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ORIGINAL RESEARCH

CLINICAL EFFICACY OF PRE-EMPTIVE TRAMADOL FOR POSTOPERATIVE PAIN CONTROL FOLLOWING MANDIBULAR THIRD MOLAR SURGERY: A SYSTEMATIC REVIEW AND META-ANALYSIS OF RANDOMIZED CONTROLLED TRIALS

Anuroop Singhai[1], Abdulmalik Marwan Khateeb[2], Abdulaziz Awwadh Alqurayqiri[3], Abdulaziz Khalid Enayah[4]

[1]Associate Professor, Clinical Sciences Department, General Dentistry Program, Batterjee Medical College, Jeddah – 21442, Saudi Arabia, ORCID: 0000-0002-8806-1283
Email: anuroopsinghai@gmail.com
[2]Alumni – General Dentist, General Dentistry Program, Batterjee Medical College, Jeddah – 21442, Saudi Arabia
Email: abdulmalikkhateeb@gmail.com
[3]Alumni – General Dentist, Vision Medical College, Jeddah – 23643, Saudi Arabia
Email: abulazizawwadh.16@gmail.com
[4]Alumni – General Dentist, General Dentistry Program, Batterjee Medical College, Jeddah – 21442, Saudi Arabia
Email: aziz-en@hotmail.com
Corresponding author: Dr. Anuroop Singhai, Associate Professor, Clinical Sciences Department, General Dentistry Program, Batterjee Medical College, Jeddah - 21442, Saudi Arabia. Email: anuroopsinghai@gmail.com

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ABSTRACT

Background: Pre-emptive analgesia seeks to attenuate postoperative pain by limiting peripheral and central sensitization. Tramadol has been proposed as a pre-emptive option in mandibular third molar surgery, but its clinical effectiveness remains unclear.
Objective: To evaluate the efficacy of pre-emptive tramadol for postoperative pain control following mandibular third molar surgery.
Methods: A PRISMA-compliant systematic review of randomized controlled and split-mouth trials was conducted using PubMed/MEDLINE, Scopus, and EBSCOhost. Studies comparing pre-operative tramadol with placebo, NSAIDs, or combination regimens were included. Outcomes assessed were postoperative pain intensity, rescue analgesic use, total analgesic consumption, swelling, and trismus. Risk of bias was assessed using the Cochrane tool. Due to clinical heterogeneity, a qualitative synthesis with limited numerical analysis was performed.
Results: Ten trials involving 459 patients were included. Tramadol monotherapy was inferior to NSAIDs in 70% of studies, showing higher pain scores and greater rescue analgesic requirements. One study reported comparable efficacy with nimesulide. In contrast, two trials demonstrated improved analgesia when tramadol was used as an adjunct to ketorolac. NSAIDs consistently provided superior control of postoperative inflammation.
Conclusion: Pre-emptive tramadol alone is less effective than NSAIDs for postoperative pain control after mandibular third molar surgery. However, tramadol may offer additive benefit within multimodal analgesic regimens. It should not be recommended as a sole pre-emptive agent but may be considered as an adjunct in selected patients.

Keywords: Preemptive, analgesia, tramadol, third molar, pain

INTRODUCTION

Pre-emptive analgesia involves administering an analgesic agent before surgical tissue injury to reduce nociceptive input to the central nervous system and limit postoperative pain. Initiation of analgesia prior to incision may attenuate peripheral and central sensitization associated with surgical trauma, thereby reducing postoperative hyperalgesia and analgesic requirements[1,2]. Surgical injury induces the release of inflammatory mediators that increase nociceptor excitability and contribute to central sensitization,

resulting in heightened pain perception and reduced responsiveness to postoperative analgesics[2].

Despite this mechanistic rationale, the clinical effectiveness of pre-emptive analgesia remains uncertain. Systematic reviews in medical and dental literature have reported inconsistent findings, with some demonstrating benefit and others showing no superiority over postoperative administration[3-5]. This variability has been attributed to differences in surgical models, pharmacologic agents, dosing regimens, and outcome assessment.

Mandibular third molar surgery is among the most commonly performed procedures in oral and maxillofacial surgery and represents a well-established model for evaluating postoperative pain and inflammation. The procedure is frequently associated with acute postoperative pain, swelling, and trismus due to surgical trauma and the inflammatory response. Standardized surgical techniques and local anesthesia permit reliable postoperative pain assessment, making this model particularly suitable for evaluating analgesic efficacy[6-8].

