Role of Dexamethasone in reducing Postoperative Sequelae following Impacted Mandibular Third Molar Surgery: A Comparative Clinical Study

Mohammed Imran, Bipin C Reddy, Mueedul Islam, Azhar Khan, Shoaib N Parkar, Tanmoy Nath

ABSTRACT

Aims and objectives: To understand the benefits of dexamethasone and compare the effects of submucosal vs intramuscular (IM) administration of dexamethasone in reducing postoperative sequelae following impacted mandibular third molar surgery.

Materials and methods: The study was conducted on 90 patients, who were divided into three groups of 30 each. The two experimental groups were given dexamethasone 4 mg submucosally or intramuscularly (preoperatively), and the control group did not receive any form of corticosteroid. Measurements of facial swelling and maximal interincisal distance were made preoperatively and on the 1st, 3rd, and 7th postoperative days. Pain was evaluated from patients’ response to visual analog scale and recording the number of rescue analgesic tablets taken at the end of the 7th postoperative day.

Results: Both dexamethasone groups showed a significant reduction in pain, swelling, and trismus as compared with the control group at all intervals. There was a statistically significant reduction in magnitude of swelling in the submucosal dexamethasone group as compared with the IM dexamethasone group on the 1st postoperative day, but there was no significant difference among two experimental groups at other times and their effects were comparable for all variables.

Conclusion: Dexamethasone 4 mg is an effective therapeutic strategy for reducing postoperative sequelae following surgical removal of impacted third molars and submucosal dexamethasone is an effective alternative to dexamethasone given systemically.

Keywords: Corticosteroids, Submucosal dexamethasone, Third molar surgery.


Source of support: Nil

Conflict of interest: None

INTRODUCTION

The surgical removal of lower third molars is still the most common procedure performed by oral and maxillofacial surgeons. The removal of impacted third molars by surgical means involves trauma to soft and hard tissues and can result in significant postoperative sequelae.

Third molars show a high incidence of impaction and are often associated with diverse conditions, such as pericoronitis, periodontal pocket in the distal aspect of the second molar, caries formation in third molar or second molar, pressure resorption of second molar, and different types of cysts and odontogenic tumors. The removal of impacted tooth usually involves incision, flap reflection, and bone removal, which results in considerable postoperative pain, swelling, and trismus.

To reduce these postoperative complications, therefore seems to be a logical goal. Many clinical studies have investigated the treatments to reduce postoperative sequelae by using antiseptic mouthwashes, use of drains, flap design, antibiotics, enzymes, corticosteroid treatment, muscle relaxants, and physiotherapy. Among them, the use of corticosteroids has gained wide acceptance.

Corticosteroids that have extensively been used in dentoalveolar surgery are dexamethasone and methylprednisolone, owing to their nearly pure glucocorticoid effects, virtually no mineralocorticoid effects, and the least adverse effects on leukocyte chemotaxis.

Dexamethasone is a white odorless compound, which is slightly soluble in water. It has a melting point of 240°C. It is a synthetic analog of prednisolone in which a methyl group has been added at the carbon 16 position and...
a fluorine atom at carbon 9 position. It has been known that
the addition of fluorine at the carbon 9 position enhances
the anti-inflammatory activity of dexamethasone.4

Dexamethasone has a longer duration of action than
methylprednisolone and is found to be more potent of the
two.3 It has no mineralocorticoid activity and the half-life
is roughly 36 to 72 hours. The potency of dexamethasone
is about 20 to 30 times that of natural corticosteroid.5

It is also considered to have the least depressing effect
on leukocyte chemotaxis. Dexamethasone has been exten-
sively used in oral and maxillofacial surgeries because
of its very potent nature and long half-life.

Various routes have been used; orally administered
glucocorticoids are rapidly and almost completely
absorbed. However, in order to maintain adequate blood
concentration throughout the immediate postoperative
period, repeated dose is required. Intravenous (IV) route
results in instantaneous blood levels, but requires expert-
tise and additional armamentarium.6

Intramuscular route has been the most commonly
prescribed route in outpatient settings and gives good
plasma concentration of the drug and prolonged anti-
inflammatory action. The submucosal route is well suited
for third molar surgery, as the injection is given in close
proximity to the operative field and local infiltration
of dexamethasone injected submucosally around the site
of surgery is expected to provide slow absorption and
prolonged duration of action.

