



EVALUATION OF POSTOPERATIVE PAIN AFTER VARIOUS CRYOTHERAPY APPLICATIONS IN TEETH WITH CHRONIC IRREVERSIBLE PULPITIS – AN IN VIVO STUDY.

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Conflicts of Interest: Nil

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Abstract:

Aim: To evaluate the effect of various Cryotherapy applications on post operative pain in teeth with Chronic Irreversible Pulpitis.

Methodology: A total of 40 patients with Chronic Irreversible Pulpitis were randomly divided into four groups depending upon the type of Cryotherapy; Control group – No Cryotherapy application; Intracanal Cryotherapy application with 20ml saline as final irrigant at 4 degree C; Intraoral Cryotherapy application with ice packs placed on vestibular region of treated tooth; Extra oral Cryotherapy application with icepacks placed extraorally on cheek surface. The postoperative pain of the patients was recorded at the first, third, fifth, and seventh days.

Results: The data were statistically analyzed by using Mann-Whitney U test and Student's t test (P = .05). when compared with control group, all Cryotherapy groups exhibited less percussion pain and less postoperative pain.

Conclusion: within the limitations of the study, all the Cryotherapy applications resulted in lowering of post operative pain.

Clinical significance: Application of Cryotherapy results in decreased blood flow, inhibition of neural receptors in tissues results in reduction of postoperative pain.

Keywords: Cryotherapy, Cold saline, Chronic Irreversible pulpitis, Triphala.

Introduction

The goal of endodontic therapy is to eliminate micro-organisms from the infected root canal system by an adequate chemo mechanical debridement followed by a three dimensional obturation. This produces a hermetic seal, thereby to provide a favourable environment for periradicular healing.¹ Even with the utmost care in performing a root canal therapy, some patients experience pain during or after the treatment. Controlling the pain is the important aspect of treatment. The incidence of post operative pain was reported to range from 3-58%². Pak and White reported that the prevalence of post operative pain after root canal treatment was 40% at 24 hours, whereas it reduced to 11% at 1 week and it was most intense in the first six hours following a gradual decline after a week³. The causes of postoperative pain can be classified as mechanical, chemical and microbiological injuries that causes inflammation in the periapical tissues⁴⁻⁷. Several strategies have been developed for postoperative pain management including prescribing medication, using the crown-down technique in root canal preparation, administering long acting anaesthesia and occlusal reduction⁸⁻¹⁰. Cryotherapy is a long-standing

therapeutic technique that has been reported to be effective at reducing oedema, pain, Inflammation and recovery time with short term applications^{11,12}. The purpose of this study was to evaluate the effect of various Cryotherapy applications on post operative pain in teeth with Chronic Irreversible Pulpitis.

Materials and Methods:

A total of 40 patients with mandibular molars diagnosed with Symptomatic Irreversible pulpitis with either normal apical tissues or symptomatic apical periodontitis were included in the study. Inclusion criteria were the Patients diagnosed with chronic irreversible pulpitis and age ranged from 18-40 years, Teeth with mature apex. Previous root canal treatment, Teeth with root resorption, Sinus tracts / local gum swelling around the affected tooth, Presence of periapical radiolucency, Teeth with excessively curved roots, untraceable canal path and medically compromised patients comes under exclusion criteria.

40 patients who fulfilled the inclusion criteria were divided into 4 groups depending upon the type of Cryotherapy received. Group I: Control group – No Cryotherapy application; Group II: Intracanal Cryotherapy application with 20ml saline as final irrigant at 4⁰ C; Group III: Intraoral

Cryotherapy application with ice packs placed on vestibular region of treated tooth; Group IV: Extra oral Cryotherapy application with icepacks placed extra orally on cheek surface.

After confirming eligibility, the study design was explained to the patients, as well as the clinical procedure and the associated risks. They were also assured that the root canal procedure will be performed regardless of whether or not they participate in the study. An informed consent was obtained from the patient after their approval. Preoperative pain levels were also evaluated.

In Group I, Local Anaesthesia LIGNOX 2 % (lignocaine with 1:80000 adrenaline) was administered using a conventional inferior alveolar nerve block. Caries excavated and Access cavity prepared using Endo –Access bur No-2 under Rubber dam isolation. The Working length had been determined using an Electronic Apex Locator. Working length was confirmed through a radiograph to confirm that the tip of the file lay within 0.5-1 mm of the radiographic apex. Canal shaping was done using F6 SkyTaper rotary instrumentation. During the preparation the canals were irrigated using Herbal Irrigant Triphala and Final Irrigation was done using 20mL Normal saline at room temperature for 5 minutes. After irrigation, sterile absorbent points were used to dry the canals. A pre-obturation x-ray had been taken using O.06 taper GP for confirmation of the length. Lentulo spirals were used to apply the ZOE sealer Obturation had been done using 0.06 taper GP. A post endodontic restoration of Type IX GIC was done. In Group II, after Completion of Irrigation with Triphala, Final irrigation was done with 20mL cold (4⁰C) saline solution for 5 minutes. The Obturation and Post endo restoration procedures were then performed. In Group III, like the control group, the root canals in this group were given a final irrigation with 20mL room temperature saline solution for 5 minutes. Next, Small ice cubes wrapped in sterile guaze were placed intraorally in the mouth on the vestibular surface of the treated tooth. Patients were instructed to keep the ice pack in the mouth for 30 minutes. In Group IV, after final irrigation with saline at room temperature, ice wrapped in layers of sterile guaze was placed extraorally on the cheek surface. Patients were instructed to keep the icepack in pace for 30 minutes. Patients were informed that they might experience pain in days after treatment and were instructed to record their pain at 24 hrs, 3rd, 5th, 7th days after the treatment on the pain scale (Wong Baker FACES pain Rating Scale). They were instructed to use analgesics (ibuprofen 400mg) every 6-8hrs if needed for pain relief. They were also instructed to note down the details of analgesic intake regarding number of dose, timing of the dose and whether it provided adequate relief or not.

