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# Uso de corticoides no controlo da dor pós cirurgia de extração dos terceiros molares inferiores inclusos: uma revisão sistematizada

Use of corticoids to control pain after impacted mandibular third molar surgery: a systematized review

**Systematized review**

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# Index

## Acronyms list

(DM): Dexamethasone

(MP): Methylprednisolone

(INF): Postoperative complications such as inflammation

(PP): Postoperative pain

(TR): Trismus

## Resumo

**Introdução:** A pesquisa centrou-se no uso de corticosteroides para controlar a dor e as complicações pós-operatórias, como inflamação e trismo, após a extração cirúrgica de terceiros molares inferiores impactados. Os corticosteroides, especialmente os glucocorticoides como dexametasona (DM) e metilprednisolona (MP), possuem propriedades anti-inflamatórias potentes ao inibir mediadores como as prostaglandinas.

**Objetivos:** O objetivo deste artigo é comparar o efeito dos glucocorticoides e do ibuprofeno, um dos anti-inflamatórios não esteroides (AINEs) mais utilizados, no controlo da dor pós-operatória.

**Materiais e Métodos**: Este trabalho consiste numa revisão sistematizada baseada na estratégia PICO. Os artigos foram selecionados de acordo com critérios de inclusão e exclusão relacionados com o efeito dos corticosteroides na dor pós-operatória em pacientes submetidos à extração de terceiros molares inferiores impactados.

**Resultados:** O processo de seleção nesta revisão sistemática da literatura científica disponível começou com 280 registos. Após filtragem por relevância, duplicados e filtros automáticos, restaram 86 estudos. Destes, 35 textos completos não puderam ser obtidos, ficando 51 para avaliação. Posteriormente, 35 foram excluídos por não cumprirem os critérios específicos, resultando num total final de 16 estudos.

**Conclusão:** De acordo com a literatura científica, os glucocorticoides, como a dexametasona e outros corticosteroides, demonstram eficácia na redução da dor pós-operatória associada à extração dentária de terceiros molares, sendo recomendada a sua administração no manejo analgésico. Contudo, não há estudos clínicos comparativos diretos que avaliem a eficácia desses agentes em relação aos anti-inflamatórios não esteroides (AINEs), como o ibuprofeno. Por outro lado, a evidência científica sugere que a associação de corticosteroides, especificamente dexametasona, com AINEs pode potencializar os efeitos

analgésicos e anti-inflamatórios em comparação com o uso isolado de AINEs. Esses dados indicam que os corticosteroides possuem um potente efeito modulador na resposta inflamatória e na perceção da dor, podendo exercer um efeito sinérgico quando administrados concomitantemente com AINEs, otimizando o controle sintomático pós-operatório.

**Palavras-chave:** Corticosteroides, Dor pós-operatória, Dente do siso impactado, Inflamação, Trismo.

## Abstract

**Introduction:** The research focused on the use of corticosteroids to control pain and postoperative complications, such as inflammation and trismus, after surgical extraction of impacted lower third molars. Corticosteroids, especially glucocorticoids like dexamethasone (DM) and methylprednisolone (MP), possess potent anti-inflammatory properties by inhibiting mediators such as prostaglandins.

**Objectives:** The aim of this paper is to analyze and compare the effect of glucocorticoids and ibuprofen, one of the most frequently used NSAIDs, in controlling postoperative pain.

**Materials and Methods:** This work consist of a systematized review based on the PICO strategy. Articles were selected according to inclusion and exclusion criteria related to the effect of corticosteroids on postoperative pain in patients undergoing extraction of impacted lower third molars.

**Results:** The selection process for this systematized review of the available scientific literature began with 280 records. After filtering by relevance, duplicates, and automatic filters, 86 studies remained. Of these, 35 full texts could not be obtained, leaving 51 for evaluation. Subsequently, 35 were excluded for not meeting specific criteria, resulting in a final total of 16 studies.

**Conclusion:** According to the scientific literature, glucocorticoids such as dexamethasone and other corticosteroids demonstrate efficacy in reducing postoperative pain associated with third molar dental extraction, and their routine administration is recommended in pain management. However, there are no direct comparative clinical studies evaluating the efficacy of these agents against non-steroidal anti-inflammatory drugs (NSAIDs), such as ibuprofen. On the other hand, scientific evidence suggests that combining corticosteroids specifically dexamethasone with NSAIDs may enhance analgesic and anti-inflammatory effects compared to the isolated use of NSAIDs. These data indicate that corticosteroids have a potent modulatory effect on the inflammatory response

and pain perception, potentially exerting a synergistic effect when administered concomitantly with NSAIDs, thereby optimizing postoperative symptom control.