This study was designed to compare the effect of
preoperative administration of inj. dexamethasone given
via the submucosal and IM routes, on the postoperative
sequelae after removal of impacted lower third molars.

AIMS AND OBJECTIVES

Objectives of the study:
• To evaluate the efficacy of dexamethasone in reducing
  postoperative sequelae following surgical extraction
  of impacted mandibular third molars.
• To compare the effect of preoperative administration
  of inj. dexamethasone given via submucosal and IM
  routes, on the postoperative sequelae after removal of
  impacted lower third molars, which include
  – Pain
  – Facial swelling and
  – Trismus

Pharmacology of Dexamethasone

Dexamethasone is a member of the glucocorticoid class
of corticosteroids. It is a synthetic corticosteroid, highly
potent, and has anti-inflammatory and immunosuppres-
sant effects. Its potency is 25 times that of cortisol in
terms of its glucocorticoid effect, while it has minimal
mineralocorticoid activity.

It is included in the World Health Organization's List
of Essential Medicines, which enlists the most important
medications needed in a basic health system.

Chemical formula (Dexamethasone sodium phos-
phate): C_{22}H_{28}FNa_{2}O_{8}P
Molecular weight: 516.

DESCRIPTION

Dexamethasone phosphate (as sodium) is a white or
slightly yellow, very hygroscopic, crystalline powder. It is
an odorless compound or has a slight odor of alcohol.
Dexamethasone phosphate (as sodium) is Soluble in
water(ratio 1:2), slightly soluble in alcohol, insoluble in
chloroform and ether, and very slightly soluble in dioxan.4

Dexamethasone sodium phosphate in an injectable
form is a clear and colorless solution, free from visible
particulate matter. Each milliliter of solution contains
dexamethasone sodium phosphate equivalent to 4 mg
doexamethasone phosphate. The 8 mg/2 mL vial for-
mulation contains sodium citrate, disodium edetate, and
sodium sulfate anhydrous. No preservatives are present.

The pH of the solutions is adjusted using sodium
hydroxide and/or hydrochloric acid.

PHARMACOLOGY

Dexamethasone is known to have anti-inflammatory
and immunosuppressive actions. Glucocorticoids prevent
the development of the inflammatory response. They also
inhibit capillary dilation and phagocytosis and appear

to prevent the hypersensitivity response.

The principal metabolic actions of dexamethasone
are on carbohydrate, protein, and calcium metabolism.
Dexamethasone also influences the mobilization, oxida-
tion, synthesis, and storage of fats. Dexamethasone causes
inhibition of endogenous corticotropin secretion by
suppressing the release of adrenocorticotropic hormone
from the pituitary.

Pharmacokinetics

Dexamethasone phosphate (as sodium) is rapidly absorbed
following administration by oral, IM, or IV routes.

Metabolism

Dexamethasone being a synthetic derivative is less
extensively protein bound and more slowly metabolized
than hydrocortisone, and, hence, has a longer duration of action. Dexamethasone penetrates into tissue fluids and cerebrospinal fluids. The corticosteroids are metabolized mainly by hepatic microsomal enzymes. These metabolites are further conjugated with glucuronic acid and sulfate and are excreted in urine. Small amounts of unchanged drug are also excreted in the urine.

MATERIALS AND METHODS

The present study was undertaken in the Department of Oral and Maxillofacial Surgery, The Oxford Dental College & Hospital, Bengaluru, India, after obtaining ethical clearance. This study included both male and female patients, who were referred to the Department of Oral and Maxillofacial Surgery for removal of impacted mandibular third molars.

Inclusion Criteria

- Patients aged 18 to 50 years
- Patients with impacted mandibular third molars indicated for surgical extraction

Exclusion Criteria

- Patients with systemic disorders
- Pregnant and lactating females

Study sample included 90 patients who underwent surgical extraction of impacted mandibular third molars. The patients were divided into three groups of 30 each:

- **Group I (submucosal dexamethasone group):** Patients received 4 mg (1 mL) dexamethasone via submucosal route (around the tooth to be extracted) half an hour prior to the procedure.
- **Group II (IM dexamethasone group):** Patients received 4 mg (1 mL) dexamethasone via IM route (dorsogluteal site) half an hour prior to the procedure.
- **Group III (control group):** Patients in this group did not receive any form of corticosteroid.

