www.ijarp.com ISSN 2456-9992 Page: 01-19
International Journal Advanced Research Publications
Review Article
Volume: 02
Issue: 04

DEXAMETHASONE ADMINISTRATION FOR MANAGEMENT OF COMPLICATIONS IN POSTOPERATIVE THIRD MOLAR SURGERY

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Article Received: 14 March 2026, Article Revised: 03 April 2026, Published on: 23 April 2026

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DOI: https://doi-doi.org/101555/ijarp.8902

ABSTRACT

Dexamethasone is widely used in oral and maxillofacial surgery to manage postoperative pain, swelling, and trismus, particularly following third molar extractions. As a potent corticosteroid, it mitigates inflammatory responses by inhibiting the release of key mediators, thereby enhancing patient comfort and recovery. Multiple routes of dexamethasone administration exist, and optimizing the method, dosage, timing, and clinical parameters is essential for effective postoperative care. This article aims to provide evidence-based guidance on the most appropriate strategies for dexamethasone use in third molar surgeries.

KEYWORDS: Dexamethasone, Administration, Inflammation, Techniques, Postoperative recovery.

INTRODUCTION

Pain management and the reduction of postoperative complications in oral and maxillofacial surgery have advanced significantly over the years, yet postoperative discomfort remains a common challenge in dental practice. While analgesics, particularly narcotics, are frequently prescribed, their effectiveness can be limited due to the unpredictable nature of surgical outcomes.

Corticosteroids have emerged as a highly effective alternative for controlling postoperative pain and inflammation. Glucocorticosteroids, such as dexamethasone, are widely used in oral surgeries to alleviate pain, reduce swelling, and limit trismus. Dexamethasone, a synthetic glucocorticosteroid with no mineralocorticoid activity, is at least 25–50 times more potent than hydrocortisone and demonstrates minimal adverse effects on leukocyte chemotaxis. It

modulates inflammatory processes at the molecular level by regulating the synthesis of anti-inflammatory genes, mimicking the function of endogenous adrenal hormones.

Multiple clinical trials have investigated dexamethasone's efficacy, emphasizing administration routes, dosages, and timing. With emerging approaches in oral surgery, it is essential to re-evaluate these strategies. This literature review aims to provide a comprehensive overview of the recommended routes, dosages, parameters, and timing of dexamethasone use specifically for third molar surgeries.

1. Dexamethasone in General Use

Dexamethasone, a potent corticosteroid, is widely used for its anti-inflammatory properties and established safety profile. It reduces vascular dilation, limits fluid transudation, and suppresses the activity and chemotaxis of inflammatory cells that produce various mediators. These properties make dexamethasone valuable even in major procedures, such as orthognathic surgeries.

Despite its benefits, dexamethasone has notable contraindications, including diabetes mellitus, peptic ulcers, tuberculosis, hypertension, ocular herpes, glaucoma, Cushing's syndrome, renal insufficiency, and pregnancy. In pregnant patients, it may cause fetal adrenal suppression. Nevertheless, it remains widely employed for managing allergies, inflammation, and as preoperative and postoperative supportive therapy.

Dexamethasone has a relative anti-inflammatory potency of 25, a plasma half-life of 100–300 minutes, and a biological half-life of 36–72 hours. A single 4 mg dose can produce roughly five times the body's normal cortisol output. Its onset of action is 1–2 hours, allowing sufficient dispersion along cell membranes, with full anti-inflammatory effects during the first 24 hours post-surgery and potential benefits lasting up to three days. Postoperative inflammation—manifesting as redness, swelling, heat, pain, and loss of tissue function—is part of the body's natural healing response, mediated by leukocyte chemotaxis and a chemical signaling cascade that facilitates tissue repair.

2.Dexamethasone in Third Molar Surgeries

Dexamethasone is commonly studied in the context of third molar extractions, one of the most frequent procedures performed by oral and maxillofacial surgeons. These surgeries often involve bone removal, flap reflection, and tooth sectioning, which can injure surrounding tissues and lead to postoperative pain, swelling, and trismus, all of which negatively affect patient quality of life. While analgesics are typically prescribed for

moderate to severe pain, non-steroidal anti-inflammatory drugs (NSAIDs) can have side effects, making careful selection of pain management strategies essential.

Postoperative pain, swelling, and trismus primarily result from inflammation following tissue injury. Pain contributes to patient anxiety and can influence wound healing, with the visual analogue scale (VAS) commonly used to assess patient-reported pain levels. Studies show that dexamethasone has a significant effect on reducing swelling and trismus, though its impact on pain varies with the route of administration, such as sublingual delivery.

Swelling is measured at multiple anatomical points around the jaw, cheek, and eye, using linear dimensions to quantify soft tissue changes. Trismus is evaluated by measuring the interincisal distance or the change from preoperative maximum opening. Dexamethasone has been shown to reduce postoperative swelling and trismus, often allowing for decreased NSAID consumption. Combined therapy with corticosteroids and NSAIDs can further minimize postoperative complications without added risk, though corticosteroid use should be tailored to the difficulty of the extraction.

Patient quality of life, encompassing physical, social, and mental well-being, is also improved with dexamethasone administration. Intravenous corticosteroids, in particular, have been associated with reduced pain and swelling, enhancing recovery and daily functioning after third molar surgery.

3.Mechanism of Dexamethasone in Inflammation

Inflammation following tissue injury begins with cell membrane disruption, which activates phospholipase A2 (PLA2) to convert phospholipids into arachidonic acid. This leads to the production of prostaglandins and thromboxanes via cyclooxygenase (COX) and leukotrienes via lipoxygenase, triggering the initial inflammatory response. These mediators contribute to peripheral sensitization, increasing excitability of dorsal horn neurons, followed by central sensitization. Once established, central sensitization amplifies pain perception, making patients less responsive to conventional analgesics.

