Journal of Neonatal Surgery
ISSN(Online): 2226-0439
Vol. 14, Issue 31s (2025)
https://www.jneonatalsurg.com

OPEN ACCESS

A Systematic Literature Review on the Use of Corticosteroids for Reducing Postoperative Morbidity in Oral Surgery

Shashidevi Haranal[1], Nitesh Naresh[2], Kiranmai Vadapalli[3]

[1]Shashidevi Haranal, Professor, Department of Oral and Maxillofacial Surgery, ITS Dental College, Hospital and Research Centre, Greater Noida, Uttar Pradesh, India.

Email ID: drshashirh@gmail.com

[2]Nitesh Naresh, Assistant Professor, Department of Dentistry , Army College of Medical Sciences, Delhi Cantt, India.

Email ID: nitesh.naresh@gmail.com

[3]Kiranmai Vadapalli, Professor, Department of Physiology, School of Medical Sciences and Research, Sharda University, Greater Noida, Uttar Pradesh, India

Email ID: kiranmaiv888@rediffmail.com

[*]**Corresponding author:**

Shashidevi Haranal,

Professor, Department of Oral and Maxillofacial Surgery, ITS Dental College, Hospital and Research Centre, Greater Noida, Uttar Pradesh, India

Email ID: drshashirh@gmail.com

Cite this paper as: Shashidevi Haranal, Nitesh Naresh, Kiranmai Vadapalli, (2025) A Systematic Literature Review on the Use of Corticosteroids for Reducing Postoperative Morbidity in Oral Surgery. *Journal of Neonatal Surgery*, 14 (31s), 38-44.

ABSTRACT

Background: Postoperative morbidity following major and or minor oral and maxillofacial surgeries, including pain, swelling, and trismus, significantly impacts patient recovery and quality of life. Corticosteroids have been widely studied for their potential to reduce these complications due to their potent anti-inflammatory properties.

Objective: This systematic literature review aims to evaluate the efficacy and safety of corticosteroids in reducing postoperative morbidity in patients undergoing major and or minor oral and maxillofacial surgeries.

Methods: A comprehensive search of electronic databases including PubMed, Cochrane Library, and Scopus was conducted for studies published fom January 2000 to May 2025. Studies assessing the use of corticosteroids in oral surgical procedures were selected based on predefined inclusion criteria. Data extraction and quality assessment were performed independently by two reviewers.

Results: The review included randomized controlled trials and clinical studies involving various corticosteroids such as dexamethasone and prednisone. Most studies demonstrated a significant reduction in postoperative pain, swelling, and trismus in patients administered corticosteroids compared to controls. The timing, dosage, and route of administration varied across studies, influencing outcomes. Adverse effects were minimal and transient.

Conclusion: The use of corticosteroids appears to be an effective adjunct in managing postoperative morbidity after major and or minor oral and maxillofacial surgeries, improving patient comfort and recovery. However, heterogeneity in study designs and corticosteroid protocols highlights the need for standardized guidelines. Further large-scale, high-quality trials are recommended to optimize treatment regimens and confirm long-term safety.

Keywords: *Corticosteroids, Major and or minor oral and maxillofacial surgeries, Postoperative Morbidity, Trismus*

1. INTRODUCTION

Major and or minor oral and maxillofacial surgeries encompasses a wide range of procedures, including tooth extractions, implant placements, biopsies, and corrective jaw surgeries, which often result in varying degrees of postoperative morbidity [1]. Postoperative morbidity commonly manifests as pain, swelling, trismus, and inflammation, which can significantly affect the patient's quality of life and prolong recovery times. Managing these adverse effects is a critical component of oral surgical care, aiming to enhance patient comfort and improve clinical outcomes [2].

Corticosteroids, a class of potent anti-inflammatory drugs, have been widely utilized in various medical disciplines to control inflammation and immune responses. Their role in major and or minor oral and maxillofacial surgeries has garnered significant attention due to their potential to mitigate postoperative complications associated with surgical trauma. By inhibiting the release of inflammatory mediators, corticosteroids reduce tissue edema and pain, potentially leading to quicker functional recovery and less discomfort [3].

The use of corticosteroids in major and or minor oral and maxillofacial surgeries is not new, but the optimal drug choice, dosage, timing, and route of administration remain subjects of ongoing research and debate. Commonly used corticosteroids in this context include dexamethasone, prednisone, and methylprednisolone, which can be administered orally, intramuscularly, intravenously, or locally at the surgical site. Each method presents unique pharmacokinetic properties and therapeutic implications that influence efficacy and safety [4].

