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**ORIGINAL ARTICLE**

# Importance of Dexamethasone for Control of Edema and Pain at Surgical Site in the Mandibular Fracture Osteosynthesis Treatment

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## ABSTRACT

Dexamethasone is highly sensitive to low dosages and is widely used in oral surgical procedures with variable dosage, timing and route of administration.

**Aim of the study:** Comparison of the results of treatment with placebo and dexamethasone in terms of the edema and mean pain at the surgical site in patients with osteosynthesis of the mandible.

**Methods:** This randomised controlled trial was held in the Oral and Maxillofacial surgery department of different dental hospitals of Lahore for one-year duration from June 2021 to May 2022. A total of 100 patients with mandibular fractures of both sexes, aged 20 to 60, were included in the study. Patients with other associated facial fractures, patients with a history of diabetes mellitus, heart and kidney disease due to chronic drug use, and pregnant women were excluded. The experimental group was given eight milligrams of dexamethasone with submucosal infiltration at the surgical incision site and the normal saline was given in the control group. Edema and pain were evaluated by means of visual analog scale at a nine-line measurement at twenty-four and seventy-two hours postoperatively, respectively.

**Results:** In this study, 24 hours after the procedure, the visual analog scale was 2.16 ± 0.89 in group I (experimental group) and 3.51 ± 1.23 in group II (placebo group) and 2.29 ± 0.89 in control group and 0.62 ± 0.19 in group given dexamethasone at seventy-two hours. Postoperative edema score was significantly less up to 4.26 ± 1.42 in patients receiving group I (dexamethasone), in comparison to group II (placebo group) 5.38 ± 1.01 twenty-four hours afterwards surgical procedure and 2.06 ± 0.64 in the placebo group and 0.042 ± 1.23 in the group given dexamethasone at seventy-two hours.

**Conclusions:** This study found that patients with osteosynthesis of the mandible had lower rates of pain and swelling after applying dexamethasone to the surgical site.

**Keywords:** Dexamethasone, Mandibular osteosynthesis, Edema.

## INTRODUCTION

The mandibular bone is particularly vulnerable to facial fractures because it is visible and conspicuous. Typically, internal fixation and open reduction are used to treat mandibular fractures (ORIF)[1-2]. High postoperative sequelae with biological and social consequences are linked to ORIF. The most frequent postoperative consequence following mandibular osteosynthesis with open reduction and internal fixation is hypomobility of the mandible, along with discomfort, edema, infection, trismus, etc[3-4]. Gender, age, health, length of recovery after surgery, use of antibiotics, location and severity of the fracture, timing of the operation, incision style, experience of the surgeon, and fixation technique all increase the risk of these problems[5-6]. The most frequent side effects are discomfort and edema. After surgery, pain often peaks 6 to 12 hours later. Pain following surgery is assessed using the visual analogue scale (VAS)[7-8]. The patient is asked to choose a number on a scale between 0 and 10. The pain scale goes from 0 (no pain) to 10 (the worst pain). Transudate and exudate are expressed as postoperative edema. By measuring 9 lines, edema was evaluated[9]. A measuring tape has nine lines on it (1st line continues from lateral canthus to gonion of the right side, 2nd line continues from lateral canthus to gonion on left side, 3rd line continues from lips commissure to tragus of the right side, 4th line continues from left lips commissure to the tragus of the left side, 5th line continues from chin midline to right tragus, 6th line continues from chin midline to left tragus, 7th line continues from right ala to right tragus, 8th line continues from left ala to left tragus, 9th line continues from left gonion to right gonion)[10-11]. When used in oral surgery, corticosteroids can reduce postoperative problems and sequelae. By changing the inflammatory response, corticosteroids help manage inflammation. Dexamethasone has a high response to modest doses, which accounts for its widespread use. In the literature, various administration methods and schedules have been proposed[12]. The patient is subject to a variety of potential surgical risks with ORIF. After ORIF, edema and pain are managed and reduced using a variety of techniques[13]. There isn't much writing about this topic in our society. This research was done to assist surgeons in using and prescribing dexamethasone to lessen postoperative pain and edema.

## METHODS

This study was held in the Oral and Maxillofacial surgery department of different dental hospitals of Lahore for one-year duration from June 2021 to May 2022. In this randomised controlled trial; 80 male and 20 female patients with mandibular fractures between the ages of 20-60 were included. Patients with history of diabetes, heart illness, chronic drug usage, pregnant females, kidney disease, or additional craniofacial fractures were eliminated. The enrolled patients were split into two groups, with 50 patients each in Group I (the experimental group) and Group II (the control group). Under general anaesthesia, aseptic measures were adopted to complete the standard procedures on every patient in each group. Through a vestibular incision, the fracture segment was exposed using an intraoral technique. Miniplates were used for open reduction and fixation of the fracture segments. The experimental group was given eight milligrams of dexamethasone with submucosal infiltration at the surgical incision site and the normal saline was given in the control group after the main incision site closure with 3-0 polyglactin sutures. A visual analogue scale was used to quantify pain 24 and 72 hours following the operation and the range was 0 to 10. In general, pain levels go from 0 to 10, with 7-10 being the most painful, 4-6 means pain is moderate and 1-3 score exhibited mild pain while no pain if ''0'' on the VAS scale. The nine-line method was used to measure edema at 24- and 72-hours following surgery. All of this data was entered into the pre-designed proforma.

