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Original Research

Postoperative pain evaluation following chemomechanical preparation of single-rooted nonvital teeth with and without laser irradiation

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ABSTRACT:
Background: Although it varies greatly from person to person, postoperative pain after endodontic treatment, such as root canal therapy, is not unusual. The present study was conducted to assess efficacy of laser irradiation in controlling postoperative pain following chemomechanical preparation of teeth.**Materials & Methods:**60 patients with apical periodontitis in single-rooted nonvital teeth of both genders were selected. Two groups of 30 patients each were formed from the patients. Group I underwent mock laser therapy, in which a laser tip was inserted but not triggered, after chemomechanical preparation. In group II, laser irradiation was administered and activated after chemomechanical preparation. The Visual Analog Scale was used to assess postoperative pain scores at baseline, 24 hours, 48 hours, and 72 hours. Scores for percussion pain and the need for rescue analgesics were also noted.**Results:** Out of 60 patients, 32 were males and 28 were females. The mean pain score (VAS) at baseline in group I was 6.5 and in group II was 7.3, at 24 hours in group I was 4.2 and in group II was 4.0, at 48 hours in group I was 3.3 and in group II was 1.6 and at 72 hours in group I was 2.1 and in group II was 0.74. The difference was significant (P< 0.05). Percussion pain score (VAS) was 5.3 in group I and 2.8 in group II. Rescue medication requirement was seen in 12 patients in group I and 5 patients in group II. The difference was significant (P< 0.05).**Conclusion:** Intracanal laser irradiation using a diode laser can successfully reduce discomfort and enhance patient comfort during endodontic treatment when compared to typical chemomechanical procedures.
Keywords: laser irradiation, discomfort, pain

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INTRODUCTION

Although it varies greatly from person to person, postoperative pain after endodontic treatment, such as root canal therapy, is not unusual. While some people might feel very little discomfort, others might feel more pain or sensitivity. The severity of the initial infection or inflammation, the intricacy of the treatment, and the patient's pain threshold are some of the variables that may affect how painful the procedure is.[1]

Following the treatment, pain and discomfort may be caused by inflammation in the surrounding tissues. The trauma of the procedure and the existence of lingering bacteria or irritants in the root canal system frequently cause this inflammation as a normal reaction.[2] The periapical tissues—the tissues that surround the tooth's root—may become irritated during the cleaning and contouring of the root canal system. Pain following surgery may result from this inflammation.[3] Because of its accuracy, adaptability,

and potential to lessen postoperative discomfort and inflammation, diode lasers have become more and more popular in dentistry, particularly in endodontic procedures. During endodontic therapy, diode lasers can be used as an adjuvant disinfectant for the root canal system.[4]Diode lasers can help remove bacteria, fungus, and other microorganisms that may be causing postoperative discomfort and inflammation by penetrating deeply into the dentinal tubules and supplying energy in the form of laser light.[5]

Better cleaning can lower the risk of surgical complications and encourage better healing. Diode lasers decreased pain and inflammation by lowering PGE2, bradykinin, acetylcholine, histamine, serotonin, and substance P.6.[6] Although studies have been done to evaluate postoperative endodontic pain using lasers, it is still unknown if laser therapy may successfully reduce postoperative pain after endodontic treatment.[7]The present study was conducted to assess efficacy of laser irradiation in controlling postoperative pain following chemomechanical preparation of teeth.

MATERIALS & METHODS

The present study consisted of 60 patients with apical periodontitis in single-rooted nonvital teeth of both genders. All gave their written consent to participate in the study.

Data such as name, age, gender etc. was recorded. Two groups of 30 patients each were formed from the patients. Group I underwent mock laser therapy, in which a laser tip was inserted but not triggered, after chemomechanical preparation. In group II, laser irradiation was administered and activated after chemomechanical preparation. The Visual Analog Scale was used to assess postoperative pain scores at baseline, 24 hours, 48 hours, and 72 hours. Scores for percussion pain and the need for rescue analgesics were also noted. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Total- 60		
Gender	**Male**	**Female**
Number	32	28

Table I shows that out of 60 patients, 32 were males and 28 were females.