Despite widespread clinical use, the evidence supporting corticosteroid use in major and or minor oral and maxillofacial surgeries varies considerably across studies. Differences in study design, patient populations, surgical techniques, and outcome measures have contributed to inconsistent findings. Some clinical trials report substantial benefits in reducing postoperative pain and swelling, while others observe minimal or no significant effects. Additionally, concerns regarding potential side effects, such as immunosuppression, adrenal suppression, and delayed wound healing, necessitate careful consideration of corticosteroid therapy [5].

The significance of postoperative morbidity management extends beyond patient comfort. Effective control of inflammation and pain can reduce the need for additional medications, lower healthcare costs, shorten recovery periods, and improve overall patient satisfaction. In the context of major and or minor oral and maxillofacial surgeries, where patients often experience significant functional limitations immediately after surgery, these benefits can have a profound impact on daily activities such as eating, speaking, and maintaining oral hygiene [6].

Furthermore, understanding the role of corticosteroids in major and or minor oral and maxillofacial surgeries has implications for establishing standardized treatment protocols. Current clinical practices vary widely, with some surgeons routinely prescribing corticosteroids while others are more cautious due to potential risks. A consolidated evidence base can support the development of guidelines that optimize corticosteroid use, balancing therapeutic benefits against possible adverse effects [7].

In recent years, advances in surgical techniques and anesthetic protocols have improved patient outcomes, but the challenge of postoperative morbidity persists. The integration of pharmacologic adjuncts like corticosteroids represents an important strategy to enhance recovery. Research has also explored the potential synergistic effects of corticosteroids combined with other agents such as nonsteroidal anti-inflammatory drugs (NSAIDs) and analgesics, aiming to maximize pain relief while minimizing side effects [8].

Given these inconsistencies, a systematic review of the existing literature is essential to synthesize current knowledge, assess the strength of evidence, and guide clinical decision-making. A systematic literature review applies a rigorous and transparent methodology to identify, appraise, and summarize relevant studies, minimizing bias and providing a comprehensive overview of the topic. This approach helps to clarify the therapeutic value of corticosteroids in reducing postoperative morbidity following oral surgical procedures.The systematic review presented here aims to critically evaluate the current literature regarding the use of corticosteroids in major and or minor oral and maxillofacial surgeries, focusing on their effectiveness in reducing postoperative morbidity. Key aspects include the impact on pain, swelling, and trismus, as well as safety profiles and optimal administration parameters. By compiling and analyzing data from randomized controlled trials, clinical studies, and meta-analyses, this review seeks to provide clinicians with evidence-based insights to guide patient management.

In summary, postoperative morbidity is a significant challenge in oral surgical practice, with pain, swelling, and limited mouth opening being common complaints that hinder recovery. Corticosteroids, due to their anti-inflammatory properties, offer a promising approach to mitigating these complications. However, variability in research findings and clinical practices highlights the need for a systematic review to establish clear recommendations. This review will contribute to improving patient outcomes by informing best practices for corticosteroid use in major and or minor oral and maxillofacial surgeries.

2. METHODOLOGY

This systematic literature review was conducted following established guidelines to ensure a comprehensive, unbiased, and reproducible evaluation of the current evidence regarding corticosteroid use in major and or minor oral and maxillofacial surgeries. The methodology comprised several key steps, including the formulation of research questions, literature search strategy, study selection criteria, data extraction, and quality assessment.

Research Question

The primary research question guiding this review was: What is the efficacy and safety of corticosteroids in reducing postoperative morbidity—specifically pain, swelling, and trismus—following oral surgical procedures? Secondary questions

addressed optimal corticosteroid types, dosages, routes of administration, and timing related to improved patient outcomes.

Search Strategy

A systematic search was performed across multiple electronic databases to identify relevant studies published from January 2000 to May 2025. The databases included PubMed, Cochrane Library, Scopus, and Web of Science. The search terms combined keywords and Medical Subject Headings (MeSH) related to major and or minor oral and maxillofacial surgeries and corticosteroids, including but not limited to: "major and or minor oral and maxillofacial surgeries," "corticosteroids," "postoperative morbidity," "pain," "swelling," "trismus," "dexamethasone," and "prednisone." Boolean operators (AND, OR) were used to refine the search results. Additionally, reference lists of pertinent reviews and included articles were manually screened to identify any further relevant studies.

