

# Single Dose of Dexamethasone with or without Ibuprofen Effects on Post-Operative Sequelae of Lower Third Molar Surgical Extraction

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## ABSTRACT

**Objective:** To evaluate the combined effect of single preoperative dose of dexamethasone and ibuprofen in comparison to dexamethasone alone on postoperative pain, swelling and trismus after third molar surgery.

**Methods:** Sixty patients (35 males, 25 females), underwent surgical extraction for their partially impacted lower third molar. Patients were allocated into three groups. In the first group (n=20), 8mg of (2ml) dexamethasone was injected intramuscularly into the deltoid muscle one hour before the operation, while in the second group (n=20), 8mg of (2ml) dexamethasone was injected intramuscularly into the deltoid muscle and 600mg ibuprofen was administered one hour before the operation. In the third (control) group (n=20), 2ml of normal saline was injected intramuscularly. Pain, swelling and trismus were evaluated postoperatively. The data were collected and statistically analyzed using (ANOVA) test.

**Results:** There was no significant difference among the groups (control, dexamethasone, and dexamethasone-ibuprofen groups) in pain intensities showed by visual analogue scale. Postoperative swelling was significantly less in dexamethasone, and dexamethasone-ibuprofen groups in comparison with the control group. Smaller loss of mouth opening postoperatively was noted in dexamethasone-ibuprofen group compared to the other two groups.

**Conclusion:** The combination of preoperative dexamethasone and ibuprofen is associated with reduced pain, trismus, and swelling after dental surgical procedures.

**Key words:** Dexamethasone, Ibuprofen, Impacted third molar, Pain, Trismus, Swelling

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## Introduction

Surgical extraction of lower third molar is one of the most frequent minor operations performed in the clinics of oral and maxillofacial surgery. Pain, swelling and trismus are the most frequent

consequences which are related to the postoperative inflammation.<sup>(1-3)</sup> Adequate amount of anti-inflammatory therapy is necessary to control these postoperative associated symptoms.<sup>(1-4)</sup>

The use of corticosteroids to reduce edema after

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dentoalveolar surgery is widely recommended and practiced. Alexander *et al.*<sup>(5)</sup> reviewed the contemporary literature of 30 years on the rationale use of corticosteroids during and after dentoalveolar surgery; postoperative edema and trismus was reduced. Some reduction of post-operative pain generally accompanies a reduction of edema.<sup>(6)</sup>

Clinical trials have shown repeatedly that, by themselves, NSAIDS are effective for the management of any level of dentoalveolar pain whether mild, moderate or severe.<sup>(7,8,9)</sup> It has been suggested that NSAIDS can be more effective analgesic if they are given early enough and in sufficient doses to prevent the synthesis of prostaglandins.<sup>(10)</sup> Preoperative administration of NSAIDS may reduce the need for analgesics postoperatively.<sup>(11)</sup>

The purpose of our study was to evaluate the combined effect of single preoperative dose of dexamethasone and ibuprofen in comparison with dexamethasone alone on postoperative pain, swelling and trismus after third molar surgery.

## Methods

This two center study was performed at clinics of oral and maxillofacial surgery at King Hussein Medical Center, Amman-Jordan, and Prince Rashid Bin Hassan Hospital, Irbid - Jordan, between 2010 and 2012, in which sixty patients (35 males, 25 females) with a mean age of 24 years old underwent surgical extraction for their partially impacted mesioangular lower third molar. The eligibility criteria for selection of those patients for our study were the same as that used in the prospective cohort study previously described by White *et al.*<sup>(12)</sup> (Table I).

Patients were randomly allocated into three groups taking into consideration that the groups are well balanced with respect to age, sex, smoking as shown in Table II. In the first group (n=20), 8mg of (2ml) dexamethasone was injected intramuscularly into the deltoid muscle one hour before the operation, while in the second group (n=20), 8mg of (2ml) dexamethasone was injected intramuscularly into the deltoid muscle and 600mg ibuprofen was administered one hour before the operation. In the third (control) group (n=20), 2ml of normal saline was injected intramuscularly. Patients in each group were instructed to take paracetamol

(500 mg) every four hours as needed for postoperative pain relief. No postoperative antibiotic was prescribed to the patients.