Non-steroidal anti-inflammatory drugs (NSAIDs) remain the primary agents for postoperative pain control following third molar surgery due to their inhibition of prostaglandin synthesis. Although some studies report benefits from pre-emptive NSAID administration, systematic reviews have yielded conflicting conclusions[9-11]. Corticosteroids may reduce postoperative inflammation, but their superiority over NSAIDs remains unclear[12]. These inconsistencies highlight the need to assess alternative analgesic options, particularly in patients with contraindications to NSAIDs.

Tramadol is a centrally acting synthetic opioid that provides analgesia through weak μ-opioid receptor agonism and inhibition of serotonin and norepinephrine reuptake. Owing to this dual mechanism and a relatively favourable safety profile, tramadol has been investigated as a pre-emptive analgesic in third molar surgery. However, randomized controlled trials have reported inconsistent effects on postoperative pain control and rescue analgesic requirements[13-15].

Given these uncertainties, a systematic synthesis of randomized evidence is warranted. Accordingly, this systematic review and meta-analysis aimed to evaluate the efficacy of pre-emptive tramadol for postoperative pain control following mandibular third molar surgery and to clarify its role within contemporary multimodal analgesic strategies.

METHODS

Eligibility Criteria

- **Study design:** Randomized controlled trials and split-mouth trials.
- **Population:** Patients undergoing mandibular third molar surgery.
- **Intervention:** Pre-operative tramadol (oral or injectable).
- **Comparators:** Placebo, NSAIDs, or combination regimens.
- **Outcomes:** Pain intensity (VAS), time to first rescue analgesic, total analgesic consumption, swelling, trismus.

Literature Search Strategy

An independent reviewer (AS) conducted a comprehensive electronic literature search across PubMed/MEDLINE, Scopus, and EBSCOhost databases. The search strategy was designed to identify randomized controlled trials evaluating the use of pre-emptive tramadol for postoperative pain control following mandibular third molar surgery.

The search terms applied across all databases included combinations of Medical Subject Headings (MeSH) and free-text keywords as follows: “tramadol” AND (“pre-emptive analgesia” OR “preoperative analgesia”) AND (“third molar” OR “wisdom tooth”) AND (“mandibular” OR “lower third molar”).

Manual screening of reference lists from all included articles and relevant systematic reviews was performed to identify additional eligible studies. Backward citation tracking of included randomized controlled trials was undertaken using Google Scholar and Scopus to ensure completeness of the search. No restrictions were applied regarding year of publication. Only studies published in the English language were considered.

Study Selection Process

The study selection process was conducted in three sequential phases to ensure methodological rigor and objectivity.

In the first phase, titles and abstracts retrieved from the electronic search were independently screened to identify potentially relevant studies. In the second phase, full-text articles of all shortlisted studies were independently assessed in detail by a designated reviewer (AS) to evaluate eligibility based on predefined

inclusion and exclusion criteria.

In the final phase, all eligible full-text articles were critically appraised by all four reviewers, and studies were included in the final qualitative synthesis only after unanimous agreement was achieved. Any discrepancies were resolved through discussion to reach consensus.

Data Extraction

Data were extracted on study design, sample size, tramadol dose and route, comparator agents, outcome measures, and overall conclusions. The data extraction was carried out by first reviewer (AS) and auditing of extracted data was done by second reviewer (AK).

Risk of Bias and Methodological Quality

The included randomized controlled trials were assessed using the Cochrane Risk of Bias tool and exhibited an overall moderate risk of bias. Randomization was generally reported, but allocation concealment and blinding were often unclear, particularly in studies comparing tramadol with active comparators. Pain outcomes were clinically relevant, though heterogeneity in assessment tools, timing, dosing, and administration routes limited comparability.

Synthesis measures

Review manager computer program (RevMan) version 5.4 was used for data entry and calculation of effect size for total analgesic consumption from five studies that used either intramuscular or intravenous route of administration and had employed monotherapy[17,18,20,21,24]. The forest plot was derived by entry of total number of analgesics consumed during the postoperative period.