## RESULTS

There were 100 patients, of which 80 (80 %) were men and 20 (20%) women. The patients mean age was 35.90 ± 7.94, ranging from 20 to 60 years old. In group I, the mean age of the patients was 36.30 ± 7.57 and 35.43 ± 7.80 years was the mean age in

Group-II. Most of the patients, 6. (60%), were 40-60 years of age. The mean surgery duration was 55.23± 10.71 minutes.

Table-1: shows the patients demographic features

| Variables | Group-I (experimental group) | Group-II (Control Group) |
|---|---|---|
| Males | 38(76%) | 42(84%) |
| Females | 12(24%) | 8(16%) |
| Age Groups | | |
| 20-40 | 22(55%) | 18(45%) |
| 40-60 | 35(58.3%) | 25(41.7%) |
| Mean age | 36.30 ± 7.57 | 35.43 ± 7.80 |
| Overall Mean age | 35.90 ± 7.94(range; 20-60) | |
| Mean Duration of surgery | 55.23± 10.71 minutes | |

In this study, 24 hours after the procedure, the visual analog scale was 2.16 ± 0.89 in group I (experimental group) and 3.51 ± 1.23 in group II (placebo group) and 2.29 ± 0.89 in control group and 0.62 ± 0.19 in group given dexamethasone at seventy-two hours. Postoperative edema score was significantly less up to 4.26 ± 1.42 in patients receiving group I (dexamethasone), in comparison to group II (placebo group) 5.38 ± 1.01 twenty-four hours afterwards surgical procedure and 2.06 ± 0.64 in the placebo group and 0.042 ± 1.23 in the group given dexamethasone at seventy-two hours. (Table 2)

Table-2: shows the Edema and mean pain scores stratification of both groups

| Variables | Age Groups | Group I (n=50) | | Group II (n=50) | | P-value |
|---|---|---|---|---|---|---|
| | | Mean | SD | Mean | SD | |
| Edema score at 24 hours | 40-60 | 4.26 | 1.42 | 5.38 | 1.01 | 0.0001 |
| | 20-40 | 2.69 | 0.86 | 4.27 | 1.35 | 0.0001 |
| Edema score at 72 hours | 40-60 | 0.042 | 1.23 | 2.06 | 0.64 | 0.0001 |
| | 20-40 | -0.29 | 1.37 | 2.21 | 0.89 | 0.0001 |
| Pain score at 24 hours | 40-60 | 2.16 | 0.89 | 3.51 | 1.23 | 0.0001 |
| | 20-40 | 1.89 | 0.85 | 3.68 | 1.46 | 0.0001 |
| Pain score at 72 hours | 40-60 | 0.62 | 0.65 | 2.29 | 0.89 | 0.0001 |
| | 20-40 | 0.19 | 0.50 | 2.75 | 0.36 | 0.0001 |

## DISCUSSION

To lessen postoperative edema and pain, oral and maxillofacial surgeons frequently prescribe short-acting corticosteroids[14]. Assessing clinical correlation is vital to determine its effects on immune function, inflammation, and tissue healing might be harmful[15]. In a recent study, after having their wisdom teeth removed, three equal groups were given four milligrams of dexamethasone, eight milligrams of dexamethasone, and saline[16-17]. They were then evaluated two and seven days later. There was no apparent difference between the two dose regimens, however facial edema was greatly reduced in the four and eight mg groups compared to the placebo group in both cases[18]. On day seven following surgery, there was no obvious change in any of the treatment groups. In other study; edema was reduced after 72 hours in patients who were administered dexamethasone 24 hours after surgery. The VAS pain scores were also observed to be reduced in this trial at 24- and 72-hours following surgery in the group given dexamethasone. Another study included 100 patients between the ages of 18 and 40 into two equal groups and performed wisdom tooth old's extraction in both groups[19]. Before surgery, 50 patients (the experimental group) received an oral injection of 4 mg of dexamethasone submucosally at the surgical site and the control group did not receive an injection. Evaluations were made of mouth opening, swelling, and facial edema. There was substantial decrease in edema on the second postoperative day and trismus was significantly improved[21]. Thirty-three participants in another randomised clinical trial had their impacted wisdom teeth surgically removed. Injections of corticosteroids were administered submucosally to one group and intramuscularly to the other. Significant improvement in speech, quality of life and appearance were seen in both groups[22]. Both administrating routes have produced successful outcomes. In the 1950s, people started to get interested in using corticosteroids in oral and maxillofacial surgery[23]. Since then, corticosteroids have been researched, particularly in relation to third molar surgery, and numerous studies have shown their advantages[24]. Similar advantages to systemic treatment can be obtained by local corticosteroid injection. According to a survey conducted by maxillofacial surgeons, perioperative corticosteroids are particularly favoured due to their proven efficacy to lessen postoperative edema[25]. Additionally, corticosteroids lessen discomfort following oral surgery in general and aid recovery of sensory neurons following orthognathic surgery in specific.

## CONCLUSION

In this study, it was found that after giving dexamethasone to the surgical site, patients with osteosynthesis of the mandible had decreased edema and pain.

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