International Journal Dental and Medical Sciences Research
Volume 4, Issue 5, Sep-Oct 2022 pp 263-268 www.ijdmsrjournal.com ISSN: 2582-6018

Comparative Evaluation of Post Operative Pain of Teeth Treated With Cefixime -Modified Triple Antibiotic Paste and Its Anti Microbial Efficacy: An In Vivo Study

Benefsha Shabir

Submitted: 20-09-2022 Accepted: 30-09-2022

ABSTRACT

Aim and Objective: To evaluate the postoperative pain of teeth treated with cefixime-modified triple antibiotic paste and its antimicrobial efficacy.

Methodology: 30 patients were selected for the study. Out of 30 patients, 60 anterior teeth were divided into two groups. After access cavity preparation, the first sample was collected. In Group I (control group)—no medicament; in Group II—modified triple antibiotic paste was placed. Pain was checked by using a visual analogue scale at 6, 12, 24, 48, and 72 hour intervals. Samples were collected on days 3 and 7 and sent to the laboratory to see whether the bacterial count had decreased. In repeated measure (RM) analysis of variance (ANOVA), groups were compared using two factors (groups and periods), and the significance of the mean difference within (intra) and between (inter) groups was determined using Tukey's HSD.

Result: Following 72 hours, VAS showed a mean value of 3.93 ± 1.01 for the control group and 0.40 ± 0.50 for MTAP. After 7 days, the mean bacterial count was 2.02 ± 1.55 for the control group and 0.28 ± 0.24 for MTAP.

Conclusion: The VAS score and mean bacterial colony counts decreased gradually with time, and the decrease was evidently higher in the modified triple antibiotic paste as compared to the no-medication group.

Keywords: Modified Triple Antibiotic Paste, Post-operative pain, Intracanal medication.

I. INTRODUCTION

The most common sign of many medical and dental disorders that can significantly affect a person's daily functioning is pain. Effective management of endodontic pain is an ongoing challenge. The main reason of the discomfort is the presence of bacteria as a result of a failure to properly disinfect the canal. During root canal design, about 50% of root canal peripherals and ramifications may go unnoticed. The necrotic tissues in this situation might provide the surviving bacteria with food. This phenomenon might be diminished by thorough mechanical instrumentation, irrigation, and the use of inter-appointment medicine.[2]

The methodical administration of antibiotics depends on a patient adhering to the dosing instructions, then on the medication's absorption through the gastrointestinal tract and diffusion through the circulatory system to target areas of the body.[5]Because teeth with necrotic pulp lack a normal blood flow, the affected area needs it in order to survive. As a result, administering antibiotics locally within the root canal system may be a more efficient way to do so.[8]

An infected root canal contains a variety of germs, and a single antibiotic cannot effectively combat such a diverse array of micro flora. So, triple antibiotic paste, a mixture of antibiotics, has also been applied. The TAP, a trifecta of 100 mg of minocycline, 200 mg of ciprofloxacin, and 400 mg of metronidazole, has been used extensively as an intra-canal medication in dosages ranging from 0.1% to 1 mg/ml.[2]However, a drawback to the TAP formula's inclusion of minocycline is crown discoloration, which is a problem.

Cefixime (200 mg) is a third-generation cephalosporin antibiotic with broad spectrum activity that is generated from the fungus Cephalosporium acremonium. Similar to penicillin, cefixime prevents the creation of bacterial cell walls by interfering with the production of peptidoglycans. This reduces the stability of bacterial cell walls and promotes bacterial cell lysis.[9]

II. MATERIALS AND METHOD

This in vivo study was conducted with the oral and written consent of the study participants after explaining the complete procedure and ethical clearance. To avoid major side reactions, a complete medical history was obtained detailing the patient's sensitivity to antibiotics.Thirty patients were selected for the study. Out of 30 patients, 60 teeth (maxillary and mandibular anterior teeth) with acute peri-apical abscess requiring non-

International Journal Dental and Medical Sciences Research
Volume 4, Issue 5, Sep-Oct 2022 pp 263-268 www.ijdmsrjournal.com ISSN: 2582-6018

surgical endodontic therapy were included in the study. Patients who had taken analgesics or systemic antibiotics within the last 12 hours and patients who required surgical endodontic therapy were excluded from the study.