Preoperatively, facial measurements and interincisal opening were recorded, and this was taken as baseline. The evaluations were made subsequently on 1st, 3rd, and 7th postoperative days and compared with baseline.

### Evaluation of Pain

Pain was evaluated using standard visual analog scale (VAS) on 1st, 3rd, and 7th postoperative days and also taking into account the number of rescue analgesic tablets taken at the end of 7th postoperative day.

### Evaluation of Facial Swelling

Facial swelling on the operated side was evaluated by two facial measurements (Figs 1 and 2):

- Tragus–midline (Tr-Md) and
- Gonion–lateral canthus (Go-Lc)

This was done using a flexible measuring tape. The preoperative sum of two values was taken as the baseline for that side.

Facial measurements were made subsequently on 1st, 3rd, and 7th postoperative days and compared with the baseline.

### Evaluation of Trismus

Maximal mouth opening was recorded preoperatively, which was taken as baseline.

Mouth opening values were recorded subsequently on 1st, 3rd, and 7th postoperative days and compared with the baseline for evaluation of trismus.

### Postoperative Instructions

Regular postextraction instructions were given. All patients were given amoxicillin 500 mg thrice daily for

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**Fig. 1:** Evaluation of facial swelling. (A) Tragus–midline; and (B) gonion–lateral canthus

**Fig. 2:** Evaluation of facial swelling. (A) Tragus–midline; and (B) gonion–lateral canthus
5 days, and tramadol 50 mg orally as required as rescue analgesia. Chlorhexidine mouth wash was to be used twice daily starting 1 day after operation for 5 days.

RESULTS

There were 54 men and 36 women in the age range of 19 to 45 years. Following completion of clinical study on the patients, the measurements and data taken from all patients were tabulated for statistical studies. The results of our study are described in brief as follows:

Pain

In all groups, the mean postoperative pain score was highest at postoperative day 1 and gradually reduced over the following 7 days (Tables 1 to 4 and Graphs 1 and 2). The mean postoperative pain was lower in the submucosal dexamethasone group at all time points when compared with the control group. The IM dexamethasone group showed significant difference in mean postoperative pain values on 1st and 3rd postoperative day as compared with the control group; however, there was no significant difference between the two groups on the 7th postoperative day. The accumulated number of rescue analgesic tablets also differed significantly between the dexamethasone groups and control group. However, there was no significant difference in mean postoperative pain score and the total number of rescue analgesic tablets in either dexamethasone group at any interval.

Table 1: Mean and standard deviation of pain on 1st postoperative day treatment-wise

<table>
<thead>
<tr>
<th>Descriptives</th>
<th>n</th>
<th>Mean</th>
<th>Standard deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Submucosal dexamethasone</td>
<td>30</td>
<td>28.33</td>
<td>6.989</td>
</tr>
<tr>
<td>Intramuscular dexamethasone</td>
<td>30</td>
<td>30.00</td>
<td>5.872</td>
</tr>
<tr>
<td>Control group</td>
<td>30</td>
<td>39.67</td>
<td>8.087</td>
</tr>
<tr>
<td>Total</td>
<td>90</td>
<td>32.67</td>
<td>8.585</td>
</tr>
</tbody>
</table>

F: 22.658; Degrees of freedom: 2.87; p < 0.001

Table 2: Mean and standard deviation of pain on 3rd postoperative day treatment-wise

<table>
<thead>
<tr>
<th>Descriptives</th>
<th>n</th>
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<th>Standard deviation</th>
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</thead>
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<tr>
<td>Submucosal dexamethasone</td>
<td>30</td>
<td>14.67</td>
<td>8.604</td>
</tr>
<tr>
<td>Intramuscular dexamethasone</td>
<td>30</td>
<td>17.33</td>
<td>6.915</td>
</tr>
<tr>
<td>Control group</td>
<td>30</td>
<td>22.33</td>
<td>7.279</td>
</tr>
<tr>
<td>Total</td>
<td>90</td>
<td>18.11</td>
<td>8.196</td>
</tr>
</tbody>
</table>