RESULTS

Study Selection

The electronic search and manual screening process identified eligible records, of which 10 randomized controlled trials met the predefined inclusion criteria and were included in the final qualitative synthesis[16-25]. The PRISMA flow diagram summarizes the study selection process, including reasons for exclusion at each stage. (Figure 1)

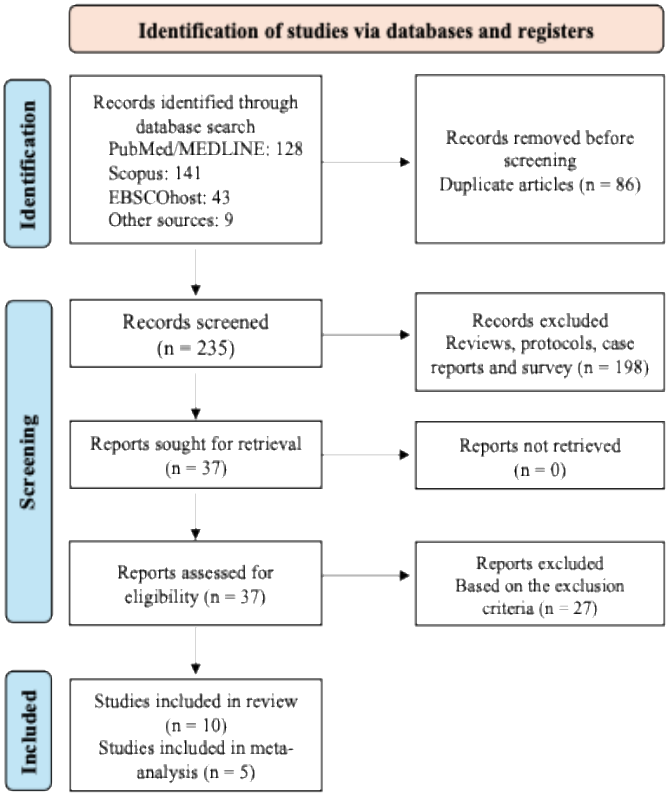

Figure 1. PRISMA flow diagram of study selection for clinical efficacy of pre-emptive tramadol in mandibular third molar surgery

Study Characteristics

The included trials comprised 459 patients undergoing surgical removal of impacted mandibular third molars[16-25]. Sample sizes ranged from 30 to 94 participants. Tramadol was administered via oral, intramuscular, intravenous, or submucosal routes, either as monotherapy or in combination with NSAIDs. Comparator interventions included ketorolac, diclofenac, meloxicam, piroxicam, nimesulide, or placebo[16-25]. Postoperative pain was assessed in all studies, primarily using visual analogue scales (VAS), along with secondary outcomes such as total analgesic consumption, time to first rescue analgesic use, facial edema, and trismus (Table 1).

Table 1. Summary of Characteristics and Key Findings of Included Randomized Controlled Trials

Author / Year	Number of patients	Groups	Parameters Evaluated	Overall Outcome
Isiordia-Espinoza et al., 2011[16]	30	Oral ketorolac + Submucous tramadol vs Oral ketorolac + Submucous placebo	Pain, total analgesic consumption	Ketorolac + tramadol superior
Pandit et al., 2011[17]	50	IV tramadol vs IV diclofenac	Pain, total analgesic consumption, time for first analgesic use	Tramadol inferior
Isiordia-Espinoza et al., 2012[18]	30	IM meloxicam vs IM tramadol	Pain, edema, trismus, total analgesic consumption	Tramadol inferior
da Costa Araújo et al., 2012[19]	47 Bilateral	Oral tramadol vs Oral nimesulide	Pain, total analgesic consumption	Similar efficacy
Shah et al., 2013[20]	50 Bilateral	IM ketorolac vs IM tramadol vs Control	Pain, total analgesic consumption, time for first analgesic use	Tramadol inferior
Gopalraju et al., 2014[21]	40	IV tramadol vs IV ketorolac	Pain, total analgesic consumption	Tramadol inferior
Isiordia-Espinoza et al., 2016[22]	30	Oral ketorolac + IM placebo vs Oral placebo + IM tramadol	Pain, total analgesic consumption, time for first analgesic use	Tramadol inferior
Mazhar et al., 2022[23]	40	Oral ketorolac + Submucous tramadol vs Oral ketorolac + Submucous placebo	Pain, need for analgesic intake in the first 24 hours	Ketorolac + tramadol superior
Muthuluri S et al., 2022[24]	78	IM tramadol vs IM piroxicam vs IM placebo	Pain, edema, trismus, total analgesic consumption, time for first analgesic use	Tramadol inferior to piroxicam
Rao & Fazal, 2023[25]	94	Oral Tramadol vs Oral Ketorolac	Pain, total analgesic consumption, time for first analgesic use	Tramadol inferior

Effects on Postoperative Pain

All included trials evaluated postoperative pain intensity[16-25]. Seven of ten studies reported that tramadol monotherapy was inferior to NSAIDs for postoperative pain control[17,18,20,21,22,24,25]. One split-mouth trial demonstrated comparable analgesic efficacy between tramadol and nimesulide[19]. In contrast, two trials reported superior analgesic outcomes when tramadol was used as an adjunct to ketorolac, particularly when administered submucosally in combination with oral NSAIDs[16,23].