**Keywords:** Corticosteroids, Postoperative pain, Impacted third molar, Inflammation, Trismus.

## List of Tables



## List of figures

## Contextualization of the theme

The use of multimodal analgesia is a common practice in clinical settings, where a combination of drugs with different mechanisms of action is used to improve pain relief and reduce adverse effects. However, although conventional analgesics are frequently used, research has explored more effective alternatives, such as the use of corticosteroids, for the management of postoperative pain. The evidence on the efficacy and safety of these interventions is still debated. (1)

In international literature it is reported that between 30.3% and 68.6% of the world population has impacted third molars. (2) Postoperative pain is a relevant problem because it generates anxiety in patients, so it is essential to adopt practices that can reduce this side effect and contribute to the patient's well-being. (2) This pain arises as a natural response of the body to surgery and, specifically, to the immune system reaction to tissue damage. (3)

Chemical mediators recognize the lesion and induce the migration of inflammatory cells to the affected tissues. Pain at the surgical site may increase and persist for prolonged periods after the noxious stimulus has been removed. The extraction of an impacted molar can cause discomfort ranging from moderate to severe. Medications such as nonsteroidal anti-inflammatory drugs (NSAIDs), corticosteroids, and analgesics with central and peripheral actions, either alone or in combination, are used to manage this pain. (4)

Corticosteroids fall into two categories: glucocorticoids and mineralocorticoids. (5) In this study we will focus only on glucocorticoids, as they have anti-inflammatory properties with minimal or no effect on fluid and electrolyte balance. Glucocorticoids have been shown to be effective in suppressing the inflammatory response, which manifests itself through symptoms such as pain, heat, redness, swelling and loss of function. (6)

The use of corticosteroids could transform postoperative practices in oral surgery by improving recovery and reducing patient discomfort. (7) Trauma management in dentistry requires effective treatments. Controlling pain during the intervention is essential, but given that these procedures are more invasive than conservative therapies, it is also crucial to ensure adequate pain management in the

postoperative period. (8) However, although there are several options for relieving post-surgical pain in oral surgery including traditional analgesics, glucocorticoid represents a promising alternative due to their proven anti-inflammatory capacity. Their incorporation could optimize clinical outcomes and significantly improve the patient experience after invasive procedures such as third molar extraction. (9)

Corticosteroids are produced in the cortex of the adrenal glands and have a more significant impact on carbohydrate metabolism than on water and electrolyte regulation. Their mechanism of action involves inhibition of phospholipase A2 secretion and stimulation of the production of lipocortin, a protein that acts as an inhibitor of phospholipase A2. (10)

These hormones have receptors present in almost every cell of the body, allowing them to generate diverse physiological responses. They function as transcription factors for specific genes, regulating their expression and influencing the immune system at the cellular level, including effects on cytokines. (11)

Due to changes in gene expression and protein synthesis, the effects of corticosteroids are not immediate; they manifest after several hours, which is relevant for clinical application. The main action of corticosteroids appears to be the suppression of different phases of the inflammatory response, such as cell recruitment (vasodilation and diapedesis), inhibition of granulation tissue formation and reduction in the secretion of enzymes (phospholipase, collagenase and elastase) as well as pro-inflammatory mediators (prostaglandins and prostacyclins). (8)

The use of corticosteroids is more palliative than curative; the goal is to relieve the patient's symptoms. Various doses have been shown to be effective in controlling edema and trismus. A single high dose or a short course of treatment usually has few side effects; however, potential adverse effects increase with the intensity and duration of treatment. When administered for more than a week, signs of toxicity and suppression of the hypothalamic-pituitary-adrenal axis may appear, manifesting as hyperglycemia, glycosuria, fluid retention, hyperkalemia, changes in body fat distribution, increased risk of infection, and impaired wound healing. (11)

Corticosteroid administration is contraindicated in cases such as ocular herpes, glaucoma, tuberculosis and psychosis; it is also relatively contraindicated in peptic ulcers, hypotension, diabetes mellitus, osteoporosis and chronic infections. It is essential to carefully evaluate the balance between risks and benefits before starting treatment. (11) In the dental surgical setting, corticosteroids help reduce trismus and inflammation after third molar surgery. They are more effective when given before the procedure than after. (12)

The use of corticosteroids in various formulations has proven to be effective in controlling pain, inflammation, and trismus after wisdom tooth extraction. These medications work by inhibiting inflammatory mediators responsible for vascular exudation and edema, as well as providing analgesic effects due to their anti-inflammatory action and their ability to inhibit prostaglandins. Although the most intense effects are observed within the first 24 hours postoperatively, they can last up to three days. (12)

The interaction between the mechanisms of nonsteroidal anti-inflammatory drugs (NSAIDs) and corticosteroids suggests that combination therapy may substantially alleviate expected complications without causing adverse reactions associated with the use of either drug alone. (13)

It has been shown that a single dose of dexamethasone administered before the procedure is as effective as methylprednisolone in reducing postoperative inflammation and trismus. This approach offers a practical and efficient solution to improve clinical outcomes for patients, minimizing discomfort and promoting faster recovery. (14)