F: 7.798; Degrees of freedom: 2.87; p < 0.001

Table 3: Mean and standard deviation of pain on 7th postoperative day treatment-wise

<table>
<thead>
<tr>
<th>Descriptives</th>
<th>n</th>
<th>Mean</th>
<th>Standard deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Submucosal dexamethasone</td>
<td>30</td>
<td>2.33</td>
<td>4.302</td>
</tr>
<tr>
<td>Intramuscular dexamethasone</td>
<td>30</td>
<td>4.00</td>
<td>4.983</td>
</tr>
<tr>
<td>Control group</td>
<td>30</td>
<td>5.67</td>
<td>5.040</td>
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<tr>
<td>Total</td>
<td>90</td>
<td>4.00</td>
<td>4.926</td>
</tr>
</tbody>
</table>

F: 3.637; Degrees of freedom: 2.87; p < 0.05

Table 4: Mean of number of rescue tablets taken treatment-wise

<table>
<thead>
<tr>
<th>Descriptives</th>
<th>n</th>
<th>Mean</th>
<th>Standard deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Submucosal dexamethasone</td>
<td>30</td>
<td>6.70</td>
<td>1.442</td>
</tr>
<tr>
<td>Intramuscular dexamethasone</td>
<td>30</td>
<td>6.50</td>
<td>1.456</td>
</tr>
<tr>
<td>Control group</td>
<td>30</td>
<td>9.23</td>
<td>1.278</td>
</tr>
<tr>
<td>Total</td>
<td>90</td>
<td>7.48</td>
<td>1.862</td>
</tr>
</tbody>
</table>

F: 35.817; Degrees of freedom: 2.87; p < 0.001

Graph 1: Mean pain on day 1, day 3 and day 7 treatment-wise

Graph 2: Mean number of rescue analgesics taken treatment-wise
Role of Dexamethasone in reducing Postoperative Sequelae following Impacted Mandibular Third Molar Surgery

**Swelling**

The postoperative facial swelling was highest on the 1st and 3rd postoperative days compared with the baseline in the control group (Tables 5 to 8 and Graph 3). Both dexamethasone groups showed a significant difference in magnitude of swelling on 1st and 3rd postoperative days as compared with the control group. There was also a statistically significant reduction in magnitude of swelling in submucosal dexamethasone group as compared with the IM dexamethasone group on the 1st postoperative day. In all groups, the values reached baseline by the 7th postoperative day.

**Mouth Opening**

Patients in the control group consistently had lower maximal interincisal opening on the 1st and 3rd postoperative days as compared with the dexamethasone-treated groups (Tables 9 to 12 and Graph 4). However, there was no significant difference among the dexamethasone-treated groups for the above parameter. The interincisal mouth opening values reached baseline in all the three groups by the 7th postoperative day.

**Graph 3: Mean increase in swelling on day 1, day 3 and day 7 treatment-wise**

![Graph 3: Mean increase in swelling on day 1, day 3 and day 7 treatment-wise](image)

Table 5: Mean and standard deviation of facial swelling (Tr-Md + Go-Lc) at baseline

<table>
<thead>
<tr>
<th>Descriptives</th>
<th>n</th>
<th>Mean</th>
<th>Standard deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Submucosal dexamethasone</td>
<td>30</td>
<td>25.833</td>
<td>1.12444</td>
</tr>
<tr>
<td>Intramuscular dexamethasone</td>
<td>30</td>
<td>25.500</td>
<td>1.13715</td>
</tr>
<tr>
<td>Control group</td>
<td>30</td>
<td>25.383</td>
<td>1.33703</td>
</tr>
<tr>
<td>Total</td>
<td>90</td>
<td>25.572</td>
<td>1.20523</td>
</tr>
</tbody>
</table>

F: 1.130; Degrees of freedom: 2.87; p > 0.05

Table 6: Mean and standard deviation of increase in facial swelling (Tr-Md + Go-Lc) on 1st postoperative day