Pre-emptive analgesia aims to minimize postoperative pain by suppressing central sensitization before surgery, preventing hyperesthesia. Key inflammatory mediators such as bradykinin, prostaglandins, and leukotrienes play pivotal roles in initiating and sustaining inflammation. Dexamethasone inhibits bradykinin-induced prostaglandin (PGE2) release, reducing early inflammatory responses, while leukotrienes contribute to hypoalgesia, modulating inflammatory pain.

Swelling typically peaks around 48 hours post-surgery. Both NSAIDs and corticosteroids act on inflammatory pathways, but corticosteroids block both cyclooxygenase and lipoxygenase systems, whereas NSAIDs inhibit only cyclooxygenase. This dual inhibition makes dexamethasone more effective than NSAIDs in reducing swelling, trismus, and other postoperative inflammatory sequelae.

II.Routes of Administration of Dexamethasone

Dexamethasone can be administered through various routes in dental surgeries, including oral, submucosal, intramuscular, and intravenous methods. Each route has advantages and limitations, and no single approach has been universally established as superior.

1.Oral route: Oral dexamethasone has been shown to reduce postoperative pain, trismus, and swelling when administered pre- or postoperatively. Preoperative dosing appears more effective in some studies. Oral administration requires patient compliance and repeated dosing to maintain therapeutic blood levels, which may limit its practicality.

2.Submucosal route: Submucosal injection is widely favored due to ease of administration and positive outcomes for swelling and pain reduction. Studies have reported that even a low dose of 4 mg can effectively decrease postoperative discomfort with minimal systemic effects. Submucosal administration has also been associated with improved patient quality of life after third molar surgery.

Table 1. Summary of the latest clinical trials with the use of dexamethasone through different routes.

Study	Dose (mg)	Design	Time of administration	Route of administration	Sample size and mean age (yr)	Evaluated parameters	Results
Majid[19] (2011)	4	Randomized	Postoperative	Submucosal Intramuscular	33 patients; mean age, 26.9	Pain, swelling, trismus, quality of life	Submucosal more favorable than intramuscular
Antunes et al.[3] (2011)	8	Randomized	Preoperative	Intramuscular (masseter) Oral	67 patients; mean age, 21	Pain, swelling, trismus	Intramuscular and oral equally effective
Boonsiriseth et al.[26] (2012)	8	Randomized	Postoperative	Intramuscular (deltoid) Oral	20 patients; mean age, 20	Pain, swelling, trismus	Intramuscular and oral equally effective
Majid and	4	Randomized	Postoperative	Submucosal	30	Pain,	Submucosal more

Study	Dose (mg)	Design	Time of administration	Route of administration	Sample size and mean age (yr)	Evaluated parameters	Results
Mahmood[63] (2011)				Intramuscular	patients; mean age, 25.6	swelling, trismus, quality of life	favorable than intramuscular
Chaudhary et al.[64] (2015)	4 (IV) 8 (oral)	Randomized	Preoperative	Intravenous Oral	200 patients; mean age, 20.8	Pain, swelling, trismus	Intravenous and oral equally effective
Sabhlok et al.[50] (2015)	4	Randomized	Postoperative	Intramuscular (masseter) Oral	60 patients; mean age not mentioned	Pain, swelling, trismus	Oral favorable to intramuscular
Vivek et al.[60] (2017)	8	Randomized	Postoperative	Intravenous Submucosal Intramuscular (masseter)	45 patients; mean age, 27	Pain, swelling, trismus	Intravenous, submucosal, and intramuscular equally effective (Intravenous is faster)
Moranon et al.[62] (2019)	8	Randomized	Preoperative	Pterygomandibular space Sublingual space	30 patients; mean age, 21	Pain, swelling, trismus	Pterygomandibular and sublingual routes equally effective
Kaewkumnert et al.[27] (2020)	4	Randomized	Preoperative	Submucosal Intraosseous	56 patients; mean age not mentioned	Pain, swelling, trismus	

3.Intravenous route: Intravenous dexamethasone provides rapid onset and high bioavailability, with studies showing enhanced pain and trismus control, particularly when combined with NSAIDs. Maximum daily doses of up to 16 mg have been safely used in surgical settings.

4.Intramuscular route: Intramuscular injections demonstrate effects comparable to the intravenous route, offering long-lasting anti-inflammatory benefits and improved patient comfort postoperatively. Preoperative doses, commonly 8 mg in the deltoid, have effectively reduced pain, swelling, and functional limitations after third molar extractions.

5.Novel Routes of Dexamethasone Administration

Recent studies have explored alternative routes for administering dexamethasone to enhance postoperative outcomes in third molar surgeries. Injection into the **pterygomandibular space** (8 mg) effectively reduced swelling, pain, and trismus. Similarly, the **sublingual route** was

shown to provide faster onset and improved patient comfort, with comparable efficacy to intramuscular administration. Both methods have been validated in subsequent studies, demonstrating reliable postoperative benefits.

Other approaches include **intra-alveolar (endo-alveolar) powder** and **submucosal injections**, which show similar reductions in pain, swelling, and trismus, with topical administration particularly effective for trismus. The **intra-masseteric route** has also been investigated, offering localized absorption and minimal systemic side effects due to its proximity to the surgical site.

Finally, the **intraosseous route** has been compared with the submucosal method, with findings indicating submucosal injections as more effective and better tolerated due to reduced discomfort and tissue tension. These novel routes provide additional options for clinicians to tailor dexamethasone administration to patient needs and surgical complexity.

III. Dosages of Dexamethasone

The optimal dexamethasone dose for third molar surgeries remains undetermined, with dosing often tailored to the severity of the surgical procedure and patient tolerance.

