

Prevalence of Awareness among Dental Interns Regarding Endodontic Flare-Ups and its Management

Lama Adwan, BDS^{1*}, Sarah AlHazmi, BDS², Thani Alsharari³, BDS, MS, MSc, CAGS, Ayman Mandorah, BDS, MSc⁴

¹General Dentistry, Jeddah, KSA

²General Dentistry at National Guard Hospital, Madina, KSA

³Assistant Professor, Restorative and Dental Materials Department, Faculty of Dentistry, Taif University

⁴Assistant Professor, Restorative and Dental Materials Department, Faculty of Dentistry, Taif University

DOI: [10.36348/sjodr.2021.v06i10.006](https://doi.org/10.36348/sjodr.2021.v06i10.006)

| Received: 29.08.2021 | Accepted: 06.10.2021 | Published: 21.10.2021

*Corresponding author: Lama Adwan, BDS

Abstract

Aims and Objectives: The aim of the study was to evaluate the prevalence of awareness among dental interns regarding endodontic flare ups and its management. This cross-sectional survey was targeting the 2017-2018 patch of dental interns in all the dental colleges around the western region of Saudi Arabia which include: Ibn Sina national college, King Abdulaziz University, Al-Farabi and Al-Bateerjee colleges in Jeddah, also Um Al Qura University in Makah and Taibah University in Al Madina. **Methods:** A total of 294 participants in this cross-sectional survey divided into two parts 16 closed-ended questions in which first part of the questionnaire assessed the demographic profile of the Interns such as age, gender, and the Institution they belong to. The second part consisted of 12 multiple-choice questions to investigate their knowledge and awareness about endodontic flare up and its management. The study targeting the 2017-2018 patch of dental interns in all the dental colleges around the western region of Saudi Arabia. Relationship between these factors and are-ups was examined. Statistical analysis was done using Pearson Chi-square test and Fisher's exact test. **Results:** majority of the students having the higher incidence of flare-ups with Necrotic pulp [52%] while [41.5%] student participants, the best choice of treatment for cases of severe inter-appointment pain is re-instrumentation, occlusal reduction, antibiotics, and analgesics. **Conclusions:** Flare-ups develops due to many factors, which are directly interdependent and interrelated. Incorrectly measured working length of the root canal is a mechanical factor causing the damaging effect of the chemical and microbial factors to the apical periodontal tissue. Development of the flare-up after the endodontic treatment procedures is also influenced by demographics, general health, clinical symptoms, condition of the pulp and apical periodontal tissue, tooth being treated, number of visits during the treatment and intracanal medicaments. Women compared to men are more prone to are-ups.

Keywords: Endodontic treatment, flare-up, Prevalence, pain, risk factors.

Copyright © 2021 The Author(s): This is an open-access article distributed under the terms of the Creative Commons Attribution 4.0 International License (CC BY-NC 4.0) which permits unrestricted use, distribution, and reproduction in any medium for non-commercial use provided the original author and source are credited.

INTRODUCTION

Despite meticulous biomechanical preparation (shaping, cleaning, and disinfecting) of the root canal, providing conditions for the periradicular tissues to heal, and hermetically sealing it, some patients may experience outbreaks of endodontic disease. In the area of the endodontically treated tooth, a flare-up is defined as pain and swelling in the surrounding soft tissues and oral mucosa following a root canal treatment. When a patient experiences clinical symptoms, such as pain upon biting or spontaneous pain, and visits a health care institution sooner than scheduled. Occasionally, root canal treatment can cause flare-ups, which are characterized by acute exacerbations of asymptomatic

pulpal or periradicular swelling [1]. Root canal treatment can cause mild pain, even if performed appropriately. The patient should expect this to occur, even if the procedure is performed according to clinical standards. In addition to gender, age, presence of preoperative pain, treatment protocol, pulp diagnosis, root canal irritants, number of appointments, inter-appointment medications, apical debris, and preservation of apical patency, there are other factors [2]. The possibility of flare-ups is also higher among teeth that have been endodontically treated [3]. A flare-up between appointments, however, is an unusual occurrence. Both patients and dentists experience agony and need urgent dental care [4]. Postoperative pain after

