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"EVALUATION OF DEXAMETHASONE: SUBMUCOSAL VS INTRAVENOUS ADMINISTARATION IN IMPACTION SURGERY – A PROSPECTIVE CLINICAL STUDY"

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ABSTRACT

Introduction: Impaction surgeries for mandibular third molars often result in postoperative pain, swelling, and trismus due to the inflammatory response. Managing these symptoms effectively is crucial for patient comfort and recovery. Corticosteroids, particularly dexamethasone, are known for their potent anti-inflammatory effects, which they achieve by inhibiting the phospholipase A2 enzyme in the arachidonic acid pathway. This study aims to evaluate the effectiveness of post-operative dexamethasone administration via submucosal and intravenous routes in reducing postoperative discomfort. By comparing these two administration methods, we seek to determine the most effective approach for minimizing pain, swelling, and trismus following mandibular third molar extractions.

Material and methods: This study involved 40 patients undergoing mandibular third molar extraction. Group A (20 patients) received 8 mg dexamethasone intravenously, while Group B (20 patients) received 8 mg submucosally. Facial swelling and interincisal distance were measured on days 3 and 7 post-surgery to compare the efficacy of the two administration methods.

Results: The study compared intravenous and submucosal dexamethasone for postoperative management in 40 patients. Both methods effectively improved mouth opening, reduced swelling, and alleviated pain, with submucosal administration demonstrating slightly better overall outcomes.

Conclusion: Both submucosal and intravenous dexamethasone significantly reduced postoperative symptoms after mandibular third molar surgery. Submucosal administration proved to be slightly more effective

Key words:

Dexamethasone, Submucosal administration, Intravenous administration, Impaction surgery, Third molar removal, Postoperative swelling, Pain management, Trismus, Oral surgery

INTRODUCTION: The surgical removal of impacted third molars is a common and essential procedure in the everyday practice of oral surgeons. However, in recent times, there has been increasing interest and concern regarding the postoperative quality of life following third molar surgery. The primary aim of surgically removing impacted mandibular third molars is to prevent or treat any pathology associated with these teeth. Yet, postoperative discomfort in the form of pain, swelling, and trismus remains a common occurrence. [1]

The etiology of these postoperative difficulties is closely linked to the inflammatory process, which varies in occurrence and severity among patients. Numerous studies have investigated the efficacy of various drugs, including corticosteroids, NSAIDs, and enzymes like chymotrypsin and serratiopeptidase, in alleviating postoperative discomfort following third molar surgery. Additionally, local interventions such as the application of cold packs, placement of intraoral surgical drains, and low-level laser therapy have been explored to mitigate postoperative sequelae. [1]

Dexamethasone, a corticosteroid, has garnered significant attention in dentoalveolar surgery due to its potent anti-inflammatory properties, low sodium-retaining ability, and prolonged half-life. In this context, our study aims to assess the effectiveness of preoperative submucosal and intravenous administration of dexamethasone in reducing discomfort following surgical removal of mandibular third molars.

MATERIALS AND METHODS

Present study was carried out on 40 patients on an out-patient basis in the department of oral and maxillofacial surgery at Rajarajeswari Dental College and hospital, Bangalore. Patients were divided randomly into two groups, irrespective of age and gender - each group consisting of 20 patients each.

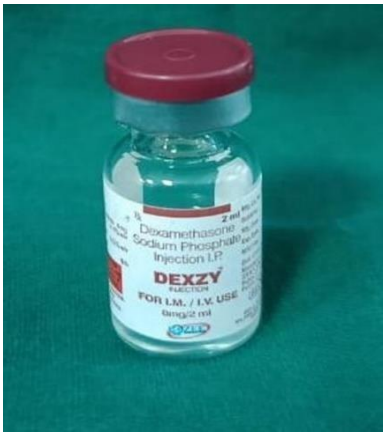


Fig 1: INJ DEXONA 8MG

INCLUSION CRITERIA

1) Age 18 to 35 years,
2) absence of systemic disease (ASA I),
3) no use of medication in the previous seven days,
4) mandibular third molars in similar positions with similar root formation patterns,
5) absence of allergy to the drugs used in the study and surgical site with no current signs or symptoms of infection.