However, there are divergent opinions among authors regarding the effectiveness of corticosteroids in reducing limitations in mouth opening after third molar surgery. Although there are studies indicating that they do not have a significant impact on trismus per se, Peterson et al. recommended their use to minimize pain, edema, and trismus. Even so, the most effective method for their application is not yet well established in the literature. (15)

Finally, an initial intravenous dose of corticosteroid during surgery was found to have a significant clinical effect in reducing edema and trismus in the first few postoperative days; however, this benefit disappeared between the second and

third days if additional doses were not administered subsequently. This suggests that single doses may be useful initially but may require boosting to maintain the benefits throughout the critical period of recovery. (15) Their findings were corroborated by other studies indicating that patients treated with corticosteroids experienced persistent facial swelling until the third day after surgery, thus recommending their administration for at least three postoperative days. (12)

Opinions vary among authors about the potential side effects of steroids used in surgery; However, there is no evidence of adrenal cortex suppression with high short-term doses. Limited parenteral use (immediately before and after the operation), regardless of the dose administered, does not negatively affect adrenal-pituitary regulation concerning natural steroid secretion, which implies its safety for this indication. (16)

Potential complications associated with perioperative corticosteroid use include adrenal suppression and delayed healing, primarily observed with prolonged administration. While steroids are effective in reducing the inflammatory response after third molar extraction, their use remains limited due to concerns about impairing normal healing and issues such as needle phobia related to their parenteral administration. (15)

Traditionally, non-steroidal anti-inflammatory drugs (NSAIDs) have been preferred for controlling INF and PP due to their rapid onset and sustained analgesic effects. However, recent clinical trials suggest that administering a single preoperative dose of glucocorticoids may be more effective in preventing these complications than a single NSAID dose. (16)

Additionally, corticosteroids limit the release of lysozyme and reduce the vasodilatory action of bradykinin, leading to a reduction in edema and inflammation. Clinically, these actions translate into better outcomes after procedures such as third molar extractions. Although they significantly reduce edema and trismus by decreasing inflammatory mediators, they do not directly affect the neurotransmitters responsible for pain; Therefore, pain may persist but with less intensity. (15)

There are several routes for administering corticosteroids in oral surgery. The most common are oral and submucosal routes. The oral route is usually preferred

for its convenience and greater acceptance by patients; Corticosteroids administered orally are rapidly absorbed with nearly complete bioavailability. However, this raises questions about their onset of action and the time needed to reach therapeutic plasma levels. (16)

On the other hand, the use of ibuprofen in the preoperative period has been shown to reduce both the frequency and intensity of pain experienced by patients. We believe that, since this preoperative medication appears to offer significant benefits without presenting relevant adverse effects, its administration could be routinely adopted in surgical procedures related to the extraction of third molars. Likewise, this strategy could be extended to routine dental extractions, thereby improving patient comfort and recovery. The widespread implementation of preoperative ibuprofen in these contexts could contribute to more effective pain management and a more positive surgical experience for patients, always ensuring that its use is supervised and adjusted according to individual needs and specific clinical conditions. (17)

In contrast, submucosal administration due to its proximity to the surgical site can allow for direct local action on eicosanoids at the tissue level. This could prevent subsequent inflammatory processes more effectively than systemic administration. The submucosal route offers several advantages: it is less invasive, eliminates the need for an additional injection site, reduces systemic effects, and does not cause pain when applied in a previously anesthetized area. Therefore, this method is considered safe, simple, and suitable for routine use in oral surgery. (18)

It is important to mention that these treatments cause some pain, therefore, pain, according to the International Association for the Study of Pain (IASP), is an unpleasant sensory or emotional experience associated with actual or potential tissue damage, and it is a subjective concept that manifests when a person perceives it. It is a common condition in the general population, especially relevant in the workplace due to its socioeconomic implications. The prevalence and intensity of pain are higher in women and increase with age. (19)

Analgesic prescription should consider factors such as age, sex, cause of pain, and sociodemographic or psychosocial aspects. (19)

The assessment of pain's impact for legal purposes requires a multidisciplinary approach that integrates medical, occupational, and social aspects. This process involves evaluating limitations caused by the illness from a medical perspective and then grading them according to specific regulations of each country to determine compensation for damages. Defining pain in a universally accepted way is challenging because it is a personal and subjective experience. Additionally, there is no scientific method to measure it objectively, as perceptions vary widely and can be influenced by numerous sensations that may intensify the experience. Due to these difficulties, assessment relies on simple, understandable tools that are quick for patients to use and are reliable and valid. Traditionally, scales such as analog, verbal, numerical, or graphical ones have been employed alongside clinical history to evaluate pain. (19)

## Objectives

The aim of this paper is to compare the effect of glucocorticoids and ibuprofen in controlling postoperative pain.

## Materials and methods

This work consists of a systematized review based on the PICO strategy. Articles are selected according to inclusion and exclusion criteria related to the effect of corticosteroids on postoperative pain in patients undergoing extraction of impacted lower third molars.