Analgesic Consumption and Rescue Medication

Total postoperative analgesic consumption and time to first rescue analgesic intake were reported in eight studies[16–18,20–22,24,25]. Tramadol monotherapy was consistently associated with higher rescue analgesic requirements and earlier analgesic intake compared with NSAIDs[17,18,20–22,24,25]. Combination therapy involving tramadol and ketorolac resulted in reduced analgesic consumption, particularly within the first 24 hours following surgery[16,23].

Secondary Outcomes

Five studies assessed inflammatory sequelae such as facial swelling and trismus[18,20,22,24]. NSAIDs, particularly meloxicam and piroxicam, demonstrated superior control of postoperative inflammation[18,24], whereas tramadol alone did not consistently improve these outcomes[18,20,22].

Results of syntheses

Due to substantial heterogeneity in intervention protocols, dosing regimens, routes of administration, outcome assessment timing, and comparator drugs, a full quantitative meta-analysis was not feasible[16–25]. However, a limited numerical synthesis was performed to evaluate the direction and consistency of treatment effects.

Across the included trials:

- 70% (7/10) favored NSAIDs over tramadol monotherapy[17,18,20–22,24,25]
- 20% (2/10) favored tramadol when used as part of a multimodal regimen[16,23]
- 10% (1/10) demonstrated no significant difference between tramadol and an NSAID comparator [19]

When studies were grouped by intervention strategy, tramadol monotherapy was associated with inferior postoperative pain control in the majority of comparisons[17,18,20–22,24,25], whereas combination therapy demonstrated a consistent trend toward improved analgesic outcomes[16,23].

Five studies provided the relevant data for sample size and mean analgesic consumption with standard deviations (SD).[17,18,20,21,24] The forest plot analysis was performed for these studies using RevMan for academics. All together 5 studies were analyzed with a total of 107 subjects in the Experimental cohort and 109 subjects in the Control cohort.

Based on the analysis performed using random effects model with Inverse variance method to compare the standardized mean difference (SMD), there is no statistical difference between the two cohorts, the summarized standardized mean difference (SMD) is 2.12 with a 95% confidence interval of -0.15 - 4.4. The test for overall effect, Z = 1.83 (P = 0.0676) does not show a significant effect.

A significant heterogeneity was detected ($p<0.01$), suggesting inconsistent effects in magnitude and/or direction. The I^2 value indicates that 93.8% of the variability among studies arises from heterogeneity rather than random chance. The synthesis calculated the pooled average effect size, SD, at a 95% confidence interval (CI). These findings were visually summarized using a forest plot (Figure 2).

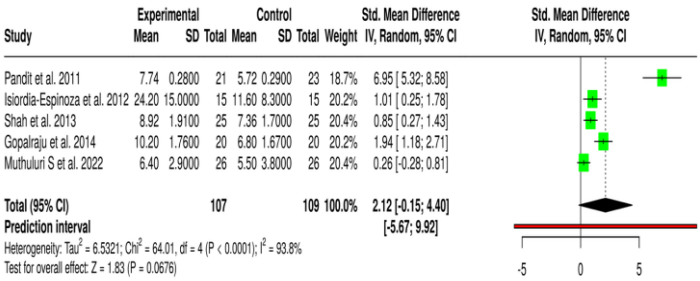

Figure 2. Forest plot of total postoperative analgesic consumption comparing pre-emptive tramadol with comparators (SMD, 95% CI, random-effects)

DISCUSSION

This systematic review and limited meta-analysis evaluated the efficacy of pre-emptive tramadol for postoperative pain control following mandibular third molar surgery. The evidence indicates that tramadol monotherapy is generally less effective than NSAIDs, being associated with higher pain scores, increased analgesic consumption, and earlier rescue analgesic use[17,18,20–22,24,25]. In contrast, tramadol used as part of multimodal regimens, particularly in combination with ketorolac, demonstrated improved analgesic outcomes, suggesting complementary central and peripheral mechanisms[16,23].