EXCLUSION CRITERIA

1) Patients with existing active infections,
2) Patients with systemic disorders,
3) Patients on long-term steroids,
4) Pregnant and lactating women.
5) History of gastrointestinal bleeding or peptic ulcer;
6) Allergy to aspirin or NSAIDs;
7) Current smoking habit.

A written consent was obtained from all the patients after being explained about the study purpose and the nature of the surgical procedure performed and drugs prescribed post operatively after it. Ethical clearance was obtained from the institutional ethical committee. Pre-operative investigations including routine blood investigations were done in all the subjects. For this short study, all patients will undergo preoperative evaluations. A single surgeon will perform the surgeries using standard aseptic and surgical techniques. Lingual and conventional inferior alveolar nerve blocks will be administered. Tooth extraction will involve bone cutting and splits, with efforts to minimize tissue damage. After extraction, sockets will be irrigated with a 5% povidone iodine solution. Flaps will be sutured using Black Braided Silk 3-0 interrupted sutures. Trismus will be assessed by measuring interincisal opening, and edema will be evaluated using extra oral facial measurements with two reference points-
Measurement of facial edema (tragus to midline)
Measurement of facial edema (gonion to lateral canthus)
Measurements of facial swellings and maximal interincisal distance will be made on 3rd and 7th day post operatively.

Fig 2: Submucosal Administration of Dexamethasone

Fig 3: IV Administration of Dexamethasone

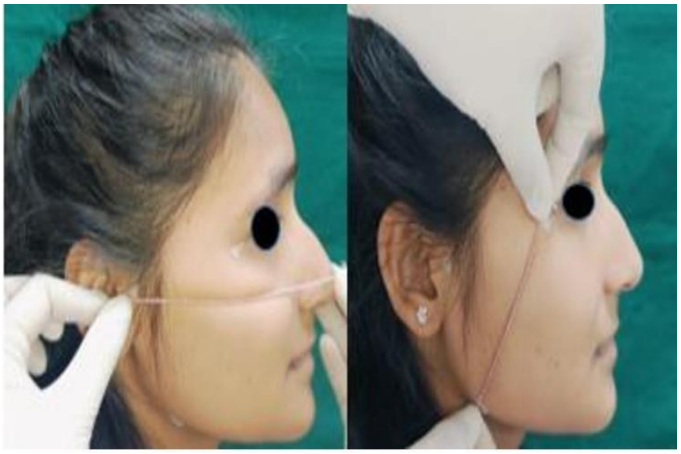


Fig 4: Facial measurements using different points

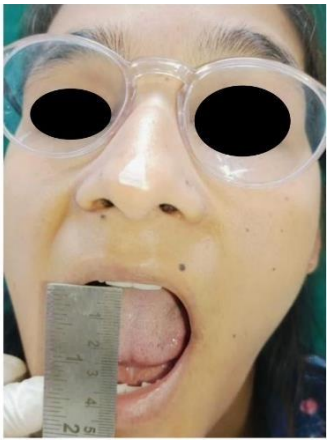


Fig 5: Measurement of maximal interincisal distance

RESULTS:

Comparison of Mean Interincisal Mouth Opening (in mm) Between Post-op 3 & 7 Days Using Student Paired T Test

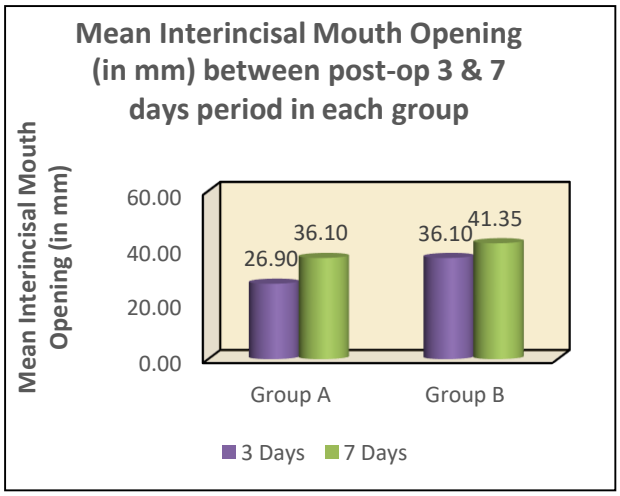
Interincisal mouth opening increased significantly from 26.90 mm to 36.10 mm in Group A and from 36.10 mm to 41.35 mm in Group B ($p<0.001$).