The visual analogue scale, with "no pain" and "pain as awful as it possibly be" as its two extremes, was used to quantify the degree of the pain experienced prior to surgery.

Following isolation with a rubber dam and anaesthesia with 1:100,000 lignocaine hydrochloride and adrenaline, access cavity preparation was carried out, and the working length was calculated and validated by collecting radiographs.

A microbial culture test was done to determine the abundance of micro-organisms in the sample. The first sample (S1) was collected from both the groups by inserting a paper point into the root canals and was left for 1 minute before being transferred into two sterile test tubes with saline and sent to the laboratory.

Chemo mechanical preparation was done with protaper universal rotary Ni Ti files (DENTSPLY) and 2ml of 3% sodium hypochlorite (Septodont). Following cleaning and shaping, a total of 60 teeth were split into two groups:

1. Group I (n=30) - No medicament placed into the root canal. (Control)
2. Group II (n=30) - Modified triple antibiotic paste (Ciprofloxacin 500mg Cipla, Metronidazole 400mg J.B pharmaceuticals, Cefixime 200mg cipla) in the ratio of 1:1:1 was mixed with 0.3 ml of saline, injected into the root canal with the aid of lentulospiral.

Access cavities were temporarily restored with intermediate restorative material. Following root canal instrumentation, patients were encouraged to keep a pain journal using a visual analogue scale every 6, 12, 24, 48, and 72 hours.

After 72 hours following the instrumentation of the root canals, patients were summoned back and another culture test (S2) was done for both groups to determine the reduction in bacterial colony count. Cefixime modified triple antibiotic paste was again placed into the root canals of group II patients. There was an absence of any allergic reaction prior to the second appointment in any of the samples.

Patients were again recalled after 7 days, and another sample (S3) was collected from both groups to determine the reduction in the bacterial count.

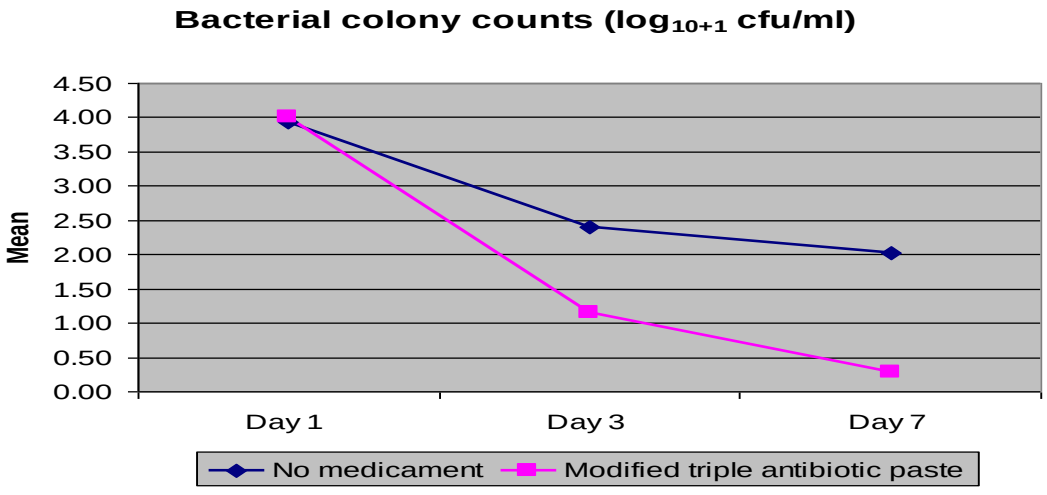
All samples were transferred to petri plates containing blood agar and incubated for 48 hours at 37 degrees Celsius. The obtained bacterial colonies were manually counted. The data obtained after culture tests and the visual analogue scale were subjected to statistical analysis.

III. RESULT

The bacterial colony counts were assessed at pretreatment (day 1) and post-treatment (days 3 and 7) and measured in colony forming units per millilitre (cfu/ml). After therapy, pain was assessed on a visual analogue scale (VAS) (0-10 mm) after 6, 12, 24, 48, and 72 hours.