root canal treatment is commonly caused by inadequate instrumentation, extrusion of irrigation solutions, extrusion of intracanal dressing, trauma, missed canals, preoperative pain, periapical pathology, and extrusion of apical debris [5]. Endodontic flare-up rates range from 14% to 16% [6]. Some research suggests they can be as high as 50% [2]. Research findings vary with different research types (retrospective and prospective), as well as the differences in methodology, time of pulp and apical periodontitis diagnosis, and moment the pain was recorded, as well as the clinical experience and methods of the dentist [7].

MATERIALS AND METHODS

This cross-sectional survey was targeting the 2017-2018 patch of dental interns in all the dental colleges around the western region of Saudi Arabia which include: Ibn Sina national college, King

abdulAziz university, Al-farabi and Al-Batarji colleges in Jeddah, also Um Al Qura university in Makkah and Taibah university in Al Madina .This questionnaire composes of 16 closed-ended questions in which first part of the questionnaire assessed the demographic profile of the Interns such as age, gender, and the Institution they belong to. The second part consisted of 12 multiple-choice questions to investigate their knowledge and awareness about endodontic flare up and it's management. This study was approved by the Ibn Sina College Ethical Review Board.

A pilot study was performed on a random sample of the students (n = 20), and the questionnaire was modified according to the feedback obtained.

Data from 294 dental interns were collected and analyzed using SPSS.

Kingdom of Saudi Arabia
Ibn Sina National College
O.N. 4030144057
P.O. Box 31206 Jeddah 21418
Protocol identification number
0020P23062017

المملكة العربية السعودية
كلية ابن سينا الطبية - جدة
ص.ب. 31206
جدة 21418
Human ethics approval
H05-10062017

Institutions' Name: _____ Interns' Gender: _____
Age: _____ E-mail address: _____

Prevalence of awareness among dental interns regarding endodontic flare ups and its management.

Q1. What is the Definition of Dental Flare-Up?
A. An emergency case caused by a vital inflamed pulp is incapable of healing.
B. An Acute exacerbation of an asymptomatic pulp(s) and/or periapical pathology after initiation or continuation of RCT.
C. I don't know

Q2. How many cases diagnosed as Flare-up you faced in a year?
A. Less than 5
B. More than 5
C. More than 10

Q3. Most flare-up's you faced in your clinic occur when?
A. After First Visit
B. Between visits
C. After treatment
D. I don't know

Q4. What are the causes for a Flare-up?
A. Mechanical
B. Chemical
C. All the above
D. I don't know

Q5. Which gender has higher incidence of flare-up?
A. Male
B. Female
C. I don't know

Q6. Does it have significant positive correlation with patient's Age?
A. Yes
B. No
C. I don't know

Q7. Does the tooth Location effect on the prevalence of incidence?
A. Yes
B. No
C. I don't know

Q8. In which cases have a higher incidence of Flare-up?
A. Vital pulp
B. Necrotic pulp
C. Restored tooth
D. I don't know

Q9 - Q10. What is the best treatment choice for cases with severe inter-appointment pain?
A. re-instrumentation
B. irrigation reduction
C. prescribe antibiotics and analgesic
D. All the above
E. I don't know

Q10. Does prevalence incidence of flare-up Relate to any systemic Disease?
A. Yes
B. No
C. I don't know

Q11. What is the best treatment choice for cases with severe pain and swelling immediately after RCT?
A. irrigation reduction
B. prescribe antibiotics and analgesic, incision and drainage
C. Considered as a failure, retreatment has to be done
D. All the above
E. A and B
F. I don't know

Q12. What is your clinical management to prevent flare up in necrotic pulp cases?
A. Finish RCT in one visit
B. Finish cleaning and shaping in one visit
C. I don't know

