



Journal Homepage: -[www.journalijar.com](http://www.journalijar.com)  
**INTERNATIONAL JOURNAL OF  
 ADVANCED RESEARCH (IJAR)**

Article DOI:10.21474/IJAR01/1517  
 DOI URL: <http://dx.doi.org/10.21474/IJAR01/1517>



### RESEARCH ARTICLE

## COMPARISON OF POST-OPERATIVE SEQUELAE OF INTRA-SPACE INJECTION OF TWIN MIX VERSUS INTRAORAL-SUBMUCOSAL, INTRAMUSCULAR, INTRAVENOUS AND PER-ORAL ADMINISTRATION OF DEXAMETHASONE AFTER REMOVAL OF IMPACTED MANDIBULAR THIRD MOLAR.

**Kanika Singh (MDS)<sup>1</sup>, Sanjeev Kumar (MDS, FDS RCPS)<sup>2</sup>, Vidhi Chhabra Rathi (MDS)<sup>3</sup>, Abhishek Rathi (MDS)<sup>4</sup> and Bharat Bhati (MDS)<sup>5</sup>.**

1. Post graduate trainee, Department of oral and maxillofacial surgery, I.T.S-CDSR, Muradnagar, Ghaziabad.
2. Professor and Head, Department of oral and maxillofacial surgery, I.T.S Centre for dental studies and research, Delhi-Meerut Road, Muradnagar, Ghaziabad. Pin-201206. Uttar Pradesh, India.
3. Senior Lecturer, Department of oral and maxillofacial surgery, I.T.S Centre for dental studies and research, Delhi-Meerut Road, Muradnagar, Ghaziabad. Pin-201206. Uttar Pradesh, India.
4. Senior Lecturer, Department of oral and maxillofacial surgery, Institute of Dental Studies and Technologies (IDST) Kadrabad, Modinagar, Ghaziabad. Pin- 201206. Uttar Pradesh, India
5. Post-Graduate trainee, Department of oral and maxillofacial surgery, I.T.S Centre for dental studies and research, Delhi-Meerut Road, Muradnagar, Ghaziabad. Pin-201206. Uttar Pradesh, India.

#### Manuscript Info

##### Manuscript History

Received: 22 July 2016

Final Accepted: 19 August 2016

Published: September 2016

##### Key words:-

Twin Mix, Dexamethasone, Post-operative sequelae, Impacted, Third molar

#### Abstract

**Aim:-** This study compares the post-operative sequelae of intra-space injection of Twin mix versus intraoral-submucosal, intramuscular, intravenous and per-oral administration of dexamethasone on impacted mandibular third molars.

**Materials & method:-** A randomized prospective study including a sample size of 60 patients were divided into 6 groups. Group I: (Control group) No steroid was administered before the surgical procedure. Group II: (Intra-space injection of Twin mix) 1.8 ml 2 % lignocaine with 1:200,000 epinephrine+1 ml 4 mg dexamethasone administered in the pterygomandibular space before the surgical procedure. Group III: (Submucosal dexamethasone) 1 ml of 4 mg dexamethasone administered in the buccal mucosa intraorally immediately before the surgical procedure. Group IV: (Intramuscular dexamethasone) 1 ml of 4 mg dexamethasone administered in the deltoid muscle immediately before the surgical procedure. Group V: (Intravenous dexamethasone) 1 ml of 4 mg dexamethasone administered in a vein in the forearm immediately before the surgical procedure. Group VI: (Per-oral dexamethasone) 4 mg per-oral dexamethasone 1 h before the procedure.

**Corresponding Author:- Kanika Singh.**

Address:- Post graduate trainee, Department of oral and maxillofacial surgery, I.T.S-CDSR, Muradnagar, Ghaziabad

**Result:-**All the groups were followed up on 1<sup>st</sup>, 3<sup>rd</sup> and 7<sup>th</sup> day. There was statistically significant difference between group II and the control group for pain and swelling.

**Conclusion:-**Steroid groups appeared to have a better clinical outcome with improved quality of life post-operatively when compared to the non-steroid study group. Intra-space injection of dexamethasone in pterygomandibular space as Twin mix was found to have similar clinical effects as conventional methods of administering steroids via intraoral-submucosal, intramuscular, intravenous and per-oral routes.