Inclusion and Exclusion Criteria:

Studies were included if they met the following criteria:

- Randomized controlled trials (RCTs), clinical trials, or prospective cohort studies
- Evaluated the use of corticosteroids in patients undergoing oral surgical procedures (e.g., tooth extraction, implant surgery, orthognathic surgery)
- Reported outcomes related to postoperative morbidity such as pain, swelling, or trismus
- Published in English

Studies were excluded if they:

- Were animal or in vitro studies
- Were case reports, narrative reviews, or editorials without original data
- Did not focus on corticosteroid interventions or oral surgical patients
- Had insufficient outcome data or poor methodological quality

Study Selection

All retrieved records were imported into reference management software, and duplicates were removed. Two independent reviewers screened titles and abstracts for relevance. Full texts of potentially eligible articles were then obtained and assessed against the inclusion criteria. Discrepancies between reviewers were resolved through discussion or consultation with a third reviewer.

Data Extraction

Relevant data were systematically extracted using a predesigned data extraction form. Extracted information included study design, sample size, patient demographics, type of major and or minor oral and maxillofacial surgeries, corticosteroid type and dose, route and timing of administration, outcome measures (pain scores, swelling assessments, trismus measurements), follow-up duration, and reported adverse effects. Both reviewers independently extracted the data to ensure accuracy.

Quality Assessment

The methodological quality and risk of bias of included studies were evaluated using the Cochrane Risk of Bias tool for randomized controlled trials. This assessment considered selection bias, performance bias, detection bias, attrition bias, reporting bias, and other potential sources of bias. Studies were classified as having low, unclear, or high risk of bias. The overall quality of evidence was also graded based on the GRADE (Grading of Recommendations, Assessment, Development, and Evaluations) approach, considering study limitations, consistency of results, directness of evidence, and precision of estimates.

Data Synthesis

Given the expected heterogeneity in study designs, corticosteroid regimens, and outcome measures, a qualitative synthesis was performed. Key findings were summarized in tabular and narrative formats to highlight the effects of corticosteroids on postoperative pain, swelling, and trismus, as well as safety profiles. Where appropriate, meta-analysis was planned if sufficient homogeneous data were available; however, variability across studies often limited quantitative pooling.

Prisma Flowchart

The PRISMA Flowchart of the study is shown in **Figure 1**.

