed no significant differences.[9, 11, 19-21]

Calcium hydroxide, which is rather insoluble, depending upon aqueous environment, releases hydroxyl ions. When calcium hydroxide comes in contact with water, there is optimal release of hydroxyl ions; but, the release of hydroxyl ions may be limited, due to decline in the availability of water moleculesin an instrumented canal. Moreover, calcium hydroxide is effective when it is in contact with the substrate, which is unlikely the case in the instrumented canal. Bacteria may occur as small colonies, in which cells lying at the periphery protects the bacterial cells at the center.[11, 22, 23]

Furthermore, initially, only the microorganisms at the tubule orifice may be exposed to hydroxyl ions than the ones lining dentinal tubules. In an in- vitro study conducted by Perez *et al*, theyobserved that the depth of penetration of in the dentinal tubules was 479 um for streptococcus. For Enterococcus feacalis and Streptococcus sanguis, it was 300-400um deep after 2-3 weeks and Pseudomonas aeurigunosa infected the dentin as early as in 3 days as observed in the study conducted byOrstavik and Haapasal. At these distances, calcium hydroxide is ineffective even after seven days, and it has been observed that these microorganisms can survive even in high pH. Within the lateral canals and the reticulated network of the pulp tissue, bacteria may also be enclosed. Bacterial regrowth in the canal has been observed, with or without inter-appointment medicament including calcium hydroxide, in cases which was done in prolonged time using multiple appointments.[11, 24, 25]

Calcium hydroxide dressing improves canal cleanliness when compared to instrumentation and irrigation with saline. However, calcium hydroxide does not always reduce bacteria more effectively than instrumentation and irrigation with copious amount of sodium hypochlorite. Enterococcus faecalis and Candida albicans are highly resistant to calcium hydroxide according to recent studies and is also found to be ineffective against S aureus and B subtilis which are present in the infected canals. Root canals are cleaner immediately after

proper instrumentation along with copious amount of sodium hypochlorite in adequate concentration. It has been found out that when calcium hydroxide is used indiscriminately, it can harm the periodontal membrane. Therefore, we can conclude that permanent filling with guttapercha along with a good sealer eliminates bacteria as or more effectively than what the temporary filling with calcium hydroxide does. It is also seen that complete removal of calcium hydroxide is difficult when placed in the canals which, in long run can compromise with the apical seal.[11, 26,27]

Preoperative pain

We found 3 studies have been done to evaluate the influence of Preoperative pain on post endodontic pain. Results of studies are summarized in Table 6.

Table 6 Studies on the influence of Preoperative pain on post endodontic pain in single visit and multiple visit root canal therapy

SL.NO	Author	Sample	Conclusion
1.	Riaz A, Maxood A, *et al*.[6]	60	No significant difference.
2.	Patil A A, Joshi S B, *et al*.[4]	66	No significant difference.
3.	Wong A W, Zhang S, *et.al*.[7]	538	No significant difference.

We found that there was no significant difference in incidence of post obturation pain in teeth with pre-operative pain in single visit and multiple visit root canal treatment. The presence of pre-treatment infection, which can lead to secondarily infected during treatment could be the reason for association of pre-operative pain on post-obturation pain.[11, 28]

Vitality of teeth

We found 3 studies have been done to evaluate the influence ofvitality of teeth on post endodontic pain. Results of studies are summarized in Table 7.

Table 7 Studies on the influence of vitality of teeth on post endodontic pain in single visit and multiple visit root canal therapy.

SL.NO	Author	Sample	Conclusion
1.	Patil A A, Joshi S B, *et al*.[4]	66	No significant difference.
2.	Singh S, Garg A. *et.al*.[10]	200	No significant difference.
3.	Wong A W, Zhang S, *et.al*.[7]	538	No significant difference.