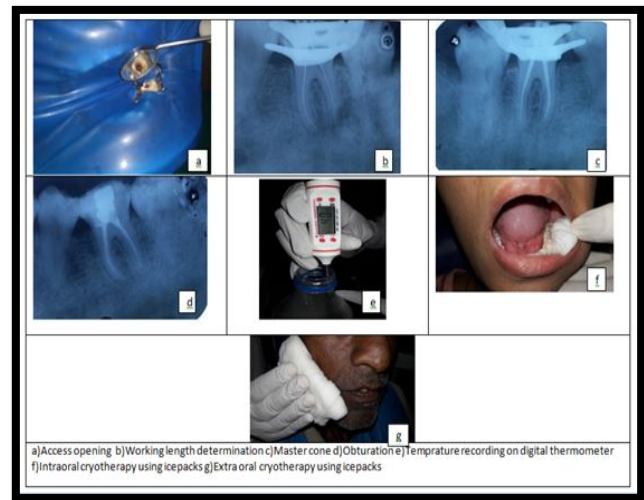


Figure 1:

RESULTS:

Comparisons between groups were measured by Mann-Whitney U test and Student's t test for Non parametric and parametric data respectively.

The preoperative pain levels were similar among the groups. When compared with the control group, all the Cryotherapy groups exhibited lower postoperative pain levels on the first, third, fifth and seventh days. Patients in the control groups used more analgesics versus the other groups.

Table 1:

	Group I	Group II	Group III	Group IV
Pain Level				
Preoperative	96.27+/- 4.26	94.4 +/- 7.26	94.7 +/- 7.9	93.3 +/- 6.7
1 st day	73.54 +/- 19.4	33.4 +/- 19.3	26.7 +/- 24.2	33.8 +/- 32.7
3 rd day	64.23 +/- 22.3	18.6 +/- 21.5	13.7 +/- 21.7	18.7 +/- 16.3
5 th day	42.9 +/- 22.8	8.3 +/- 9.6	9.7 +/- 8.6	8.6 +/- 6.7
7 th day	37.6 +/- 21.3	0.73 +/- 1.5	0.92 +/- 2.9	1.72 +/- 3.7
Analgesic usage				
Yes	8	2	3	4
No	2	8	7	6

Discussion:

It is important to achieve the reduction in postoperative pain after endodontic treatment as it is considered one of the primary problems in the treatment. The purpose of this study was to evaluate the effect of various Cryotherapy applications in molar teeth with symptomatic irreversible pulpitis with or without symptomatic apical periodontitis. The results of this study revealed that application of Cryotherapy reduced postoperative pain following single visit root canal treatment in teeth with irreversible pulpitis. In dentistry, cold application has been frequently employed for postoperative pain control following intraoral surgical procedures. In recent years, few studies have attempted and reported the intracanal use of cryotherapy in endodontics to reduce post endodontic pain¹³⁻¹⁵. It was showed that irrigation of root canals with 2.5⁰C cold saline solution for 5min resulted in reduction of

external root surface temperature by more than 10°C, which may be enough to produce a local anti-inflammatory effect of periradicular tissues¹⁶. However, unlike the above study, Intraoral and extraoral cryotherapy applications were evaluated in this study for postoperative pain reduction. Degree of temperature set for Intracanal cold saline as final irrigant was at 4°C. Herbal Irrigant Triphala was used in contrary to standard regimen of NaOCl and EDTA to minimise the effect of chemical injuries to periradicular tissues. Rotary single file system F6 SkyTaper was used which was proven to reduce the extrusion of infected debris from the root canal into periradicular tissues. The study results indicated that postoperative pain levels were significantly lower in the intracanal, intraoral and extraoral cryotherapy groups versus those in the control group.

Conclusion:

Within the limitations of the study, all the Cryotherapy groups resulted in reduced postoperative pain levels as compared with the levels in control group. In light of the observations from this study, Cryotherapy can be considered as simple, cost-effective and non toxic therapeutic treatment option for postoperative pain control in single visit RCT cases.

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