



## EFFICACY OF INTRA-MASSETERIC AND SUBMUCOSAL DEXAMETHASONE INJECTION IN SURGICAL EXTRACTION OF IMPACTED LOWER THIRD MOLAR.

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**ABSTRACT...** To determine the efficacy of intra-masseteric and submucosal dexamethasone injection to minimize the postoperative discomfort after the surgical extraction of impacted lower third molar. **Study Design:** Cross sectional study (Comparative). **Setting:** Department of Oral & Maxillofacial Surgery, Institute of Dentistry, Liaquat University of Medical & Health Sciences Jamshoro / Hyderabad. **Period:** January 2017 to June 2017. **Materials and Methods:** All surgical extractions were done under local anaesthesia by giving conventional inferior alveolar nerve block. An envelope mucoperiosteal flap was raised to expose the third molar. Then tooth was extracted. After the removal of tooth any sharp bone was smoothed by bone file and the socket was washed and sutured. The severity of pain was recorded by using Visual Analogue Scale from 0 (no pain) to 10 (worst pain) described as mild, moderate or severe. Degree of swelling was measured by facial size through Amin and laskin criteria which was measured in millimeters. Mouth opening was measured by interincisal distance through ruler (35-45mm normal value). **Results:** From sixty four patients it was observed that the minimum age was 28.03+6.12 years. There were 35 male patients and 29 female patients. When Chi square test was applied, there was a significant association found between Groups (A and B). By using independent sample t-test, it was observed that there was a significant association found in both groups concerning facial swelling (Facial size in mm) having p-value 0.00. When the independent t-test was applied on the data, there was a significant association found in Group A and B regarding mouth opening (in mm) having p-value 0.001. **Conclusions:** Dexamethasone has a good efficacy for reducing the postoperative symptoms including severe pain, facial swelling and trismus after the surgical extraction of impacted lower third molar. The better outcomes perceived when it was administered submucosally.

**Key words:** Dexamethasone, Intramasseteric, Lower Third Molar Impaction, Submucosal.

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### INTRODUCTION

Impacted tooth is one that fails to erupt into its proper functional occlusion at the age of eruption.<sup>1</sup> The surgical removal of impacted mandibular third molar is one of the most frequent procedure performed by Oral & Maxillofacial Surgeon.<sup>3</sup>

The position of an impacted third molar is categorized radiographically using Winter's (Angulation) Classification based on the inclination of the impacted wisdom tooth (3rd molar) to the long axis of the 2<sup>nd</sup> molar i.e Mesioangular, Distoangular, Vertical or Horizontal impaction.<sup>1</sup>

Indications for mandibular third molar extraction

are pain, pericoronitis, periodontal defects, caries, cyst, odontogenic tumor and neurogenic pain.<sup>5</sup>

The surgical removal of impacted 3<sup>rd</sup> molar can vary in difficulty, degree of trauma to the surgical site and sometimes it require bone removal and soft tissue injury which usually causes significant postoperative pain, swelling and trismus.<sup>2,3</sup>

Many clinical studies are performed to reduce postoperative complications by using corticosteroids, well planned atraumatic surgery, flap design, muscle relaxant and Nonsteroidal anti-inflammatory drugs.<sup>4,5,7,8,9</sup>

Masseter is a masticatory muscle which is substantially affected by postoperative edema after impacted mandibular third molar surgery.<sup>8</sup>

Corticosteroids are useful in controlling acute inflammation by interfering with the multiple signaling pathways involved in the inflammatory response. Their primary mechanisms are thought to involve suppression of leukocyte and macrophage accumulation at the site of inflammation, and prevention of prostaglandin formation through the disruption of the arachidonic acid cascade.<sup>7,11</sup>

Dexamethasone, a glucocorticoid has 20-30 times greater potency than natural corticosteroids and long half-life which reduces inflammatory response.<sup>6,8</sup>

Intra-masseteric injection of dexamethasone is easy and tolerable and may be an effective route of administration for reducing postoperative edema, pain and trismus on second postoperative day after lower mandibular third molar surgery its disadvantage is that it is painful, invasive and need expert skill to reach at insertion area.<sup>9</sup>

An alternative to intramasseteric injection is the sub mucosal administration of dexamethasone in buccal vestibule near surgical site, which is simple and easy for both patient and surgeon.<sup>9,10</sup> It is less painful and decreases pain, swelling and trismus which improves patient's quality of life.<sup>10,11</sup>

Submucosal administered dexamethasone is locally administered hence concentrated at surgical site only, whereas intramasseterically administered is spreading systemically.<sup>6</sup>

#### **DATA COLLECTION PROCEDURE**

Patients who fulfilled the inclusion criteria were included in this study. The data was collected from the patients who came to the Out Door Patient department. Informed and written consent was taken from the patient. The impacted tooth was diagnosed by clinical examination and radiograph like OPG and periapical radiographs.