<table>
<thead>
<tr>
<th>Descriptives</th>
<th>n</th>
<th>Mean</th>
<th>Standard deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Submucosal dexamethasone</td>
<td>30</td>
<td>0.0833</td>
<td>0.18952</td>
</tr>
<tr>
<td>Intramuscular dexamethasone</td>
<td>30</td>
<td>0.2167</td>
<td>0.25200</td>
</tr>
<tr>
<td>Control group</td>
<td>30</td>
<td>0.5833</td>
<td>0.26533</td>
</tr>
<tr>
<td>Total</td>
<td>90</td>
<td>0.2944</td>
<td>0.31707</td>
</tr>
</tbody>
</table>

F: 35.526; Degrees of freedom: 2.87; p < 0.001

Table 7: Mean and standard deviation of increase in facial swelling (Tr-Md + Go-Lc) on 3rd postoperative day

<table>
<thead>
<tr>
<th>Descriptives</th>
<th>n</th>
<th>Mean</th>
<th>Standard deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Submucosal dexamethasone</td>
<td>30</td>
<td>0.0667</td>
<td>0.17287</td>
</tr>
<tr>
<td>Intramuscular dexamethasone</td>
<td>30</td>
<td>0.2500</td>
<td>0.36554</td>
</tr>
<tr>
<td>Control group</td>
<td>30</td>
<td>0.8500</td>
<td>0.52768</td>
</tr>
<tr>
<td>Total</td>
<td>90</td>
<td>0.3889</td>
<td>0.50713</td>
</tr>
</tbody>
</table>

F: 34.185; Degrees of freedom: 2.87; p < 0.001

Table 8: Mean and standard deviation of increase in facial swelling (Tr-Md + Go-Lc) on 7th postoperative day

<table>
<thead>
<tr>
<th>Descriptives</th>
<th>n</th>
<th>Mean</th>
<th>Standard deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Submucosal dexamethasone</td>
<td>30</td>
<td>0.0000</td>
<td>0.00000</td>
</tr>
<tr>
<td>Intramuscular dexamethasone</td>
<td>30</td>
<td>0.0000</td>
<td>0.00000</td>
</tr>
<tr>
<td>Control group</td>
<td>30</td>
<td>0.0333</td>
<td>0.18257</td>
</tr>
<tr>
<td>Total</td>
<td>90</td>
<td>0.0111</td>
<td>0.10541</td>
</tr>
</tbody>
</table>

F: 1.000; Degrees of freedom: 2.87; p > 0.05

Table 9: Mean and standard deviation of mouth opening at baseline treatment-wise

<table>
<thead>
<tr>
<th>Descriptives</th>
<th>n</th>
<th>Mean</th>
<th>Standard deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Submucosal dexamethasone</td>
<td>30</td>
<td>47.80</td>
<td>2.631</td>
</tr>
<tr>
<td>Intramuscular dexamethasone</td>
<td>30</td>
<td>47.67</td>
<td>3.642</td>
</tr>
<tr>
<td>Control group</td>
<td>30</td>
<td>48.53</td>
<td>3.431</td>
</tr>
<tr>
<td>Total</td>
<td>90</td>
<td>48.00</td>
<td>3.250</td>
</tr>
</tbody>
</table>

F: 0.613; Degrees of freedom: 2.87; p > 0.05

Table 10: Mean and standard deviation of mouth opening on 1st postoperative day treatment-wise

<table>
<thead>
<tr>
<th>Descriptives</th>
<th>n</th>
<th>Mean</th>
<th>Standard deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Submucosal dexamethasone</td>
<td>30</td>
<td>32.00</td>
<td>3.063</td>
</tr>
<tr>
<td>Intramuscular dexamethasone</td>
<td>30</td>
<td>30.23</td>
<td>3.884</td>
</tr>
<tr>
<td>Control group</td>
<td>30</td>
<td>25.73</td>
<td>3.667</td>
</tr>
<tr>
<td>Total</td>
<td>90</td>
<td>29.32</td>
<td>4.403</td>
</tr>
</tbody>
</table>

F: 24.789; Degrees of freedom: 2.87; p < 0.001
submucosal dexamethasone, IM dexamethasone, and control group.

