

Original Research Article

Post obturation analgesia in patients recently vaccinated against Covid-19, after Root canal treatment: a short observational study.

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ABSTRACT

Aim: The aim of this study was to evaluate the need for analgesia in patients undergoing single-visit root canal treatment, within 2 days after COVID-19 immunisation.

Method: Two days after receiving the COVID-19 vaccination, 50 patients undergoing Single visit root canal treatments for acute pulpitis in molar teeth were divided into two groups of 25 each (Group M for males and Group F for females). Each patient was given a prescription for 650 mg of acetaminophen (Dolo 650 mg) tablets to be taken eight hours a day, with instructions to use the same only if needed for pain. They were instructed to keep a record of the number of tablets consumed as per record sheet 1, and if the pain did not subside then a stronger analgesic, Ketorolac DT 10 mg twice a day, had to be taken and recorded.

Results: In Group M, the mean number of analgesic tablets required was 0.44 ± 0.64 and in Group F, the mean number of analgesic tablets required was 0.80 ± 1.09 . Although the mean analgesic requirement was higher in females as compared to males, the difference of 0.80 ± 1.09 between the two groups was not significant statistically (0.360).

Conclusion: Within the limitations of this study, it is concluded that acetaminophen is effective in relieving post-obturation pain after a single-visit RCT in patients recently vaccinated against the CoVid-19.

KEYWORDS: NSAIDs, Acetaminophen, Root Canal Treatment, COVID-19 Vaccination

INTRODUCTION

The majority of the COVID-19 vaccine trials allowed participants to treat post-vaccination side effects like fever, malaise, and fatigue with analgesics and antipyretics.¹ The impact of analgesics or antipyretic drugs on immunogenicity is still unknown.¹ Although the clinical significance of prophylactic acetaminophen use on antibody levels is unknown, some data suggest that therapeutic acetaminophen use may be preferred over prophylactic use to avoid any potential impact on immunogenicity.¹

Acute endodontic pain can aggravate the situation.²

The reduction of chemical inflammatory mediators that activate or sensitise peripheral nociceptors and the subsequent events involved in pain perception is the main justification for the pharmacological management of post-endodontic pain.² Management of this pain depends on numerous factors involving the use of endodontic therapy and pharmacological medication to reduce hyperalgesia.³

In the pandemic era, non-surgical root canal therapy and fewer clinical visits have gained popularity.⁴ Singh A. et al. (2020) came to the conclusion that, compared to multiple-visit RCT, single-visit root canal therapy has significantly less post-obturation pain.⁵ The fact that there was less instrumentation and immediate obturation in the single-visit group may be responsible for the lower incidence of pain.⁵ Also, the complete removal of the infected tissue and inflammation using irrigation and following the principals of instrumentation during endodontic therapy can minimise the use of post-endodontic analgesia.⁶

Commonly used analgesics for post-obturation pain belong to the NSAID group (Ibuprofen, diclofenac, piroxicam, etc.). Nonsteroidal anti-inflammatory drugs are said to interfere with the vaccine's immunity booster effect and lower antibody and proinflammatory cytokine responses to a Coronavirus infection.⁷ COX-1 and COX-2 inhibition, as well as prostaglandin reduction, reduce fever and other symptoms of COVID-19 infections, modulating vaccine efficacy.⁸ Acetaminophens are prescribed at vaccination centres to be taken if pain or fever occurs after the vaccine and are said to be safer than vaccines in terms of boosting immunity.⁹

As a result, this article is concerned with the observations regarding the need for post-endodontic analgesia in COVID-19 vaccinated individuals within 2 days before commencing single-visit endodontic therapy.

METHODOLOGY:

Patient selection:

This study was conducted in 2021. The regular patients visiting a private clinic within 2 days after a COVID-19 vaccination were screened for acute endodontic pain, and those requiring root canal treatment were chosen for this observational study. Following ethics, written and oral consent was taken regarding the vaccination and study from the patients.

The sample size was estimated with a 95% confidence level, and the patient allocation was done by the receptionist in two groups: Group M for male patients and Group F for female patients. 50 patients in the 30- to 50-year age range who met the inclusion and exclusion criteria listed in Table 1 were randomly assigned to one of two groups based on gender: 25 males in Group M and 25 females in Groups. Medicine records were taken, and interpretations were noted by the intern.

