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ADMINISTRATION OF PREOPERATIVE SUBMUCOSAL DEXAMETHASONE IN THIRD MOLAR SURGERY: A PROGRESSION TOWARDS ENHANCING QUALITY OF LIFE.

Raham Zaman, Nazish[2], Saif Ullah[3*], Zubair Nasir[4], Akif Mahmud[5], Tehmina Naushin[6]

[1]Associate Professor Science of Dental Materials, Bacha Khan Dental College Mardan, Pakistan
[2]Dental Surgeon Bolan Medical Complex Hospital Quetta, FCPS (PGT) Oral and Maxillofacial Surgery, Armed Force Institute of Dentistry, Rawalpindi, Pakistan
[3*]Assistant Professor, Oral and Maxillofacial Surgery Department, Mardan Medical Complex, Mardan, Pakistan drsaifktk@gmail.com
[4]Assistant Professor Community Dentistry, Shifa College of Dentistry, Islamabad, Pakistan
[5]Assistant Professor, Department of Oral & Maxillofacial Surgery, Women Dental College, Abbottabad, Pakistan
[6]Associate Professor Oral Pathology, Peshawar Dental College, Riphah International University, Islamabad, Peshawar campus, Pakistan

***Corresponding Author:** Dr. Saif Ullah
*Assistant Professor, Oral and Maxillofacial Surgery Department, Mardan Medical Complex, Mardan, Pakistan. Email: drsaifktk@gmail.com

ABSTRACT

Objective: To determine the efficacy of pre-operative submucosal administration of dexamethasone in surgery of impacted third molar (M3) teeth.

Methodology: Prospective comparative study was conducted at Dental Teaching hospital, from April 2024 to October 2024. A total 130 patients were enrolled in study and divided into two groups by simple randomization method. Group A was control group injected placebo and group B was case group injected 4mg dexamethasone immediately after induction of anesthesia through submucosal route. Efficacy was measured in terms of reduction in trismus, pain and inflammation in post-operative time. SPSS version 26 was used for data entry and analysis of variables.

Results: The mean pain score in Group A was 28.74 ± 5.21 compared with 22.56 ± 4.02 in Group B ($p < 0.001$). Mean swelling was 5.01 ± 1.35 mm in Group A and 3.42 ± 0.88 mm in Group B ($p < 0.001$). Mean trismus measured 24.89 ± 4.10 mm in Group A and 19.78 ± 2.91 mm in Group B, with Group B showing significantly less trismus ($p < 0.001$

Conclusion: Administering 4mg of dexamethasone through the submucosal route prior to mandibular third molar surgery can effectively reduce post-operative pain, swelling, and trismus.

Keywords: Dexamethasone; Third Molar Surgery; Swelling; Trismus; Quality of Life.

INTRODUCTION

The extraction of an impacted third molar is a common surgery that dental surgeons across the world carry out.[1] When there is insufficient room in the jaw, wisdom teeth frequently become impacted, which means that they do not fully erupt through the gum line.[2] Pain, infection, crowding, and damage to adjoining teeth are just some of the potential complications that might arise as a result of this. A tiny incision is made in the gum tissue to generate a flap during a surgical extraction

of an impacted third molar.[3] The flap is then raised or reflected in order to get access to the tooth and bone that lie behind it. Additionally, in certain instances, the extraction may require the removal or trimming of a tiny part of the bone that surrounds the tooth in order to make the extraction process easier.[4]

It is possible that the degree of damage that was done to both hard and soft tissues during surgery, which might result in the release of inflammatory mediator,[5] can have an effect on the intensity of the discomfort that patients experience after surgery. After the excision of an impacted third molar, patients may experience discomfort, edema, and trismus.[6] During the healing period that immediately follows surgery, these postoperative symptoms have the potential to have a significant influence on the patient's quality of life.