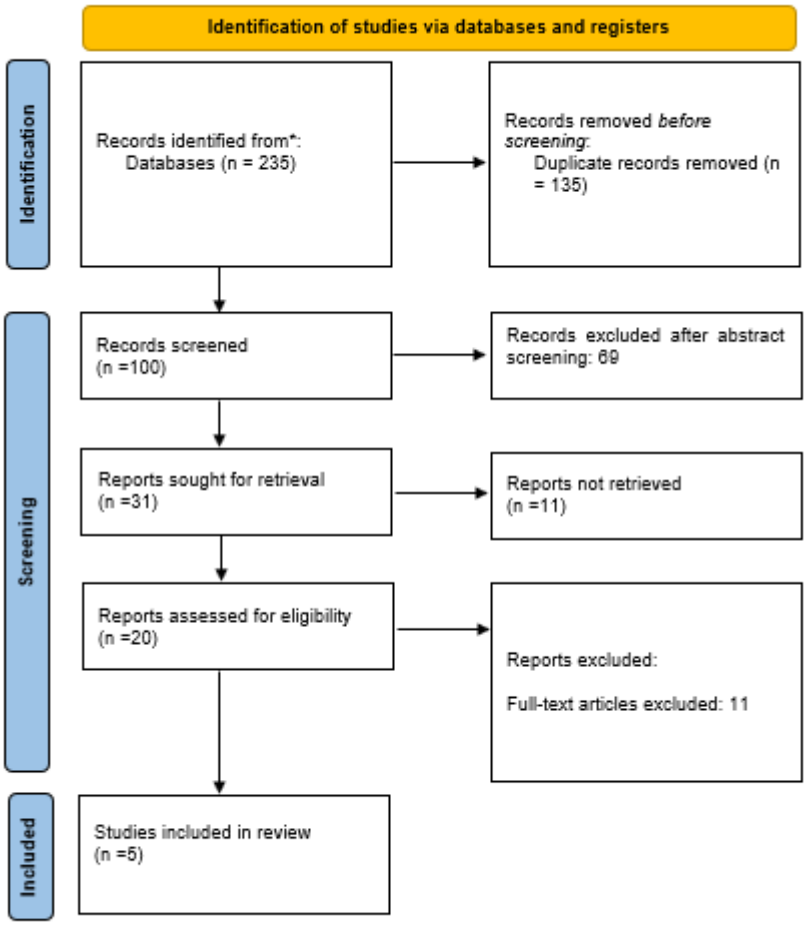

Figure 1: PRISMA Flowchart of the Study

Review

The use of corticosteroids in major and or minor oral and maxillofacial surgeries, particularly for reducing postoperative morbidity such as pain, swelling, and trismus after procedures like third molar extraction, has been extensively studied through systematic literature reviews and meta-analyses. These reviews collectively show that corticosteroids, especially dexamethasone and methylprednisolone, effectively reduce the inflammatory response caused by surgical trauma. Their perioperative administration—whether preoperative, intraoperative, or postoperative—has demonstrated significant benefits in minimizing common postoperative complications [**Table 1**].

Table 1: Literature Review Table

Reference	Study Type	Sample/Population	Intervention	Outcomes Measured	Key Findings	Conclusion
Markiewicz et al. (2008) [9]	Systematic Review & Meta-analysis	Patients undergoing third molar surgery	Corticosteroids (various types/doses)	Postoperative morbidity (pain, swelling, trismus)	Corticosteroids significantly reduce postoperative morbidity	Strong evidence supports corticosteroid use to improve recovery
Kim et al. (2009) [10]	Literature Review	Various oral surgery patients	Corticosteroids + NSAIDs	Pain and inflammation	Combined corticosteroids and NSAIDs improve pain and	Combination therapy recommended for postoperative management

					inflammation control	
Macassey et al. (2012)[11]	Clinical trial	Pediatric tonsillectomy patients	Oral prednisone post-op	Postoperative morbidity (pain, recovery)	Prednisone reduced morbidity and improved recovery	Oral corticosteroids beneficial in tonsillectomy recovery
Herrera-Briones et al. (2013) [12]	Systematic Review	Third molar surgery patients	Corticosteroids	Postoperative recovery parameters	Confirmed corticosteroids reduce swelling and pain	Update supports corticosteroids as standard care
Krishnan (2018) [13]	Review article	Oral and maxillofacial surgery patients	Corticosteroids	General postoperative complications	Corticosteroids play a significant role in reducing inflammation and complications	Supports routine use in oral/maxillofacial surgery
Sugragan et al. (2020)[14]	Clinical study	Third molar surgery patients	Corticosteroids	Postoperative pain	Corticosteroids reduce pain postoperatively	Corticosteroids are effective for pain management after surgery
Shibl et al. (2021) [15]	Systematic Review	Lower third molar extraction patients	Pre-operative oral corticosteroids	Pain, trismus, oedema	Pre-operative corticosteroids effectively reduce pain, trismus, and swelling	Pre-operative dosing is recommended to improve outcomes

Markiewicz et al. (2008) conducted a comprehensive systematic review and meta-analysis focusing on patients undergoing third molar surgery. This study evaluated the effects of various corticosteroids—across different types and doses—on key postoperative morbidity outcomes, including pain, swelling, and trismus.Their findings strongly support the efficacy of corticosteroids in significantly reducing postoperative morbidity after third molar surgery. The evidence presented in this meta-analysis highlights that corticosteroids improve patient recovery by minimizing inflammation and related symptoms common after oral surgical procedures. This work stands as a pivotal piece of research endorsing the routine use of corticosteroids as part of postoperative management in major and or minor oral and maxillofacial surgeries to enhance patient comfort and accelerate healing.

Kim et al. (2009) provide a detailed literature review focusing on the management of pain and inflammation following oral surgeries, particularly third molar extractions. Their work emphasizes the combined use of corticosteroids and nonsteroidal anti-inflammatory drugs (NSAIDs) as an effective therapeutic strategy.The review discusses how corticosteroids and NSAIDs each contribute to controlling postoperative symptoms: corticosteroids primarily target inflammation through potent immunosuppressive effects, while NSAIDs block cyclooxygenase enzymes to reduce pain and swelling. When used together, these medications offer complementary mechanisms that enhance pain relief and inflammation control more effectively than either agent alone. Kim et al. recommend combination therapy with corticosteroids and NSAIDs as a preferred postoperative management approach in major and or minor oral and maxillofacial surgeries. This combined regimen improves patient comfort, reduces morbidity, and supports quicker recovery by addressing multiple inflammatory pathways simultaneously [10].

