TO EVALUATETHE OCCURRENCE AND VARIABLES IMPACTING POST OPERATIVE PAINAFTER ROOT CANAL TREATMENT IN ORTHODONTICALLY CORRECTED TEETH: AN ORIGINAL RESEARCH STUDY

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ABSTRACT

Background: The documented frequencies of post-endodontic discomfort in the literature vary from 1.5 percent to 53 percent. The occurrence of post-operative pain varies; some research find high incidences while others indicate low rates. 82.9 percent is a relatively high occurrence rate for post-obturation soreness, according to reports. Large variations in prevalence rate can be due to sample size variances, different techniques, and ethnic as well as cultural variables. Previous research has looked at the prevalence of postoperative pain following single visit treatments.

Aim: To evaluate incidence and factors influencing post operative pain following root canal treatment in orthodontically corrected vital teeth.

Materials and Methods: The study was questionnaire based in which responses were noted at various time intervals. Different predefined exclusion and inclusion criteria had been utilized during methodology procedure.

Results: In this study 27.43% of study participants had post obturation pain. Seventy seven study participants had mild pain, twenty six had moderate pain, 4 had severe while 23 had very severe pain after twenty hours of procedure. 291 study participants had no pain after forty eight hours of completion of obturation process. 69 study participants had mild pain, 8 had moderate pain, 3 had severe while no one had very severe pain after forty eight hours of procedure.349 study participants had no pain after seven days of completion of obturation process.

Conclusion: It can be concluded from the findings of this study that there are several important factors affecting post obturation pain among which status of immediate pre operative pain ,intraoperative pain and mishaps during the endodontic treatment were significantly associated with the incidence of pain post operatively.

Keywords: Post operative pain, Root canal therapy, Orthodontic treatment, Malocclusion

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Introduction

The globally acknowledged solution for irreversible pulpitis is root canal therapy. Primary root canal therapy has an 86.02 percent success rate. Numerous root canal procedures have been performed globally as a result of this achievement. Although this endodontic method has some drawbacks, the most significant being the potential for pain after completion of therapy. Both patients as well as professionals dislike postoperative pain following endodontic treatments. Knowing how frequently post-endodontic pain occurs, the causes of those things that may be contributing to it, and the methods for managing it can help the doctor build more trust with patients.[1] For patients presenting with dental problems, pain is a major source of anxiety, and it's a major issue for dentists. The specific cultural, personal, and financial background of patients all have a significant impact on how they perceive pain. According to previously reported statistics, root canal therapy and pulp therapy cause more common postoperative soreness than any other dental surgical procedures. Pain after completion of endodontic therapy is the discomfort that might occasionally occur after endodontic therapy. Any pain experienced following the start of root canal therapy may also be referred to as post-operative discomfort. Flare ups, a true complication, start within just few hours or days following the root canal operation and are severe enough to necessitate an urgent appointment for treatment.[2,3]The documented frequencies of post-endodontic discomfort in the literature vary from 1.5 percent to 53 percent. The occurrence of post-operative pain varies; some research find high incidences while others indicate low rates. 82.9 percent is a relatively high occurrence rate for post-obturation soreness, according to reports. Large variations in prevalence rate can be due to sample size variances, different techniques, and ethnic as well as cultural variables. Previous research has looked at the prevalence of postoperative pain following single visit treatments.[4,5]Few research have examined the many factors that contribute to post-operative discomfort after endodontic treatment in important teeth, although the sample sizes in some of these studies appear to be modest.[6,7] Since there is a dearth of research on the factors influencing the magnitude and time duration of pain after completion of obturation this experimental investigation aims to fill that gap.

Methods and Materials

The study was conducted and completed in the department of conservative dentistry and department of orthodontics. In order to conduct this study, 371 individuals who need root canal therapy were included. Care was taken to select the teeth those corrected by orthodontic treatment for their malocclusion. Patients were firstly sent to department of orthodontics for the correction of alignment then treated by root canal therapy in conservative department. The criteria, encompassing preoperative as well as intraoperative factors that may lead to pain after completion of procedure, were examined using a standardized questionnaire. The study's doctors who carried out the root canal treatments received training on how to document patient-centric and intraoperative data.

Inclusion Criteria

1. Permanent teeth with obvious malocclusion which necessitate orthodontic correction.
2. Treatment of a single tooth with good periodontal condition and completion of treatment were the inclusion criteria.

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3. The teeth with vital pulp and the diagnosis of symptomatic or asymptomatic irreversible pulpitis are an indication.