The questionnaire sheet sample distributed among interns

DATA MANAGEMENT

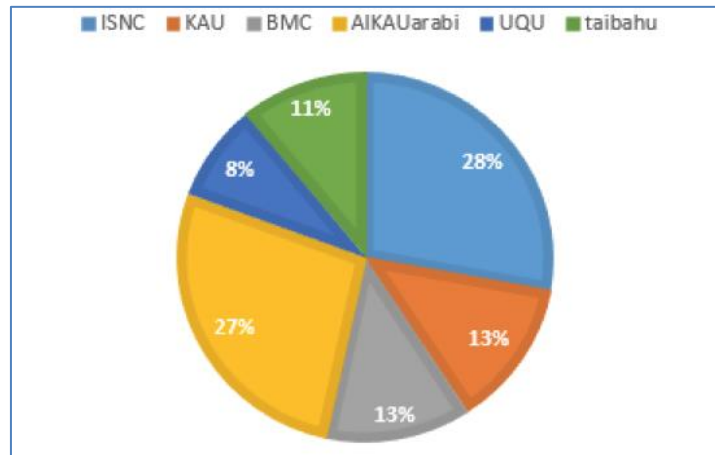
RESULTS

The survey to study the prevalence of awareness among the Dental Interns regarding the

Endodontic Flare ups and its management was completed by 294 participants. Among all the 294 dental interns, majority [82] of them were from ISNC, followed by 80 from Alfarabi Universities.

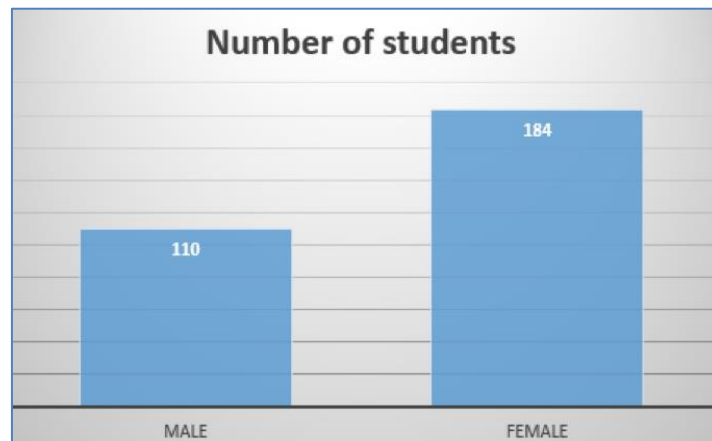
Table-1: Showing the number of students in each university

University	Number of participants of students
ISNC	82
KAU	38
BMC	37
Alfarabi	80
UQU	25
Taibahu	32



Pie-diagram showing the University of All the Student Participants

Among the 294 dental interns, 184 [65.5%] were females and 110 [37.4%] participants were males.



Graph showing the gender ratio of the student participants

Most of the student participants, that is, about 125 [42.5%] were of the age group of 25 years.

Table-2: showing the prevalence of the student participants about the dental flare-ups

Q. No	Question	Yes	No	I don't Know
Q. 6	Does it have significant positive correlation with patient's Age	101	120	73
Q. 7	Does the tooth Location effect on the prevalence of incidence?	121	108	65
Q. 10	Does prevalence incidence of flare-up Relate to any systemic Disease?	90	123	81

Graphs showing the prevalence of the student participants about the dental flare-ups According to the majority of the student participants, about 120 [41%] feels that Dental Flare-up has NO significant positive correlation with patient's age, around 121 [41.2%] fees

that tooth location effects on the prevalence of incidence and about 123 [42%] of the students say that they don't know about the prevalence incidence of flare-up relates to any systemic disease.

Table-3: Showing the Causes of Dental Flare-ups.