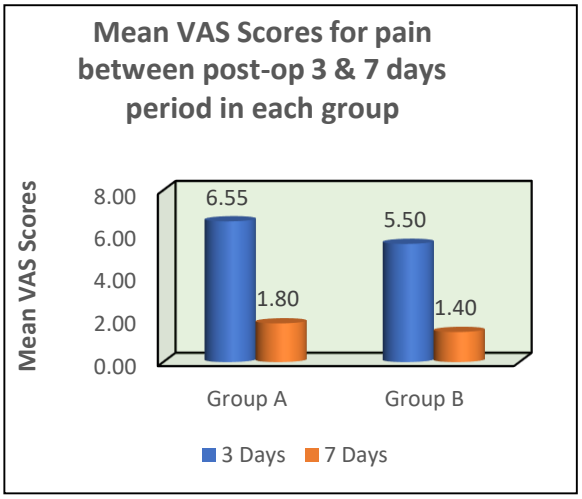
Comparison of Mean Swelling Size Between Post-op Day 3 and Day 7 Using Student Paired T Test

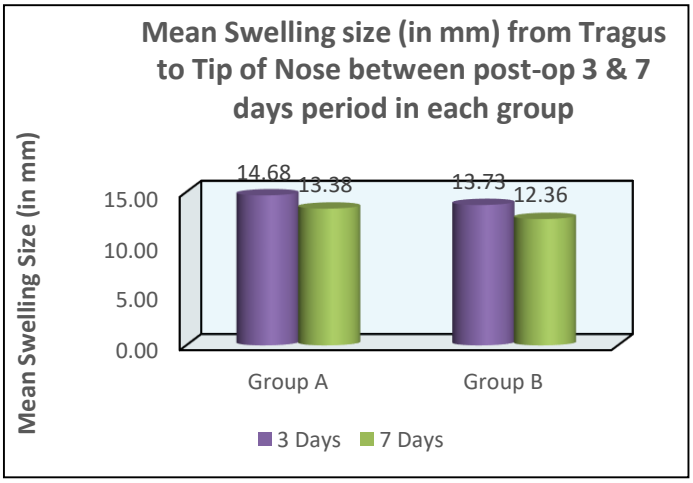
Swelling decreased significantly in both groups: Group A (tragus to tip of nose: 14.68 mm to 13.38 mm; Gonial to lateral Canthal: 11.27 mm to 9.88 mm) and Group B (tragus to tip of nose: 13.73 mm to 12.36 mm; Gonial to lateral Canthal: 10.30 mm to 8.95 mm) ($p<0.001$).

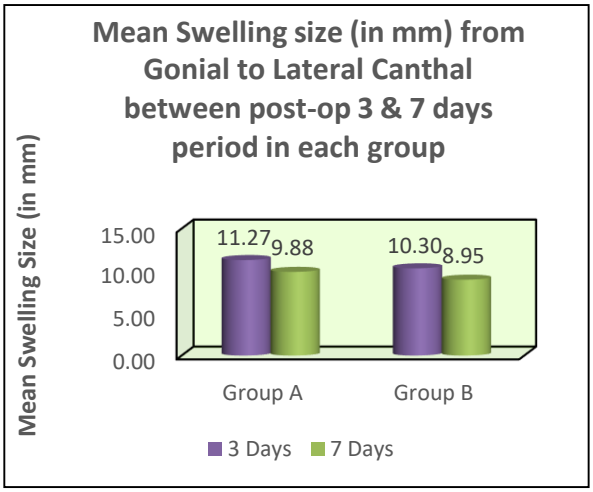
Comparison of Mean VAS Scores for Pain Between Post-op Day 3 and Day 7 Using Wilcoxon Signed Rank Test

VAS pain scores decreased significantly: Group A (6.55 to 1.80) and Group B (5.50 to 1.40) ($p<0.001$).