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The inferior performance of tramadol monotherapy likely reflects its central analgesic mechanism, which does not directly modulate the peripheral inflammatory cascade triggered by surgical trauma. NSAIDs, by inhibiting prostaglandin synthesis, more effectively reduce postoperative pain, swelling, and trismus, consistent with the observed outcomes[18,20,24]. The combination of tramadol with NSAIDs may leverage both central and peripheral pathways, enhancing analgesic efficacy.

Methodological limitations should be noted. Heterogeneity in dosing, routes of administration, and timing of outcome assessment limited quantitative pooling. Small sample sizes and inconsistent reporting of blinding and allocation concealment introduced potential bias, which may have influenced effect estimates[16–25]. Indeed, the limited meta-analysis of five studies revealed substantial statistical heterogeneity (I^2 = 93.8%) and a non-significant overall effect (SMD 2.12, 95% CI −0.15 to 4.4), reflecting inconsistent study-level findings.

Clinically, these results suggest that tramadol should not be recommended as a sole pre-emptive analgesic for third molar surgery[17,18,20–22,24,25]. However, it may serve as a useful adjunct in multimodal analgesic protocols, particularly when NSAID optimization is constrained or contraindicated[16,23].

Future studies should implement standardized dosing regimens, uniform pain assessment intervals, and adequately powered sample sizes to clarify tramadol's role. Comparative trials evaluating multimodal strategies incorporating tramadol, NSAIDs, and corticosteroids are warranted to define the most effective analgesic protocol for postoperative pain control in this model[16,23].

CONCLUSION

The available evidence indicates that pre-emptive tramadol monotherapy is inferior to NSAIDs for postoperative pain control following mandibular third molar surgery, being associated with higher pain scores, earlier rescue analgesic use, and greater analgesic consumption. Tramadol alone also shows limited efficacy in controlling postoperative inflammatory sequelae.

However, tramadol demonstrates potential benefit as an adjunct within multimodal analgesic regimens, particularly when combined with NSAIDs, suggesting complementary central and peripheral mechanisms of action. Consequently, tramadol should not be recommended as a sole pre-emptive analgesic, but may be considered as part of a multimodal strategy when NSAID optimization is constrained. Further high-quality, standardized trials are needed to define its precise clinical role.

DECLARATION

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REFERENCES

1. Kissin I. Preemptive analgesia. Anesthesiology. 2000;93(4):1138–1143.
2. Woolf CJ, Chong MS. Preemptive analgesia—treating postoperative pain by preventing the establishment of central sensitization. Anesth Analg. 1993;77(2):362–379.
3. Ong CK, Lirk P, Seymour RA, Jenkins BJ. The efficacy of preemptive analgesia for acute postoperative pain management: a meta-analysis. Anesth Analg. 2005;100(3):757–773.
4. Dahl JB, Møiniche S. Pre-emptive analgesia. Br Med Bull. 2004;71:13–27.
5. Costa FW, Esses DF, de Barros Silva PG, Carvalho FS, Sá CD, Albuquerque AF, Bezerra TP, Ribeiro TR, Sá Roriz Fonteles C, Soares EC. Does the Preemptive Use of Oral Nonsteroidal Anti-inflammatory Drugs Reduce Postoperative Pain in Surgical Removal of Third Molars? A Meta-analysis of Randomized Clinical Trials. Anesth Prog. 2015 Summer;62(2):57-63.
6. Blondeau F, Daniel NG. Extraction of impacted mandibular third molars: postoperative complications and their risk factors. J Can Dent Assoc. 2007;73(4):325.
7. Brucoli M, De Andreis M, Bonaso M, Boffano P, Benech A. Comparative assessment of dexamethasone administration routes for the management of postoperative symptoms following third molar surgery. J Stomatol Oral Maxillofac Surg. 2019 Dec;120(6):529-533.
8. Demirbas AE, Karakaya M, Bilge S, Canpolat DG, Kütük N, Alkan A. Does Single-Dose Preemptive Intravenous Ibuprofen Reduce Postoperative Pain