<i>Causes of flare-ups</i>	<i>Total number of participants</i>	<i>Percentage</i>	<i>P value</i>
<i>Mechanical</i>	50	17%	0.001
<i>Chemical</i>	8	2.8%	
<i>All the above</i>	219	74.5%	
<i>I don't know</i>	17	5.7	

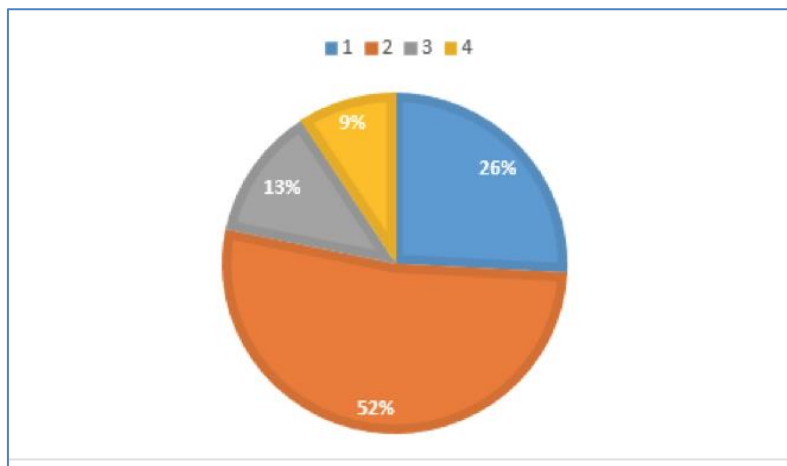
P<0.001 highly statistically significant using Chi-square test

About 219 [74.5%] student participants during this survey to determine the causes of Dental Flare-ups

feels that it is caused by Mechanical and Chemical factors.

Table-4: Showing the cases with higher incidence of Dental Flare-ups

<i>Cases with higher incidence of flare-ups</i>	<i>Total number of participants</i>	<i>Percentage</i>	<i>P value</i>
<i>Vital Pulp</i>	76	26%	0.001
<i>Necrotic Pulp</i>	154	52%	
<i>Retreated Pulp</i>	37	13%	
<i>I don't know</i>	27	9%	

**Pie-Diagram showing the percentage of cases with higher incidence of Dental Flare-ups**

The student participants around 154 [52%], feels that Necrotic pulp cases are with higher incidence of Dental Flare-Ups.

According to 122 [41.5%] student participants, the best choice of treatment for cases of severe inter-appointment pain is re-instrumentation, occlusal reduction, antibiotics, and analgesics.

Table-5: Showing the best choice of treatment for severe inter-appointment pain

<i>Best treatment chosen for cases with severe inter-appointment pain?</i>	<i>Total number of participants</i>	<i>Percentage</i>	<i>P value</i>
<i>Re-instrumentation</i>	77	26%	0.001
<i>Occlusal reduction</i>	47	16%	
<i>Prescribe antibiotics and analgesic</i>	35	12%	
<i>All the above</i>	122	41.5%	
<i>I don't know</i>	13	4.5%	

Majority of the students around 108 [36.7%] feels that the best choice of treatment for cases with severe pain and swelling immediately after the root

canal treatment is both occlusal reduction and prescribing antibiotics and analgesic, incision and drainage.

Table-6: Showing the best choice of treatment for severe pain and swelling immediately after RCT

<i>Best treatment chosen for cases with severe pain and swelling immediately after RCT?</i>	<i>Total number of participants</i>	<i>Percentage</i>	<i>P value</i>
<i>Occlusal reduction</i>	25	8.5%	0.001
<i>prescribe antibiotics and analgesic, incision and drainage</i>	57	19.4%	
<i>Considered as a failure, retreatment has to be done</i>	37	12.6%	
<i>Al the above</i>	41	14%	
<i>A and B</i>	108	36.7%	
<i>I don't know</i>	26	8.8%	

Table-7: Showing the clinical management followed to prevent flare-up in necrotic pulp cases

<i>Clinical management to prevent flare up in necrotic pulp cases?</i>	<i>Total number of participants</i>	<i>Percentage</i>	<i>P value</i>
<i>Finish RCT in one visit</i>	103	35%	0.001
<i>Finish cleaning and shaping in one visit</i>	168	57.1%	
<i>I don't know</i>	23	7.9%	

Among the student participants, majority of the students 168 [57.1%] feels that the clinical management that they perform to prevent flare up in necrotic pulp cases is finish cleaning and shaping in one visit.

