



## Assessment of intracanal cryotherapy and curcumin as a final irrigant in reducing post endodontic pain in primary teeth

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### ABSTRACT

**Background:** Post-endodontic pain is defined as the sensation of discomfort after endodontic treatment. The present study was conducted to compare intracanal cryotherapy and curcumin as a final irrigant in reducing post endodontic pain in primary teeth.

**Materials & Methods:** 60 primary teeth of age 3-8 years requiring pulpectomy of both genders were randomly divided into three groups. Group I was intracanal cryotherapy using 2.5°C cold saline, group II was curcumin irrigant, and group III normal saline. Subjects were asked to rate the severity of their postoperative pain on the visual analog scale before, immediate postoperative after wearing of local anesthetic effect, and 24 hours after the procedure.

**Results:** Group I had 11 males and 9 female teeth, group II had 8 males and 12 female teeth and group III had 13 males and 7 female teeth. The mean VAS before treatment in group I, II and III was 6.2, 6.3 and 6.1 respectively. The mean VAS post-operatively was 4.2, 5.0 and 5.7 and after 24 hours was 1.7, 2.4 and 2.8 respectively. The difference was significant ( $P < 0.05$ ).

**Conclusion:** Curcumin irrigant with its anti-inflammatory properties is a better alternative as a final irrigant for reducing postoperative pain in primary teeth. Cryotherapy can be a straightforward, cost-effective, and nontoxic treatment option for the management of postendodontic pain.

**Key words:** Post-endodontic pain, VAS, pulpectomy

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## Introduction

Post-endodontic pain is defined as the sensation of discomfort after endodontic treatment and is reported by 25%–40% and ranging from 1.5% more than 50% of patients regardless of pulp and peri-radicular status.<sup>1</sup> The pain can vary in severity and duration, and may be caused by a variety of factors, including inflammation, nerve irritation, and trauma to the surrounding tissues during the procedure.<sup>2</sup>

Post-endodontic pain is common, even when the endodontist has followed acceptable standards of treatment. Pulp therapy and root canal treatment (RCT) induce more frequent and more severe postoperative pain than do other dental operative procedures.<sup>3</sup> Cryotherapy has been used after intraoral surgical procedures such as periodontal surgery, extractions, and implant placement, and was found to be effective in reducing swelling and pain.<sup>4</sup>

Among natural compounds with recognized antimicrobial and anti-inflammatory characteristics, curcumin is a plant-derived agent (turmeric root), which also exhibits antioxidant and anticancer effects, thus having significant clinical relevance related to the prevention and treatment of numerous illnesses.<sup>5,6</sup> Curcumin has already been used in the fabrication of electrospun fibers for biomedical applications (e.g., skin tissue regeneration) and more recently, it was employed as an intracanal irrigant during endodontic treatment, showing effective and promising disinfection results probably explained by its permeabilization effects that cause damage of bacterial membranes.<sup>7</sup> The present study was conducted to compare intracanal cryotherapy and curcumin as a final irrigant in reducing post endodontic pain in primary teeth.

## Materials & Methods

The present study consisted of 60 primary teeth of age 3-8 years requiring pulpectomy of both genders. Parents gave their written consent to participate in the study.

Data such as name, age, gender etc. was recorded. The teeth were randomly divided into three groups. Group I was intracanal cryotherapy using 2.5°C cold saline, group II was curcumin irrigant, and group III normal saline. Following completion of chemomechanical preparation, final irrigation with 2.5°C cold saline, curcumin irrigant, and normal saline solution at room temperature were employed in the groups. Subjects were asked to rate the severity of their postoperative pain on the visual analog scale before, immediate postoperative after wearing of local anesthetic effect, and 24 hours after the procedure. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

## Results

**Table I Distribution of tooth**

Groups	Group I	Group II	Group III
Agent	cryotherapy with 2.5°C cold saline	curcumin	normal saline
M:F	11:9	8:12	13:7

Table I shows that group I had 11 males and 9 female teeth, group II had 8 males and 12 female teeth and group III had 13 males and 7 female teeth.

