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Original Article

USE OF PREOPERATIVE SUBMUCOSAL DEXAMETHASONE IN THIRD MOLAR SURGERY: A STEP TOWARDS IMPROVEMENT IN QUALITY OF LIFE

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ABSTRACT

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

Materials and Methods: *Prospective, randomized controlled trial was conducted at Armed Forces Institute of Dentistry, CMH Rawalpindi, from April 2023 to October 2023. 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 24 was used for data entry and analysis of variables.*

Results: *The mean pain score in Group A was 31.29 ± 6.04, while in Group B it was 25.32 ± 3.49, with Group B showing significantly lower pain levels than Group A ($p < 0.001$). The mean swelling measured 4.63 ± 1.22 mm in Group A and 3.16 ± 0.72 mm in Group B, indicating significantly less swelling in Group B ($p < 0.001$). Similarly, the mean trismus was 26.17 ± 3.63 mm in Group A compared to 21.15 ± 2.44 mm in Group B.*

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

Key words: *Dexamethasone; Third Molar Surgery; Swelling; Trismus; Quality of Life.*

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INTRODUCTION

Removal of impacted third molar is a usual procedure performed by the dental surgeons in the worls[1]. Wisdom teeth are frequently impacted, failing to fully erupt through the gum line because of limited space in the jaw[2]. This can lead to various issues such as pain, infection, crowding, and damage to neighboring teeth. In a surgical extraction of impacted third molar a small incision is made in the gum tissue to create a flap, which is then lifted or reflected to access the underlying tooth and bone[3]. Sometime, the extraction may involve removing or trimming a small portion of the bone around to facilitate the extraction of the tooth[4].

The severity of postoperative discomfort can be influenced by the degree of damage to both hard and soft tissues during surgery, which can lead to the release of inflammatory mediators[5]. Pain, swelling, and trismus are common after extraction of impacted

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third molar. These postoperative symptoms can have a profound impact on the patient's quality of life during the immediate recovery period[6].

Corticosteroids (Dexamethasone) can be beneficial in preventing certain postoperative complications associated with tooth extraction, such as excessive inflammation, infection, or delayed healing by inhibiting vasodialtion[7], limiting leukocyte migration, reducing the edema and transudate production and suppression of inflammatory response[8]. By suppressing the immune response, it can help reduce the likelihood of these complications and promote a smoother recovery process[9]. Regarding trismus, the evidence regarding the effectiveness of corticosteroids is mixed. Some studies suggest that corticosteroids may help reduce trismus, particularly when administered prior to surgery, while others have not found a significant effect[10].

This study aims to assess the effectiveness of preoperative submucosal dexamethasone administration in improving postoperative outcomes and quality of life following third molar surgery. By comparing postoperative pain, swelling, and trismus between patients receiving dexamethasone and those who do not, this study seeks to establish evidence supporting the routine use of submucosal corticosteroids in oral surgical practice. The findings may contribute to refining perioperative management protocols and enhancing overall patient satisfaction after third molar extractions.

MATERIALS AND METHODS

Prospective, randomized controlled trial was commenced at Armed Forces Institute of Dentistry, CMH Rawalpindi, from April 2023 to October 2023. Ethical consideration was obtained from Ethical Review Board of Armed Forces Institute of Dentistry Rawalpindi vide Ref. No. 918/Trg date 13 May 2020, 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 illness 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 sur-

gery) 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.

RESULT

A total of 130 subjects were included in the study, with age and gender distribution being almost equal between the two groups ($p > 0.050$) Table-I. The mean pain score in Group A was 31.29 ± 6.04, while in Group B it was 25.32 ± 3.49, with Group B showing significantly lower pain levels than Group A ($p < 0.001$). The mean swelling measured 4.63 ± 1.22 mm in Group A and 3.16 ± 0.72 mm in Group B, indicating significantly less swelling in Group B ($p < 0.001$). Similarly, the mean trismus was 26.17 ± 3.63 mm in Group A compared to 21.15 ± 2.44 mm in Group B, with Group B exhibiting significantly less trismus than Group A ($p < 0.001$). Table-II

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. Ehsan et al (2014)[14] also reported similar findings, demonstrating that preoperative submucosal administration of 4 mg dexamethasone is an effective approach for reducing postoperative complications, particularly trismus.

In a study by Warraichet al[15] 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. Nair et al[16] 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

Table 1: Distribution of demographic characteristics among the groups

Demographic characteristics	Group A	Group B	p-value
Age (years)			
Mean±S.D	26.84±3.74	25.72±3.38	0.644
18-27	37 (56.9)	43 (66.2)	0.279
28-38	28 (43.1)	22 (33.8)	
Sex			
Male	42 (64.6)	44 (67.7)	0.711
Female	23 (35.4)	21 (32.3)	

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

Variable	Group A	Group B	p-value
Pain	31.29±6.04	25.32±3.49	<0.001
Swelling	4.63±1.22	3.16±0.72	<0.001
Trismus	26.17±3.63	21.15±2.44	<0.001

groups, as indicated by a p-value of ≥0.05.

Based on study conducted by Mojsaet 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.

Majid et al[19] 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 Veraset al[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.

LIMITATIONS

Despite promising results, limitations include variations in sample size, methodology, dosage, and administration techniques across studies, reducing comparability. Most focused on short-term outcomes, with limited evaluation of long-term or systemic effects.

Literature consistently supports dexamethasone's role in reducing postoperative complications after mandibular third molar surgery. Most studies, including those by Shad, Ehsan, Warraich, and Mojsa, found that preoperative submucosal administration of 4 mg dexamethasone significantly decreases pain, swelling, and trismus. However, Nair and Grossi reported no significant differences, suggesting variable effects based on surgical and patient factors. Overall, submucosal dexamethasone is an effective and simple adjunct for enhancing postoperative recovery and comfort.

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.

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CONFLICT OF INTEREST
Authors declare no conflict of interest.
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AUTHORS' CONTRIBUTION

The following authors have made substantial contributions to the manuscript as under:

Conception or Design:	SS, AAK, UAK, OS, SN, LAAR
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Manuscript Writing & Approval:	SS, AAK, UAK, OS, SN, LAAR

All the authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.