### Inclusion Criteria

- Clinical investigations, randomized controlled trials, observational studies, or systematic reviews that include patients who are adults over 18 years old and have undergone bilateral or unilateral lower wisdom tooth extraction.
- Studies that specifically report on the efficacy of postoperative pain control with corticosteroids.
- Publications with clear data on postoperative pain management, including the use of corticosteroids and other analgesics.

### Exclusion Criteria

- Studies that do not report specific data on postoperative pain control with corticosteroids.
- Studies with non-rigorous methodologies, such as anecdotal reports, retrospective studies without proper controls, or articles lacking peer review.
- Studies that use corticosteroids in doses or forms different from those commonly employed in oral surgery if this affects comparability.

The PICO criteria defined are the following:

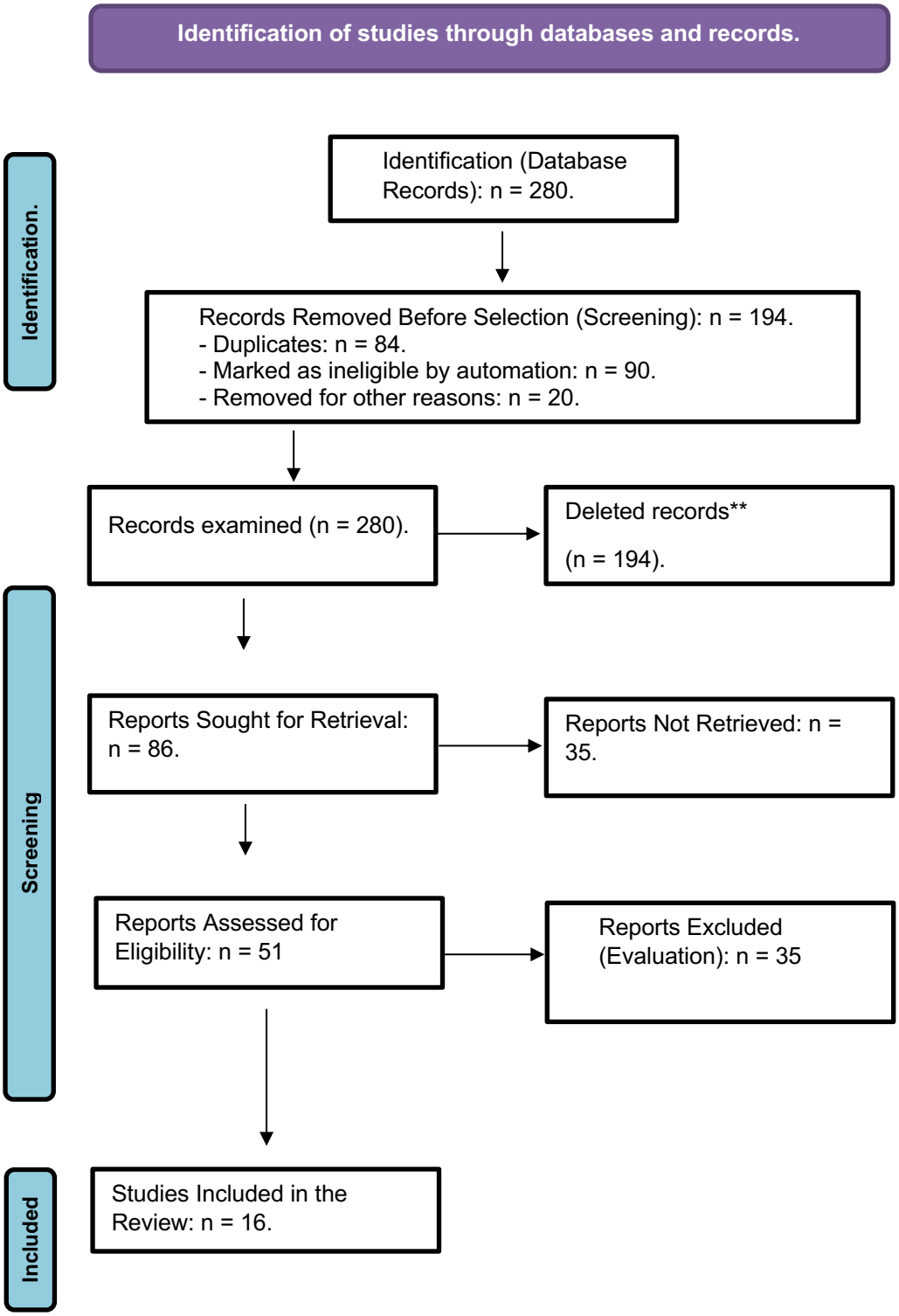
- Population: Patients undergoing extraction of impacted lower third molars.
- Investigation: Patients taking corticosteroid medication starting immediately after surgery.

- Comparison: Patients taking ibuprofen starting immediately after surgery.
- Outcome: Compare pain, according to a quantitative scale Numeric Rating Scale (NRS).

