

Is Dexamethasone a Better Choice after Third Molar Surgery

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ABSTRACT

Background: To determine the effect of submucosal Dexamethasone injection given pre-operatively in third molar surgery on facial swelling and trismus.

Materials and Methods: Forty patients in the age group ranging from 20-40 years having impacted tooth were divided into two groups. Group A (20 patients) received prophylactic 4 mg submucosal Dexamethasone intraoral injection and group B (20 patients) acted as a control group who were not given any corticosteroid. Facial swelling and trismus were assessed at baseline (1st Day), 3rd and 7th postoperative day. Data was analyzed using SPSS-10.

Results: It showed that the administration of the Dexamethasone has a statistically significant effect in reduction of facial swelling and trismus on third post-operative day ($p < 0.05$) in group A. At seventh day no facial swelling and trismus was found in both groups.

Conclusion: Pre-operative 4 mg Dexamethasone submucosal intraoral injection had significant useful effect in reducing facial swelling and trismus.

Keywords: Dexamethasone, impaction, steroid, inflammation, inter-incisal opening, trismus.

INTRODUCTION

In regular dentistry effective control of postoperative complications plays an important role. The surgical extraction of impacted mandibular third molar is one of the most commonly performed day care procedures in oral and maxillofacial surgery and is associated with varying degree of postoperative discomfort.² There is lot of trauma to soft tissue in the surgical impaction of third molar. It can also lead to pain, swelling and trismus. These post-operative complications can lead to distress the patient and affect the patient's quality of life. Although inflammatory response is good for healing but an exacerbated response can cause all of the above-mentioned complications. To overcome these complications, clinicians mostly prescribe corticosteroids.

Reduction of these comorbidities using several strategies has been an area of interest in the field of minor oral surgery. Surgical strategies include using different flaps, bone cutting techniques, and sectioning techniques among others. However, these may not effective in all clinical situations. Consequently, a lot of research has gone into the field of pharmacological agents to reduce postoperative sequele³.

Few complications like stomach irritation, indigestion, tachycardia, nausea, insomnia, metallic taste in the mouth are present, but it all depends on the dose and mode of administration of the drug. Prolonged use can delay healing and increase patient's susceptibility to infections. But in dental extraction the doses are for shorter

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duration, hence chances of adverse effects are very rare. Till date, very few study has been carried out which relates the type, dosage, time and mode of administration of these drugs. further, the use of these drugs in surgical extractions have remained under-investigated. Also, in international research scenario, this topic is very much debated These symptoms are not observed immediately after surgery but rather begin gradually, peaking 2 days after the extraction. Corticosteroids such as dexamethasone may inhibit the initial step in this process and have been extensively used in varying regimens and routes to lessen inflammatory sequelae after third molar surgery¹. Since Dexamethasone has been shown to reduce post-operative edema, it was decided to do a confirmation study of Dexamethasone on third molar surgery.

MATERIALS AND METHODS

Patients were selected from the outpatient department of Karnavati school of dentistry. All the procedure was explained and a written consent were obtained.

Inclusion criteria

1. Patients in the age group of 20-45 years.
2. Free from any bleeding disorder

Exclusion criteria

1. Patients with existing active infections.
2. Patients with systemic disorders.
3. Patients on long term steroids.
4. Pregnant and lactating women.

Forty patients were selected for the study. They were divided into two groups of twenty each. Twenty patients were randomly allocated to each group. In group A Dexamethasone 4mg per ml was injected submucously 1 hour prior to surgery whereas in group B surgery was done without any drugs.

All patients were given standard post-operative instructions and were told to apply an ice pack on the region intermittently for next 6 hours. All patients were put on 500 mg of amoxicillin thrice daily for 5 days and paracetamol 500 mg combination thrice daily for 3 days.

All patients were followed up at intervals of 1st, 3rd and 7th post-operative days. Suture removal was done on the 7th post-operative day if the healing was deemed to be satisfactory.

The following were assessed:

Swelling: Evaluated by modification of tape measuring method described by Schultje- mosque et al. two measurements were made between three reference points: Tragus, pogonion, and the corner of the mouth. The pre-operative sum of the two measurements was considered as the baseline for that side.