Exclusion Criteria

1. Teeth with purulent discharge or necrotic pulp
2. Patients using opioids and corticosteroids
3. Pregnant females
4. Different types of canals, such as curved and calcified canals
5. Teeth that cannot be restored

Evaluation of pulp status & radiographic presentation was done very carefully. By subjecting a tooth to a cold stimulation using Endo frost from Germany and evoking hemorrhage during cavity preparation, the vitality condition of a tooth was ascertained. Using an RVG imaging machine, a digital radiograph was taken to evaluate the teeth. The periapical state of the tooth was evaluated using the Ostravikperiapical index. Determination of preoperative pain & pre-op medication intake was done. Pre-operative pain was defined as the pain that was evaluated if the patient complained of pain or discomfort in the affected tooth 24 hours before treatment and that time period was recorded. The pain experienced in the affected tooth within 24 hours before the root canal therapy was recorded as immediate pre-operative pain. The length of the suffering was also noted. Additionally, patients were asked if they had taken any medications within the previous 24 hours of the root canal surgery. Various parameters included in the study. Preoperative factors, intra-operative variables, and postoperative variables were used to examine the study's parameters. (Table 1)Unaware of the study's specifics, an investigator called the patients and questioned about their level of discomfort after 24 and 48 hours. Patients who returned for a change in restoration or crown preparation on the seventh and fifty-first days, respectively, were clinically evaluated for pain kind, intensity, and stimulation, as well as a periapical evaluation.Post-obturation pain was rated on a Likert scale from 0 to 4 in this study. The study's pain values were as follows: Zero-no pain 1-masticational pain that is mild and self-relieving,2-Medicine-relieved moderate chronic discomfort on mastication, 3-spontaneous persistent pain that doesn't respond to treatment, necessitates stronger medication. 4-extremely painful, unresponsive to medicine, and requiring assistance

Table1: Parameters used in the research

Pre Operative Variables	Intra Operative Variables	Post Operative Variables
Age	Hot tooth	Post operative pain
Gender	Mishaps	Post pain assessment (After 24 Hrs, 48 Hrs, 7 days, 15 days)
Pre operative medication	Types of mishaps	
Immediate preoperative pain (Status, Value, Duration)	Apical enlargement file size	
Preoperative pain (Presence, Value)		
Type of tooth		
Main masticatory tooth		

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Statistical Analysis and Results

Statistical Analysis was done by using the software SPSS version 22.0, chi square tests were used to analyze the samples.In this study 27.43% of study participants had post obturation pain .It was found in our study that 241 study participants had no pain after twenty four hours of completion of obturation process. Seventy seven study participants had mild pain, twenty six had moderate pain, 4 had severe while 23 had very severe pain after twenty hours of procedure. 291 study participants had no pain after forty eight hours of completion of obturation process. 69 study participants had mild pain, 8 had moderate pain, 3 had severe while no one had very severe pain after forty eight hours of procedure.349 study participants had no pain after seven days of completion of obturation process.16 study participants had mild pain, 4 had moderate pain, 1 had severe while 1 one had very severe pain after seven days of procedure.364 study participants had no pain after fifteen days of completion of obturation process.4 study participants had mild pain, 1 had moderate pain, 1 had severe while 1 one had very severe pain after fifteen days of procedure. (Table 2)81 study participants had pain just immediately before the start of procedure. 81 participants had intra operative pain while thirty study participants had mishaps during the endodontic treatment. When there was analysis of impact of different parameters on incidence of pain after completion of root canal therapy in vital teeth then it was observed that parameters like status of immediate pre operative pain, intra-operative pain and mishaps during the endodontic treatment were significantly associated with the incidence of pain post operatively. (Table 3,4)

Table 2: Details of post operative variables

S.No	Variable evaluated	Sub-Categories	Total
1	Post operative pain value after twenty four hours of procedure	No pain situation	241
		Mild pain situation	77
		Moderate pain situation	26
		Severe pain situation	4
		Very severe pain situation	23
2	Past operative pain value after forty eight hours ofprocedures	No pain situation	291
		Mild pain situation	69
		Moderate pain situation	8
		Severe pain situation	3
		Very severe pain situation	0
3	Past operative pain value after seven days of procedure	No pain	349
		Mild pain	16
		Moderate pain	4
		Severe pain	1
		Very severe pain	1
4.	Past operative pain value after 15day of	No pain	364

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	procedure	Mild pain	4
		Moderate pain	1
		Severe pain	1
		Very severe pain	1