DISCUSSION

The removal of impacted third molars is a routine yet critical procedure in oral and maxillofacial surgery, often associated with significant postoperative discomfort. This

discomfort is primarily due to the inflammatory response initiated by the surgical trauma. Dexamethasone, a potent corticosteroid with anti-inflammatory properties, is widely used to manage these postoperative symptoms.

Our study aimed to compare the efficacy of submucosal and intravenous administration of dexamethasone in controlling postoperative swelling, pain, and trismus. The results indicate that while both methods are effective, submucosal administration offers greater benefits in reducing facial swelling and pain. This can be attributed to the localized action of dexamethasone when administered submucosally, leading to a more concentrated effect at the site of inflammation.

In a study at MES Dental College and Hospital in Perinthalmanna examined the efficacy of intravenous versus submucosal dexamethasone for postoperative pain and edema management in oral and maxillofacial surgery patients. The results indicated that intravenous administration provided superior pain relief, achieving optimal plasma levels more rapidly, with statistically significant pain reduction observed immediately post-surgery and on the second postoperative day. Conversely, while both methods reduced swelling by the third day, the submucosal group demonstrated a slight edge in reducing edema, particularly noted on the second postoperative day**.** [1]

Laureano Filho et al. reported that in patients undergoing surgery for impacted third molars, administration of 8 mg of dexamethasone one hour before surgery resulted in superior control of swelling compared to treatment with 4 mg of dexamethasone. [8]

In our study, we measured postoperative swelling from the tragus to the nose tip and from the gonion to the lateral canthus. For Group A, swelling decreased from 14.68 mm to 13.38 mm and 11.27 mm to 9.88 mm from the 3rd to the 7th day (both $p<0.001$). For Group B, it decreased from 13.73 mm to 12.36 mm and 10.30 mm to 8.95 mm (both $p<0.001$). Both administration routes significantly reduced swelling, with submucosal administration showing a slightly greater reduction, likely due to its direct anti-inflammatory effect at the surgical site.

In a study at Department of Oral and Maxillofacial Surgery, Kannur Dental College, Kannur, Kerala, it was shown that 4 mg of dexamethasone administered submucosally caused a significant reduction in trismus on the 2nd postoperative day compared to the intravenous and control groups. [4]

In our study, postoperative interincisal mouth opening significantly improved in both groups. Group A (intravenous) showed an increase from 26.90 mm on the 3rd day to 36.10 mm on the 7th day. Group B (submucosal) demonstrated a rise from 36.10 mm on the 3rd day to 41.35

mm on the 7th day. Both methods effectively reduced trismus, but the submucosal route provided a more substantial improvement, likely due to its localized effect.

Waldron et al. conducted a meta-analysis revealing that patients treated with dexamethasone experienced reduced postoperative pain, required fewer opioids, had a longer time to first analgesic dose, and needed less rescue analgesia compared to controls. They concluded that perioperative single-dose dexamethasone provided statistically significant analgesic benefits.[9]

In our study, postoperative pain, measured by VAS scores, significantly decreased in both groups. Group A's pain score dropped from 6.55 on the 3rd day to 1.80 on the 7th day. Group B's pain score decreased from 5.50 on the 3rd day to 1.40 on the 7th day. This significant reduction ($p<0.001$) in both groups indicates effective pain management with dexamethasone, with submucosal administration providing slightly better pain control due to its targeted action.

The findings of our study are consistent with previous research on the use of corticosteroids in dentoalveolar surgery. However, the preference for submucosal administration highlights a practical advantage, as it is easier to administer in a clinical setting and offers targeted relief.

Future studies could explore the long-term outcomes of these administration routes and investigate the potential benefits of combining dexamethasone with other therapeutic interventions to further enhance postoperative recovery.

CONCLUSION: This prospective clinical study demonstrates that both submucosal and intravenous administrations of dexamethasone are effective in reducing postoperative swelling, pain, and trismus following the surgical removal of mandibular third molars. However, submucosal administration exhibited superior outcomes in reducing facial swelling and controlling pain. These findings suggest that submucosal administration may be the preferred method due to its localized anti-inflammatory effects and ease of use.

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