Table 1: Inclusion and exclusion criteria

INCLUSION CRITERIA	<ol style="list-style-type: none"> 1. Patient vaccinated against covid-19(at least first dose) before RCT (within 2 days) 2. Symptomatic molar teeth posted for RCT 3. Molar teeth with no periapical involvement.
EXCLUSION CRITERIA	<ol style="list-style-type: none"> 1. Patients taking medicines for other systemic disorders and periapical involvement. 2. Patients unvaccinated against covid-19 3. Third molar teeth 4. Patients under 30 years of age. 5. Pregnant women and Mentally challenged patients

Procedure for a single visit root canal:

1. Taking the patient's history and obtaining consent regarding the patient's COVID-19 vaccination status
2. Barrier technique was recommended for the operators as well as the chairside assistants, including double masking, a face shield, and necessary aerosol management of the working area.¹⁰
3. Chohexidine mouthwash rinses are prescribed for patients preoperatively¹¹.
4. Xylocaine anaesthesia and rubber dam isolation
5. Ideal access preparation, pulp extirpation, and straight-line glide path with the help of K files no. 6–15
6. Working length determination with radiographs and an apex locator
7. Biomechanical preparation, initially using K files (Mani) No. 15–30 and then with Rotary files and Endomotor.
8. 17% EDTA was used as file lubricant, and each file use was followed by irrigation with normal saline and a 3% NaOCl solution.
9. Obturation was done on the same day using gutta-percha and resin-based AH Plus sealer, and access was sealed with temporary restoration for a week.

Medication Record:

Each patient was given a prescribed amount of acetaminophen (Dolo 650 mg) to be taken in the event of pain every eight hours, with the instruction to only use it for pain. They were instructed to keep a record of the number of tablets consumed as per record sheet 1, and if the pain did not subside then a stronger analgesic, Ketorolac DT 10 mg twice a day, had to be taken and recorded.

Clinicians were trained to use the record sheet, and telephonic reminders were used to remind patients to fill out the record sheets. Follow-ups were scheduled one week later, and the vertical percussion test was used to confirm the final pain assessment.

Statistical Evaluation: The statistical evaluation of analgesics used in groups M and F was done by a student's t-test. The statistical analysis was done using SPSS (Statistical Package for Social Sciences) Version 20.0 statistical analysis software.

RESULTS:

In group M, a total of 16 (64%) patients did not require analgesics, compared to 13 (52%) in group F. In group M, a total of 7 (28% of the cases) required only 1 tablet and 2 (8%) required 2 tablets. None of the patients required more than two tablets. The mean number of analgesic tablets required was 0.44–0.64. In group F, a total of 13 (52%) patients required only 1 tablet, 7 (28%) patients

required 2 tablets, and 1 (4%) patient each required 3 and 4 tablets. The mean number of analgesic tablets required was between 0.80 and 1.09. Although Group F had a higher mean analgesic requirement than Group M, the difference between the two groups was not statistically significant ($p = 0.360$).

Form 1: Medication record

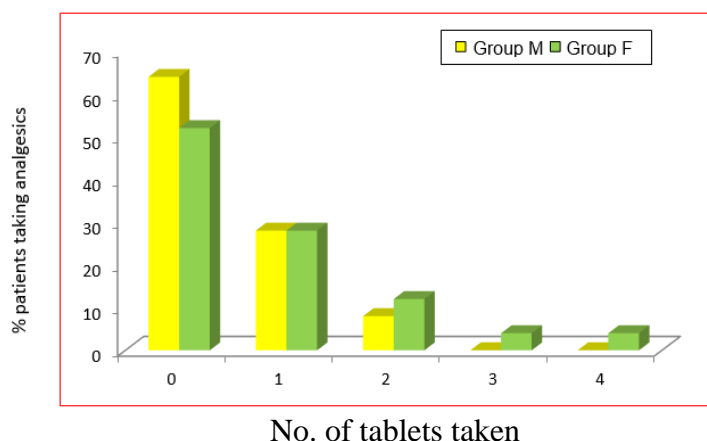
MEDICATION TAKEN				
Name..... Age..... Sex.....				
Are you vaccinated against COVID-19?(yes/no).....				
DATE	ANALGESIC	ANTIBIOTIC	TIME	NO. OF TABLETS TAKEN

SIGNATURE OF SUPERVISOR
SIGNATURE OF OPERATOR

Table 2: Statistical evaluation of Analgesic use in Group M and Group F

SN	Number of tablets	Group M(n=25)		group F (n=25)	
		No.	%	No.	%
1.	0	16	64	13	52
2.	1	7	28	7	28
3.	2	2	8	3	12
4.	3	0	0	1	4
5.	4	0	0	1	4
Mean Number of Tablets±SD		0.44±0.64		0.80±1.09	

$t=1.427$; $p=0.360$

Bar diagram 1**Bar diagram 1:** Comparison of Analgesic use in group M and sub group F**DISCUSSION:**

As per our results more acetaminophen analgesia was recorded in group F than group M, which was statistically insignificant and acetaminophen was found to be effective in pain management of root canal treatment patients vaccinated against COVID-19 within 2 days ($p=0.360$).