Table 3: Details of different parameters suspected of post operative pain

Variables evaluated	Sub-Categories	Incidence of pain	Incidence of pain
		Yes	No
Age in years	15-20 years	8	20
	21-30 years	37	80
	31-40 years	29	64
	41-50 years	25	45
	51-60 years	8	24
	61-70 years	4	9
Gender	Male	44	97
	Female	64	140
Immediate pre op pain status	-	43	161
Immediate pre op Pain value	No pain	44	161
	Mild	33	37
	Moderate	25	29
	Severe	4	7
	Very severe	5	3
Immediate pre op	No pain	47	167
	Less than 1 week	41	47
	< 1 week	10	12
	<10 days	8	9
	<1 Month	6	12
Pre op pain presence	-	81	131
Pre op pain value	No pain	31	111
	Mild pain	37	77
	Moderate pain	33	47
	Severe pain	5	6
	Very severe pain	7	5
Tooth type	Upper anterior	14	37
	Lower anterior	2	17
	Upper premolar	15	38
	Lower premolar	8	27
	Upper molar	26	39
	Lower molar	51	91

Intra operative pain	-	81	291
Mishaps	WL beyond apex	5	3
	Master cone beyond apex	3	12
	Obt short of WL	4	1
	Obturation beyond WL	4	2
	Instrument fracture	4	9
	Ledge	1	3

Table 4: Impact of the study variables on post operative pain incidence

S.No	Variable	Pearson Chi Square Test		
		Value	DF	Significance
1	Age criteria	4.80037	7	0.81493
2	Gender criteria	0.17236	2	0.91563
3	Pre Operative Medication criteria	2.17147	2	0.41412
4	Immediate Pre Operative Pain Status criteria	37.52433	2	0.00111*
5	Immediate Pre Op Pain Value criteria	38.06073	2	0.02002*
6.	Immediate Pre Op Pain Duration criteria	31.68335	2	0.00602*
7	Pre Operative Pain Value criteria	29.65571	3	0.02331*
8	Pre Op Pain Presence criteria	10.73922	1	0.01331*
9	Tooth Type criteria	8.72672	5	0.28984
10	Main Masticatory tooth criteria	2.22277	2	0.30259
11	Intra Operative Pain criteria	33.87230	1	0.00422*
12	Mishaps criteria	3.37743	1	0.00157
13	Types Of Mishaps criteria	31.22742	6	0.07441
				***p<0.05 significant**

Discussion

Thousands of root canal procedures have been carried out all over the world. Although this endodontic procedure has various downsides, the possibility of pain following therapy completion is the most important one. Patients and medical professionals dislike the pain that comes after surgery for endodontic treatments. Knowing the frequency of post-endodontic pain, the factors that may be contributing to it and the treatments available can help the doctor gain the patients' trust.Pain is a significant source of worry for people who appear with dental problems, and it is a significant challenge for dentists. Patients' individual cultural, social, and economical backgrounds all have a big impact on how they experience pain.[8]Statistics have shown that compared to other dental surgical treatments, root canal therapy and pulp therapy result in

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the most frequent postoperative discomfort. Pain upon endodontic therapy completion is the discomfort that could sporadically develop following endodontic therapy. Post-operative discomfort can also apply to any pain felt after beginning root canal therapy. True complications, flare ups, begin within a few hours or days of the root canal procedure and are severe enough to require an immediate appointment for treatment.[9]In our study when there was analysis of impact of different parameters on incidence of pain after completion of root canal therapy in vital teeth then it was observed that parameters like status of immediate pre operative pain , intraoperative pain and mishaps during the endodontic treatment were significantly associated with the incidence of pain post operatively. In this study 27.43% of study participants had post obturation pain. The literature reports a range of documented post-endodontic pain frequencies, from 1.5 percent to 53 percent. Post-operative pain is not always common; some studies show high incidences while others show low rates. According to statistics, the prevalence of post-obturation discomfort is 82.9 percent. Discrepancies in sample sizes, methods, and ethnic and cultural factors can all cause significant variations in prevalence rates. The prevalence of postoperative pain following one visit treatments has been examined in earlier studies.[10,11]Even though the sample sizes in some of these studies seem to be minor, little study has been done to evaluate the several factors that contribute to post-operative discomfort following endodontic treatment in vital teeth.[12-14]

Conclusion

It can be concluded from the findings of this study that there are several important factors affecting post obturation pain among which status of immediate pre operative pain, intra-operative pain and mishaps during the endodontic treatment were significantly associated with the incidence of pain post operatively. Findings also highlight the relative importance of the multidisciplinary approach in successfully managing the teeth. Orthodontic correction followed by endodontic therapy revealed excellent results in the studied teeth.

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