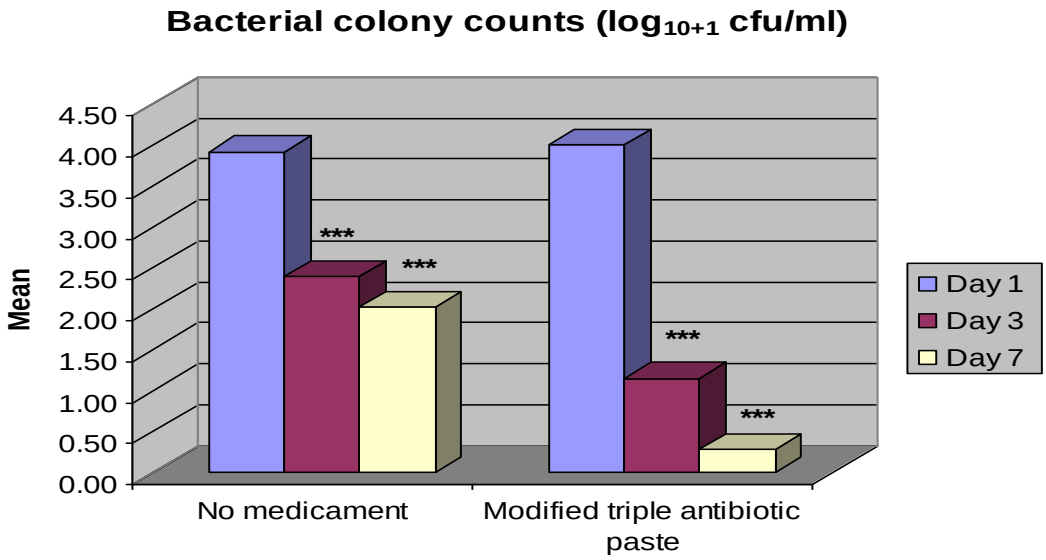
The objective of the study was to compare the efficacy of two treatments (no medicament and modified triple antibiotic paste) on outcome measures (bacterial colony counts) over time.

The pre (day 1) and post (day 3 and 7) bacterial colony counts of two groups are summarized in Table 1 and also shown in Graph 1.



Graph. 1. Mean bacterial colony counts of two groups over the periods

International Journal Dental and Medical Sciences Research
Volume 4, Issue 5, Sep-Oct 2022 pp 263-268 www.ijdmsrjournal.com ISSN: 2582-6018

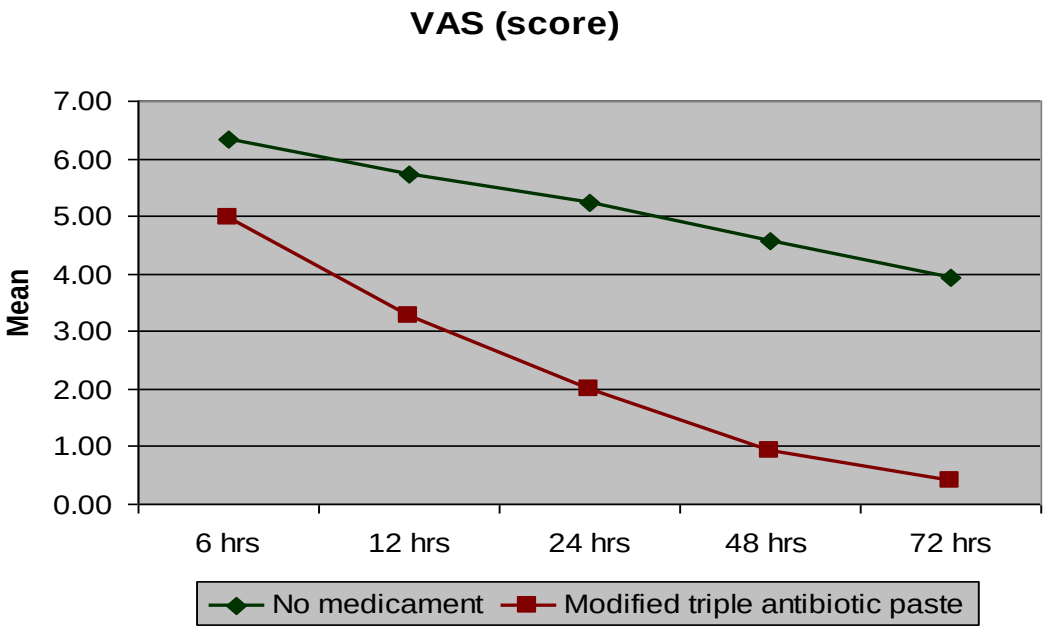


Graph. 2. For each group, comparisons of difference in mean bacterial colony counts between the periods.