The criteria for vaccination before RCT were taken because often patients experience post-immunisation effects including hyperthermia, malaise, and fatigue, which can also elevate the overall wellness of the patient.^{1,2}

According to Chen JS et al (2021)⁷ the NSAID's drugs dampens the body cytokines and weaken the antibody response of the Vaccines against SARS-COV2 infection, therefore use of these analgesics is not recommended after vaccination.⁷ Powis S. (2020) stated that the French ministry advocated to not use ibuprofen in COVID-19 patients as it can worsen pneumonia and respiratory conditions.⁸ Acetaminophen was given in all the cases vaccinated against COVID-19, as this antipyretic drug does not affect the immune response induced in the host body due to vaccination dose⁹ as per Saleh E et al (2016)⁹ and Brown et al (2020)¹²

In our study, more analgesic tablets were consumed in Group F than Group M which was statistically insignificant (Table 2) this no significant gender-based influence on post-operative pain in patients is confirmed in previous studies too.

As per a study conducted by Al-Qazaz HK, Al-Obaidy LM, and Attash HM (2022), a high prevalence of severe pain was observed among females. Females were also more likely than males to report dermatological reactions such as swelling, redness, and skin rash.¹³ Another Cohort study on the COVID-19 vaccination discovered that young women had the highest rates of reactogenicity following a COVID-19 vaccination.¹⁴ In another study, females had a later onset of symptoms than males.¹⁵

Albashaireh and Alnegrish, (1998)¹⁶, Imura N and Zuolo ML (1995)¹⁷, and Keskin, C (2015)¹⁸ concluded that Age, sex, different arch/tooth groups, and the pulp status did not correlate with flare-ups. A systemic Review (Vishwanathaiiah et al 2021)¹⁹ also includes some articles for no gender base relation of post-obturation pain. Also, Ryan JL (2008)²⁰, Talha M (2011)²¹ and Salma J (2013)²² concluded that female requires more analgesia after endodontic treatment than males. More requirement of analgesia in females than males is related to biological and hormonal difference among two genders. The changes in amount of serotonin and non adrenalin are due to

two fluctuations hormone levels (Marcus, 1995)²³. Cortisol hormone controls the experience of pain in humans, which is less excreted in females than men (Mehrvarzfar et al., 2008)²⁴. The effect of menstrual cycle in females and effect of estrogen in males also differentiate the pain experience in two genders (Keskin et al 2015).¹⁸

Postoperative pain in all cases subsided with the use of a few tablets of mild analgesics (acetaminophen). In none of the teeth belonging to any gender group, more than 3 tablets of analgesic were required in any case. A stronger analgesic (ketorolac) was not required. None of the patients required antibiotics. This is in agreement with Haas DA (1997)²⁵, Mickel AK(2006)²⁶ Germack M et al (2017)²⁷ who found that endodontic pain is best managed by eliminating the source of infection or inflammation as completely as possible and whenever drugs are required, judicious use of non-opioid analgesics can be beneficial and provide the first course of action. In the present study, none of the patients developed swelling and so antibiotics were not required in any case. As per Yingling NM (2002)²⁸ and Bansal R et al (2019)²⁹, prescribing antibiotics for pain due to the inflammatory process is inappropriate and ineffective.^{29,30} AAE statement (2016)³⁰ also found that postoperative pain after instrumentation or obturation is usually associated with periradicular inflammation, not periradicular infection.³⁰

Hence in the limitations of our study of observations, in COVID-19 vaccinated patients, acetaminophen (Dolo 650 mg) proved to be a useful drug in post-operative pain relief in both male and female groups. In future studies, a large sample size of COVID-19 vaccinated patients are required to be monitored after root canal therapy, and also long-term observations for the effect of pharmacological management on the immune response of vaccinated people are recommended. In our study, there was no third-gender patient; further studies were required for this group.