DISCUSSION

Dentists provide 15 million root canal therapies annually, making endodontic treatments extremely common. Flare-ups, therefore, are a major source of pain, suffering, and increased medical costs. However, several factors have been considered, including over-instrumentation, inadequate instrumentation, oxidation-reduction potential, apical extrusion of microorganisms, and immunological and psychological factors, individually or in combination.

Recently, competency-based education has replaced the traditional dental education methodology in most dental education programs. This approach focuses on developing a student's understanding, skills, and values essential to begin independent practice of dentistry. The faculty prepares the dental students for pre-clinical and clinical courses by teaching them simple and uncomplicated treatments. Procedural accidents are often discussed in terms of how frequently they occur, their causes, and their prognosis. There have been no studies examining dentists' or dental students' knowledge of dental accidents [12]. However, because of the difference in study designs, it may not be possible to compare results of the present study with others, although other comparable studies have observed dental students delivering exemplary root canal treatment. Increasing the amount of practical teaching and workshops will increase students' familiarity with this field [12]. It is uncertain what the average occurrence of endodontic flare-ups is due to the lack of consistency in articles reporting them. A meta-analysis, however, has found that flare-ups are 84% common [14]. In addition, previously reported rates of flare-up ranged from 1.3 to 20% [15, 16, 5, 17-22].

Dentists believe that 41% of the dental interns believe there is a prevalence of flare-up effects at that tooth location. The rate of flare-ups caused by Mechanical and Chemical factors $P < 0.001$ is highly statistically significant by Chi-Square test. Students with Necrotic pulp cases are more likely to have flare-ups (52%), and serious inter-appointment pain (re-instrumentation, occlusal reduction, antibiotics, and analgesics) are more likely to be treated (41.5%).

CONCLUSION

After endodontic treatment, flare-ups are common. Several factors interrelate directly and are directly interdependent in terms of how it develops. The study of other dental schools would vastly improve our ability to determine whether or not we have been adequately trained in endodontics [11]. Overall, Interns are fairly knowledgeable about this topic, whereas those who struggled were the ones who didn't apply it in their practice time.

Ethical Considerations

Compliance with ethical standards

Ethical approval: This proposal contains studies with human participants performed by any of the authors. This study was approved by the University of Taif Ethical Review Board.

Conflict of interest: The authors do not have any commercial associations that might pose or create a conflict of interest with information presented in this communication. No intramural or extramural funding supported any aspect of this work

The role and responsibilities of the persons involved in the study. To do multi step systematic search on the web based literature about the post-operative complications of rhinoplasty reported in various articles using Medline, PubMed Central database.