Standardized surgical procedures were performed for each patient. All extractions were performed under local anesthesia (Articaine 3% with 1:100000 adrenaline). Access to the third molar from the buccal aspect, and bone removed with rotary instruments. Informed consent was obtained from all participants.

The evaluation of postoperative pain intensities was performed by a visual analogue scale (VAS) of 0-10. Facial swelling was evaluated using a horizontal and vertical guide with a caliper following control points as described by Neupert *et al.*<sup>(13)</sup> This includes four facial points (Ear tragus, External canthus of the eye, Nose wing and buccal commissure) in relation to the angle of the mandible (Fig. 1). The percentage of facial swelling was obtained from the difference of the measures made in the preoperative and postoperative periods, dividing the result by the value obtained in the preoperative period and multiplying it by 100. The evaluation of the postoperative facial swelling was carried out at 24 hours and 48 hours after the procedure. Trismus was evaluated by measuring the maximum mouth opening before the surgical procedures and reevaluated at 24 hours and 48 hours postoperatively.

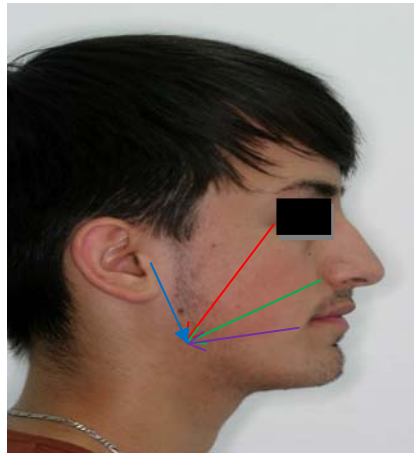
The data were collected and statistically analyzed using ANOVA test. The p value was set to be significant at <0.05 level.

**Table I:** Eligibility criteria for patient selection

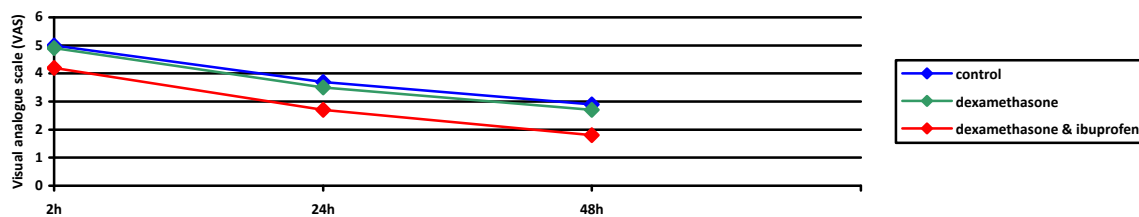
- Healthy ASA (I,II)
- No history of treatment for psychological problems
- Not pregnant or lactating mother or on oral contraceptives
- Free of acute pericoronitis or extensive periodontal diseases
- Not taking systemic antibiotics

**Table II:** Patients in each group

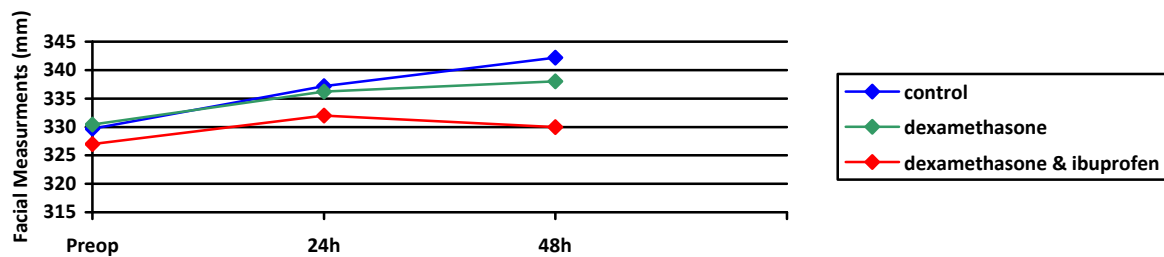
	Group 1 (n=20)	Group 2 (n=20)	Group 3 (n=20)
Age	23.5	24.2	24.4
Sex:			
Male	11	12	12
Female	9	8	8
Smoking:			
Yes	6	7	7
No	14	13	13