Table IIEvaluation of pain

Period	Group I	Group II	P value
Baseline	6.5	7.3	0.53
24 hours	4.2	4.0	0.52
48 hours	3.3	1.6	0.01
72 hours	2.1	0.74	0.01

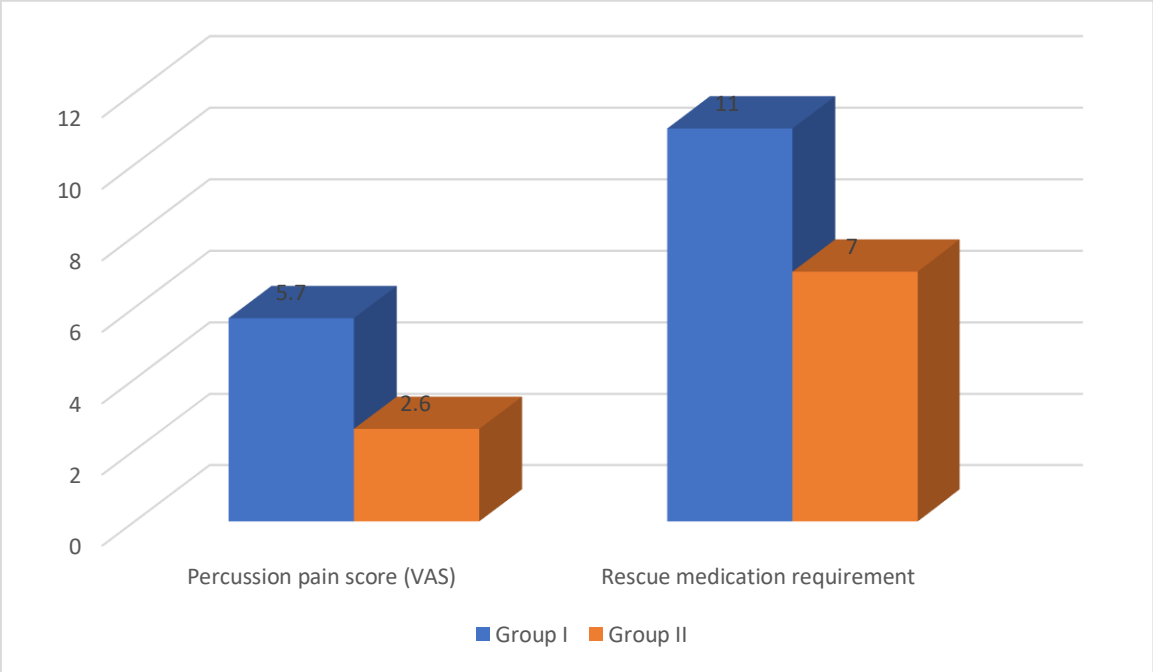
Table IIshows that mean pain score (VAS) at baseline in group I was 6.5 and in group II was 7.3, at 24 hours in group I was 4.2 and in group II was 4.0, at 48 hours in group I was 3.3 and in group II was 1.6 and at 72 hours in group I was 2.1 and in group II was 0.74. The difference was significant (P< 0.05).

Table III Evaluation of percussion pain scores and rescue medication requirement

Parameters	Group I	Group II	P value
Percussion pain score (VAS)	5.7	2.6	0.01
Rescue medication requirement	11	7	0.04

Table III, graph I shows that percussion pain score (VAS) was 5.7 in group I and 2.6 in group II. Rescue medication requirement was seen in 11 patients in group I and 7 patients in group II. The difference was significant (P< 0.05).