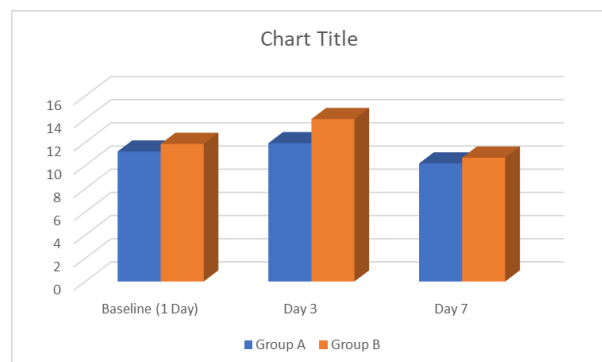
Trismus: Measured as the difference in maximal mouth opening (taken as the distance between upper and lower central incisors, assessed by a measuring to the nearest mm) before and after operation.(fig 3)

RESULTS

Sixteen were male and twenty four were females out of the forty patients that were selected for the study. The average age of the patients were 32.8 years. Recalled visit were scheduled on the 1st, 3rd, and 7th post-operative days. Obtained data was analyzed using SPSSTM 1.8 statistical software package. The statistical tools used were mean values with standard deviation and one-way analysis of variance test to compare the mean values. Swelling from earlobe-corner of mouth plane at baseline was 11.21 ± 0.12 cm for Group A whereas 11.87 ± 0.20 cm for group B. This difference was non-significant at the baseline. Swelling on third day visit were 11.93 ± 0.34 in Group a patient and 14.01 ± 0.56 in Group B. This difference was statistically significant ($p < 0.05$). On 7th day postoperatively, swelling decrease to 10.18 ± 0.23 in group A and 10.68 ± 0.61 in Group B.

Table 1: Measurements of swelling during each visits.

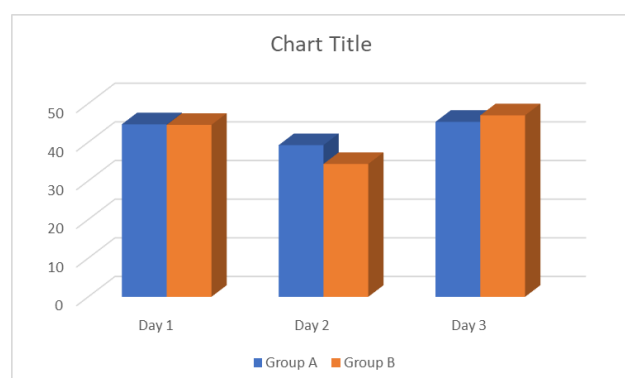
	Group A	Group B	P Value
Baseline (1 Day)	11.21 ± 0.12	11.87 ± 0.20	0.16
Day 3	11.93 ± 0.34	14.01 ± 0.56	0.014
Day 7	10.18 ± 0.23	10.68 ± 0.61	0.21



Graph 1: Graph showing comparison between swelling during each visits.

Table 2: Measurements of mouth opening during each visits.

	Group A	Group B	P Value
Day 1	44.64 ± 1.28	44.49 ± 2.01	0.14
Day 2	39.24 ± 1.82	34.37 ± 1.29	0.012
Day 3	45.27 ± 1.61	46.96 ± 1.52	0.023



Graph 2: Graph showing comparison between mouth opening during each visit.

Interincisal mouth opening at base line (Day 1) was at baseline was 44.64 ± 1.28 mm in Group A and 44.49 ± 2.01mm in Group B. Difference was statistically non-significant ($p > 0.05$). At third day postoperative, group A patient's interincisal distance was 39.24 ± 1.82mm and Group B had 34.37 ± 1.29mm. The difference was statistically significant ($p < 0.05$). On 7th day, group- A interincisal distance was 45.27 ± 1.61mm and group – B interincisal distance was 46.96 ± 1.52. Difference was statistically significant ($p < 0.05$).

DISCUSSION

Corticosteroids are very well-known for controlling inflammation, and reducing transudation and oedema. Most of the surgeons prescribe corticosteroids to control surgical outcomes and yield a comfortable post-surgical healing period. However, there are no definite protocols related to different molecules or regimes, time and route of administration.⁶ There is limited information on the use of corticosteroids as a single oral pre-surgical dose to reduce pain during third molar extractions. The drug doses used in the present study were based on the previous literature available.

