

Comparison of Postoperative Pain in Patient's Where Occlusal Adjustment was done after Endodontic Treatment Versus Patients Where Occlusal Contacts Were Maintained

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ABSTRACT

Background: This study was done to compare and analyse the effect of occlusal adjustment on postoperative pain after endodontic treatment in patients diagnosed with symptomatic irreversible pulpitis. **Methods:** Eighty-four participants were included in this study, patients were divided into two groups, Group 1: patients receiving occlusal adjustment (intervention group) and Group 2: patient not receiving occlusal adjustment (control group). endodontic treatment was performed and pain score was evaluated using Verbal rating scale (VRS). Pain assessment was done at 6, 24 and 72 hours. Statistical analysis: Data was analysed using chi square and T test, Wilcoxon Rank Sum rank test was used to test if pain score is likely to derive from the same population. **Results:** No statistical significance was observed between the group when compared at 6,24 and 72 hours ($p>0.001$). While at 6-24-time interval group 1 showed a significant reduction ($P<0.001$) in postoperative pain as compared to group 2. **Conclusion:** Occlusal adjustment did not affect the occurrence of post-endodontic pain over a 72-hour period.

Keywords: Occlusal adjustment, Postoperative pain, Root canal treatment.

INTRODUCTION

Postoperative pain is a common complication of endodontic treatment (ET), which can vary from mild to severe. To reduce the occurrence of postoperative pain, instrumentation within the confines of root canals is recommended additionally various modifications in clinical protocol have been carried out to reduce the occurrence of post endodontic pain.^[1-3]

The intensity of pain has been reported to be greatest in the initial 24 hours of treatment which gradually weans off by 7 day.^[4] Several factors may affect the perception of pain in patients, the role of age, sex, position of tooth in the arch and premedication have been studied among many other factors. One of the factors that can lead to increased perception of pain after ET is the occlusal forces acting on the tooth, which can lead to mechanical stimulation of nociceptors and hence increased perception of pain.^[5,6]

Several studies have suggested the role of occlusal adjustment as a potential technique to reduce the

occurrence of postoperative pain while other support that it has no bearing.^[7-9] The aim of this study was to compare and analyze the influence of occlusal adjustment on postoperative pain after ET in teeth diagnosed with symptomatic irreversible pulpitis.

MATERIAL AND METHOD

This study was conducted after obtaining institutional ethical clearance from January 2018 to August 2019. The patients coming to the outpatient department of conservative and endodontics, KVG dental college, requiring endodontic treatment were recruited in this study after obtaining a written consent from the patients. A sample size of 84 patients was calculated using G* power software. Following inclusion and exclusion criteria were followed:

Inclusion criteria:

- Teeth requiring endodontic treatment
- Mandibular molar teeth with symptomatic irreversible pulpitis.
- Patient aged between 18-45 years
- No or mild spontaneous pain

Exclusion criteria

- Any history systemic disease
- Pregnant patient
- Patient taken premedication
- Temporomandibular joint disorder

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- Non restorable teeth
- Any periapical disease

The diagnosis was made using cold test and occlusion was checked using articulating paper, after which a preoperative pain assessment was done using verbal rating scale (VRS) to establish baseline score the patients were then divided into two groups with 42 subjects in each group.

- **Group 1:** Patients receiving occlusal adjustment (intervention group)
- **Group 2:** Patient not receiving occlusal adjustment (control group)

Endodontic treatment was performed after clinical and radiographic examination was done. The tooth was anesthetized using 2% lidocaine with 1:100000 epinephrine (Warren, Lignox, India) by inferior alveolar nerve block. Rubber dam was applied and access opening done using endo access bur (Dentsply, India). Refinement of the access cavity was done using Endo Z bur (DENTSPLY, India). Glide path was established using #8, #10 K -files. Working length was determined using apex locator (Root ZX, Morita, Tokyo, Japan) and confirmed using intraoral periapical radiograph at 0.5 mm from apical foramen.

Root canal instrumentation was done using ProTaper gold NiTi system (Dentsply, Maillefer, Ballaigues, Switzerland) in crown down manner. Slow speed engine driven motor (X Smart, Dentsply, Maillefer, Ballaigues, Switzerland) was used in continuous rotation at torque and speed recommended by manufacturer. While preparing canals the instruments were checked for any defect and cleaning with gauge was performed with each insertion of instrument into the canal to prevent clogging of debris

Instruments were aided with continuous irrigation of 2.5% sodium hypochlorite and a final irrigation of 17% EDTA was done before obturation. AH plus sealer (Dentsply, Maillefer, Ballaigues, Switzerland) along with Gutta percha cones were used to seal the root canal space. After obturation provisional restoration was done using glass ionomer cement and a postoperative radiograph was taken.

In group 1 the maximal intercuspation and functional occlusal contacts were recorded using articulating paper. The occlusal contacts at cusps and ridges were removed using high speed diamond bur, in group 2 non cutting smooth bur was used to imitate.