*Copy Right, IJAR, 2016., All rights reserved.*

## **Introduction:-**

An impacted tooth is one that fails to erupt into proper functional position in the dental arch within expected time. Prophylactic or curative removal of impacted third molar teeth is the most common surgical procedure carried out by oral surgeons.<sup>1</sup>

Removal of third molar is followed by a sequelae of problems like pain, trismus, dry socket, swelling, nerve damage, wound infection and delayed onset wound infection which occurs after suture removal, periodontal pocket formation, loss of connective tissue attachment or bone loss on the distal aspect of second molar, changes in alveolar bone height following third molar extractions have also been a subject of controversy in literature.<sup>2</sup> The most common sequelae of surgical extraction of mandibular third molar is tissue trauma which causes an inflammatory reaction.<sup>3</sup>

This study compares the post-operative sequelae of intra-space injection of Twin mix versus intraoral-submucosal, intramuscular, intravenous and per-oral administration of dexamethasone on impacted mandibular third molars.

## **Material and method:-**

### **Patient demographics:-**

This study included 60 patients with 10 patients in each group.

The study included 34 males and 26 females, with a mean age of 27.50 years ranging from 18 years to 40 years.

### **Criteria:-**

The inclusion and exclusion criteria for the present study are defined as follows-

#### **Inclusion Criteria:-**

1. All the patients having impacted mandibular third molars according to Pell & Gregory Classification
2. All the patients in the age group between 18-40 years and in good health.
3. Patients requiring surgical removal of impacted mandibular third molars and who are willingly to take part in study after signing a written informed consent.
4. Patients deemed fit for the surgery
5. Patients having a vital tooth without periapical radiolucency
6. Patients with recurrent pericoronitis

#### **Exclusion Criteria:-**

1. Patients who are allergic to any of the local anesthetic solutions and / or allergic to medications prescribed in the study
2. Presence of acute infection or swelling at the site at the time of extraction
3. Pregnant patients
4. Medically compromised patients
5. Patients who will be unable to provide informed consent to the maxillofacial surgeon at the time of procedure

#### **Method of Study:-**

Each patient was prepared according to the parameters of one of the study group and administered the local anaesthetic (2% lignocaine with 1:200,000 epinephrine) nerve block.

In group II- Twin mix was prepared by mixing 1.8 ml of 2 % lignocaine with 1:200,000 epinephrine and 1 ml dexamethasone Injection 4 mg immediately before injecting. The Twin-mix solution was injected as an inferior alveolar nerve block.

In group III- 1 ml of 4 mg dexamethasone administered in the buccal mucosa intraorally immediately before the surgical procedure.

In group IV- 1 ml of 4 mg dexamethasone administered in the deltoid muscle immediately before the surgical procedure.

In group V- 1 ml of 4 mg dexamethasone administered in a vein in the forearm immediately before the surgical procedure.

In group VI- 4 mg per-oral dexamethasone 1 h before the procedure.

Surgical access to the third molar was achieved with a modified ward's mucoperiosteal flap, and bone guttering was done using a 702 Surgical Carbide Fissure Bur (SS White, Lakewood, NJ) on a straight surgical micro-motor/hand piece with normal saline irrigation. Surgical site was thoroughly irrigated with normal saline, and the closure was done with interrupted 3–0 silk sutures.

All patients in the study routinely received post-operative dose of oral antibiotics in a combination of Capsule Ampicillin 250mg and Capsule Cloxacillin 250mg and Tablet Metronidazole 400mg three times daily for 5 days and analgesics in a combination of Tablet Ibuprofen 400mg and Paracetamol 325mg three times daily for 3 days. The patients were recalled on the first (24 hours after surgery), third and the seventh postoperative day for follow-up.

#### **Parameters:-**

The parameters for this study included Pain, Swelling and trismus measured pre-operatively and on the 1<sup>st</sup>, 3<sup>rd</sup> and 7<sup>th</sup> postoperative day.

Pain was measured on a 100mm long visual analog scale (VAS), which was marked by the patient himself/herself, as per the pain experienced by the patient. The visual analog scale (VAS) was used to measure their current pain intensity from 0 (“no pain”) to 10 (“worst possible pain”).

The facial dimensions were measured from the distance from the base of the mandibular angle till the tragus, lateral canthus, alar and pogonion will be noted. The difference between each postoperative measurement and the baseline indicated the facial swelling for that day.

Post-operative trismus was determined daily taking preoperative maximum inter- incisal opening. The maximum opening of the jaws was recorded by a pair of graduated Verniercalipers.

#### **Data collection and Statistical analysis:-**

The data obtained were compiled systematically, transformed from a pre-coded proforma to a computer and a master table was prepared. The total data was distributed meaningfully and presented as individual tables along with graphs. Significance was assessed at 5% level of significance. Data analysis was done using *Student's t test* and *ANOVA*.

Inter-group comparisons between group I (nonsteroid group) and group II (intra-space steroid Twin mix group) were done using Student's t test.

Comparisons among steroid groups (groups II, III, IV, V & VI) were done using ANOVA.