Like any surgical procedure, impactions are also associated with post-operative sequelae such as pain, swelling, and trismus. The extent of postoperative sequelae depends on many factors. One of the most important factors is the amount of tissue trauma, and manipulation among many others. Inability to open the mouth completely is a complication after surgery that hinders patients' activities such as eating, drinking and performing oral hygiene procedures.

Although the phenomenon of inflammatory reaction plays a vital role in post-operative healing, an exaggerated response often leads to severe patient discomfort. Since maxillofacial region is richly vascularized and has areas of loose connective tissue, the inflammatory responses tend to be significant.

Corticosteroids are very strong medicines. In addition to their helpful effects in treating your medical problem, they have side effects that can be very serious. If your adrenal glands are not producing enough cortisone-like hormones, taking this medicine is not likely to cause problems unless you take too much of it. If you are taking this medicine to treat another medical problem, be sure that you discuss the risks and benefits of this medicine with your doctor.

Effects of corticosteroids on pain control are still debated and not very clear. Studies have not been able to attribute definite analgesic properties to corticosteroids. However, thromboxane A₂ levels decrease post steroid administrations, prostaglandin E₂ levels, which are the main pain mediators remain unaltered. However, reduction in swelling and trismus is perceived by many as alleviation of pain.

Although intravenous administration affords excellent and immediate plasma drug levels, this route is infrequently used in an outpatient clinical setting, unless patients are receiving intravenous sedation at the same time⁴. In fact, throughout the last 10 years, only 3 studies looked into the effectiveness of the intravenous route as a means to deliver corticosteroids. Chaudary et al. compared the pre-emptive effect of 4 mg intravenous dexamethasone against an oral administration of 8 mg dexamethasone and found that both routes of administration were equally effective in reducing post-operative swelling, pain and trismus⁵. Do note, however, that the dosage of the oral route was twice the intravenous dose of dexamethasone administered. A similar effect has been reported by Majid and Mahmood who, in 2013, compared the intravenous route against intramuscular injection, submucosal injection, endo-alveolar application and per oral intake⁶. Koçer et al. on the other hand showed that the intravenous route was more effective than intramuscular and oral intake. This finding is in contrast to a report 60 years ago, which stated that the oral route was found to be as effective as the intravenous route⁷. This finding also contradicts earlier reports that suggested supplementing intravenous corticosteroids with post-operative oral doses up to 1 day to maximize the beneficial effect of corticosteroids.

The dose of the drug should be more than the cortisol released normally by the body. Due to this reason, the present study 8mg dexamethasone is used which corresponded to 200 mg of cortisol^{8,9}.

This study showed that prophylactic administration of dexamethasone injection through intraoral submucosal route has significantly reduced swelling and trismus. These results are in accordance to those of Laureno⁴ and his colleagues found that use of corticosteroids reduced edema and improved the range of mouth opening. Similarly, Deo¹⁰ reported the reduction of edema and trismus after use of dexamethasone. The study of Majid¹¹ proved that dexamethasone can significantly reduce the swelling. Graziani¹² et al. showed test side treated with dexamethasone had greater reduction of swelling and trismus. Bamgbose¹² and colleagues observed that treatment with dexamethasone and diclofenac provided relief of postsurgical pain with swelling. Moore and colleague's study on pre-

emptive effect of rofecoxib and dexamethasone 10 mg (i.v) demonstrated reduction of postoperative swelling and trismus¹³.

Cortisol has the capacity to interfere with the physiologic processes of inflammation and, thus, suppress the development of inflammatory sequelae. Therefore, in literature, emphasis on the use submucosal dexamethasone injection have been reported for significant reduction of swelling and trismus.³

In agreement with Graziani et al¹⁵, our data show that the submucosal administration of dexamethasone 4 mg per ml resulted in a highly significant decrease in edema on the second post-operative day.

CONCLUSION

The results of this study are in support to earlier literature and it is found that the administration of 4 m.g. dexamethasone injection is effective in reduction of postoperative swelling and trismus. It can thus be, safely used pre-operatively as single dose through intraoral submucosal route. Hence, we strongly recommend that preoperative use of dexamethasone is worth in third molar surgery.

CONFLICTS OF INTEREST

The authors declare they have no potential conflict of interests regarding this article.

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