The literature gives wide variations and opinions concerning the incidence of post endodontic pain due to the vitality of teeth, which remains inconclusive. The amount of prostaglandins, serotonin, histamines and bradykinis secreted due to the injury of periapical tissues during endodontic treatment can explain the progression of pain in vital pulp.[25, 29]

The presence of more microorganisms in the complex anatomy of the apical third of the canal along with the presence of periapical bone destruction area can explain the higher incidence of pain in non-vital pulp.[30]

CONCLUSION

This qualitative systematic review concluded that there is no significant association between gender, teeth type, intracanal medicaments, vitality of teeth and preoperative pain, on the post Endodontic flare-ups in single visit and multiple visits root canal therapy. Single visit endodontic treatment is viable treatment option in routine endodontics which reduces the number of patient visits and can be viewed as a procedure that supplements patient care.

References

1. Wong AW, Zhang C, Chu CH. A systematic review of nonsurgical single-visit versus multiple-visit endodontic treatment. Clin Cosmet Investig Dent. 2014;6:45.
2. Akbar I, Iqbal A, Al-Omiri MK. Flare-up rate in molars with periapical radiolucency in one-visit vs two-visit endodontic treatment. *The journal of contemporary dental practice*. 2013 May 1; 14(3):414.
3. Prasad LK, Kumar V, Jose S. A comparative study of flare-ups in nonvital molars in single-visit versus multi-visit endodontic treatment. Endodontology. 2013 Dec;25(2).
4. Patil AA, Joshi SB, Bhagwat SV, Patil SA. Incidence of postoperative pain after single visit and two visit root canal therapy: a randomized controlled trial. *Journal of clinical and diagnostic research*: JCDR. 2016 May;10(5):ZC09.
5. Sathorn C, Parashos P, Messer H. The prevalence of postoperative pain and flare-up in single-and multiple-visit endodontic treatment: a systematic review. *International endodontic journal*. 2008 Feb;41(2):91-9.
6. Riaz A, Maxood A, Abdullah S, Saba K, Din SU, Zahid S. Comparison of frequency of post-obturation pain of single versus multiple visit root canal treatment of necrotic teeth with infected root canals. A Randomized Controlled Trial. JPMA. *The Journal of the Pakistan Medical Association*. 2018 Oct 1;68(10):1429-33.
7. Wong AW, Zhang S, Li SK, Zhu X, Zhang C, Chu CH. Incidence of post-obturation pain after single-visit versus multiple-visit non-surgical endodontic treatments. BMC oral health. 2015 Dec;15(1):96.
8. Bhagwat SA, Patel A, Mandke LP. The effect of variation in inter-appointment time on the incidence of post-operative pain in single-visit versus two visit endodontics: An in vivo study. *Journal of the International Clinical Dental Research Organization*. 2012 Jan 1;4(1):9
9. Tarale K. Post-operative pain analysis between single visit and two visit root canal treatments using visual analogue Scale: an in vivo study. *J Dent Allied Sci*. 2013 Jan 1;2(1):8-15.
10. Singh S, Garg A. Incidence of post-operative pain after single visit and multiple visit root canal treatment: A randomized controlled trial. *Journal of conservative dentistry*: JCD. 2012 Oct;15(4):323.
11. Mathew ST. Post operative pain in endodontics: A systemic review. *Journal of Dentistry and Oral Hygiene*. 2015 Aug 31;7(8):130-7.
12. Marcus DA. Interrelationships of neurochemicals, estrogen, and recurring headache. Pain. 1995 Aug 1;62(2):129-39.
13. Walton R, Fouad A. Endodontic interappointment flare-ups: a prospective study of incidence and related factors. *Journal of endodontics*. 1992 Apr 1;18(4):172-7.
14. Mehrvarzfar P, Shababi B, Sayyad R, Fallahdoost A, Kheradpir K. Effect of supraperiosteal injection of dexamethasone on postoperative pain. *Australian Endodontic Journal*. 2008 Apr;34(1):25-9.
15. Greenspan JD, Craft RM, LeResche L, Arendt-Nielsen L, Berkley KJ, Fillingim RB, Gold MS, Holdcroft A, Lautenbacher S, Mayer EA, Mogil JS. Studying sex and