Additionally, it was discovered that the modified triple antibiotic paste's net mean decrease (93.1%) in bacterial colony counts (i.e., the mean change from day 1 to day 3) was 44.5% larger than the placebo (48.6%).

Pain

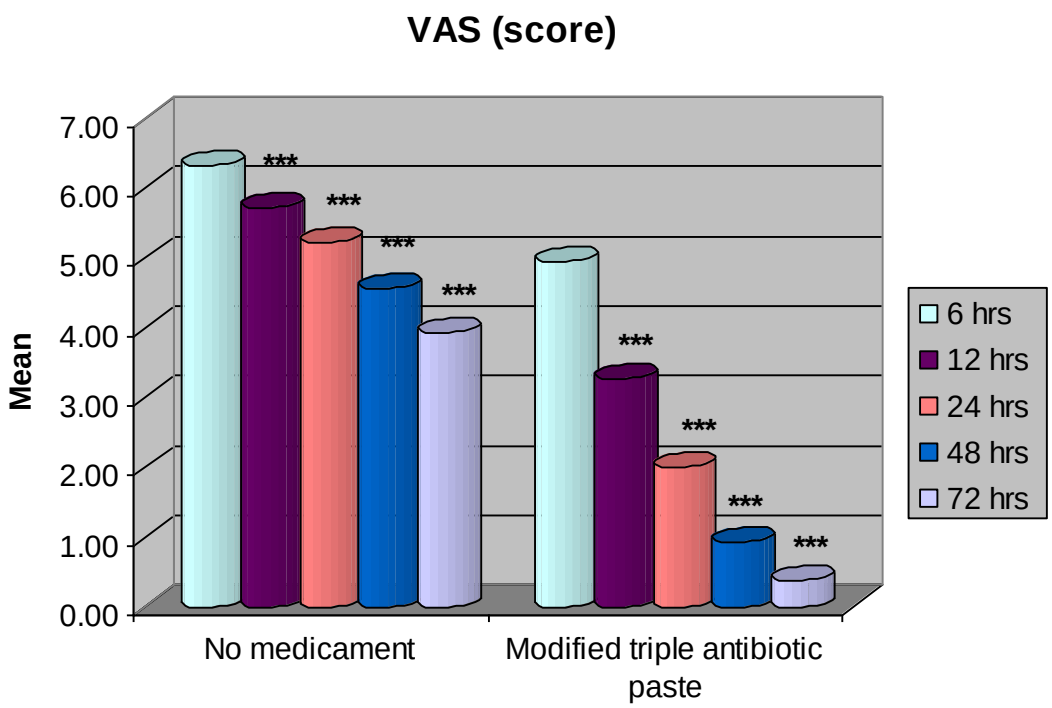
The post (6, 12, 24, 48, and 72 h) VAS score (i.e., pain) of two groups is summarized in Table 2 and also depicted in the graph. 3. The post-treatment mean VAS score decreased gradually with time and the decrease was evidently higher in modified triple antibiotic paste as compared to no medicament.



Graph. 3. Mean VAS score of two groups over the time.

International Journal Dental and Medical Sciences Research
Volume 4, Issue 5, Sep-Oct 2022 pp 263-268 www.ijdmsrjournal.com ISSN: 2582-6018

Additionally, the modified triple antibiotic paste's net mean decrease in pain (i.e., mean change from 6 hours to 72 hours) was determined to be 54.0% higher than that of no medication (37.9%) at the time of final evaluation.



Graph. 4. For each group, comparisons of difference in mean VAS score between time periods.

