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Evaluation of the Effect of Submucosal Injection of Dexamethasone to Control Postoperative Sequelae after Third Molar Surgery: A Prospective Randomized Clinical Study

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ABSTRACT
The extraction of impacted lower third molars is the most common operation in oral surgery and usually produces pain, swelling and mouth opening in the postoperative period. The surgical removal of impacted third molars involves trauma to soft and bony tissue and can result in considerable pain, swelling and trismus. The study aim to evaluate the effect of submucosal administration of dexamethasone sodium phosphate after mandibular third molar surgery. To compare the efficiency of 8mg Dexamethasone given locally at the operated site and systemically in surgical extractions of similarly impacted mandibular third molars. A total of 25 patients (50 impacted teeth – split arch) who underwent surgical extraction of mandibular third molars were included. The study subjects were randomly assigned into two groups: Control Group and Experimental Group (8 mg Dexamethasone). This study was conducted in same patient one side was injected 8 mg Dexamethasone intraoral submucosally & other side was injected normal saline injection for placebo effect for control study. This study shows that dexamethasone successfully reduces the post-operative sequelae after third molar surgery. Hence, 8 mg dexamethasone can be used in routine third molar surgery to improve the post-operative quality of life of the patient.
Keywords: Third molar surgery, dexamethasone, postoperative sequelae, submucosal, extraction.

I. INTRODUCTION

Surgical third molar extraction is most common procedure in patients aged (18-45 years) in oral & maxillofacial surgery department. There are many factors to consider before a decision to remove a mandibular third molar can be reached, involving a through medical, dental and social history combined with clinical and radiographic assessment. Removal of symptomatic or diseased third molars has been shown to improve oral health and function of patients. The World Health Organisation (WHO) characterizes the presence of an impacted third molar as a developmental condition within their International Classification of Disease. However, impaction is a descriptive term and is not an indication for surgery when being considered alone. Management strategies for mandibular third molars can range from clinical monitoring, partial removal in the form of coronectomy or removal.

Post-operative sequelae (pain, swelling and trismus) are acute inflammatory complications of surgical removal of impacted mandibular third molar and are generally regarded as short term problems of third molar surgery. Minimally invasive surgical technique will minimize the sequelae of inflammation but will not prevent them. Therefore, pharmacological intervention is needed to control the extent of inflammation and sequelae such as pain, swelling and trismus.

In clinical trials that investigated the effect of peri-operative dexamethasone, various routes of administration were employed ranging from oral tablet formulation, intra-muscular, intra-alveolar to intra-venous administration.Our study investigation the effects of the submucosal injection of 8mg dexamethasone to control the postoperative pain reported at the surgical time. A submucosal route has the benefit of providing local effects but avoiding systemic administration. Most clinical trials after surgery, the intensity of the pain to be measured by a visual analog scale (VAS).

AIM
To evaluate the effect of submucosal administration of dexamethasone sodium phosphate after mandibular third molar surgery.

OBJECTIVES
1. To compare the efficiency of 8mg Dexamethasone given locally at the operated site and systemically in surgical extractions of similarly impacted mandibular third molars.

2. To evaluate the postoperative sequelae like pain, swelling and mouth opening following the administration of Dexamethasone.

METHOD:

For this study, 25 patients who underwent surgical extraction of mandibular third molars in the Department of Oral and Maxillofacial Surgery, Rajasthan Dental College, Jaipur. The patients were enrolled for the study consecutively as and when they reported to the hospital. The study subjects were randomly assigned into two groups: Control Group and Experimental Group (8 mg Dexamethasone). This study was conducted in same patient one side was injected 8 mg Dexamethasone intraoral submucosally & other side was injected normal saline injection for placebo effect for control study.

Surgical Procedure

A randomized prospective study was conducted on healthy patients with asymptomatic Impacted Mandibular third molars, reporting to the Department of Oral and Maxillofacial Surgery. Mouth opening and facial swelling was evaluated at preoperative and postoperative day.[35] The subjects were asked to open the mouth slowly until pain was first felt. Maximal interincisal distance was measured with the help of a ruler. Facial swelling was evaluated by a modification of tape measuring method.

After the surgical preparation of the subjects, lignocaine 2% with epinephrine 1:2,00,0000 was used as the anesthetic agent to block the inferior alveolar, lingual and long buccal nerve. 8 mg dexamethasone or normal saline in placebo was injected submucosally into the pre-third molar regions. Post-operative instructions were given to subjects, including an ice pack for 20 minutes and a pressure pack for 30 minutes over the surgical site to achieve hemostasis. All the subjects were prescribed antibiotic per oral three times a day for 5 days and analgesic per oral 8 hourly. The subjects were asked to take the first analgesic post-operatively as soon as the pain reached moderate level and asked to record the time. The subjects were instructed to not to take any other analgesic drugs.

All the subjects were given a 10 cm visual analog scale (VAS) and instructed about the rating (Figure 1).They were asked to enter their pain level, the time at which the analgesic was taken, and the number of tablets taken until the end of the first post-operative week. The technique and reference points used for these measurements were the same as those based in the pre-operative assessment. The evaluation of trismus and facial edema was recorded as the differences between pre-operative (baseline) and post-operative values.


Preoperative OPG


Intraoperative photograph


Surgical photograph


Extracted third molar tooth

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Research Design -
It is a randomized prospective study.

Population-
Patients with surgical extraction of mandibular third molars.

Sample Size-
25 patients (50 impacted teeth – split arch) who underwent surgical extraction of mandibular third molars in the Department of Oral and Maxillofacial Surgery, Rajasthan Dental College, Jaipur.