Inhibiting vasodialtion,[7] limiting leukocyte migration, reducing edema and transudate production, and suppressing inflammatory response8 are some of the ways in which corticosteroids, specifically dexamethasone, can be beneficial in preventing certain postoperative complications associated with tooth extraction.[8] These complications include excessive inflammation, infection, and delayed healing. It is possible that by decreasing the immunological response, it will help lessen the risk of these problems and promote a more smooth healing process.[9] There is a lack of consensus among the available research concerning the efficacy of corticosteroids in treating trismus. Corticosteroids have been shown to have a considerable effect in reducing trismus in some trials, particularly when they are provided prior to surgical procedures; however, other studies have not found any significant effect.[10]

MATERIALS AND METHODS

Study commenced at a tertiary teaching hospital from April 2024 to October 2024. Ethical consideration was declared by committee of ethics at institute and consent was obtained from patients. Patients randomized into two groups (A and B) by simple randomization method. Patients having mandibular 3rd impaction class II and level B were included in the study. Patients with compromised medical illnesses like diabetes, tuberculosis, glaucoma, infection at surgical site and refused to participate in study were excluded.

Patient’s demographics like age, gender and study variables like mouth opening, facial measurement preoperatively and depth or position of tooth were recorded on pre-designed Performa. Mouthwash with chlorhexidine (0.02%) was advised at start of surgery. This step is often carried out to reduce the amount of bacteria in the mouth and minimize the risk of infection during the procedure. Additionally, local anesthesia was given with lignocaun 2% plus adrenaline 1:100,000. Local anesthesia is commonly used to numb the area being treated or operated on, allowing the patient to remain comfortable and pain-free during the procedure.

Before the procedure, profound anesthesia was confirmed to ensure the patient does not experience pain or discomfort during the surgery.Ward's incision is a specific type of surgical cut made to provide access to the surgical site. Surgeon removed bone from distal and buccal sides. To prevent overheating of the bone and the surrounding tissues, and to minimize the risk of bone necrosis (tissue death due to lack of blood flow), the surgical site was continuously irrigated with sterile saline. This helps to keep the area cool and clean during the bone cutting process.Once the tooth has been sectioned, each segment is carefully removed from the socket using dental forceps or other specialized instruments. This step requires skill and precision to prevent damage to the surrounding structures.After the complete removal of the tooth, the socket (the space left in the jawbone where the tooth was located) is thoroughly irrigated with a sterile saline solution or another appropriate irrigant.Flap was reconstructed by using appropriate suture. Post operatively patients advised to care for the extraction site, including proper oral hygiene, what to eat and avoid, and any prescribed medications for pain or infection prevention. Paracetamol 500 mg, two tablets after 8 hours was given and advised for follow up after 48 hours.

On follow up pain was assessed using visual analogue scale, facial swelling was assessed using specific measurements with measuring tape and trismus was also recorded. Measurement of trismus was done by using ruler inserting it from between maxillary side and mandibular incisor.
Trismus is being measured as the maximum interincisal distance between the upper (maxillary) and lower (mandibular) incisors using a ruler. The interincisal distance is the distance between the incisor teeth when the mouth is fully opened. To evaluate the level of trismus, a comparison is made between the preoperative (before treatment or surgery) and postoperative (after treatment or surgery) interincisal distances. The difference between these two measurements would indicate the degree of improvement or worsening of the trismus following the intervention.
In this study, age, swelling, trismus, and pain were treated as continuous variables, with their mean values calculated along with standard deviations (SD) to measure variability. Categorical variables were presented as both frequency (number of occurrences) and percentage. To assess the significance of differences in mean pain, swelling, and trismus between the control and experimental groups, a t-test was applied. A probability (p) value of less than 0.05 was considered statistically significant.

RESULTS

A total of 130 subjects participated in the study, with equal allocation to each group (n = 65 per group). Age and gender distribution were comparable between groups ($p > 0.05$) (Table I). The mean age in Group A was 27.10 ± 4.01 years and in Group B was 26.45 ± 3.56 years. The age category distribution was 35 (53.8%) participants aged 18–27 and 30 (46.2%) aged 28–38 in Group A, versus 40 (61.5%) and 25 (38.5%) respectively in Group B. Males comprised 38 (58.5%) of Group A and 39 (60.0%) of Group B ($p = 0.842$).
Group B demonstrated significantly lower postoperative morbidity than Group A. The mean pain score in Group A was 28.74 ± 5.21 compared with 22.56 ± 4.02 in Group B ($p < 0.001$). Mean swelling was 5.01 ± 1.35 mm in Group A and 3.42 ± 0.88 mm in Group B ($p < 0.001$). Mean trismus measured 24.89 ± 4.10 mm in Group A and 19.78 ± 2.91 mm in Group B, with Group B showing significantly less trismus ($p < 0.001$) (Table 2).