IV. DISCUSSION

Priority one during endodontic therapy is the complete eradication of germs and removal of pulp tissue from the root canal system. It is crucial to clean and shape the root canal space with endodontic instruments and irrigants in order to disinfect the pulp space. However, the poly-microbial character of the endodontic infection in some clinical situations warrants the administration of an intra-canal medication in addition to the irrigants.[19]A single irrigant or medication cannot effectively sterilize the root canal due to the complexity of root canal infections. Combining drugs has a synergistic impact that prevents the spread of resistant bacterial strains and prolongs the duration of their antibacterial action through continuous medication release. A single empirical antibiotic is not able to create a bacterial-free zone in the canal because of the poly-microbial nature of tooth infection, which is the justification for mixing the antibiotics.[11]A combination of antibiotics against all endodontic infections is necessary to prevent microbial resistance. The trio of antibiotics metronidazole, ciprofloxacin, and minocycline is the most promising. In the endodontic literature, allergy to antibiotics used during endodontic therapy is well documented. In addition, the tetracycline family member minocycline has been linked to allergic reactions (Jang et al. 2010, Travassos et al. 2012). An allergic reaction may be more likely if a medication extrudes from the apical foramen upon administration.[10]There have been numerous studies comparing the effectiveness of triple antibiotic paste alone or when combined with amoxicillin, clindamycin, and cefaclor, but none have compared the effectiveness of ciprofloxacin, metronidazole, and cefixime.The detrimental effects of cefixime are generally mild and short-term. Drug hypersensitivity reactions also develop rarely.[16]

In the current study, the effectiveness of a triple antibiotic paste modified with cefixime for post-operative tooth pain was assessed. Although there are many different pain rating scales like the Color Rating Scale (CAS), Numerical Rating Scale (NRS), and Face Rating Scale, The VAS was utilized in this study to assess post-operative pain since previous research has shown that it has better metrical properties than other discrete pain scales. It is regarded as a valid and trustworthy scale for assessing pain.[20]

Colony forming units, which represent the quantity of live residual bacteria present in root canals, were counted in the current study to assess

International Journal Dental and Medical Sciences Research
Volume 4, Issue 5, Sep-Oct 2022 pp 263-268 www.ijdmsrjournal.com ISSN: 2582-6018

the antimicrobial efficacy of intracanal medications and to calculate the percentage reduction in bacterial colony count in infected dentine before and after intracanal medication application. In order to evaluate the efficacy of endodontic treatment methods, microbial root culture is frequently performed. A logarithmic transformation was carried out to normalize the data before statistical evaluation. The recommended retention time for the intracanal medication is 7 days; however, if the medication is kept in place for longer than 2 weeks, the canal may become recontaminated. Medication was inserted following access opening, correct shape and cleaning in group I patients during the first session and was changed after three days in the trial, taking into account a minimum retention time of one week. The present study has shown more favourable results in teeth treated with cefixime modified triple antibiotic paste than in teeth in which conventional root canal treatment was done with no intracanal medicament.

The outcome measures of the study were bacterial colony counts and pain. The bacterial colony counts were assessed and measured in colony forming units per millilitre (cfu/ml). After therapy, pain was assessed on a visual analogue scale (VAS) (0-10 mm) after 6, 12, 24, 48, and 72 hours.

In both groups, the mean bacterial colony counts decreased linearly with time, and the decrease was evidently higher in the modified triple antibiotic paste as compared to no medicament. This may be explained by the fact that modified triple antibiotic paste effectively disinfected the area when compared to the group that received no medication.

The current study is in accordance with a study conducted by**AzimaHanin S Et al. 2020**[19]inwhichthey concluded that TAP is more effective at eradicating bacteria than CH.

The findings of this study are consistent with those of a study by **KunjamSawhney**[2019][18], which came to the conclusion that triple antibiotic paste is a potent intracanal medication that may be utilized to treat post-operative pain.

Period	No medicament (n=30)	Modified triple antibiotic paste (n=30)
Day 1	3.93 ± 1.28	4.01 ± 1.30
Day 3	2.40 ± 1.48	1.16 ± 0.10
Day 7	2.02 ± 1.55	0.28 ± 0.24

Table 1: Pre and post bacterial colony counts (log_{10+1} cfu/ml) of two groups

Time	No medicament (n=30)	Modified triple antibiotic paste (n=30)
6 hrs	6.33 ± 0.76	4.97 ± 0.93
12 hrs	5.73 ± 0.91	3.27 ± 0.98
24 hrs	5.23 ± 0.94	2.00 ± 0.91
48 hrs	4.57 ± 1.01	0.93 ± 0.64
72 hrs	3.93 ± 1.01	0.40 ± 0.50

Table 2: Post VAS score of two groups over the time

V. CONCLUSION

The post-treatment VAS score and mean bacterial colony counts reduced over time, according to the constraints of this investigation, and the decline was clearly greater in the group receiving the modified triple antibiotic paste than in the group receiving no medicine.