4 mg dosage:

Studies show mixed results. Some reports indicate that 4 mg intravenous dexamethasone has minimal effect on swelling and trismus, while submucosal administration of 4 mg effectively reduces pain, edema, and trismus. Comparisons between 4 mg and 8 mg doses in certain studies suggest that 4 mg may be sufficient for controlling postoperative edema.

8 mg dosage:

Other studies suggest that 8 mg is more effective than 4 mg in minimizing trismus and swelling, particularly when administered orally or intravenously. However, evidence is inconsistent, with some reports indicating no significant difference between 4 mg and 8 mg doses, suggesting that the choice of dose may depend on the administration route and patient-specific factors.

IV. Timing of Administration

Dexamethasone can be administered preoperatively, perioperatively, or postoperatively, with timing affecting its efficacy in controlling postoperative sequelae.

Preoperative: Preoperative administration is widely favored, as it prevents central sensitization caused by peripheral nociceptive activity during surgical trauma. This approach

has been shown to minimize postoperative pain, swelling, and trismus more effectively than other timings.

Perioperative:

Perioperative dexamethasone can modestly reduce edema and trismus, though evidence for pain reduction is limited. Ease of administration during surgery can also help reduce postoperative morbidity.

Postoperative:

Postoperative administration alone has shown some efficacy in controlling swelling, pain, and trismus, but studies are limited. In some cases, pre- and postoperative dosing appear equally effective, suggesting flexibility in timing depending on clinical context.

Table 2

Studies on dexamethasone comparing preoperative and postoperative administrations for third molar surgeries.

Study	Design	Dose (mg)	Time of administration	Route	Sample size and mean age (yr)	Results
Al-Shamiri et al.[13] (2017)	RCT	8	Preop. or Postop.	Oral	24 patients; N/A	Preop.>Postop.
Latif Shah et al.[66] (2018)	RCT	8	Preop. or Postop.	Intramuscular	150 patients; N/A	Preop.>Postop.
Giri et al.[24] (2019)	RCT	8	Preop. or Postop.	Intravenous	100 patients; 27.7±9.7	Preop.=Postop.
Núñez-Díaz et al.[67] (2020)	RCT	4	Preop. or Postop.	Intramuscular	60 patients; N/A	Preop.>Postop.
Sitthisongkhram et al.[71] (2020)	RCT	4	Preop. or Postop.	Pterygomandibular	27 patients; N/A	Preop.=Postop.

V. Difficulty of Surgery

The complexity of third molar extraction can influence postoperative outcomes and the benefits of dexamethasone administration. Although the Pell and Gregory Difficulty Index has limitations in reliability, it remains a useful tool in predicting postoperative sequelae. Most dexamethasone trials included teeth classified as Class II, Position B. Corticosteroid use is not necessary for every extraction but can be particularly valuable in cases of moderate to high surgical difficulty.

VI.Adverse Effects

Dexamethasone is generally well tolerated and has been widely used to reduce postoperative pain, swelling, and nausea. Systematic reviews indicate routine wound healing without significant complications, although transient increases in blood glucose may occur. Gastric irritation is possible but rarely severe, and combining corticosteroids with NSAIDs may increase the risk of peptic ulcers; prophylactic proton pump inhibitors are advised in such cases. Immunological effects, including mild T lymphocyte apoptosis or reduced β-cell counts, have been noted with moderate to high doses. Overall, most studies report minimal adverse effects, supporting the safe use of dexamethasone in oral surgery.

VII. CONCLUSION

Dexamethasone is an effective and potent corticosteroid for managing postoperative sequelae in third molar surgeries. Its anti-inflammatory action reduces pain, swelling, and trismus by suppressing key inflammatory mediators. Evidence from clinical trials indicates that preoperative administration, particularly via the submucosal route at doses of 4–8 mg, offers the most consistent benefit. However, outcomes can vary depending on study design, surgical complexity, and patient-specific factors. Further research is warranted to optimize dosing strategies and administration routes to maximize the therapeutic efficacy of dexamethasone.

REFERENCE

1. Mutlu I, Abubaker AO, Laskin DM. Narcotic prescribing habits and other methods of pain control by oral and maxillofacial surgeons after impacted third molar removal. J Oral Maxillofac Surg. 2013;71:1500–3. doi: 10.1016/j.joms.2013.04.031. https://doi.org/10.1016/j.joms.2013.04.031 . [DOI] [PubMed] [Google Scholar]
2. Herrera-Briones FJ, Prados Sánchez E, Reyes Botella C, Vallecillo Capilla M. Update on the use of corticosteroids in third molar surgery: systematic review of the literature.

Oral Surg Oral Med Oral Pathol Oral Radiol. 2013;116:e342–51. doi: 10.1016/j.oooo.2012.02.027. https://doi.org/10.1016/j.oooo.2012.02.027 . [DOI] [PubMed] [Google Scholar]