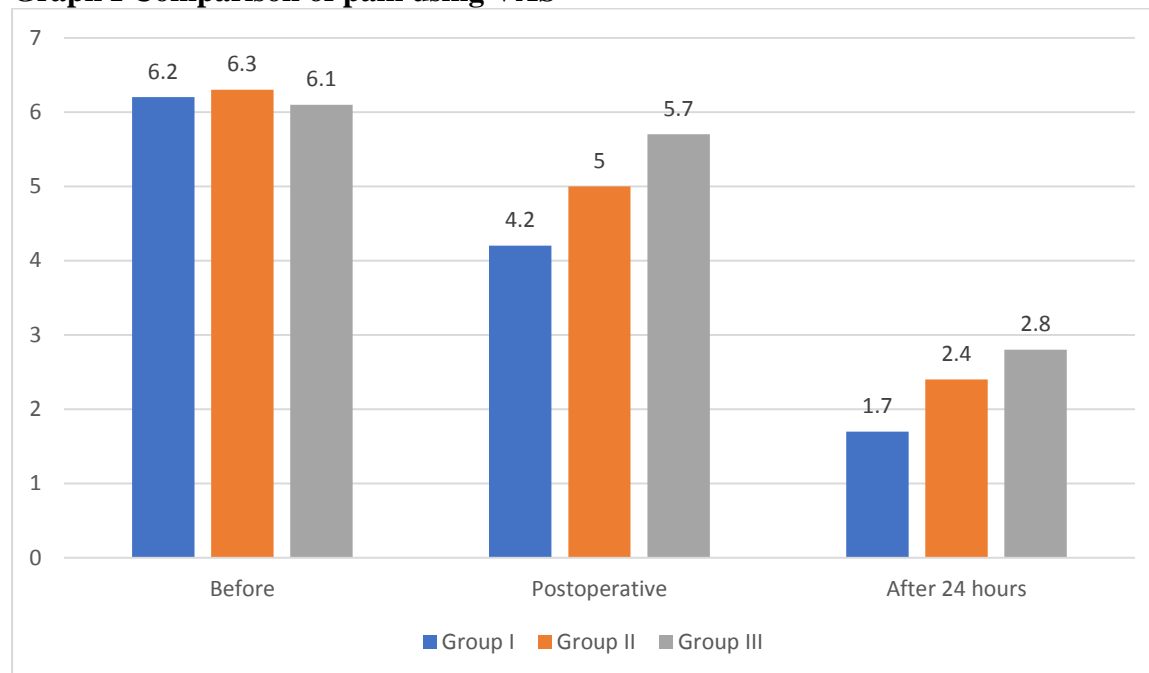
**Table II Comparison of pain using VAS**

Period	Group I	Group II	Group III	P value
Before	6.2	6.3	6.1	0.95

Postoperative	4.2	5.0	5.7	0.98
After 24 hours	1.7	2.4	2.8	0.24

Table II, graph I shows that mean VAS before treatment in group I, II and III was 6.2, 6.3 and 6.1 respectively. The mean VAS post-operatively was 4.2, 5.0 and 5.7 and after 24 hours was 1.7, 2.4 and 2.8 respectively. The difference was significant ( $P < 0.05$ ).

**Graph I Comparison of pain using VAS**



## Discussion

The common factors influencing the occurrence of pain after root canal treatment include insufficient instrumentation, irrigant extrusion, intracanal interappointment dressing extrusion, hyper-occlusion, missed canals, presence of preoperative pain, presence of periapical pathosis, apical debris extrusion, and apical patency during root canal preparation.<sup>8,9</sup> Post-endodontic pain most often occurs during the first 24–48 hours after obturation, and generally recedes in a few hours, although it occasionally persists for several days.<sup>10</sup> Major advances in rotary instrumentation and metallurgy have led to the introduction of numerous systems with innovative designs in recent years. Nonetheless, all the preparation techniques and instruments available to date are still associated with some degree of extrusion of debris which may cause post-endodontic pain.<sup>11</sup> The present study was conducted to compare intracanal cryotherapy and curcumin as a final irrigant in reducing post endodontic pain in primary teeth.

We found that group I had 11 males and 9 female teeth, group II had 8 males and 12 female teeth and group III had 13 males and 7 female teeth. Kumari et al<sup>12</sup> evaluated the intracanal effectiveness of cryotherapy, curcumin irrigant, and normal saline as a final irrigant in reducing post-endodontic pain in primary teeth. A total of 120 teeth between the ages of 4 and 7 years requiring pulpectomy in primary teeth were included in the study. The teeth were randomly assigned to one of the three treatment groups: intracanal cryotherapy using 2.5°C cold saline, curcumin irrigant, or normal saline. Following completion of chemo-mechanical preparation, final irrigation with 2.5°C cold saline, curcumin irrigant, and normal saline

solution at room temperature were employed in the groups. Participants were asked to rate the severity of their postoperative pain on the Visual Analog Scale before, immediate postoperative after wearing of local anesthetic effect, and 24 h after the procedure. The differences in reduction of post-endodontic pain between the three irrigating regimens were statistically not significant. Cryotherapy utilizing 2.5°C cold saline or curcumin irrigant can be used instead of normal saline as a final irrigant in pulpectomy of primary teeth.