Key findings: Acetaminophen is an useful drug in the pharmacological management of post-operative pain RCT after COVID-19 vaccination in both genders.

Conclusion: Within the limitations of this study, this is concluded that acetaminophen is effective in relieving post-obturation pain in patients recently vaccinated against COVID-19. Although after root canal treatment, the analgesic requirement for the female patients recently vaccinated against COVID-19 is more than males but the results were statistically insignificant, and large sample size is required in future studies.

CONFLICT OF INTEREST: No

REFERENCES

1. **Ooi EE, Dhar A, Petruschke R, Loch C, Buchy P, Low JGH.** Use of analgesics/antipyretics in the management of symptoms associated with COVID-19 vaccination. *NPJ Vaccines.* 2022 Mar 2;7(1):31. doi: 10.1038/s41541-022-00453-5. PMID: 35236842; PMCID: PMC8891349.
2. **Khan AA, Diogenes A.** Pharmacological Management of Acute Endodontic Pain. *Drugs.* 2021 Sep;81(14):1627-1643. doi: 10.1007/s40265-021-01564-4. Epub 2021 Oct 7. PMID: 34618315.
3. **Di Spirito F, Scelza G, Fornara R, Giordano F, Rosa D, Amato A.** Post-Operative Endodontic Pain Management: An Overview of Systematic Reviews on Post-Operatively Administered Oral Medications and Integrated Evidence-Based Clinical Recommendations. *Healthcare (Basel).* 2022 Apr 19;10(5):760. doi: 10.3390/healthcare10050760. PMID: 35627897; PMCID: PMC9141195.

4. **Nosrat A, Yu P, Dianat O, Verma P, Taheri S, Wu D, Fouad AF.** Endodontic Specialists' Practice During the Coronavirus Disease 2019 Pandemic: 1 Year after the Initial Outbreak. *J Endod.* 2022 Jun;48(6):699-706. doi: 10.1016/j.joen.2022.03.004. Epub 2022 Mar 17. PMID: 35307515; PMCID: PMC8928705
5. **Singh A, Konark, Kumar A, Nazeer J, Singh R, Singh S.** Incidence of postoperative flare-ups after single-visit and multiple-visit endodontic therapy in permanent teeth. *J Indian Soc Pedod Prev Dent* 2020;38:79-83
6. **Jethi N, Beniwal J, Yadav R, Kaur S, Nain VJ, Gupta C.** The Effect of Speed and Rotation for Protaper File Systems on Postobturation Pain in a Single Visit and Multiple (Two) Visits in Root Canal Therapy: An In Vivo Study. *J Int Soc Prev Community Dent.* 2021 Sep 28;11(6):695-702. doi: 10.4103/jispcd.JISPCD_147_21. PMID: 35036379; PMCID: PMC8713487.
7. **Chen JS, Alfajaro MM, Chow RD, Wei J, Filler RB, Eisenbarth SC, Wilen CB.** Non-steroidal anti-inflammatory drugs dampen the cytokine and antibody response to SARS-CoV-2 infection. *J Virol.* 2021 Jan 13;95(7):e00014-21. doi: 10.1128/JVI.00014-21. Epub ahead of print. PMID: 33441348; PMCID: PMC8092681.
8. **Powis S.** 2020. Novel coronavirus: anti-inflammatory medications. Medicines and Healthcare Products Regulatory Agency, London, United Kingdom.
9. **Saleh E, Moody MA, Walter EB.** Effect of antipyretic analgesics on immune responses to vaccination. *Hum Vaccin Immunother.*2016;12(9):2391-2402.
10. **Jethi N, Pandav G, Nagri D, Pandav S, Kumari D, Kaur M.** Asymptomatic COVID-19 patients and possible screening before an emergency aerosol related endodontic protocols in dental clinic-A Review. *J Family Med Prim Care* 2020;9:4552-6.
11. **Huang YH, Huang JT.** Use of chlorhexidine to eradicate oropharyngeal SARS-CoV-2 in COVID-19 patients. *J Med Virol.* 2021 Jul;93(7):4370-4373
12. **Brown, Chase DO; Daly, Sarah DO.** Do prophylactic antipyretics reduce the efficacy of vaccinations in children?, *Evidence-Based Practice:* 2020;23(2):44-46.
13. **Al-Qazaz HK, Al-Obaidy LM, Attash HM.** COVID-19 vaccination, do women suffer from more side effects than men? A retrospective cross-sectional study. *Pharm Pract (Granada).* 2022 Apr-Jun;20(2):2678. doi: 10.18549/PharmPract.2022.2.2678. Epub 2022 Jun 10. PMID: 35919795; PMCID: PMC9296083.
14. **Nachtigall, I., Bonsignore, M., Hohenstein, S. et al.** Effect of gender, age and vaccine on reactogenicity and incapacity to work after COVID-19 vaccination: a survey among health care workers. *BMC Infect Dis* **22**, 291 (2022). <https://doi.org/10.1186/s12879-022-07284-8>
15. **Alemayehu A, Demissie A, Yusuf M, et al.** COVID-19 vaccine side effect: age and gender disparity in adverse effects following the first dose of AstraZeneca COVID-19 vaccine among the vaccinated population in Eastern Ethiopia: a community-based study. *SAGE Open Medicine.* 2022;10. doi:[10.1177/20503121221108616](https://doi.org/10.1177/20503121221108616)