#### **Result:-**

Steroid groups projected a difference in facial swelling and the reduction in mouth opening post-operatively when compared to the control group.

Mean operative VAS did not show statistical variation and post-operative indicated better patient comfort in the steroid groups with statistically significant difference between group II and the control group on the first, third and the seventh post-operative daily (Table 1). Mean operative VAS for intergroup comparison is shown in Table 2.

Mean increase in distances between ala-tragus and angle-soft tissue menton to assess facial swelling showed statistically significant difference between the first and the third post-operative day between the control group and the group II (Table 3).

Inter group comparison of mean increase in distances between ala-tragus and angle-soft tissue menton to assess facial swelling is shown in Table 4.

Association of trismus was found less with the steroid treatment groups when compared to the control group (Table 5).

**Table 1:-** Mean Visual Analogue Scale between Control group and group II

Study group	Mean visual analogue scale score			
	Pre-operative	1 <sup>st</sup> day post-operative	3 <sup>rd</sup> day post-operative	7 <sup>th</sup> day post-operative
Control Group	1.30	3.6	4.7	2.4
Group II	1.7	1.2	1.1	.00
P value	<b>.566**</b>	<b>.020*</b>	<b>.000*</b>	<b>.001*</b>

**Table 2:-** Inter group comparison of Pain.

Study Group	Mean Visual Analogue Scale Score			
	Pre-operative	1 <sup>st</sup> day Post-operative	3 <sup>rd</sup> day Post-operative	7 <sup>th</sup> day Post-operative
Group III	<b>3.00</b>	<b>2.80</b>	<b>1.60</b>	<b>.40</b>
Group IV	<b>4.10</b>	<b>4.50</b>	<b>3.70</b>	<b>2.20</b>
Group V	<b>4.50</b>	<b>4.20</b>	<b>2.80</b>	<b>1.40</b>
Group VI	<b>1.40</b>	<b>2.50</b>	<b>4.80</b>	<b>2.50</b>
Total p value	<b>.002*</b>	<b>.027*</b>	<b>.005*</b>	<b>.010*</b>

**Table 3:-** Comparison of swelling between Control group and Group II

Study group	Mean increase in distances between ala-tragus and angle-soft tissue menton to assess facial swelling (mm)			
	Pre-operative	1 <sup>st</sup> day post-operative	3 <sup>rd</sup> day post-operative	7 <sup>th</sup> day post-operative
Control Group	10.85	11.50	11.44	11.14
Group II	10.66	10.90	10.76	10.52
P value	<b>.515**</b>	<b>.031*</b>	<b>.013*</b>	<b>.018*</b>

**Table 4:-** Depicting intergroup comparison of swelling.

Study Group	Mean increase in distances between ala-tragus and angle-soft tissue menton to assess facial swelling (mm)			
	Pre-operative	1 <sup>st</sup> day Post-operative	3 <sup>rd</sup> day Post-operative	7 <sup>th</sup> day Post-operative
Group III	10.64	10.74	10.66	10.40
Group IV	11.28	11.81	11.53	11.30
Group V	10.88	11.55	11.26	11.96
Group VI	10.60	10.89	11.14	10.87
Total p value	<b>.188**</b>	<b>.008*</b>	<b>.086**</b>	<b>.179**</b>

**Table 5:-** Depicting comparison of Maximal Mouth Opening between Control Group and Group II

Study group	Mean reduction in maximal mouth opening (MMO) in the post-operative period (mm)			
	Pre-operative	1 <sup>st</sup> day post-operative	3 <sup>rd</sup> day post-operative	7 <sup>th</sup> day post-operative
Control Group	4.45	3.11	3.01	3.69
Group II	4.45	4.25	3.90	3.77
P value	<b>1.000**</b>	<b>.001*</b>	<b>.052**</b>	<b>.098**</b>

**Discussion:-**

Third molar is the tooth that is most commonly impacted accounting to about 33% of population having at least one impacted third molar and 90% of population with impacted teeth. Surgical removal of wisdom teeth is a commonly performed oral surgical procedure in oral and maxillofacial surgical practice.<sup>1</sup>

Cyclo-oxygenase and prostaglandins play a crucial role in the development of postoperative pain and swelling during inflammatory reaction. Pain and swelling can be reduced via the membrane-stabilizing anti-exudative effect of glucocorticoids and by inhibiting cyclo-oxygenase with non-steroidal anti-inflammatory drugs. Apart from nonsteroidal anti-inflammatory drugs, use of potent anti-inflammatory agents like corticosteroids is backed by a number of clinical trials to aid in improvement of post-surgical quality of life by reducing the post-operative sequelae.<sup>4</sup>