Graph I Evaluation of percussion pain scores and rescue medication requirement



DISCUSSION

It has been demonstrated that diode lasers have biostimulatory effects on tissues, encouraging cellular healing, regeneration, and repair. Diode lasers can be used to irradiate the periapical tissues around the treated tooth after endodontic treatment is finished. This could hasten the healing process and lessen pain and discomfort following surgery.[8] Additionally, this biostimulatory impact might improve tissue healing and reduce inflammation. In order to aid reduce postoperative sensitivity and discomfort, diode lasers can be used to desensitize dentin surfaces and periapical tissues.[9] Diode lasers can lower dentin permeability and hypersensitivity by precisely locating and shutting off dentinal tubules, giving patients more comfort and a higher quality of life after endodontic operations.[10,11]The present study was conducted to assess efficacy of laser irradiation in controlling postoperative pain following chemomechanical preparation of teeth.

We found that out of 60 patients, 32 were males and 28 were females.Ramamoorthi Set al[12] during root canal therapy, assessed and contrast the postoperative pain level following irrigant activation utilizing an EndoActivator with traditional needle irrigation. Seventy-two patients with irreversible pulpitis symptoms were chosen for this prospective, randomized clinical trial. Following standard root canal preparation, patients were divided into two groups using block randomization. Group EA got activation using EndoActivator (n = 36) in the final irrigation protocol, whereas group EN underwent operations using endodontic irrigating needles (n = 36). At 8, 24, and 48 hours, all participants received phone calls to analyze their pain scores using a visual analogue scale. Ibuprofen 200 mg was prescribed to the patients who experienced pain. The frequency of tablet consumption and the pain score were noted and statistically examined. According to the results, group EA used much fewer analgesics and had postoperative pain than group EN. In conclusion, employing EndoActivator to activate irrigants can be regarded as an efficient way to lessen postoperative pain, given the limitations of this study.

We observed that mean pain score (VAS) at baseline in group I was 6.5 and in group II was 7.3, at 24 hours in group I was 4.2 and in group II was 4.0, at 48 hours in group I was 3.3 and in group II was 1.6 and at 72 hours in group I was 2.1 and in group II was 0.74. In Wang et al's[13] work, sixty-six human single-rooted teeth that had been extracted were instrumented up to size 60 K-file before being split into three groups of 22 teeth each at random. Fibers having diameters of 550 and 365 microm, respectively, were used to expose Groups 1 and 2 to a diode laser at 5 W for 7 seconds. Group 3 was used as a control and was not exposed to radiation. Thermography was used to measure the increase in temperature on the root surfaces of the teeth in groups 1 and 2. Each group's six teeth were longitudinally bisected and morphologically examined. The extent of apical leakage was assessed longitudinally and transversally after other teeth were obturated and submerged in rhodamine B solution. The highest recorded temperature increase was 8.1 degrees Celsius.The root canal walls of the laser-treated groups were considerably cleaner than those of the control group ($p < 0.05$) as a result of the smear layer being evaporated and eliminated. After obturation, the laser-treated groups revealed considerably reduced apical leakage than the control group ($p < 0.05$).

We observed that percussion pain score (VAS) was 5.3 in group I and 2.8 in group II. Rescue medication requirement was seen in 12 patients in group I and 5 patients in group II. In sixty (n = 30) volunteers with nonvital teeth exhibiting symptoms of apical periodontitis, Rao et al.[14] compared postoperative discomfort following chemomechanical preparation with placebo and laser irradiation. Group 1 underwent mock laser therapy after chemomechanical preparation, while Group 2 underwent laser irradiation and activation after chemomechanical preparation. Percussion pain scores before and after surgery were noted, as were postoperative pain levels. At every time point, the laser group's pain scores were much lower than those of the placebo group. The percussion pain assessments before and after surgery also differed significantly. Groups 1 and 2 each needed rescue medication for 9 and 3 participants.

CONCLUSION

Authors found that intracanal laser irradiation using a diode laser can successfully reduce discomfort and enhance patient comfort during endodontic treatment when compared to typical chemomechanical procedures.

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