3. Antunes AA, Avelar RL, Martins Neto EC, Frota R, Dias E. Effect of two routes of administration of dexamethasone on pain, edema, and trismus in impacted lower third molar surgery. Oral Maxillofac Surg. 2011;15:217–23. doi: 10.1007/s10006-011-0290-9. https://doi.org/10.1007/s10006-011-0290-9 . [DOI] [PubMed] [Google Scholar]
   Kurihara A, Ohuchi K, Tsurufuji S. Reduction by dexamethasone of chemotactic activity in inflammatory exudates. Eur J Pharmacol. 1984;101:11–6. doi: 10.1016/0014-2999(84)90025-6. https://doi.org/10.1016/0014-2999(84)90025-6 . [DOI] [PubMed] [Google Scholar]
4. Messer EJ, Keller JJ. The use of intraoral dexamethasone after extraction of mandibular third molars. Oral Surg Oral Med Oral Pathol. 1975;40:594–8. doi: 10.1016/0030-4220(75)90369-2. https://doi.org/10.1016/0030-4220(75)90369-2 . [DOI] [PubMed] [Google Scholar]
5. Barnes PJ. Mechanisms and resistance in glucocorticoid control of inflammation. J Steroid Biochem Mol Biol. 2010;120:76–85. doi: 10.1016/j.jsbmb.2010.02.018. https://doi.org/10.1016/j.jsbmb.2010.02.018 . [DOI] [PubMed] [Google Scholar]
6. Simone JL, Jorge WA, Horliana AC, Canaval TG, Tortamano IP. Comparative analysis of preemptive analgesic effect of dexamethasone and diclofenac following third molar surgery. Braz Oral Res. 2013;27:266–71. doi: 10.1590/S1806-83242013005000012. https://doi.org/10.1590/S1806-83242013005000012 . [DOI] [PubMed] [Google Scholar]
7. Weber CR, Griffin JM. Evaluation of dexamethasone for reducing postoperative edema and inflammatory response after orthognathic surgery. J Oral Maxillofac Surg. 1994;52:35–9. doi: 10.1016/0278-2391(94)90010-8. https://doi.org/10.1016/0278-2391(94)90010-8 . [DOI] [PubMed] [Google Scholar]
8. Dhanavelu P, Shanmugapriyan S, Ebenezer V, Balakrishnan B, Elumalai M. Dexamethasone for third molar surgery- a review. Int J Pharm Bio Sci. 2013;4:9–13. [Google Scholar]
9. Stanbury RM, Graham EM. Systemic corticosteroid therapy--side effects and their management. Br J Ophthalmol. 1998;82:704–8. doi:

10.1136/bjo.82.6.704. https://doi.org/10.1136/bjo.82.6.704 . [DOI] [PMC free article] [PubMed] [Google Scholar]

10. Neupert EA, 3rd, Lee JW, Philput CB, Gordon JR. Evaluation of dexamethasone for reduction of postsurgical sequelae of third molar removal. J Oral Maxillofac Surg. 1992;50:1177–82. discussion 1182–3. doi: 10.1016/0278-2391(92)90149-t. https://doi.org/10.1016/0278-2391(92)90149-t . [DOI] [PubMed] [Google Scholar]
11. Waldron NH, Jones CA, Gan TJ, Allen TK, Habib AS. Impact of perioperative dexamethasone on postoperative analgesia and side-effects: systematic review and meta-analysis. Br J Anaesth. 2013;110:191–200. doi: 10.1093/bja/aes431. https://doi.org/10.1093/bja/aes431 . [DOI] [PMC free article] [PubMed] [Google Scholar]
12. Al-Shamiri HM, Shawky M, Hassanein N. Comparative assessment of preoperative versus postoperative dexamethasone on postoperative complications following lower third molar surgical extraction. Int J Dent. 2017;2017:1350375. doi: 10.1155/2017/1350375. https://doi.org/10.1155/2017/1350375 . [DOI] [PMC free article] [PubMed] [Google Scholar]
13. Takeuchi O, Akira S. Pattern recognition receptors and inflammation. Cell. 2010;140:805–20. doi: 10.1016/j.cell.2010.01.022. https://doi.org/10.1016/j.cell.2010.01.022 . [DOI] [PubMed] [Google Scholar]
14. Chen L, Deng H, Cui H, Fang J, Zuo Z, Deng J, et al. Inflammatory responses and inflammation-associated diseases in organs. Oncotarget. 2017;9:7204–18. doi: 10.18632/oncotarget.23208. https://doi.org/10.18632/oncotarget.23208 . [DOI] [PMC free article] [PubMed] [Google Scholar]
15. Coulthard P, Esposito M, Renton TF, Worthington HV. Surgical techniques for the removal of mandibular wisdom teeth. Cochrane Database Syst Rev. 2003;2003(7):CD004345. doi: 10.1002/14651858.CD004345.pub3. [DOI] [PubMed] [Google Scholar]
16. Amaya F, Izumi Y, Matsuda M, Sasaki M. Tissue injury and related mediators of pain exacerbation. Curr Neuropharmacol. 2013;11:592–7. doi: 10.2174/1570159X11311060003. https://doi.org/10.2174/1570159X11311060003. [DOI] [PMC free article] [PubMed] [Google Scholar]

17. Osunde OD, Adebola RA, Omeje UK. Management of inflammatory complications in third molar surgery: a review of the literature. Afr Health Sci. 2011;11:530–7. [PMC free article] [PubMed] [Google Scholar]
18. Majid OW. Submucosal dexamethasone injection improves quality of life measures after third molar surgery: a comparative study. J Oral Maxillofac Surg. 2011;69:2289–97. doi: 10.1016/j.joms.2011.01.037. https://doi.org/10.1016/j.joms.2011.01.037 . [DOI] [PubMed] [Google Scholar]
19. Isik K, Unsal A, Kalayci A, Durmus E. Comparison of three pain scales after impacted third molar surgery. Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 2011;112:715–8. doi: 10.1016/j.tripleo.2011.01.001. https://doi.org/10.1016/j.tripleo.2011.01.001 . [DOI] [PubMed] [Google Scholar]
20. Sirintawat N, Sawang K, Chaiyasamut T, Wongsirichat N. Pain measurement in oral and maxillofacial surgery. J Dent Anesth Pain Med. 2017;17:253–63. doi: 10.17245/jdapm.2017.17.4.253. https://doi.org/10.17245/jdapm.2017.17.4.253 . [DOI] [PMC free article] [PubMed] [Google Scholar]
21. Laureano Filho JR, Maurette PE, Allais M, Cotinho M, Fernandes C. Clinical comparative study of the effectiveness of two dosages of dexamethasone to control postoperative swelling, trismus and pain after the surgical extraction of mandibular impacted third molars. Med Oral Patol Oral Cir Bucal. 2008;13:E129–32. [PubMed] [Google Scholar]
22. Gozali P, Boonsiriseth K, Kiattavornchareon S, Khanijou M, Wongsirichat N. Decreased post-operative pain using a sublingual injection of dexamethasone (8 mg) in lower third molar surgery. J Dent Anesth Pain Med. 2017;17:47–53. doi: 10.17245/jdapm.2017.17.1.47. https://doi.org/10.17245/jdapm.2017.17.1.47 . [DOI] [PMC free article] [PubMed] [Google Scholar]
23. Giri KY, Joshi A, Rastogi S, Dandriyal R, Indra B, Prasad N, Singh HP, et al. Efficacy of intravenous dexamethasone administered preoperatively and postoperatively on pain, swelling, and trismus following third molar surgery. A comparative study. Oral Surg. 2019;12:110–7. doi: 10.1111/ors.12399. https://doi.org/10.1111/ors.12399 . [DOI] [Google Scholar]