To see which of the treatment groups are significantly different, the least significant difference technique was used by taking two treatments at a time.

**DISCUSSION**

The removal of impacted third molar by surgical modality can result in considerable pain, swelling, and dysfunction. The factors that contribute to postoperative pain and edema are complex, but many of these the factors correlate to the process of inflammation. Careful attention to surgical techniques will minimize the sequelae of inflammation, but will not prevent them. Postoperative inflammation is a biological response characterized by increased vascular permeability, increased movement of leukocytes into the inflamed area, and the release of chemical mediators of inflammation. By controlling the extent of the inflammatory process, using pharmacologic measures, postoperative complications, such as pain, swelling, and trismus, can be minimized.

For more than 30 years, glucocorticoids have been used in an attempt to reduce the severity or intensity of postoperative sequelae after surgical removal of impacted third molars. The use of corticosteroids has gained wide acceptance in the field of oral and maxillofacial surgery, and numerous reports are now available supporting the use of systemic corticosteroids in the setting of third molar surgery. In a meta-analysis, concluded that giving corticosteroids perioperatively produces mild-to-moderate reduction in edema and improvement in range of motion after third molar removal. More recently, Herrera-Briones et al, in a systematic review on the use of corticosteroids after third molar surgery, concluded that administration of corticosteroids improves the postoperative experience of patients and has a significant impact on trismus and inflammation. The results achieved appeared to be even better when using parenteral route and by administering corticosteroids before the surgery.

The most commonly used forms of corticosteroids in dentoalveolar surgery include dexamethasone (oral), dexamethasone sodium phosphate (IV or IM), dexamethasone acetate (IM), methylprednisolone (oral), and methylprednisolone sodium succinate (IV/IM). Dexamethasone meets these requirements, as it has no mineralocorticoid activity, the half-life is roughly 36 to 72 hours, and its potency is 25 times that of hydrocortisone. It is also considered to have the least adverse effect on leukocyte chemotaxis. Dexamethasone also has a longer duration of action than methylprednisolone, thereby considered more potent.

Dexamethasone is available in oral, parenteral, and topical formulations, and is largely used in oral surgery due to its high efficacy and long half-life. In our study, we aimed to evaluate the effectiveness of dexamethasone given via two different routes (submucosal and IM) on postoperative sequelae after impacted third molar surgery.

Consistent with published data, third molar surgery in the control group was associated with significant postoperative sequelae. The postoperative sequelae including pain and trismus reached its peak on 1st day postoperatively and facial swelling was the highest on 3rd day postoperatively. They gradually reduced to reach near baseline (preoperative) values by the 7th postoperative day.

### Table 11: Mean and standard deviation of mouth opening on 3rd postoperative day treatment-wise

<table>
<thead>
<tr>
<th>Descriptives</th>
<th>n</th>
<th>Mean</th>
<th>Standard deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Submucosal dexamethasone</td>
<td>30</td>
<td>36.93</td>
<td>3.373</td>
</tr>
<tr>
<td>Intramuscular dexamethasone</td>
<td>30</td>
<td>36.17</td>
<td>3.582</td>
</tr>
<tr>
<td>Control group</td>
<td>30</td>
<td>32.77</td>
<td>4.174</td>
</tr>
<tr>
<td>Total</td>
<td>90</td>
<td>35.29</td>
<td>4.109</td>
</tr>
</tbody>
</table>

F: 10.631; Degrees of freedom: 2.87; p < 0.001

### Table 12: Mean and standard deviation of mouth opening on 7th postoperative day treatment-wise

<table>
<thead>
<tr>
<th>Descriptives</th>
<th>n</th>
<th>Mean</th>
<th>Standard deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Submucosal dexamethasone</td>
<td>30</td>
<td>43.40</td>
<td>2.920</td>
</tr>
<tr>
<td>Intramuscular dexamethasone</td>
<td>30</td>
<td>42.10</td>
<td>3.689</td>
</tr>
<tr>
<td>Control group</td>
<td>30</td>
<td>41.73</td>
<td>3.352</td>
</tr>
<tr>
<td>Total</td>
<td>90</td>
<td>42.41</td>
<td>3.375</td>
</tr>
</tbody>
</table>