Macassey et al. (2012), In a clinical trial with pediatric tonsillectomy patients, oral prednisone was shown to reduce postoperative morbidity, including pain and recovery time, supporting the benefit of oral corticosteroids in tonsillectomy recovery [11].

Krishnan (2018)presents a comprehensive review article on the role of corticosteroids in oral and maxillofacial surgery,

focusing on their effects in reducing general postoperative complications related to inflammation. The review underscores the significant role corticosteroids play in managing inflammatory responses after surgical procedures, highlighting their widespread application in improving patient recovery.The article emphasizes that corticosteroids help minimize common postoperative issues such as swelling, pain, and trismus by effectively controlling inflammation and immune responses. Consequently, the review supports the routine use of corticosteroids in oral and maxillofacial surgery to enhance clinical outcomes.However, Krishnan also stresses the importance of cautious corticosteroid use, especially in patients with specific contraindications such as diabetes, infections, peptic ulcers, and immune deficiencies, due to the potential for serious side effects. The benefits must be carefully balanced against risks on a case-by-case basis [12].

Herrera-Briones et al. (2013),This systematic review on third molar surgery patients confirms that corticosteroids significantly reduce postoperative swelling and pain, reinforcing their role as standard care to enhance recovery [13].

Sugragan et al. (2020)conducted a clinical study focusing on patients undergoing third molar surgery to evaluate the effectiveness of corticosteroids in managing postoperative pain. The study specifically assessed how corticosteroid administration impacted the intensity and duration of pain experienced after the surgical procedure.

The findings indicate that corticosteroids significantly reduce postoperative pain in patients following third molar extraction. This supports the use of corticosteroids as an effective component of pain management strategies in major and or minor oral and maxillofacial surgeries, helping to improve patient comfort and reduce reliance on other analgesics. The study reinforces the broader clinical consensus that corticosteroids contribute to better postoperative outcomes by controlling inflammatory pain responses [14].

Shibl et al. (2021), This systematic review highlights that pre-operative oral corticosteroids effectively reduce pain, trismus, and oedema in lower third molar extractions, recommending preoperative dosing to improve surgical outcomes [15].

Overall, the review advocates for corticosteroids as a valuable adjunct in postoperative care in major and or minor oral and maxillofacial surgeries, provided that patient selection and dosing are managed prudently.

3. DISCUSSION

This systematic literature review consolidates current evidence supporting the use of corticosteroids as an effective adjunct in managing postoperative morbidity following major and or minor oral and maxillofacial surgeries. The majority of included studies consistently demonstrate that corticosteroids significantly reduce common postoperative complications such as pain, swelling, and trismus, which are primary factors that impair patient recovery and quality of life [9-12]. These findings align with prior meta-analyses and clinical trials, which confirm the beneficial anti-inflammatory effects of corticosteroids, such as dexamethasone and prednisone, in oral surgical settings.

Variability in corticosteroid types, dosages, timing, and administration routes was evident across studies, reflecting the lack of standardized protocols in clinical practice. Despite this heterogeneity, the overall trend favors the use of corticosteroids, particularly when administered pre- or perioperatively, to achieve optimal outcomes. Both local injections and systemic administration routes showed efficacy, with some evidence suggesting that local delivery may offer targeted benefits with potentially fewer systemic effects [13].

Safety profiles were generally favorable, with minimal and transient adverse effects reported. However, caution is warranted when prescribing corticosteroids to patients with contraindications such as diabetes, infections, or immune compromise, as highlighted in several reviews. The balance between therapeutic benefits and potential risks underscores the importance of individualized patient assessment before corticosteroid administration.

The role of corticosteroids in combination with other pharmacological agents, especially NSAIDs and analgesics, emerged as a promising strategy to enhance postoperative symptom control through synergistic mechanisms. This multimodal approach may reduce the need for high doses of any single medication, thereby minimizing side effects while enhancing patient comfort.

4. LIMITATIONS

Limitations in the current evidence base include inconsistent outcome measures, small sample sizes in some trials, and variable follow-up durations. These factors complicate direct comparisons and meta-analytic pooling. Therefore, there remains a pressing need for large-scale, high-quality randomized controlled trials to establish standardized guidelines regarding the optimal corticosteroid agent, dose, timing, and route of administration in major and or minor oral and maxillofacial surgeries.