The databases used to search for relevant articles on the topic are PubMed, Cochrane Library, Web of Science, and Scopus, applying filters for time (between 2014 and 2024) and language (Portuguese, English, and Spanish).

The search for articles is based on the following keywords: “third molar extraction”, “third molar surgery”, “ibuprofen”, “corticosteroids”, “pain”, “corticosteroid use” in isolation and using different combinations using the Boolean connector “AND”. The articles will be filtered based on the title, abstract and, finally, on the full reading of the article. Below is the PRISMA diagram, which highlights the selected articles.

***Figure1 -*** *PRISMA diagram.*



The study selection process in this systematized review began with an initial search across PubMed, Cochrane Library, Web of Science, and Scopus, which identified a total of 280 potential records. This step serves as the starting point, as it gathers all studies that could be relevant to the research. Subsequently, a screening phase was conducted in which the titles and abstracts of these records were examined to quickly eliminate those that were clearly irrelevant. As a result, 194 records were discarded, leaving a more manageable set for further analysis. The removal at this stage was mainly justified by three reasons: the presence of duplicates (84 records), which are repeated studies found in different databases; the application of automated filters that marked 90 records as ineligible; and other miscellaneous reasons not specified, accounting for 20 records eliminated. Of the remaining 86 reports after screening, attempts were made to obtain the full texts of each one. However, it was not possible to retrieve complete reports in 35 cases, reducing the number of studies available for evaluation to 51.

This stage was crucial to determine whether the studies could be analyzed in depth. Next, these 51 retrieved reports underwent a detailed assessment based on predefined inclusion and exclusion criteria established earlier. During this thorough review, an additional 35 reports were excluded for not meeting all the necessary thematic or methodological requirements. Although the exact reasons are not always specified, these exclusions generally relate to aspects such as the studied population, applied interventions, or reported outcomes. Finally, after completing all previous phases, a total of 16 studies remained included in the review. These represent the final evidence upon which the conclusions and analyses of this systematized work will be based. This meticulous process ensures that only the most relevant studies are part of the final analysis.

# Results

*Table1. Results of articles.*

| Author, country, year. | Type of article. | Subject and scope. | Goals. | Results. | Conclusions, implications. |
|---|---|---|---|---|---|
| - Alcantara, C., Falci, S., Oliveira-Ferreira, F., Santos, C., and Pinheiro, C.<br>- Brazil<br>- 2014 | Randomized, double-blind, split-mouth clinical trial | Evaluation of the preventive effect of dexamethasone and methylprednisolone on pain, inflammation, and trismus after third molar surgery. | To compare the efficacy of dexamethasone and methylprednisolone in reducing postoperative complications in third molar surgery. | Both corticosteroids showed beneficial effects in reducing pain, inflammation, and trismus; however, there were no statistically significant differences between them. | Dexamethasone and methylprednisolone are effective in preventing postoperative complications in third molar surgery; their use may improve patient comfort. |
| - Zetehaku Araújo, R., Campos Pinto, A., Sigua-Rodriguez, E., Olate, S., Fonseca Alves, L., and Henriques de Castro, W.<br>- Brazil<br>- 2016 | Original study | Pain control in third molar surgery. | Evaluate methods to control pain in this type of surgery. | Different techniques or medications for pain control are analyzed. | Recommend effective strategies to improve postoperative pain management. |

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| **- Ngeow, W., Lim, D.**<br>**- Malaysia**<br>**- 2016** | Revision | Use of corticosteroids in third molar surgery. | To review the current role of corticosteroids in postoperative treatment after third molar extraction. | Corticosteroids continue to be helpful in reducing pain and inflammation after the surgical procedure. | Despite the debate about their use, corticosteroids continue to be relevant in postoperative treatment. |
| **- Araújo, R., Pinto, J., Campos, A., Sigua-Rodriguez, E., Olate, S., Fonseca Alves, L., de Castro, W.**<br>**- Chile**<br>**- 2016** | Original study | Pain control in third molar surgery. | Investigate different methods for controlling pain after tooth extraction. | Several effective strategies for postoperative pain control have been identified, with varying levels of effectiveness. | Choosing the right pain management method is crucial to improving the patient experience after surgery. |
| **Lim, D., & Ngeow, W.A. (2017)**<br>**- Singapore / Malaysia**<br>**- 2017** | Comparative study (prospective study) on clinical efficacy | Comparison between submucosal injection of dexamethasone versus methylprednisolone in reducing postoperative sequelae after third molar surgery. | To evaluate which corticosteroid administered submucosally is most effective in reducing pain, inflammation, and trismus after the surgical procedure. | Both drugs significantly reduced postoperative sequelae; however, one showed greater efficacy in certain parameters. | Submucosal injection is an effective route for administering corticosteroids in molar surgery; the choice between dexamethasone or methylprednisolone may depend on the specific clinical profile. |