The demographic and clinical parameters

like age, gender, preoperative assessment of swelling, pain & mouth opening were recorded. Patients were divided into two groups Group-A and group-B by Lottery method.

All surgical extractions were done under local anaesthesia by giving conventional inferior alveolar nerve block. An envelope mucoperiosteal flap was raised to expose the third molar. By using straight elevator tooth was lifted up, if tooth was retrieved then procedure was stopped. Otherwise, bone was removed under constant irrigation with sterile 0.9% normal saline on the occlusal and buccal surface of third molar. Then tooth was extracted.

After the removal of tooth any sharp bone was smoothed by bone filer and the socket was washed with 0.9% normal saline, then suturing was done with vicryl 3-0 in both groups.

In group A, dexamethasone (inj. Dexamex. Bosch 4mg) was given intramasseterically immediately after the flap closure.

In group B, dexamethasone (inj. Dexamex. Bosch 4mg) was given submucosally.

Patients was given standard antibiotics for pain relief. Postoperative instructions was given to patient, including soft diet and maintain good oral hygiene by using mouthwash.

The severity of pain was recorded by using Visual Analog Scale from 0 (no pain) to 10 (worst pain) described as mild, moderate or severe. Degree of swelling was measured in millimeters by facial size through Amin and laskin criteria. Mouth opening was measured by interincisal distance through ruler (35-45mm normal value) and all data was recorded on the second and seventh day by the clinician.

#### **RESULTS**

Figure 1 shows Age ranges: the 28.03+6.12 years was mean age with + standard deviation.

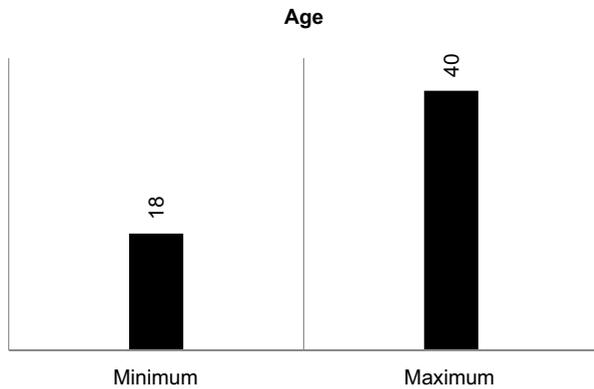


Figure-1. Bar chart representing age ranges

Table-I shows distribution of gender.

	Frequency	Percentage
Male	35	54.7
Female	29	45.3
Total	64	100.0

Table-I. Distribution of gender (n = 60)

Figure-2 shows intensity of pain in group A according to visual analog scale.

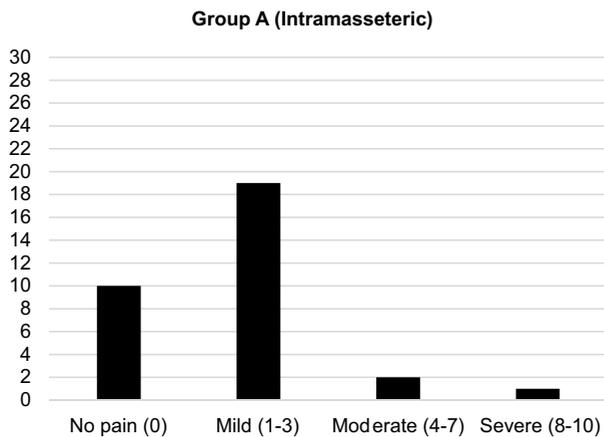


Figure-2. Bar chart representing VAS scale in group A

Figure-3 shows intensity of pain in group B according to visual analog scale.

Table-II shows comparison of facial swelling.

Group	n	Mean + SD	P-Value
Group A	32	26.70 + 0.39	0.001
Group B	32	25.60 + 0.36	

Table-II. Comparison of swelling (Facial size in mm) in both groups (n = 64) Independent T-test applied

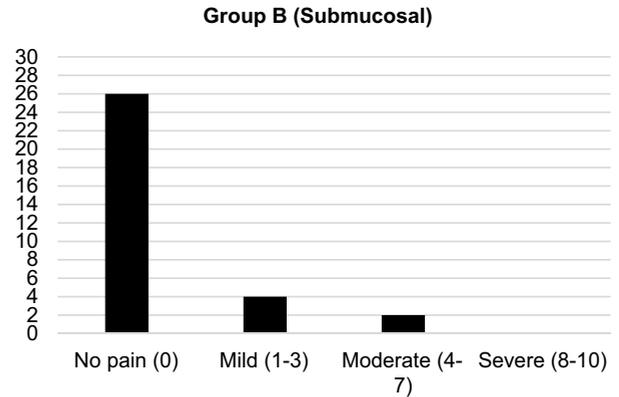


Figure-3. Bar chart representing VAS scale in group B

Table-III shows results about mouth opening in both groups.