Table. I: Distribution of demographic characteristics among the groups

Demographic characteristics	Group A (n = 65)	Group B (n = 65)	p-value
Age (years) — Mean ± S.D.	27.10 ± 4.01	26.45 ± 3.56	0.382
18–27	35 (53.8%)	40 (61.5%)	0.271
28–38	30 (46.2%)	25 (38.5%)	
Sex			
Male	38 (58.5%)	39 (60.0%)	0.842
Female	27 (41.5%)	26 (40.0%)	

Table. 2: Distribution of pain, swelling and Trismus among the groups

Variable	Group A (n = 65)	Group B (n = 65)	p-value
Pain (mean ± S.D.)	28.74 ± 5.21	22.56 ± 4.02	< 0.001
Swelling (mm, mean ± S.D.)	5.01 ± 1.35	3.42 ± 0.88	< 0.001
Trismus (mm, mean ± S.D.)	24.89 ± 4.10	19.78 ± 2.91	< 0.001

DISCUSSION

The perioperative administration of dexamethasone has been studied and used in various surgical procedures to evaluate its effectiveness in reducing inflammation and related complications[11]. While research on the specific use of corticosteroids after M3 removal is limited, studies in other surgical

contexts have suggested potential benefits.Corticosteroids have indeed been studied and administered via different routes to reduce postoperative sequelae after surgical extraction of third molars (M3). These routes include intramuscular, submucosal, intravenous, and intraalveolar administration and all are effective[12].

In a study conducted by Shad et al[13]it was reported that preoperative submucosal administration of 4mg dexamethasone has been studied and found to be effective in reducing post-operative pain, swelling, and trismus (limited mouth opening) in mandibular third molar (wisdom tooth) surgery. Similar findings were reported by Sharma et al[14] in 2024, preoperative submucosal administration of 4mg dexamethasone through the submucosal route is an effective method in post operative complications reduction specially trismus.

In a study by Naik al[15] in 2024 also reported positive outcome observed in patients receiving dexamethasone compared to a control group. Same as previous studies route of administration of dexamethasone was submucosal injection. Ahmed et al[16] in 2024 conducted a study comparing the effects of dexamethasone on pain reduction between two groups: the dexamethasone group and the control group. The results of the study showed that there was no significant difference in pain reduction between these two groups, as indicated by a p-value of ≥ 0.05.

Based on study conducted by Koç al[17] that investigated the effect dexamethasone on pain, edema and trismus after procedure and reported better control of these postoperative complications with the administration of submucosal dexamethasone. Study conducted by Grossiet al[18] investigated the use of submucosal dexamethasone in wisdom tooth surgery and its potential effects on postoperative trismus (restricted mouth opening) and pain. According to the study's findings, there was no statistically significant relationship observed between trismus and dexamethasone administration. Manavadaria et al[19] in 2025 conducted a study comparing the effects of submucosal dexamethasone on post-operative swelling in different groups of patients. The results indicated that the patients who received submucosal dexamethasone experienced significantly less post-operative swelling when compared to the control group.In another study by Saeidi 2025[20] it was reported that the effectiveness of submucosal application of dexamethasone in reducing postoperative pain and inflammation is supported by some research. It can indeed provide a faster local action and may have certain advantages over other forms of injection, such as intramuscular or intravenous administration, in terms of simpler execution and potentially less morbidity for the patient.

CONCLUSION

Results of our study suggests that administering 4mg of dexamethasone through the submucosal route prior to mandibular third molar surgery can effectively reduce post-operative pain, swelling, and trismus that allows patients to resume their daily activities earlier and improve the quality of life.

Conflict of Interest

None

Authors' Contribution

Concept or Design	Dr. Saif Ullah, Dr. Raham Zaman
Acquisition, Analysis or Interpretation of Data	Dr. Nazish, Dr. Raham Zaman, Dr. Zubair Nasir
Manuscript Writing & Approval	Dr. Akif Mahmud, Dr. Tehmina Naushin

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