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| **- Cho H., Lynham A., Hsu E.**<br>**- United States**<br>**- 2017** | Systematic review | Postoperative interventions to reduce inflammatory complications after third molar surgery | To review the current evidence on effective interventions to minimize inflammatory complications after tooth extraction. | Several effective interventions have been identified; However, the limited but positive role of corticosteroids in this specific context has been highlighted. | Interventions should be personalized; Further research into specific protocols is suggested. |
| **- Raakesh N. et al. India.**<br>**- 2017** | Original study (research). | Oral surgery; surgical extraction of impacted mandibular third molars. | To evaluate the role of corticosteroids in reducing postoperative swelling and pain after surgical extraction of impacted third molars. | Corticosteroids have been shown to be effective in reducing postoperative pain and swelling. | The use of corticosteroids may be beneficial in improving postoperative outcomes of tooth extractions. |
| **- Selimović, E., Ibrahimagić-Šeper, L., Šišić, I., Sivić, S., Huseinagić, S.**<br>**- Bosnia and Herzegovina**<br>**- 2017** | Clinical study | Prevention of trismus after surgical extraction of mandibular third molars using different pharmacologic al therapies. | To compare the effectiveness of different pharmacologic al treatments in preventing postoperative trismus. | Significant differences were observed between the treatments used; some were more effective than others in preventing trismus. | The appropriate choice of drug treatment can be crucial in preventing complications such as trismus after tooth extraction. |

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| **- SUGRAGAN, C., SIRINTAWAT, N., KIATTAVORNCHAREON, S., KHOO, L., KC, K., WONGSIRICHAT, N. - THAILAND - 2020** | Original article / clinical research | Effects of corticosteroids on postoperative pain in dental surgery. | To determine whether corticosteroids effectively reduce pain after third molar surgery. | A significant reduction in postoperative pain was observed among patients treated with corticosteroids. | The authors conclude that corticosteroids are effective in reducing pain after third molar surgery and suggest their routine use. |
| **- SUGRAGAN, C., SIRINTAWAT, N., KIATTAVORNCHAREON, S., KHOO, L., AND WONGSIRICHAT, N. - THAILAND - 2020** | Research article | The study focuses on the use of corticosteroids to reduce postoperative pain in patients undergoing third molar extraction. The field of study is dentistry and dental anesthesia. | To evaluate whether corticosteroids are effective in reducing postoperative pain after third molar extraction. | The results indicated that corticosteroids may be effective in reducing postoperative pain compared with placebo. | The study concludes that the use of corticosteroids may be a viable option for controlling postoperative pain after third molar extraction. |
| **- MOMESSO, G., GROSSI-OLIVEIRA, G., SILVA, W., ET AL. - BRAZIL - 2021** | Triple-blind randomized clinical trial | Evaluation of different combinations of dexamethasone and nonsteroidal anti-inflammatory drugs (NSAIDs) for prevention in third molar extractions. | To determine which combination is most effective in reducing postoperative pain and inflammation following wisdom tooth extraction. | Combinations with dexamethasone significantly improved outcomes compared with NSAIDs alone; some combinations were more effective than others. | Combining dexamethasone with certain NSAIDs may offer a better preventive strategy to reduce complications after molar extraction; this could guide clinical decisions regarding pharmacological management. |

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| **- Selvido, D., Bhattarai, B., Niyomtham, N., Riddhabhaya, A., Vongsawan, K., Pairuchvej, V., Wongsirichat, N.**<br>**- South Korea**<br>**- 2021** | Revision | Dexamethasone administration in third molar surgery. | To evaluate the efficacy of dexamethasone in the treatment of postoperative complications after third molar extraction. | Dexamethasone administration showed a significant reduction in postoperative pain and inflammation. | Dexamethasone is effective in improving postoperative outcomes in patients undergoing third molar surgery. |
| **-Miroshnychenko, A., Azab, M., Ibrahim, S., Roldan, Y., Diaz Martinez, J., Tamilselvan, D., He, L., Urquhart, O., Verdugo-Paiva, F., Tampi, M., Polk, D., Moore, P., Hersh, E., Brignardello-Petersen, R., Carrasco-Labra, A.**<br>**- United States**<br>**- 2023** | Systematic review and meta-analysis | Treatment of acute pain after surgical extraction of mandibular third molars. | To evaluate the efficacy of corticosteroids in the treatment of postoperative pain after surgical extraction of third molars. | Corticosteroids have been found to be effective in reducing acute postoperative pain compared with placebo or alternative treatments. | The results suggest that corticosteroids should be considered as part of the treatment of postoperative pain after third molar extraction. |
| **- Malamed S.**<br>**- United States**<br>**- 2023** | Review or technical chapter | Pain management in dental trauma and related surgical procedures. | Provide updated guidelines for the effective management of post traumatic dental and surgical pain. | Pharmacological and non-pharmacological strategies to reduce postoperative pain. | Proper implementation can significantly improve patient recovery. |