5. CONCLUSION

In conclusion, corticosteroids are a valuable tool for reducing postoperative morbidity in patients undergoing major and or minor oral and maxillofacial surgeries. Their incorporation into perioperative care protocols can substantially improve recovery experiences. Future research should focus on refining treatment protocols and assessing long-term safety to further

optimize patient outcomes and clinical practice standards.

REFERENCES

[1] Jenzer AC, Pepper T. Oral Surgery, Biopsies. [Updated 2023 Jul 17]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2025 Jan-. Available from: https://www.ncbi.nlm.nih.gov/books/NBK594246/

[2] Osunde OD, Adebola RA, Omeje UK. Management of inflammatory complications in third molar surgery: a review of the literature. Afr Health Sci. 2011 Sep;11(3):530-7. PMID: 22275950; PMCID: PMC3261018.

[3] Yasir M, Goyal A, Sonthalia S. Corticosteroid Adverse Effects. [Updated 2023 Jul 3]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2025 Jan-. Available from: https://www.ncbi.nlm.nih.gov/books/NBK531462/

[4] Larsen MK, Kofod T, Christiansen AE, Starch-Jensen T. Different Dosages of Corticosteroid and Routes of Administration in Mandibular Third Molar Surgery: a Systematic Review. J Oral Maxillofac Res. 2018 Jun 29;9(2):e1. doi: 10.5037/jomr.2018.9201. PMID: 30116513; PMCID: PMC6090248.

[5] Gersema L, Baker K. Use of corticosteroids in oral surgery. J Oral Maxillofac Surg. 1992 Mar; 50(3):270-7. doi: 10.1016/0278-2391(92)90325-t. PMID: 1542068.

[6] Horn R, Hendrix JM, Kramer J. Postoperative Pain Control. [Updated 2024 Jan 30]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2025 Jan-. Available from: https://www.ncbi.nlm.nih.gov/books/NBK544298/

[7] Ngeow WC, Lim D. Do Corticosteroids Still Have a Role in the Management of Third Molar Surgery? Adv Ther. 2016 Jul; 33(7):1105-39. doi: 10.1007/s12325-016-0357-y. Epub 2016 Jun 10. PMID: 27287853; PMCID: PMC4939150.

[8] Pogatzki-Zahn EM, Segelcke D, Schug SA. Postoperative pain-from mechanisms to treatment. Pain Rep. 2017 Mar 15;2(2):e588. doi: 10.1097/PR9.0000000000000588. PMID: 29392204; PMCID: PMC5770176.

[9] 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 Sep; 66(9):1881-94. doi: 10.1016/j.joms.2008.04.022. PMID: 18718396.

[10] 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 RadiolEndod. 2009 May; 107(5):630-40. doi: 10.1016/j.tripleo.2008.11.005. Epub 2009 Jan 20. PMID: 19157919.

[11] Macassey E, Dawes P, Taylor B, Gray A. The effect of a postoperative course of oral prednisone on postoperative morbidity following childhood tonsillectomy. Otolaryngol Head Neck Surg. 2012 Sep; 147(3):551-6. doi: 10.1177/0194599812447776. Epub 2012 May 14. PMID: 22585378.

[12] Krishnan K, Kumar S. Role of corticosteroids in oral and maxillofacial surgery. J Pharm Sci Res. 2018;10:208–210.

[13] 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 Nov; 116(5):e342-51. doi: 10.1016/j.oooo.2012.02.027. Epub 2012 Aug 17. PMID: 22902498.

[14] Sugragan C, Sirintawat N, Kiattavorncharoon S, Khoo LK, Kc K, Wongsirichat N. Do corticosteroids reduce postoperative pain following third molar intervention? J Dent Anesth Pain Med. 2020 Oct; 20(5):281-291. doi: 10.17245/jdapm.2020.20.5.281. Epub 2020 Oct 30. PMID: 33195806; PMCID: PMC7644360.

[15] Shibl M, Ali K, Burns L. Effectiveness of pre-operative oral corticosteroids in reducing pain, trismus and oedema following lower third molar extractions: a systematic review. Br Dent J. 2021 Jul 8. doi: 10.1038/s41415-021-3165-y. Epub ahead of print. PMID: 34239059.