After Third Molar Surgery? A Prospective, Randomized, Double-Blind Clinical Study. J Oral Maxillofac Surg. 2019 Oct;77(10):1990-1997.
9. Savage MG, Henry MA. Preoperative nonsteroidal anti-inflammatory agents in oral surgery. Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 2004;98(2):146–152.
10. Cetira Filho EL, Carvalho FSR, de Barros Silva PG, Barbosa DAF, Alves Pereira KM, Ribeiro TR, Costa FWG. Preemptive use of oral nonsteroidal anti-inflammatory drugs for the relief of inflammatory events after surgical removal of lower third molars: A systematic review with meta-analysis of placebo-controlled randomized clinical trials. J Craniomaxillofac Surg. 2020 Mar;48(3):293-307.
11. Tirupathi S, Rajasekhar S, Maloth SS, Arya A, Tummalakomma P, Lanke RB. Pre-emptive analgesic efficacy of injected ketorolac in comparison to other agents for third molar surgical removal: a systematic review. J Dent Anesth Pain Med. 2021 Feb;21(1):1-14.
12. Falci SGM, Lima TC, Martins CC, Santos CRRD, Pinheiro MLP. Preemptive Effect of Dexamethasone in Third-Molar Surgery: A Meta-Analysis. Anesth Prog. 2017 Fall;64(3):136-143.
13. Kumara R, Zacharias M. Effectiveness of tramadol as an analgesic in oral surgery. N Z Dent J. 2002 Mar;98(431):9-11.
14. Kanto D, Salo M, Happonen RP, Vahlberg T, Kanto J. Tramadol premedication in operative extraction of the mandibular third molar: a placebo-controlled crossover study. Acta Odontologica Scandinavica. 2005 Feb;63(1):43-49.
15. Eriksson L, Tegelberg A. Analgesic efficacy and clinical acceptability of adjunct pre-emptive intravenous tramadol in midazolam sedation for third molar surgery. Oral Maxillofac Surg. 2013 Sep;17(3):193-9.
16. Isiordia-Espinoza MA, Pozos-Guillén AJ, Martínez-Rider R, Herrera-Abarca JE, Pérez-Urizar J. Preemptive analgesic effectiveness of oral ketorolac plus local tramadol after impacted mandibular third molar surgery. Med Oral Patol Oral Cir Bucal. 2011 Sep 1;16(6):e776-80.
17. Pandit MK, Godhi S, Lall AB. Preoperative intravenous tramadol versus diclofenac for preventing postoperative pain after third molar surgery: a comparative study. J Maxillofac Oral Surg. 2011 Dec;10(4):306-9.
18. Isiordia-Espinoza MA, Sánchez-Prieto M, Tobías-Azúa F, Reyes-García JG. Pre-emptive analgesic effectiveness of meloxicam versus tramadol after mandibular third molar surgery: a pilot study. J Oral Maxillofac Surg. 2012 Jan;70(1):31-6.
19. da Costa Araújo FA, de Santana Santos T, de Morais HH, Laureano Filho JR, de Oliveira E Silva ED, Vasconcellos RJ. Comparative analysis of preemptive analgesic effect of tramadol chlorhydrate and nimesulide following third molar surgery. J Craniomaxillofac Surg. 2012 Dec;40(8):e346-9.
20. Shah AV, Arun Kumar KV, Rai KK, Rajesh Kumar BP. Comparative evaluation of pre-emptive analgesic efficacy of intramuscular ketorolac versus tramadol following third molar surgery. J Maxillofac Oral Surg. 2013 Jun;12(2):197-202.
21. Gopalraju P, Lalitha RM, Prasad K, Ranganath K. Comparative study of intravenous Tramadol versus Ketorolac for preventing postoperative pain after third molar surgery--a prospective randomized study. J Craniomaxillofac Surg. 2014 Jul;42(5):629-33.
22. Isiordia-Espinoza MA, Pozos-Guillen A, Martinez-Rider R, Perez-Urizar J. Comparison of the analgesic efficacy of oral ketorolac versus intramuscular tramadol after third molar surgery: A parallel, double-blind, randomized, placebo-controlled clinical trial. Med Oral Patol Oral Cir Bucal. 2016 Sep 1;21(5):e637-43.
23. Mazhar H, Samudrawar R, Tamgadge P, Wasekar R, Tiwari RVC, Tiwari H. Preemptive Oral Ketorolac with Local Tramadol Versus Oral Ketorolac in Third Molar Surgery: A Comparative Clinical Trial. J Maxillofac Oral Surg. 2022 Mar;21(1):227-234.
24. Muthuluri T, Chandrupatla SG, Rajan R, Reddy VV, Jhawar DK, Potturi A. Pre-emptive analgesia efficacy of piroxicam versus tramadol in oral surgery. J Dent Anesth Pain Med. 2022 Dec;22(6):443-450.
25. Rao U, Fazal M. Efficacy of Oral Toradol (Ketorolac) Compared to Oral Tramadol as a Preemptive Analgesic in Impacted Third Molar Surgery. J Coll Physicians Surg Pak. 2023 Aug;33(8):895-899.

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