Lama Adwan, Sarah AlHazmi

1. Data collection
2. Data analysis
3. Writing the manuscript and the proposal

Ayman Mandorah, Thani Alsharari

1. Reviewing the proposal and the manuscript
2. Finalizing the research into the last version

REFERENCES

1. Sipavičiūtė, E., & Manelienė, R. (2014). Pain and flare-up after endodontic treatment procedures. *Stomatologija*, 16(1), 25-30.
2. de Oliveira Alves, V. (2010). Endodontic flare-ups: a prospective study. *Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology, and Endodontology*, 110(5), e68-e72.
3. Azim, A. A., Azim, K. A., & Abbott, P. V. (2017). Prevalence of inter-appointment endodontic flare-ups and host-related factors. *Clinical oral investigations*, 21(3), 889-894.
4. Akbar, I. (2015). Efficacy of prophylactic use of antibiotics to avoid flare up during root canal treatment of nonvital teeth: A randomized clinical trial. *Journal of clinical and diagnostic research: JCDR*, 9(3), ZC08.
5. Seltzer, S., & Naidorf, I. J. (1985). Flare-ups in endodontics: II. Therapeutic measures. *Journal of endodontics*, 11(12), 559-567.
6. Siqueira Jr, J. F., & Barnett, F. J. E. T. (2004). Interappointment pain: mechanisms, diagnosis, and treatment. *Endodontic Topics*, 7(1), 93-109.
7. Arias, A., de la Macorra, J. C., Hidalgo, J. J., & Azabal, M. (2013). Predictive models of pain following root canal treatment: a prospective clinical study. *International endodontic journal*, 46(8), 784-793.
8. Siqueira Jr, J. F. (2002). Endodontic infections: concepts, paradigms, and perspectives. *Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology, and Endodontology*, 94(3), 281-293.
9. Orstavik, D. (Ed.). (2020). *Essential endodontology: prevention and treatment of apical periodontitis*. John Wiley & Sons.
10. Khan, S., & Hargreaves, K. M. (2012). Pharmacologic control of dental pain. *Seltzer and Bender's Dental Pulp*, 2, 185-204.
11. Tanalp, J., Güven, E. P., & Oktay, I. (2013). Evaluation of dental students' perception and self-confidence levels regarding endodontic treatment. *European journal of dentistry*, 7(02), 218-224.
12. Kashefi Nejad, M., Ehsani, M., & Abdollahi Kalorazi, H. (2016). Evaluation of dental students' awareness of endodontic procedural accidents in Babol University of Medical Sciences in 2013-2014. *Journal of Dental Materials and Techniques*, 5(3), 131-137.
13. Motamedi, M. R. K., Davoodi, S. H. R., Saeidi, A., Barekatin, B., Noormohammadi, H., & Razavian, H. (2015). Technical quality of root canal therapies performed by novice dental students in preclinical practice. *Dental research journal*, 12(4), 365.
14. Tsesis, I., Faivishevsky, V., Fuss, Z., & Zukerman, O. (2008). Flare-ups after endodontic treatment: a meta-analysis of literature. *Journal of Endodontics*, 34(10), 1177-1181.
15. Abbott, A. A., Koren, L. Z., Morse, D. R., Sinai, I. H., Doo, R. S., & Furst, M. L. (1988). A prospective randomized trial on efficacy of antibiotic prophylaxis in asymptomatic teeth with pulpal necrosis and associated periapical pathosis. *Oral Surgery, Oral Medicine, Oral Pathology*, 66(6), 722-733.
16. Torabinejad, M., Kettering, J. D., McGraw, J. C., Cummings, R. R., Dwyer, T. G., & Tobias, T. S. (1988). Factors associated with endodontic interappointment emergencies of teeth with necrotic pulps. *Journal of Endodontics*, 14(5), 261-266.
17. Barnett, F. (1989). The incidence of flare-ups, following endodontic treatment. *J Dent Res*, 68, 1253.
18. Morse, D. R., Furst, M. L., Lefkowitz, R. D., D'Angelo, D., & Esposito, J. V. (1990). A comparison of erythromycin and cefadroxil in the prevention of flare-ups from asymptomatic teeth with pulpal necrosis and associated periapical pathosis. *Oral surgery, oral medicine, oral pathology*, 69(5), 619-630.
19. Trope, M. (1990). Relationship of intracanal medicaments to endodontic flare-ups. *Dental Traumatology*, 6(5), 226-229.
20. Rimmer, A. (1991). Intracanal medications and antibiotics in the control of interappointment flare-ups. *Quintessence International*, 22(12).
21. Eleazer, P. D., & Eleazer, K. R. (1998). Flare-up rate in pulpally necrotic molars in one-visit versus two-visit endodontic treatment. *Journal of endodontics*, 24(9), 614-616.
22. Seltzer, S., & Naidorf, I. J. (1985). Flare-ups in endodontics: I. Etiological factors. *Journal of Endodontics*, 11(11), 472-478.