Group	n	Mean + SD	P-Value
Group A	32	38.84 + 2.38	0.001
Group B	32	41.59 + 2.87	

Table-III. Comparison of mouth opening (in mm) in both groups (n = 64) Independent T-test applied

### DISCUSSION

The efficacy of dexamethasone injection at surgery site was depend on the quantity of dose delivering to control the postoperative symptoms, such as facial swelling, severe pain at facial region and limited mouth opening. It has been previously mentioned in many studies that the dexamethasone is act as an inflammatory suppressor and is not only minimize facial swelling, but also reduce pain and trismus after surgical procedure.<sup>12</sup>

A small number of prior studies had objective to investigate the administration of intramuscular dexamethasone injection to prevent the postoperative complications in lower third molar surgery, however, for third molar surgery in out-patients department, this technique of administrating the steroid injection is frequently used. It has been identified in the intramuscular injection of dexamethasone studies that single dose of dexamethasone could be introduced before or after surgical extraction. This technique could be very effective for better outcomes, however, there is no statistical difference

between two different quantity of doses, 4mg or 8mg.<sup>13</sup> In another study, it has been specified that the efficacy of dexamethasone could be dependent on the dosage. Moreover, it has been recommended by many surgeons that the 8–12 mg dexamethasone is injected to achieve the better outcomes.<sup>14</sup>

Several studies have investigated to observe the outcomes of injecting of dexamethasone intramuscular and submucosal with removal wisdom tooth and all these studies have described the varying results<sup>15,16[216,217]</sup> but one study evaluated that there was no significant difference between submucosal and intramuscular administration.

In another study, it has been observed that the introducing of dexamethasone intramuscularly showed the reduction significantly in postoperative swelling on the first and third days after surgery. It has also been found that pain visual scale analogue scores is significantly decreased too. Additionally, in this study, it has been perceived that the outcomes regarding the postoperative swelling between controls group versus the dexamethasone injection was administered submucosally. In the latter group, significant reduction in swelling has been noticed on the 1 and 3 days after surgery.<sup>17</sup>

While in our present study, when Chi square test was applied to see the effect of intramasseteric and submucosal dexamethasone injections, there was a significant association found between Groups A (intramasseteric) and Group B (submucosal), which indicates that the results of our present study are relevant to international studies.

In few prior study, participants were distributed into three different groups, such as intramuscular, submucosal and control group. In our study, the only two group were suggested to denote precise and definite outcomes between two groups. In our study, the effect of both groups independent sample t-test was applied and it was observed that there was a significant association found in both groups concerning swelling (Facial size

in mm). Many authors have been used direct measurement method with tape scales and rulers, similar method has been used with this study for the facial swelling because it is simple, reliable and cost-effective method. The postoperative swelling were reduced in both group, but submucosal patients had sufficiently decrease postoperative discomfort and facial swelling than intramasseteric patients. However, it could be difficult to specify that whether the reduction in facial swelling is due to quick systemic dispersion of dexamethasone by intramasseteric or diffusion of dexamethasone in submucosal site at the time of injection.

When the independent sample t-test was applied, there was a significant association found in both Groups concerning mouth opening (in mm). There was not much difference between both groups in the respect of mouth opening. As it was considered that the limited mouth opening could be result of facial swelling and surgical trauma. It was clearly reported that there is no significant difference on trismus either administered dexamethasone peri- or post- operatively.

In pervious study, it has been stated that the route of dexamethasone injection submucosally is very effective and easy to delivered technique for minimizing the postoperative discomfort and symptoms including swelling, pain and trismus after the open surgical extraction of impacted lower third molar surgeries.<sup>18</sup> Dexamethasone is a pharmacological agent, which has a good efficacy to reduce post-surgical third molar removal sequelae, these are commonly as follows: pain, swelling, and trismus.<sup>19</sup> The introducing of dexamethasone at the third molar surgical region by using submucosal or intra-masseteric techniques showed a greatly decrease in postoperative swelling and pain in the against of control group at all intervals.<sup>20</sup>

## CONCLUSION

It has been ratified on the basis of this research protocols that dexamethasone has a good efficacy for reducing the postoperative symptoms including pain, swelling and mouth opening after the removal of impacted third molar. This study

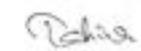
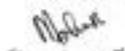
also favoured that submucosal administration of dexamethasone is an effective therapeutic technique than intra-masseteric administration technique because submucosal is simple, safe, painless, non-invasive and cost effective method to avoid the moderate to severe postoperative complication of surgical extraction cases of lower third molar.

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2	Tahira Shaikh	Data collection, Literature search.	
3	Mahwish Memon	Data analysis.	
4	Salman Shams	Results, References	