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Analysis of variables associated with Postoperative Pain in patients undergoing root canal therapy: An observational study

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Abstract

Background: Prevention and management of post-endodontic pain (PEP) is an integral part of endodontic treatment. Mechanical factors, including over instrumentation or extrusion of root-filling materials, have been associated to the presence of postoperative pain, suggesting that root canal instrumentation and obturation techniques may influence postoperative pain. Hence; the present study was undertaken for assessing various parameters associated with Postoperative Pain in patients undergoing root canal therapy.

Materials & methods: A total of 200 patients who underwent endodontic therapy were enrolled. Patients who underwent root canal therapy of third molars were excluded. Root canal therapy was performed in all the patients under local anesthesia. After completing of obturation, patients were recalled after one week and postoperative radiographs were taken. Radiographic length of root canal filling and sealer extrusion was recorded. All the patients were instructed to mark the presence of pain on a 10 cm long visual analogue scale (VAS) for recording postoperative pain. On this scale, 0 indicated no pain and score of 10 indicated unbearable pain.

Results: None to mild postoperative endodontic pain as found to be present in 161 patients while moderate to unbearable pain was found to be present in 39 patients. Among these 39 patients, 25 patients were males while the remaining were females. Among 39 patients with moderate to unbearable pain, mandibular molar was involved in 18 cases, while maxillary molar was involved in 9 cases. In 23 patients out of 39 patients (with moderate to unbearable pain), preoperative symptoms were present while in remaining 16 cases, patients were asymptomatic during the pre-operative time.

Conclusion: Post-treatment endodontic pain was significantly higher in females, in mandibular molars and in patients with presence of pre-treatment symptoms. However; further studies are recommended.

Keywords: Endodontic pain, Root canal therapy

Introduction

Prevention and management of post-endodontic pain (PEP) is an integral part of endodontic treatment. Informing patients about expected post-endodontic pain (PEP) and prescribing medications to manage it can increase patient confidence in their dentists, increase patients' pain threshold, and improve their attitude toward future dental treatment [1-3]. According to previously published data, pulp therapy and root canal treatment (RCT) induce more frequent and more severe postoperative pain than do other dental operative procedures. In the literature, reported frequencies of PEP range from 1.5 to 53%. The large range is apparently due, in large part, to differences in definitions of post-endodontic pain [4].

Mechanical factors, including over instrumentation or extrusion of root-filling materials, have been associated to the presence of postoperative pain, suggesting that root canal instrumentation and obturation techniques may influence postoperative pain. In fact, several studies have found correlation between the root canal instrumentation technique and postoperative pain [5, 6].

Hence; under the light of above mentioned data, the present study was undertaken for assessing various parameters associated with Postoperative Pain in patients undergoing root canal therapy.

Materials & methods

The present study was conducted for assessing various parameters associated with postoperative pain in patients undergoing root canal therapy. A total of 200 patients who

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underwent endodontic therapy were enrolled. Complete demographic details and clinical data of all the patients were obtained. Patients who underwent root canal therapy of third molars were excluded. Written consent was obtained from all the patients after explaining in detail the entire research protocol. We also excluded patients who were previously on analgesics or antibiotic medications. Root canal therapy was performed in all the patients under local anesthesia. After completing of obturation, patients were recalled after one week and postoperative radiographs were taken. Radiographic length of root canal filling and sealer extrusion was recorded. All the patients were instructed to mark the presence of pain on a 10 cm long visual analogue scale (VAS) for recording postoperative pain. On this scale, 0 indicated no pain and score of 10 indicated unbearable pain. All the results were recorded in Microsoft excel sheet and were analyzed by SPSS software.

Results

In the present study, a total of 200 patients were analyzed. Among these patients, none to mild postoperative endodontic pain as found to be present in 161 patients while moderate to unbearable pain was found to be present in 39 patients. Among these 39 patients, 25 patients were males while the remaining were females. Mean age of these patients was found to be 38.7 years. In the present study, among 39 patients with moderate to unbearable pain, mandibular molar was involved in 18 cases, while maxillary molar was involved in 9 cases. Mandibular premolar was involved in 5 cases, while maxillary premolar was involved in 3 cases. In 23 patients out of 39 patients (with moderate to unbearable pain), preoperative symptoms were present while in remaining 16 cases, patients were asymptomatic during the pre-operative time.