24. Khalida B, Fazal M, Muntaha S, Khan K. Effect of submucosal injection of dexamethasone on post-operative swelling and trismus following impacted mandibular third molar surgery. Pakistan Oral Dent J. 2017;37:231–4. [Google Scholar]
25. Boonsiriseth K, Klongnoi B, Sirintawat N, Saengsirinavin C, Wongsirichat N. Comparative study of the effect of dexamethasone injection and consumption in lower third molar surgery. Int J Oral Maxillofac Surg. 2012;41:244–7. doi: 10.1016/j.ijom.2011.12.011. https://doi.org/10.1016/j.ijom.2011.12.011 . [DOI] [PubMed] [Google Scholar]
26. Kaewkumnert S, Phithaksinsuk K, Changpoo C, Nochit N, Muensaiyat Y, Wilaipornsawai S, et al. Comparison of intraosseous and submucosal dexamethasone injection in mandibular third molar surgery: a split-mouth randomized clinical trial. Int J Oral Maxillofac Surg. 2020;49:529–35. doi: 10.1016/j.ijom.2019.10.006. https://doi.org/10.1016/j.ijom.2019.10.006 . [DOI] [PubMed] [Google Scholar]
27. De Santana-Santos T, Martins-Filho PR, da Silva LC, Gomes AC de Souza-Santos aA, author; de Oliveira E Silva ED, author. Prediction of postoperative facial swelling, pain and trismus following third molar surgery based on preoperative variables. Med Oral Patol Oral Cir Bucal. 2013;18:e65–70. doi: 10.4317/medoral.18039. https://doi.org/10.4317/medoral.18039 . [DOI] [PMC free article] [PubMed] [Google Scholar]
28. Rullo R, Addabbo F, Papaccio G, D'Aquino R, Festa VM. Piezoelectric device vs. conventional rotative instruments in impacted third molar surgery: relationships between surgical difficulty and postoperative pain with histological evaluations. J Craniomaxillofac Surg. 2013;41:e33–8. doi: 10.1016/j.jcms.2012.07.007. https://doi.org/10.1016/j.jcms.2012.07.007 . [DOI] [PubMed] [Google Scholar]
29. Latt MM, Chewpreecha P, Wongsirichat N. Prediction of difficulty in impacted lower third molars extraction; review literature. Mahidol Dent J. 2015;35:281–90. [Google Scholar]
30. Majid OW, Mahmood WK. Use of dexamethasone to minimise post-operative sequelae after third molar surgery: comparison of five different routes of administration. Oral Surg. 2013;6:200–8. doi: 10.1111/ors.12049. https://doi.org/10.1111/ors.12049 . [DOI] [Google Scholar]

31. Bodh R, Kumari S, Mohanty S, Kumar RD, Diana C. Removal of a deeply impacted ectopic mandibular third molar through a buccal corticotomy in severe trismus-a case report. J Clin Diagn Res. 2018;12:ZD04–06. doi: 10.7860/JCDR/2018/29051.11077. https://doi.org/10.7860/JCDR/2018/29051.11077 . [DOI] [Google Scholar]
32. Shah SA, Khan I, Shah HS. Effectiveness of submucosal dexamethasone to control postoperative pain & swelling in apicectomy of maxillary anterior teeth. Int J Health Sci (Qassim) 2011;5:156–65. [PMC free article] [PubMed] [Google Scholar]
33. Baxendale BR, Vater M, Lavery KM. Dexamethasone reduces pain and swelling following extraction of third molar teeth. Anaesthesia. 1993;48:961–4. doi: 10.1111/j.1365-2044.1993.tb07474.x. https://doi.org/10.1111/j.1365-2044.1993.tb07474.x . [DOI] [PubMed] [Google Scholar]
34. Bamgbose BO, Akinwande JA, Adeyemo WL, Ladeinde AL, Arotiba GT, Ogunlewe MO. Effects of co-administered dexamethasone and diclofenac potassium on pain, swelling and trismus following third molar surgery. Head Face Med. 2005;1:11. doi: 10.1186/1746-160X-1-11. https://doi.org/10.1186/1746-160X-1-11 . [DOI] [PMC free article] [PubMed] [Google Scholar]
35. Graziani F, D'Aiuto F, Arduino PG, Tonelli M, Gabriele M. Perioperative dexamethasone reduces post-surgical sequelae of wisdom tooth removal. A split-mouth randomized double-masked clinical trial. Int J Oral Maxillofac Surg. 2006;35:241–6. doi:10.1016/j.ijom.2005.07.010. https://doi.org/10.1016/j.ijom.2005.07.010 . [DOI] [PubMed] [Google Scholar]
36. Sood P, Ahuja G, Makkar D, Gaba R, Sidana J. Oral health related quality of life: perspectives. Dent J Adv Stud. 2014;02:112–7. doi: 10.1055/s-0038-1671996. https://doi.org/10.1055/s-0038-1671996 . [DOI] [Google Scholar]
37. Tiwana PS, Foy SP, Shugars DA, Marciani RD, Conrad SM, Phillips C, et al. The impact of intravenous corticosteroids with third molar surgery in patients at high risk for delayed health-related quality of life and clinical recovery. J Oral Maxillofac Surg. 2005;63:55–62. doi: 10.1016/j.joms.2004.01.029. https://doi.org/10.1016/j.joms.2004.01.029 . [DOI] [PubMed] [Google Scholar]
38. Fokunang C, Fokunang ET, Frederick K, Ngameni B, Ngadjui B. Overview of non-steroidal anti-inflammatory drugs (nsaids) in resource limited countries. MOJ Toxicol. 2018;4:5–13. doi:

10.15406/mojt.2018.04.00081. https://doi.org/10.15406/mojt.2018.04.00081 . [DOI] [Google Scholar]

39. Kim K, Brar P, Jakubowski J, Kaltman S, Lopez E. The use of corticosteroids and nonsteroidal antiinflammatory medication for the management of pain and inflammation after third molar surgery: a review of the literature. Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 2009;107:630–40. doi: 10.1016/j.tripleo.2008.11.005. https://doi.org/10.1016/j.tripleo.2008.11.005 . [DOI] [PubMed] [Google Scholar]
40. Benoliel R, Kahn J, Eliav E. Peripheral painful traumatic trigeminal neuropathies. Oral Dis. 2012;18:317–32. doi: 10.1111/j.1601-0825.2011.01883.x. https://doi.org/10.1111/j.1601-0825.2011.01883.x . [DOI] [PubMed] [Google Scholar]
41. Alcântara CE, Falci SG, Oliveira-Ferreira F, Santos CR, Pinheiro ML. Pre-emptive effect of dexamethasone and methylprednisolone on pain, swelling, and trismus after third molar surgery: a split-mouth randomized triple-blind clinical trial. Int J Oral Maxillofac Surg. 2014;43:93–8. doi: 10.1016/j.ijom.2013.05.016. https://doi.org/10.1016/j.ijom.2013.05.016 . [DOI] [PubMed] [Google Scholar]
42. Gopinath KA, Chakraborty M, Arun V. Comparative evaluation of submucosal and intravenous dexamethasone on postoperative sequelae following third molar surgery: a prospective randomized control study. Int J Oral Care Res. 2017;5:191–5. [Google Scholar]
43. Grossi GB, Maiorana C, Garramone RA, Borgonovo A, Beretta M, Farronato D, et al. Effect of submucosal injection of dexamethasone on postoperative discomfort after third molar surgery: a prospective study. J Oral Maxillofac Surg. 2007;65:2218–26. doi: 10.1016/j.joms.2006.11.036. https://doi.org/10.1016/j.joms.2006.11.036 . [DOI] [PubMed] [Google Scholar]
44. Schweizer A, Brom R, Glatt M, Bray MA. Leukotrienes reduce nociceptive responses to bradykinin. Eur J Pharmacol. 1984;105:105–12. doi: 10.1016/0014-2999(84)90653-8. https://doi.org/10.1016/0014-2999(84)90653-8 . [DOI] [PubMed] [Google Scholar]
45. Lerner UH, Ransjö M, Ljunggren O. Bradykinin stimulates production of prostaglandin E2 and prostacyclin in murine osteoblasts. Bone Miner. 1989;5:139–54. doi: 10.1016/0169-6009(89)90092-5. https://doi.org/10.1016/0169-6009(89)90092-5 . [DOI] [PubMed] [Google Scholar]

46. Fernandes IA, de Souza GM, Pinheiro MLP, Falci SGM. Intramuscular injection of dexamethasone for the control of pain, swelling, and trismus after third molar surgery: a systematic review and meta-analysis. Int J Oral Maxillofac Surg. 2019;48:659–68. doi: 10.1016/j.ijom.2018.09.014. https://doi.org/10.1016/j.ijom.2018.09.014 . [DOI] [PubMed] [Google Scholar]
47. 48.Klongnoi B, Kaewpradub P, Boonsiriseth K, Wongsirichat N. Effect of single dose preoperative intramuscular dexamethasone injection on lower impacted third molar surgery. Int J Oral Maxillofac Surg. 2012;41:376–9. doi: 10.1016/j.ijom.2011.12.014. https://doi.org/10.1016/j.ijom.2011.12.014 . [DOI] [PubMed] [Google Scholar]
48. Bhargava D, Sreekumar K, Deshpande A. Effects of intra-space injection of Twin mix versus intraoral-submucosal, intramuscular, intravenous and per-oral administration of dexamethasone on post-operative sequelae after mandibular impacted third molar surgery: a preliminary clinical comparative study. Oral Maxillofac Surg. 2014;18:293–6. doi: 10.1007/s10006-013-0412-7. https://doi.org/10.1007/s10006-013-0412-7 . [DOI] [PubMed] [Google Scholar]
49. 50.Sabhlok S, Kenjale P, Mony D, Khatri I, Kumar P. Randomized controlled trial to evaluate the efficacy of oral dexamethasone and intramuscular dexamethasone in mandibular third molar surgeries. J Clin Diagn Res. 2015;9:ZC48–51. doi: 10.7860/JCDR/2015/13930.6813. https://doi.org/10.7860/JCDR/2015/13930.6813 . [DOI] [PMC free article] [PubMed] [Google Scholar]
50. De Sousa Santos JA, da Silva LC, de Santana Santos T, Menezes Júnior LR, de Assunção Oliveira AC, Brandão JR. Comparative study of tramadol combined with dexamethasone and diclofenac sodium in third-molar surgery. J Craniomaxillofac Surg. 2012;40:694–700. doi: 10.1016/j.jcms.2012.01.001. https://doi.org/10.1016/j.jcms.2012.01.001 . [DOI] [PubMed] [Google Scholar]
51. Nandini GD. Eventuality of dexamethasone injected intra-massetrically on post operative sequel following the surgical extraction of impacted mandibular third molars: a prospective study. J Maxillofac Oral Surg. 2016;15:456–60. doi: 10.1007/s12663-015-0847-5. https://doi.org/10.1007/s12663-015-0847-5 . [DOI] [PMC free article] [PubMed] [Google Scholar]
52. Arora SS, Phull T, Kumar I, Kumar A, Kumar N, Singh H. A comparative study of the effect of two dosages of submucosal injection of dexamethasone on postoperative