16. **Albashaireh ZS, Alnegrish AS.** Postobturation pain after single and multiple-visit endodontic therapy. A prospective study. *J Dent* 1998;26(3):227-32.
17. **Imura N, Zuolo ML.** Factors associated with endodontic flare-ups: a prospective study. *Int Endod J* 1995; 28: 261-265.
18. **Keskin, C.; Demiryurek, E.; Ozyurek, T.** Postoperative Pain after Single-Versus-Multiple Visit Root Canal Treatment in Teeth with Vital or Non-Vital Pulp in a Turkish Population. *Asian J. Sci. Res.* 2015, 8, 413–420. [CrossRef]
19. **Vishwanathaiah, S.; Maganur, P.C; Khanagar, S.B; Chohan, H.; Testarelli, L.; Mazzoni, A.; Gupta, A.A; Raj, A.T.; Bhandi, S.; Mehta, D.; et al.** The Incidence and Intensity of Postendodontic Pain and Flareup in Single and Multiple Visit Root Canal Treatments: A Systematic Review and Meta-Analysis. *Appl. Sci.* 2021, 11, 3358.
20. **Ryan JL, Jureidini B, Hodges JS, Baisden M, Swift JQ, Bowles WR.** Gender differences in analgesia for endodontic pain. *J Endod.* 2008 May;34(5):552-6.
21. **Talha M , Aisha W, Khalid S, Noman Q, Kehkishan A, Nirmeen T** Comparison of Incidence of Post-obturation Flare-ups Following Single and Multiple Visit Root Canal Treatment. *J. Dow Univ. Health Sci. Karachi* 2011; 5(2):47-50.
22. **Salma J, Khurshiduzzaman A.** Study of Post Obturation Pain Following Single Visit Root Canal Treatment. *Chattagram Maa-OShishu Hosp. Med. Coll. J.* 2013,12(3):3.
23. **Marcus DA.** Interrelationships of neuro-chemicals,estrogen, and recurring headache. *Pain* 1995; 26:129-139.
24. **Mehrvarzfar P, Shababi B, Sayyad R, Fallahdoost A, Kheradpir K** .Effect of suprapariosteal injection of dexamethasone on postoperative pain. *Aust. Endod. J.* 2008;34:25-29.
25. **Haas DA.** Local and systemic therapeutics for the control of endodontic pain. *Alpha Omegan* 1997;90(4):73-6.
26. **Mickel AK, Wright AP, Chogle S, Jones JJ, DDS, Kantorovich I, Curd F.** An analysis of current analgesic preferences for endodontic pain management. *J Endod* 2006; 32: 1146-54.
27. **Germack M, Sedgley CM, Sabbah W, Whitten B.** Antibiotic Use in 2016 by Members of the American Association of Endodontists: Report of a National Survey. *J Endod.* 2017 Oct;43(10):1615-1622.
28. **Yingling NM, Byrne BR, Hartwell GR.** Antibiotic use by members of the American association of endodontists in the year 2000: Report of a national survey. *J Endod* 2002; 28: 396-404.
29. **Bansal R, Jain A, Goyal M, Singh T, Sood H, Malviya HS.** Antibiotic abuse during endodontic treatment: A contributing factor to antibiotic resistance. *J Family Med Prim Care* 2019;8:3518-24

30. **AAE Position Statement.** AAE guidance on the use of systemic antibiotics in endodontics. JOE 2017; 43:1409-13.