Table 1: Distribution of patients according to post-treatment endodontic pain as per VAS

Pain according to VAS	Number of patients	Percentage of patients
None (VAS - 0)	129	64.5
Mild (VAS - 1 to 2)	32	16
Moderate (VAS - 3 to 6)	29	14.5
Sever (VAS - 7 to 8)	7	3.5
Unbearable (VAS - 9 to 10)	3	1.5

Table 2: Age-wise and gender-wise distribution of patients with moderate to unbearable pain (n=39)

Parameter		Number of patients	P-value
Age group	Less than 30	13	0.82
	30 to 45	15	
	More than 45	11	
Gender	Females	25	0.00 (Significant)
	Males	14	

Table 3: Distribution of patients with moderate to unbearable pain according to tooth involved

Tooth involved	Number of patients	p- value
Maxillary incisors	0	0.00 (Significant)
Mandibular incisors	2	
Maxillary canines	1	
Mandibular canines	1	
Maxillary premolars	3	
Mandibular premolars	5	
Maxillary molars	9	
Mandibular molars	18	

Table 4: Distribution of patients with moderate to unbearable pain according to pre-operative symptoms

Pre-operative symptoms	Number of patients	p- value
Symptomatic	23	0.00 (Significant)
Asymptomatic	16	
Total	39	

Discussion

The primary aim of endodontic treatment is biomechanical preparation of the root canal (cleaning, shaping and disinfection) and to hermetically seal it with no discomfort to the patient, and provide conditions for the peri-radicular tissues to heal. A flare-up can be defined as pain and/or swelling of the facial soft tissues and the oral mucosa in the area of the endodontically treated tooth that occur within a few hours or a few days following the root canal treatment, when clinical symptoms (tooth pain when biting, chewing or by itself) are strongly expressed and the patient visits a health care institution sooner than scheduled. After endodontic treatment the flare-up manifests as pain of various intensity [7-9]. Hence; under the light of above mentioned data, the present study was undertaken for assessing various parameters associated with Postoperative Pain in patients undergoing root canal therapy.

In the present study, a total of 200 patients were analyzed. Among these patients, none to mild postoperative endodontic pain as found to be present in 161 patients while moderate to unbearable pain was found to be present in 39 patients. Among these 39 patients, 25 patients were males while the remaining were females. Mean age of these patients was found to be 38.7 years. Sadaf D *et al.* assessed postoperative pain in endodontic therapy and its association with clinical factors such as gender, age, tooth type, pulpal diagnosis, and preoperative pain, length of obturation and sealer extrusion. One hundred and forty patients (140) requiring endodontic therapy for molar and premolar teeth were included in this study. Local Anesthesia (2% Lidocain with 1:80,000 Epinephrine) was administered. The tooth was isolated with rubber dam. Access cavity was prepared with the help of round carbide No. 2 bur. Canal preparation was completed using crown-down technique. Access was sealed with sterile dry cotton pallet and restored temporarily with double layer of Glass ionomer cement and Cavit. After one week patients were recalled and access was re-opened, obturation was done using cold lateral condensation technique. Ca(OH)(2) based sealer was used. Postoperative radiographs were taken. Patients were recalled after 24 hours and postobturation pain was recorded using Visual analogue scale (VAS). Pain was present in 42.9% of patients. Females more frequently experienced pain (65%) than males (35%). Preoperative pain was found to be significantly associated with postoperative pain. Obturation length was not found to be significantly associated with postoperative pain. Sealer extrusion was not found to be significantly associated with postoperative [10].

In the present study, among 39 patients with moderate to unbearable pain, mandibular molar was involved in 18 cases, while maxillary molar was involved in 9 cases. Mandibular premolar was involved in 5 cases, while maxillary premolar was involved in 3 cases. In 23 patients out of 39 patients (with moderate to unbearable pain), preoperative symptoms were present while in remaining 16 cases, patients were asymptomatic during the pre-operative time. Wang C *et al.* compared the incidence and intensity of post-obturation pain after one- or two-visit root canal treatment (RCT) on anterior teeth with vital pulps and a single root and canal. One

hundred patients requiring RCT on permanent anterior teeth with vital pulps preoperatively were included. The patients were assigned randomly into two groups of 50 patients each. After local an aesthesia, isolation, access and pulp extirpation, the canals of all teeth were prepared using engine-driven rotary ProTaper nickel-titanium instruments in a crown-down technique and irrigated with 2.5% NaOCl. The teeth in group 1 (n = 50) were filled with AH Plus sealer and gutta-percha using a lateral compaction technique at the first visit, whilst those in group 2 (n = 50) were medicated with a calcium hydroxide paste, a sterile dry cotton pellet and Caviton and scheduled for a second visit 7 days later. A modified verbal descriptor scale was used to measure preoperative pain and post-obturation pain at 6, 24, 48 h and 1 week after operation. Eleven patients were excluded from the study as they failed to follow the scheduled revisit or their selected teeth had more than one root canal. Data were obtained from the remaining 89 patients. Forty-three patients were undergoing one-visit treatment (group 1) and 46 undergoing two-visit treatment (group 2). Most patients in both groups reported no pain or only slight pain within each post-obturation interval, only one in group 1 and one in group 2 had flare-ups and slight swelling. There was no statistically significant difference in the incidence and intensity of post-obturation pain experienced by two groups. The incidence and intensity of post-obturation pain experience following one- or two-visit RCT on teeth with vital pulps and a single canal were not significantly different ^[11].

Conclusion

From the above results, the authors concluded that post-treatment endodontic pain was significantly higher in females, in mandibular molars and in patients with presence of pre-treatment symptoms. However; further studies are recommended.

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