The postoperative pain measurement was done using VRS [Table 1] at 6, 24 and 72 hours after completion of ET, postoperative pain evaluation was done through telephonic interview. If patients responded with moderate to severe pain, they were advised to take ibuprofen 600 mg. The patient rated the pain experienced verbally on a scale, where 'no pain' was referred to state where patient is

symptom less and 'sever pain' refer to state where patient is unable to perform function.

Statistical Analysis:

Statistical analysis was performed using statistical package SPSS version 25.0 (IBM Corporation). Mean, standard deviation and frequency was calculated The Chi-Square Test was used to determine whether there is an association between categorical variables ($P < 0.05$). Wilcoxon Rank Sum rank test, was used to test if pain score is likely to derive from the same population. Any possibility of type 2 error was checked via T test.

RESULTS

No statistical significance was observed between the group when compared at 6, 24 or 72 hours ($p > 0.001$). The percentage of patients in group I showed 73.8% ($n=31$) and group II 64.2% ($n=27$) complained of post endodontic pain and patients. Twenty- four-individuals in the group I and 25 in group II complained of pain in the first six hours and 14 patients in group I and 18 patients in group II complained of pain after twenty- four hours and 4 and 7 individuals reported with pain after 72 hours respectively in group 1 and group II. While reduction in pain between the time interval 6-72 hours showed no statistically significant difference ($P > 0.001$) between both groups, while time interval between 6-24-time interval showed only a significant difference for group I. No patient reported the moderate to severe pain and subsequent use of postoperative pain medication (Ibuprofen 600 mg).

Table 1: Verbal rating scale used in this study

| VRS scale | | | |
|-----------|-----------|---------------|-------------|
| 0 | 1 | 2 | 3 |
| No pain | Mild pain | Moderate pain | Severe pain |

Table 2: Pain score at different intervals (Mean \pm SD)

| VRS pain score | | | |
|----------------|-------------|-------------|-------------|
| | 6 hrs. | 24 hrs. | 72 hrs. |
| Group I | 0.68 (0.72) | 0.44 (0.53) | 0.23 (0.45) |
| Group II | 0.63 (0.64) | 0.45 (0.50) | 0.12 (0.30) |

DISCUSSION

Mechanical stimulation cause stimulation of nociceptors and release of mediators of inflammation leading to painful response.^[10,11] The probability of pain experienced by patients with or without occlusal adjustment after endodontic treatment are similar according to results of this study which is in agreement with study done by Arslan et al,^[6] Vianna et al,^[7] and Pairokh et al.^[8] The reason for decrease in pain score over 72 hours may be due the impulse generated at sodium channels in C fibers shows reduced sensitization, which leads to increased threshold to external stimulus, like functional and non-functional

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mechanical forces and decrease in pain perception by the patients.^[12,13]

Various preoperative factors like apical periodontitis and periapical radiolucency influence the postoperative pain,^[7] these factors were included as exclusion criteria for this study Rosenberg et al in his study has concluded that preoperative pain has more influence on postoperative pain than little or mild tenderness.^[5] The mean post-operative pain score in this study shows a similar correlation with studies done by Vianna et al^[7] and Lopes et al.^[3] the low postoperative pain score in this study can be attribute to strict inclusion and exclusion criteria, standardization of endodontic technique and dental treatment being provided by the specialist dentist in the field. The ET was also completed in one appointment in crown down technique using NiTi rotary instruments which could have also influenced the results of this study.^[5,14] Several authors,^[5,15] have suggested the apical extrusion of debris is significantly reduced using crown down technique. One of the limitations of this study being both the genders have been included in this study as study participants, several authors have suggested the variation in pain experienced by different genders. Pain is a subjective perception of noxious stimulus and can vary according to emotion and surroundings experienced by the subjects.^[7]

Undermined enamel wall are routinely reduced in clinical practice when the patient is undergoing full coverage restoration, but certain patients may not be willing to undergo further treatment other than filling of root canal, occlusion reduction of such teeth will cause it to be out of function,^[8] the results of this study further suggest the occlusal reduction does not affect prognosis of post endodontic pain. so, dentist must perform occlusal adjustments with possible disadvantages in mind.

Clinically most common method of detecting contact between opposing tooth have been articulating paper, several computerized scans do provide pattern and force of occlusion but that doesn't leave a clinically visible guide to perform occlusal adjustment.^[16] Articulating paper being readily available and a clinically acceptable method, have been used in this study.

Verbal rating scale is considered to be easily interpreted by the patients and has shown to have less variation in statistical interpretation of data also patient doesn't have to report to the clinic and the data can be collected over telephone makes it more acceptable to patients and thus willing to participate in the study.^[17]

CONCLUSION

The pain perceived postoperatively by the patient doesn't differ significantly in patients diagnosed

with symptomatic irreversible pulpitis in which occlusal adjustments have been performed to the one with none have been performed over a period of 72 hours. A prevalence of higher postoperative pain was seen at 6 to 24-hour interval.

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