discomfort after third molar surgery: a prospective randomized study. Oral Maxillofac Surg. 2018;22:225–30. doi: 10.1007/s10006-018-0699-https://doi.org/10.1007/s10006-018-0699-5 . [DOI] [PubMed] [Google Scholar]

53. Troiano G, Laino L, Cicciù M, Cervino G, Fiorillo L, D'amico C, et al. Comparison of two routes of administration of dexamethasone to reduce the postoperative sequelae after third molar surgery: a systematic review and meta-analysis. Open Dent J. 2018;12:181–8. doi: 10.2174/1874210601812010181. https://doi.org/10.2174/1874210601812010181 . [DOI] [PMC free article] [PubMed] [Google Scholar]

54. Moraschini V, Hidalgo R, Porto Barboza Ed. Effect of submucosal injection of dexamethasone after third molar surgery: a meta-analysis of randomized controlled trials. Int J Oral Maxillofac Surg. 2016;45:232–40. doi: 10.1016/j.ijom.2015.09.008. https://doi.org/10.1016/j.ijom.2015.09.008 . [DOI] [PubMed] [Google Scholar]

55. Deo SP. Single-dose of submucosal injection of dexamethasone affects the post operative quality of life after third molar surgery. J Maxillofac Oral Surg. 2016;15:367–75. doi: 10.1007/s12663-015-0846-6. https://doi.org/10.1007/s12663-015-0846-6 . [DOI] [PMC free article] [PubMed] [Google Scholar]

56. Warraich R, Faisal M, Rana M, Shaheen A, Gellrich NC, Rana M. Evaluation of postoperative discomfort following third molar surgery using submucosal dexamethasone - a randomized observer blind prospective study. Oral Surg Oral Med Oral Pathol Oral Radiol. 2013;116:16–22. doi: 10.1016/j.oooo.2012.12.007. https://doi.org/10.1016/j.oooo.2012.12.007 . [DOI] [PubMed] [Google Scholar]

57. Moore PA, Brar P, Smiga ER, Costello BJ. Preemptive rofecoxib and dexamethasone for prevention of pain and trismus following third molar surgery. Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 2005;99:E1–7. doi: 10.1016/j.tripleo.2004.08.028. https://doi.org/10.1016/j.tripleo.2004.08.028 . [DOI] [PubMed] [Google Scholar]

58. Al-Dajani M. Can preoperative intramuscular single-dose dexamethasone improve patient-centered outcomes following third molar surgery? J Oral Maxillofac Surg. 2017;75:1616–26. doi: 10.1016/j.joms.2017.03.037. https://doi.org/10.1016/j.joms.2017.03.037 . [DOI] [PubMed] [Google Scholar]

59. Vivek GK, Vaibhav N, Shafath A, Imran M. Efficacy of intravenous, intramassetric, and submucosal routes of dexamethasone administration after impacted third molar surgery: a randomized, comparative clinical study. J Adv Clin Res Insights. 2017;4:3–7. doi: 10.15713/ins.jcri.146. [DOI] [Google Scholar]
60. Latt MM, Kiattavorncharoen S, Boonsiriseth K, Pairuchvej V, Wongsirichat N. The efficacy of dexamethasone injection on postoperative pain in lower third molar surgery. J Dent Anesth Pain Med. 2016;16:95–102. doi: 10.17245/jdapm.2016.16.2.95. https://doi.org/10.17245/jdapm.2016.16.2.95 . [DOI] [PMC free article] [PubMed] [Google Scholar]
61. Moranon P, Chaiyasamut T, Sakdajeyont W, Vorakulpipat C, Klongnoi B, Kiattavornchareon S, et al. Dexamethasone injection into pterygomandibular space versus sublingual space on post-operative sequalae of lower third molar intervention. J Clin Med Res. 2019;11:501–8. doi: 10.14740/jocmr3844. https://doi.org/10.14740/jocmr3844 . [DOI] [PMC free article] [PubMed] [Google Scholar]
62. .Majid OW, Mahmood WK. Effect of submucosal and intramuscular dexamethasone on postoperative sequelae after third molar surgery: comparative study. Br J Oral Maxillofac Surg. 2011;49:647–52. doi: 10.1016/j.bjoms.2010.09.021. https://doi.org/10.1016/j.bjoms.2010.09.021 . [DOI] [PubMed] [Google Scholar]
63. Chaudhary PD, Rastogi S, Gupta P, Niranjanaprasad Indra B, Thomas R, Choudhury R. Pre-emptive effect of dexamethasone injection and consumption on post-operative swelling, pain, and trismus after third molar surgery. A prospective, double blind and randomized study. J Oral Biol Craniofac Res. 2015;5:21–7. doi: 10.1016/j.jobcr.2015.02.001. https://doi.org/10.1016/j.jobcr.2015.02.001 . [DOI] [PMC free article] [PubMed] [Google Scholar]
64. Ngeow WC, Lim D. Do corticosteroids still have a role in the management of third molar surgery? Adv Ther. 2016;33:1105–39. doi: 10.1007/s12325-016-0357-y. https://doi.org/10.1007/s12325-016-0357-y . [DOI] [PMC free article] [PubMed] [Google Scholar]
65. Latif Shah K, Saud Al Lbad A, Al Anazi YM, Ahmad Al Khalaf Y, Mohammed Balto M, Jaafar Albahrani Z. Comparison of therapeutic effects of 8 mg dexamethasone intramuscular administered pre-operatively vs. post operatively after the surgical extraction of impacted mandibular third molars. Dent Craniofac Res. 2018;03:9. doi:

10.21767/2576-392x.100025. https://doi.org/10.21767/2576-392x.100025 . [DOI] [Google Scholar]

66. Núñez-Díaz D, Chumpitaz-Cerrate V, Chávez-Rimache L, Cruz LGS. Comparison of the anti-inflammatory effectiveness of dexamethasone as pre-surgical and post-surgical therapy in mandibular third molar surgery: a randomized clinical trial. J Oral Res. 2020;8:463–70. doi: 10.17126/joralres.2019.0. https://doi.org/10.17126/joralres.2019.0 . [DOI] [Google Scholar]
67. Markiewicz MR, Brady MF, Ding EL, Dodson TB. Corticosteroids reduce postoperative morbidity after third molar surgery: a systematic review and meta-analysis. J Oral Maxillofac Surg. 2008;66:1881–94. doi: 10.1016/j.joms.2008.04.022. https://doi.org/10.1016/j.joms.2008.04.022 . [DOI] [PubMed] [Google Scholar]
68. Mehra P, Reebye U, Nadershah M, Cottrell D. Efficacy of anti-inflammatory drugs in third molar surgery: a randomized clinical trial. Int J Oral Maxillofac Surg. 2013;42:835–42. doi: 10.1016/j.ijom.2013.02.017. https://doi.org/10.1016/j.ijom.2013.02.017 . [DOI] [PubMed] [Google Scholar]
69. Lima CAA, Favarini VT, Torres AM, da Silva RA, Sato FRL. Oral dexamethasone decreases postoperative pain, swelling, and trismus more than diclofenac following third molar removal: a randomized controlled clinical trial. Oral Maxillofac Surg. 2017;21:321–26. doi: 10.1007/s10006-017-0635-0. https://doi.org/10.1007/s10006-017-0635-0 . [DOI] [PubMed] [Google Scholar]
70. Sitthisongkhram K, Niyomtham N, Chaiyasamut T, Pairuchvej V, Kc K, Wongsirichat N. Effectiveness of dexamethasone injection in the pterygomandibular space before and after lower third molar surgery. J Dent Anesth Pain Med. 2020;20:313–23. doi: 10.17245/jdapm.2020.20.5.313. https://doi.org/10.17245/jdapm.2020.20.5.313 . [DOI] [PMC free article] [PubMed] [Google Scholar]
71. Darawade DA, Kumar S, Mehta R, Sharma AR, Reddy GS. In search of a better option: dexamethasone versus methylprednisolone in third molar impaction surgery. J Int Oral Health. 2014;6:14–7. [PMC free article] [PubMed] [Google Scholar]
72. Lim D, Ngeow WC. A comparative study on the efficacy of submucosal injection of dexamethasone versus methylprednisolone in reducing postoperative sequelae after third molar surgery. J Oral Maxillofac Surg. 2017;75:2278–86. doi:

10.1016/j.joms.2017.05.033. https://doi.org/10.1016/j.joms.2017.05.033 . [DOI] [PubMed] [Google Scholar]

73. García AG, Sampedro FG, Rey JG, Vila PG, Martin MS. Pell-Gregory classification is unreliable as a predictor of difficulty in extracting impacted lower third molars. Br J Oral Maxillofac Surg. 2000;38:585–7. doi: 10.1054/bjom.2000.0535. https://doi.org/10.1054/bjom.2000.0535 . [DOI] [PubMed] [Google Scholar]
74. Capuzzi P, Montebugnoli L, Vaccaro MA. Extraction of impacted third molars. A longitudinal prospective study on factors that affect postoperative recovery. Oral Surg Oral Med Oral Pathol. 1994;77:341–3. doi: 10.1016/0030-4220(94)90194-5. https://doi.org/10.1016/0030-4220(94)90194-5 . [DOI] [PubMed] [Google Scholar]
75. Caplan A, Fett N, Rosenbach M, Werth VP, Micheletti RG. Prevention and management of glucocorticoid-induced side effects: a comprehensive review: gastrointestinal and endocrinologic side effects. J Am Acad Dermatol. 2017;76:11–6. doi: 10.1016/j.jaad.2016.02.1239. https://doi.org/10.1016/j.jaad.2016.02.1239 . [DOI] [PubMed] [Google Scholar]
76. Bebawy JF. Perioperative steroids for peritumoral intracranial edema: a review of mechanisms, efficacy, and side effects. J Neurosurg Anesthesiol. 2012;24:173–7. doi: 10.1097/ANA.0b013e3182578bb5. https://doi.org/10.1097/ANA.0b013e3182578bb5 . [DOI] [PubMed] [Google Scholar]
77. Laino L, Menditti D, Lo Muzio L, Laino G, Lauritano F, Cicciù M. Extraoral surgical approach of ectopic mandibular third molar to the lower border of mandible. J Craniofac Surg. 2015;26:e256–60. doi: 10.1097/SCS.0000000000001541. https://doi.org/10.1097/SCS.0000000000001541 . [DOI] [PubMed] [Google Scholar]