Sampling Method -
Random sampling method

Source of Data -
All patients coming to **DEPARTMENT OF ORAL AND MAXILLOFACIAL SURGERY, RAJASTHAN DENTAL COLLEGE, JAIPUR** who underwent surgical extraction of mandibular third molars by an oral surgeon and who are fulfilling the inclusion and exclusion criteria.

Statistical Analysis:
All the demographic details, base line data and postoperative data were recorded in the case report form over the course of the study. The quantitative data was represented as Mean ± Standard Deviation. Data was analyzed using Chi-square test and independent sample t-test for group analysis. The difference was considered as being of statistical significance at $P < 0.05$. The statistical analysis was done using SPSS (Statistical Package for Social Sciences) Version 22.0 statistical Analysis Software.

Inclusion Criteria
a. Patient's reporting for surgical removal of asymptomatic impacted mandibular third Molars
b. Patients in the age group of 18-45 years.
c. Patients with similar bilaterally impacted mandibular third molars classified under Pell & Gregory's classifications.
d. All the patients were informed about the study and their consent would be taken to participate in the study.

Exclusion Criteria
a. No allergies to medicines were prescribed in the postoperative period.
b. Patients who were nonsmokers, nonalcoholics and without any systemic diseases.
c. Not systemically compromised or under long term steroid therapy.
d. Patients with periapical pathologies were excluded from the study.

Armamentarium Used
1. Dexamethasone 8mg injection
4. Mouth mirror
5. Tweezer
6. B.P. blade handle (3,7) Blade no.(12,15)
7. Periosteal elevator
8. Howarth's periosteal elevator
9. Austin retractor
10. Straight hand piece with micro motor unit
11. Bone cutting burs no. 702 and 703
12. Straight elevator
13. Coupland elevator
14. Warwick james elevator
15. Cryerselevator (right and left)
16. Mandibular third molar forceps
17. Mandibular cow horn forceps
18. Bone currete
19. Bone file
20. Bone rongeur
21. Adson tissue holding forceps
22. Needle holder
23. Scissor
24. Mersilk 3-0 suture
25. Divider
26. Vernier calliper
27. Scale
28. Gauze
29. Normal Saline
31. 5ml,10ml syringes

II. RESULTS

Table 1: Distribution of participants according to Age

Age (Years)	No of patients	Percentage (%)	Mean ± SD
18-22	4	16%	28.56 ± 6.90
23-27	10	40%	
28-32	4	16%	
33-37	2	8%	
38-42	5	20%	
Total	25	100%	

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A total of 14 male and 11 female patients were selected, in the age group between 18 and 42 years. Majority of patients were between 18 and 27 years (56%), followed by 28 to 42 years (44%) (Table 1). The age of the patients, in years, was mean (M) = 28.56, standard deviation (SD) = 6.90.

Table 2: Preoperative day Pain Score in the both groups

	Groups	N	Mean	Std. Deviation	Std. Error Mean	t value	p value
8 hours	Control	25	0.320	0.4761	.0952	2.179	**0.034 (S)**
	Experimental	25	0.080	0.2769	.0554		
16 hours	Control	25	1.600	0.8660	.1732	5.781	**0.000 (S)**
	Experimental	25	0.440	0.5066	.1013		
24 hours	Control	25	2.800	0.8165	.1633	8.728	**0.000 (S)**
	Experimental	25	0.920	0.7024	.1405		

S – Significant

We included VAS score evaluation for the pain analysis. There was a significant difference in pain scores between the both groups. At each hourly observation time, more patients had higher VAS scores with normal saline procedure than with 8 mg dexamethasone procedure. The pain scores of 8 hours were statistically significant among the both groups (p = 0.034). The pain scores of 16 and 24 hours were significantly higher in the control group than the experimental group (p= 0.000) (Table 2).

Table 3: Postoperative day Pain Score in the both groups

Groups	N	Mean	Std. Deviation	Std. Error Mean	t value	p value
Control	25	2.560	1.0832	.2166	5.968	**0.019 (S)**
Experimental	25	0.960	0.7895	.1579		

S – Significant

On the postoperative day, the average pain score was increase in control group compared to the experimental group. There was a statistically significant difference in pain scores between the both groups (P=0.019) (Table 3).

III. DISCUSSION:

The acute post-operative sequelae of impacted mandibular third molar surgery are manifestations of inflammation due to tissue injury. Dental extraction is one of the most frequently performed surgical procedures in dental practice. But only teeth with fully-formed roots and bony impaction (usually the mandibular third molars) are more difficult to extract than those with partially-formed or no roots, requiring a more invasive surgery. The inflammatory reaction is an essential vital process that promotes healing of the injured tissue, further justifying the use of corticosteroid only in third molar surgery rather than in routine dental surgery. In our study, better results were obtained in the experimental group compared to the control group on the postoperative day and significant difference in the mean value of the postoperative day after surgery (P = 0.042). Results in our study showed less severity of pain on postoperative day follow up period after using 8 mg dexamethasone injection compared with the control group. Statistical difference in the pain was noted which was significantly less in dexamethasone compared to the control group.

IV. CONCLUSION:

Our study shows that dexamethasone successfully reduces the post-operative sequelae after third molar surgery. Hence, 8 mg dexamethasone can be used in routine third molar surgery to improve the post-operative quality of life of the patient. This study has led to the conclusion that the submucosal use of steroids such as dexamethasone can be a valuable tool to control postoperative sequelae of third molar surgery. Since our sample size is small, still further studies with larger sample size are required to effectively evaluate the efficacy of dexamethasone.

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