There aren't enough studies in the literature to back up the usage of cefixime modified triple antibiotic paste as an intracanal medication. However, additional clinical research is necessary to verify the findings of the current study.

REFERENCES

[1]. Abouelenien SS, Ibrahim SM, Shaker OG, Ahmed GM. Evaluation of postoperative pain in infected root canals after using double antibiotic paste versus calcium hydroxide as intra-canal medication: a randomized controlled trial. F1000Research 2018; 7.

[2]. Parhizkar A, Nojehdehian H, Asgary S. Triple antibiotic paste: momentous roles and applications in endodontics: a review. Restorative dentistry &endodontics 2018; 20:43-3.

[3]. Alamassi BY. Endodontic postoperative pain: etiology and related factors–an update. International Journal of Dental Sciences and Research 2017; 22:13-21.
[4]. Konagala RK, Mandava J, Pabbati RK, Anupreeta A, Borugadda R, Ravi R. Effect of pretreatment medication on postendodontic pain: a double-blind, placebo-controlled study. JCD 2019; 22:1-54.
[5]. PurvaBhutda. A REVIEW OF TRIPLE ANTIBIOTIC PASTE AS INTRACANAL MEDICAMENT.Int J Dent Health Sci 2016; 3:1183-1188.
[6]. AslAminabadi N, Satrab S, Najafpour E, Samiei M, Jamali Z, Shirazi S. A randomized trial of direct pulp capping in primary molars using MTA compared to 3Mixtatin: a novel pulp capping biomaterial. International journal of paediatric dentistry 2016; 26:281-90.
[7]. Vijayaraghavan R, Mathian VM, Sundaram AM, Karunakaran R, Vinodh S. Triple antibiotic paste in root canal therapy. Journal of pharmacy &bioallied sciences 2012; 4(Suppl 2):S230.
[8]. Parasuraman VR, Muljibhai BS. 3Mix-MP in Endodontics–An overview. J Dent Med Sci 2012; 3:36-45.
[9]. Dukić S, Matijević S, Daković D, Čutović T. Comparison of cefixime and amoxicillin plus metronidazole in the treatment of chronic periodontitis. Vojnosanitetskipregled 2016; 73:526-30.
[10]. Kaufman AY, Solomonov M, Galieva D, Abbott PV. Allergic reaction to the tetracycline component of Ledermix paste: a case report. International Endodontic Journal 2014; 47:1090-7.
[11]. Mohammadi Z, Jafarzadeh H, Shalavi S, Yaripour S, Sharifi F, Kinoshita JI. A review on triple antibiotic paste as a suitable material used in regenerative endodontics. Iranian endodontic journal 2018; 13:1.
[12]. Daokar SG, Mantri AR, Patil KS, Wahane KD, Rathi SV, Sharma SS. Comparative assessment of role of intracanal medicaments in pain reduction during endodontic treatment: In vivo: Visual analog scale study. Journal of Interdisciplinary Dentistry 2021; 11:73.
[13]. Mazumder P. Use of antibiotics in endodontics. J West Bengal Univ Health Sci 2021; 1:53-61.
[14]. Prasanti ED, Margono A, Djauharie N. Effect of triple antibiotic paste, calcium hydroxide, ledermix on viability of pulp mesenchymal stem cells. Int J App Pharm 2019; 11:49-53.
[15]. Goldberg M. Root canal treatment (RCT): from traditional endodontic therapies to innovating pulp regeneration. J Dent Oral DisordTher 2016; 4:1-6.
[16]. Tan BJ. Cefixime use in children: When and why. Canadian Journal of Infectious Diseases 1995; 6:204-5.
[17]. Ali F, Yousaf A, Daud Z, Hussain SM, Ullah M, Ahmed Rana MJ. Comparison of Two Intra-Canal Medicaments on the Incidence of Post-Operative Endodontic Pain. J Ayub Med Coll Abbottabad 2020; 32:299-303.
[18]. Sawhney K. To assess role of triple antibiotic paste in reducing post-operative pain. Int J Res Health Allied Sci 2019; 5:29-31.
[19]. Chandra S. Grossman's endodontic practice. Wolters Kluwer India Pvt Ltd; 2014.
[20]. Prasad LK, Tanwar BS, Kumar KN. Comparison of calcium hydroxide and triple antibiotic paste as intracanal medicament in emergency pain reduction: in vivo study. Int J Care Res 2016; 4:244-6.