F: 2.069; Degrees of freedom: 2.87; p > 0.05

Graph 4: Mean mouth opening on day 1, day 3 and day 7 treatment-wise
Role of Dexamethasone in reducing Postoperative Sequelae following Impacted Mandibular Third Molar Surgery

Submucosal Dexamethasone

Postoperative edema can be controlled with dexamethasone administered in the submucosa. Grossi et al\(^2\) compared dexamethasone given in two different doses (4 or 8 mg) as a submucosal injection. It was reported that both dosages improved swelling in untreated groups, but no difference was observed between the dosage regimens. In striking contrast with this observation, Laureano Filho et al\(^12\) reported that in patients undergoing surgery for impacted third molars, administration of 8 mg dexamethasone 1 hour before surgery produced a better control of swelling compared with treatment with 4 mg dexamethasone.

In the present study, submucosal dexamethasone 4 mg given half an hour preoperatively, showed a significant reduction of swelling on all postoperative intervals as compared with the controls, which is in agreement with the previous studies.\(^2,13\) These results add more strength to the concept that locally applied dexamethasone near the site of injury.

Unlike previous studies that reported only a limited effect on trismus and pain, our patients showed significantly less trismus and pain at all times of evaluation in the submucosal group as compared with controls, which may have been the result of higher concentration of drug at the site of injury.

Although there is an agreement about their effects on swelling, the role of corticosteroids in the prevention of postoperative pain is controversial. Recently, Waldron et al\(^14\) in a meta-analysis reported that patients treated with dexamethasone experienced comparatively lesser postoperative pain, required less opioids in postoperative period, had longer time to first analgesic dose, and needed less rescue analgesia. They concluded that perioperative single-dose dexamethasone was associated with small, but statistically significant analgesic benefits.

Intramuscular Dexamethasone

Intramuscular route is one of the most commonly used one when a steroid injection is prescribed in outpatient settings. Intramuscular dosing studies have suggested that this route can be effective if a single dose is given either preoperatively or postoperatively.\(^1\)

In our study, IM dexamethasone 4 mg given half an hour preoperatively showed a significant reduction of swelling and pain on 1st and 3rd postoperative days as compared with the controls, which comes in agreement with the previous studies.\(^1,5,9,15,16\)

An important finding was the significant reduction of trismus on all postoperative visits, which is in contrast with the previous studies. Further research is, however, needed to confirm these results.

In the present study, a comparison was drawn between two different routes of administration of dexamethasone. Both dexamethasone groups were associated with a significant reduction in pain, swelling, and trismus; submucosal dexamethasone had a significant effect on facial swelling on 1st postoperative day as compared with IM dexamethasone, but the effect in two groups were comparable overall for all variables.

Overall, the comparable results obtained show that submucosal dexamethasone is an effective alternative to systemically administered dexamethasone. The expertise of the surgeon and the discomfort caused to the patient are factors that may limit the use of IM route. Submucosal dexamethasone, on the contrary, is simple, less invasive, and painless. It is well suited for third molar surgery and provides a low-cost solution for the typical discomfort associated with extraction of impacted third molars.

CONCLUSION

In this study, inj. dexamethasone sodium phosphate was used as an adjunct to reduce postoperative sequelae following surgical removal of impacted third molars.

It indicates a definite reduction in pain, swelling, and trismus after third molar surgery in patients treated with dexamethasone as compared with the control group. These findings signify and highlight the use of dexamethasone certainly as a valid method in reducing postoperative sequelae in patients undergoing third molar surgery.

This study provides a basis for preoperative administration of dexamethasone in a subtherapeutic dose of 4 mg to reduce the intensity of postsurgical sequelae, such as pain, swelling, and trismus.

This study also compares two routes of administration of dexamethasone; the comparable results obtained show that submucosal dexamethasone is an effective alternative to dexamethasone given systemically. It offers a simple, painless, less invasive, and cost-effective solution for typical discomfort associated with surgical extraction of third molars.

REFERENCES