Dexamethasone exerts potent anti-inflammatory action by inducing the synthesis of endogenous proteins by blocking the enzymatic activation of phospholipase A2. Dexamethasone inhibits arachidonic acid release by the cell membrane, thereby inhibition of the synthesis of prostaglandins leukotrienes or substances related to thromboxane.<sup>5</sup>

Tiwana et al. in their study carried out a study on the impact of intravenous corticosteroids in patients undergoing third molar extraction. They concluded that administration of IV corticosteroids before third molar surgery without antibiotics did not hamper clinical recovery even when healthy adult patients are predicted to have delayed recovery.<sup>6</sup>

Sreekumar K et al concluded that the mean VAS value for the pain on local anesthetic injection/block was less in study group T (twin mix group). On comparative evaluation between study group C (control group) and study group T (twin mix group), patients in the control group had more severe swelling and reduction in mouth opening in the postoperative period.<sup>7</sup>

Grossi GB et al carried out a study on the effect of submucosal injection of dexamethasone on postoperative discomfort after third molar surgery. In their study, facial edema showed a statistically significant reduction in both dexamethasone 4-mg and dexamethasone 8-mg groups compared with the control group. The treatment group had a limited and a nonsignificant effect on pain and trismus when compared with the control group at the 2 times of evaluation. They concluded that parenteral use of dexamethasone 4 mg, given as an intraoral injection at the time of surgery, is effective in the prevention of postoperative edema. Increasing the dose to 8 mg provides no further benefit.<sup>8</sup>

In the study by Bhargava D et al, All the patients in the nonsteroid control group had increased pain/discomfort scores, reduction in mouth opening and facial swelling as recorded on the first, third and the seventh postoperative day in the study.<sup>5</sup>

Many advantages for intra-space injections as twin mix were observed. They include (a) Administration of dexamethasone with a single needle prick (used for inferior alveolar nerve block for anaesthesia) (b) Short latency and prolonged duration of the soft tissue anaesthesia.

In our study, statistically significant difference between group II and the control group on the first, third and the seventh post-operative day was observed for pain and swelling.

**Conclusion:-**

Steroid groups appeared to have a better clinical outcome with improved quality of life post-operatively when compared to the non-steroid study group. Intra-space injection of dexamethasone in pterygomandibular space as

Twin mix was found to have similar clinical effects as conventional methods of administering steroids via intraoral-submucosal, intramuscular, intravenous and per-oral routes.

### References:-

1. Karaca I, Simsek S, Ugar D, Bozkaya S. Review of flap design influence on the health of the periodontium after mandibular third molar surgery. *Oral Surg Oral Med Oral Pathol Radiol Endod.* 2007; 104: 18-23.
2. Mercedes M, Gutwald R, Reichman J, Cepeda X, Schmelzeisen R. Marginal flap versus paramarginal flap in impacted third molar surgery: A prospective study. *Oral Surg Oral Med Oral Pathol Oral Radio Endod.* 2003; 95: 403-08.
3. Rosa A, Carneiro M, Lavrador M. Influence of flap design on periodontal healing of second molars after extraction of impacted mandibular third molars. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod.* 2002; 93: 404-07.
4. Kim K, Brar P, Jakubowski J, Kaltman S, Lopez E. The use of corticosteroids and non steroidal anti-inflammatory medication for the management of pain and inflammation after third molar surgery: A review of the literature. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 2009; 107: 630-640.
5. Bhargava D, Sreekumar K, Deshpande A. Effects of intra-space injection of Twin mix versus intraoral-submucosal, intramuscular, intravenous and per-oral administration of dexamethasone on post-operative sequelae after mandibular impacted third molar surgery: a preliminary clinical comparative study. *Oral Maxillofac Surg* 2014 ; 18: 293-6.
6. Tiwana PS, Foy SP, Shugars DA, Marciani RD, Conrad SM, Phillips C et al .The impact of intravenous corticosteroids with third molar surgery in patients at high risk for delayed health-related quality of life and clinical recovery. *J Oral Maxillofac Surg* 2005 63: 55-62.
7. Bhargava D, Sreekumar K, Rastogi S, Deshpande A, Chakravorty N. A prospective randomized double-blind study to assess the latency and efficacy of twin-mix and 2% lignocaine with 1:200,000 epinephrine in surgical removal of impacted mandibular third molars: a pilot study. *Oral Maxillofac Surg.* 2013 ; 17: 275-80.
8. Grossi GB, Maiorana C, Garramone RA, Borgonovo A, Beretta M, Farronato D, Santoro F. Effect of submucosal injection of dexamethasone on postoperative discomfort after third molar surgery: a prospective study. *J Oral Maxillofac Surg* 2007 ; 65(11): 2218-2226.