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| - **Hannoodee, S., and Nasuruddin, D.**<br>- **Malaysia**<br>- **2024** | Reviewed article | Acute inflammatory response. | Analyze the mechanisms and characteristics of acute inflammation. | Not applicable in the traditional sense; they probably summarize acute inflammatory processes. | Understanding acute inflammation can improve clinical strategies for its management |
| - **Gaballah, K., Eldohaji, T., Tannir, M., Shaban, R., Habib, R., and Ali, K.**<br>- **Egypt**<br>- **2025** | Research study | Pain control after surgery for impacted third molars: comparison of two different protocols. | To evaluate the effectiveness of two different protocols for postoperative pain control. | Both protocols variable showed efficacy | Suggest that both protocols are effective for pain management after this type of surgery |

According to the sources consulted corticosteroids have been shown to be effective in reducing acute postoperative pain after surgical extraction of mandibular third molars, compared with placebo or alternative treatments.

Specifically, dexamethasone has shown a significant reduction in postoperative pain and inflammation. Its administration may be effective in improving postoperative outcomes in patients undergoing third molar surgery.

Methylprednisolone also showed beneficial effects in reducing pain, inflammation and trismus.

The sources provided do not include a study that directly compares the effectiveness of corticosteroids with ibuprofen specifically for postoperative pain control. (9)

## Discussion

The review of the presented studies allows us for the identification of several trends and relevant considerations for clinical practice and future research in the management of postoperative pain in third molar surgeries.

First, most studies agree that controlling postoperative pain is essential for improving patient recovery and reducing complications. For example, research conducted by Gaballah et al. (2025) in Egypt, although still in preliminary stages, suggests that both evaluated protocols one using a combination ibuprofen and paracetamol compared to one using only ibuprofen are effective, indicating that multiple viable strategies for pain management protocols are possible. This indicates that there are several viable strategies for pain management, although their effectiveness may vary depending on each patient's individual circumstances. (1) This aligns with the findings presented in a systematic review on the use of corticosteroids to control postoperative pain after impacted lower wisdom tooth extraction. The review highlights that corticosteroids can be an effective option for reducing inflammation and pain, but their use should be carefully considered, taking into account the specific characteristics of each patient and the therapeutic protocol adopted. (6)

On the other hand, studies such as those by Miroshnychenko et al. (2023) and Sugragan et al. (2020) highlight the crucial role of corticosteroids in reducing postoperative pain. Systematic and clinical evidence supports their routine use due to prove effectiveness in decreasing both pain and inflammation. This reinforces a trend toward specific pharmacological interventions that optimize postoperative recovery. (1, 5)

Studies such as those by Zetehaku Araújo et al. (2016) highlight the importance of evaluating different techniques and medications to improve pain control, suggesting that there is no single, universally effective solution but rather a set of options that must be tailored to each patient. This perspective directly relates to the use of corticosteroids in managing postoperative pain after the extraction of impacted lower third molars, as discussed in the review. In this context, the review emphasizes that corticosteroids can be an effective option within the therapeutic arsenal, but their use should be considered based on the individual characteristics of the patient and the specific circumstances of the procedure,

thereby reinforcing the idea that pain management requires a personalized and multifaceted approach. (4)

Miroshnychenko et al. (2023) highlight that corticosteroids should be considered an integral part of postoperative treatment due to their proven effectiveness compared to placebo or alternative treatments. Similarly, Sugragan et al. (2020) and Selvido et al. (2021) reinforce this idea, even suggesting their routine use in third molar extraction procedures. (1, 5, 7)

Evidence suggests that parenteral administration of corticosteroids is more effective than oral administration, especially when administered before surgery, resulting in better postoperative outcomes. However, further comparative studies are needed to determine the type of corticosteroid, the optimal dose, and the route of administration that are most effective for controlling pain and inflammation after wisdom tooth extraction. (8, 16)

On the other hand, Ngeow and Lim (2016) review the current role of these drugs in clinical practice, noting that despite some controversy, their usefulness remains relevant for reducing both pain and inflammation. The accumulated evidence thus supports a trend toward the systematic incorporation of corticosteroids into postoperative management protocols. However, it is important to consider that there are different strategies to control pain after dental surgery. (8)

Araújo et al. (2016) identify several effective methodologies and emphasize that the appropriate choice of method can significantly improve the patient's experience. The integration of pharmacological strategies such as corticosteroids along with non-pharmacological approaches can optimize clinical outcomes. (11)

In general, studies agree that corticosteroids, particularly dexamethasone and methylprednisolone, are effective in reducing symptoms such as pain, inflammation, and trismus, thereby contributing to improved patient comfort during the postoperative period. An important aspect is that although both corticosteroids demonstrated similar overall benefits, some studies suggest that certain regimens or combinations with other drugs (such as NSAIDs) may offer additional advantages. (15, 16)

Momesso et al. (2021) found that combinations of dexamethasone with NSAIDs can be more effective than the isolated use of these non-steroidal analgesics, which could guide clinical decisions toward combined strategies to optimize outcomes. (13)