We found that mean VAS before treatment in group I, II and III was 6.2, 6.3 and 6.1 respectively. The mean VAS post-operatively was 4.2, 5.0 and 5.7 and after 24 hours was 1.7, 2.4 and 2.8 respectively. Algafly et al<sup>13</sup> assessed the impact of the application of cryotherapy on nerve conduction velocity (NCV), pain threshold (PTH) and pain tolerance (PTO). Main outcome measures were NCV of the tibial nerve via electromyogram as well as PTH and PTO via pressure algometer. All outcome measures were assessed at two sites served by the tibial nerve: one receiving cryotherapy and one not receiving cryotherapy. In the control ankle, NCV, PTH and PTO did not alter when reassessed. In the ankle receiving cryotherapy, NCV was significantly and progressively reduced as ankle skin temperature was reduced to 10 degrees C by a cumulative total of 32.8% (p<0.05). Cryotherapy led to an increased PTH and PTO at both assessment sites (p<0.05). The changes in PTH (89% and 71%) and PTO (76% and 56%) were not different between the iced and non-iced sites.

Vera et al<sup>14</sup> in their study twenty extracted single-rooted teeth were instrumented to size 35/.06 and subjected to 2 different irrigation interventions with a repeated-measures design using 5% sodium hypochlorite first (control) and 2.5°C cold saline solution later (experimental). In both, 20 mL of the irrigant solution was delivered for a total time of 5 minutes with a microcannula attached to the EndoVac system inserted to the working length. The initial and lowest temperatures were recorded in the apical 4 mm with a digital thermometer for both irrigants. Although significant differences were found between the initial and lowest temperatures in both the control and experimental irrigation procedures, the experimental intervention reduced it almost 10 times that of the control. When maintaining a -10°C temperature reduction over 4 minutes, the teeth in the experimental group also sustained significantly better results ( $P = 3.047 \times 10(-10)$ ).

The limitation the study is small sample size.

## **Conclusion**

Authors found that curcumin irrigant with its anti-inflammatory properties is a better alternative as a final irrigant for reducing postoperative pain in primary teeth. Cryotherapy can be a straightforward, cost-effective, and nontoxic treatment option for the management of post-endodontic pain.

## **References**

1. Ashkenazi M, Blumer S, Eli I. Post-operative pain and use of analgesic agents in children following intrasulcular anaesthesia and various operative procedures. *British dental journal*. 2007; 202(5):13.
2. Alves Vd O. Endodontic flare-ups: a prospective study. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod*. 2010; 110:68-72.
3. Harrison JW, Baumgartner JC, Svec TA. Incidence of pain associated with clinical factors during and after root canal therapy. Part 2. Post-obturation pain. *Journal of Endodontics*. 1983; 9:434-38.

4. Al-Negrish AR, Hababbeh R. Flare up rate related to root canal treatment of asymptomatic pulpally necrotic central incisor teeth in patients attending a military hospital. *Journal of Dentistry*. 2006; 34:635-40.
5. Pak JG, White SN. Pain prevalence and severity before, during, and after root canal treatment: A systematic review. *Journal of Endodontics*. 2011; 37:429-38.
6. Seltzer S, Bender IB, Ehrenreich J. Incidence and duration of pain following endodontic therapy. Relationship to treatment with sulfonamides and to other factors. *Oral Surgery Oral Medicine Oral Pathology Oral Radiology & Endodontics*. 1961; 14:74-82.
7. Siqueira JF, Jr. Microbial causes of endodontic flare-ups. *International Endodontic Journal*. 2003; 36:453-63.
8. 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; 41(2):91-9.
9. Siqueira JF, Barnett F. Interappointment pain: mechanisms, diagnosis, and treatment. *Endodontic Topics*. 2004; 7(1):93-109.
10. Saini D. Cryotherapy–An Inevitable part of Sports Medicine and it’s benefits for Sports Injury. *IJAR*. 2015; 1(4):324-7.
11. Bashetty K, Hegde J. Comparison of 2 % chlorhexidine and 5.25 % sodium hypochlorite irrigating solutions on postoperative pain: a randomized clinical trial. *Indian J Dent Res*. 2010; 21(4):523-7.
12. Kumari N, Kaur H, Choudhary R, Yeluri R. Comparative evaluation of intracanal cryotherapy and curcumin as a final irrigant in reducing post endodontic pain in primary teeth. *Journal of Indian Society of Pedodontics and Preventive Dentistry*. 2022 Jul 1;40(3):297-301.
13. Algafly AA, George KP. The effect of cryotherapy on nerve conduction velocity, pain threshold and pain tolerance. *Br J Sports Med*. 2007; 41:365-369; discussion 369.
14. Vera J, Ochoa-Rivera J, Vazquez-Carcaño M, Romero M, Arias A, Sleiman P. Effect of Intracanal Cryotherapy on Reducing Root Surface Temperature. *Journal of endodontics*. 2015; 41(11):1884-7.