gender differences in pain and analgesia: a consensus report. Pain. 2007 Nov 1;132:S26-45.
16. Ali SG, Mulay S, Palekar A, Sejpal D, Joshi A, Gufran H. Prevalence of and factors affecting post-obturation pain following single visit root canal treatment in Indian population: A prospective, randomized clinical trial. Contemporary clinical dentistry. 2012 Oct;3(4):459.
17. Watkins CA, Logan HL, Kirchner HL. Anticipated and experienced pain associated with endodontic therapy. *The Journal of the American Dental Association*. 2002 Jan 1;133(1):45-54.
18. Cleghorn BM, Christie WH, Dong CC. Root and root canal morphology of the human permanent maxillary first molar: a literature review. *Journal of endodontics.* 2006 Sep 1;32(9):813-21.
19. Ørstavik D, Kerekes K, Molven O. Effects of extensive apical reaming and calcium hydroxide dressing on bacterial infection during treatment of apical periodontitis: a pilot study. *International Endodontic Journal*. 1991 Jan;24(1):1-7.
20. Walton RE, Holton Jr IF, Michelich R. Calcium hydroxide as an intracanal medication: effect on post treatment pain. *Journal of endodontics*. 2003 Oct 1;29(10):627-9.
21. Weiger R, Rosendahl R, Löst C. Influence of calcium hydroxide intracanal dressings on the prognosis of teeth with endodontically induced periapical lesions. *International endodontic journal*. 2000 May;33(3):219-26.
22. Sjögren U, Figdor D, Spångberg L, Sundqvist G. The antimicrobial effect of calcium hydroxide as a short-term intracanal dressing. *International endodontic journal*. 1991 May;24(3):119-25.
23. Byström A, Sunvqvist G. The antibacterial action of sodium hypochlorite and EDTA in 60 cases of endodontic therapy. *International endodontic journal*. 1985 Jan;18(1):35-40.
24. Nair PR. Light and electron microscopic studies of root canal flora and periapical lesions. *Journal of endodontics*. 1987 Jan 1;13(1):29-39.
25. Perez F, Rochd T, Lodter JP, Calas P, Michel G. In vitro study of the penetration of three bacterial strains into root dentine. Oral surgery, oral medicine, oral pathology. 1993 Jul 1; 76(1):97-103.
26. Estrela C, Pimenta FC, Ito IY, Bammann LL. Antimicrobial evaluation of calcium hydroxide in infected dentinal tubules. *Journal of endodontics*. 1999 Jun 1;25(6):416-8.
27. Christopher U, Emmanuel A. Flare-up incidence and related factors in adults. *Journal of dentistry and oral hygiene*. 2010 Aug 31;2(2):19-22.
28. Risso PD, Cunha AJ, Araujo MC, Luiz RR. Postobturation pain and associated factors in adolescent patients undergoing one-and two-visit root canal treatment. *Journal of dentistry*. 2008 Nov 1;36(11):928-34.
29. Mehrvarzfar P, Shababi B, Sayyad R, Fallahdoost A, Kheradpir K. Effect of supraperiosteal injection of dexamethasone on postoperative pain. *Australian Endodontic Journal*. 2008 Apr;34(1):25-9.
30. Ng YL, Glennon JP, Setchell DJ, Gulabivala K. Prevalence of and factors affecting post-obturation pain in patients undergoing root canal treatment. *International endodontic journal*. 2004 Jun;37(6):381-91.

How to cite this article:

Krishna Prasada L and Hithysh T Vidhyadhara (2019) 'A Comparative Study on Endodontic Flare-Ups in Single Visit vs Multiple Visits Endodontic Treatment: A Systematic Review', *International Journal of Current Advanced Research,* 08(10), pp. 20153-20157. DOI: http://dx.doi.org/10.24327/ijcar.2019.20157.3928

****