Raakesh N. et al. (2017), Cho H. et al. (2017), and Sugragan et al. (2020) present a consistent trend in their research that highlights the effectiveness of corticosteroids in reducing postoperative pain and inflammation in oral surgery procedures, specifically in third molar extractions. These studies demonstrate that the use of these medications can be a valuable clinical strategy, as they significantly contribute to improving postoperative outcomes. The administration of corticosteroids not only helps decrease the intensity of pain and inflammation but also promotes a faster and more comfortable recovery for patients, thereby reducing associated complications and enhancing their experience during the recovery process. Furthermore, these findings support the integration of corticosteroids into perioperative protocols as an effective measure to optimize pain management and promote a more efficient recovery in third molar extraction procedures. (1, 10, 18).

According to the mentioned scientific litterature, corticosteroids should be considered an integral part of the treatment to manage postoperative pain after third molar extraction. The collected evidence indicates that patients treated with corticosteroids experience a significant reduction in pain perception compared to those who do not receive these medications. (1, 10, 18).

However, although the findings are promising, some heterogeneity is also observed concerning the administered doses, routes of administration, and protocols used in each study. This variability indicates that there is still no clear consensus on the best clinical practices for corticosteroid use in this context, which limits the generalization of the results and raises questions about optimizing treatment.

Consequently, current evidence, although positive, is limited in some aspects and needs to be strengthened through studies with more rigorous and standardized designs. Conducting large-scale randomized controlled trials with uniform

protocols would be essential to define optimal doses, more effective routes of administration, and specific criteria for their use.

Finally, while the use of corticosteroids appears to be an effective strategy to improve postoperative recovery in oral surgery, it is crucial to continue researching to establish clear clinical guidelines that maximize benefits and minimize potential risks or adverse effects. Only then can this intervention be integrated safely and efficiently into routine clinical practice. Momesso et al. compared a single preoperative dose of 8 mg dexamethasone with a placebo. Patients treated with dexamethasone reported significantly less pain during the first postoperative day. (14)

Evidence suggests that optimal management of postoperative pain following third molar surgeries necessitates a multimodal and personalized approach. The routine use of corticosteroids is supported by scientific data and has become a valuable component of pain control strategies. However, it remains essential to consider additional complementary or alternative protocols tailored to the individual patient's characteristics and clinical circumstances. Future research should aim to compare various therapeutic combinations, investigate novel pharmacological agents, and explore minimally invasive techniques to further enhance clinical outcomes and patient comfort.

In particular, the administration of dexamethasone has been shown to be particularly effective in reducing both postoperative pain and inflammation. Dexamethasone helps to control inflammation and improve clinical outcomes after surgery. Similarly, other corticosteroids such as methylprednisolone have also shown beneficial effects in terms of decreasing pain and reducing inflammation after the surgical procedure. The evidence supports that glucocorticoids continue to be valuable and relevant tools in postoperative management to relieve pain and control inflammation, thus contributing to a faster and more comfortable recovery of patients undergoing third molar extraction.

On the other hand, regarding the use of ibuprofen, the available sources do not contain specific studies that directly compare its effect alone with that of a glucocorticoid in controlling postoperative pain. However, there is research on combinations of dexamethasone with NSAIDs to prevent complications after

these surgeries. Some studies found that combinations that include dexamethasone significantly improve clinical outcomes, including greater reduction in pain and inflammation, compared to the exclusive use of NSAIDs. Some specific combinations appear to be more effective than others. (16)

These findings suggest that combining dexamethasone with certain NSAIDs may offer a more effective strategy for preventing common complications after molar extractions, such as pain and inflammation. Although a direct comparison between the two types of drugs alone (glucocorticoids versus NSAIDs) is not performed, these results indicate that glucocorticoids have a potent anti-inflammatory and analgesic effect when used in conjunction with NSAIDs. Both corticosteroids and NSAIDs are useful in postoperative management; however, combinations may potentiate their effects and offer better clinical outcomes in terms of pain relief and inflammatory control after complex oral surgical procedures. (16)

## Risk/discomfort of the work

This study does not present any risks.

## Conclusion

Based on the information analyzed, we can draw the following conclusions.

First, there is evidence of the efficacy of glucocorticoids (such as dexamethasone, methylprednisolone, and corticosteroids in general) in reducing postoperative pain after third molar surgery. Even so, routine use of these medications is recommended and it is considered that they should be part of the standard of care to improve patient comfort after the procedure.

Second, there is no direct comparison between the effect of ibuprofen and glucocorticoids administered alone for pain control. So, there is no way to determine which is more effective in managing post-surgical pain.

Finally, literature suggests that adding dexamethasone to NSAIDs improves outcomes compared to using NSAIDs alone.

The available information suggests that glucocorticoids are effective and that their combination with NSAIDs may be superior to the use of the latter alone.

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