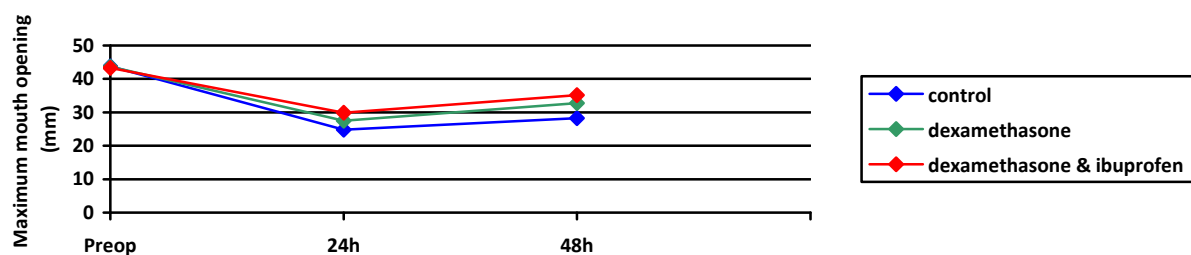
**Fig. 1:** Reference facial lines for swelling evaluation



**Fig. 2:** Pain Assessment



**Fig. 3:** Facial swelling assessment



**Fig. 4:** Trismus assessment

## Results

Sixty patients of both genders (mean age of 24 years), with impacted lower third molar, underwent surgical extraction and were involved in our study.

There was no significant difference among the groups (control, dexamethasone, and dexamethasone - ibuprofen groups) in pain

intensities showed by visual analogue scale two hours after surgery ( $P=0.061$ ). However pain was significantly different among the groups at 24 hours and 48 hours with  $p=0.013$  and  $p=0.005$  respectively (Fig. 2).

Postoperative swelling was significantly less in dexamethasone, and dexamethasone-ibuprofen groups in comparison with the control group at

48 hours postoperatively ( $p=0.041$ ). The facial swelling was less in dexamethasone-ibuprofen group at 24 hours compared to dexamethasone and control groups, however this was not statistically significant ( $p=0.714$ ) (Fig. 3).

The maximal interincisal distance was different among the three groups, this was statistically significant at 24 hours and 48 hours postoperatively ( $p=0.001$ ,  $p=0.000$ ), (Fig. 4). Smaller loss of mouth opening postoperatively was noted in dexamethasone-ibuprofen group compared to the other two groups. At 48 hours postoperatively the dexamethasone-ibuprofen group has a reduction in the mouth opening of about 20% followed by the dexamethasone group of about 25%, compared to 36% in the control group.

## Discussion

Several studies have been performed regarding the single use of corticosteroids pre-operatively in dentoalveolar surgery. Beirne and Hollander<sup>(14)</sup> reported that 125 mg of IV methylprednisolone after third molar surgery reduced pain levels during the first post-operative day. Filho *et al.*<sup>(4)</sup> studied the effect of pre-operative dexamethasone to decrease facial swelling, trismus and pain. Dexamethasone consumption was noted to reduce post-operative trismus and swelling. Esen *et al.*<sup>(15)</sup> reported decreases in pain, swelling and trismus with the use of intravenous methylprednisolone. Gross *et al.*<sup>(16)</sup> studied the effect of administration of dexamethasone on discomfort after mandibular third molar surgery and reported decrease in trismus and facial swelling.

Ibuprofen was heavily studied for pre-operative use in third molar surgery. Lokken in 1974 performed a double blind crossover study, when a population of 24 received ibuprofen 400mg three times daily commencing five days prior to surgery; significant reduction in pain compared to placebo was noted.<sup>(17)</sup> Hill *et al.*<sup>(18)</sup> Concluded in his complex blind parallel study that ibuprofen given pre-operatively delayed the onset of pain a mean time of 1.5-2hrs. Although there are varying results regarding the pre-operative use of ibuprofen on pain reduction, most studies demonstrate a better analgesic effect when used pre-operatively.<sup>(19)</sup>

Many studies evaluated the effect of NSAIDs and steroids on reducing post-operative consequences of third molar surgery; however few studies have evaluated the activity of the combined effects of these two drugs;<sup>(20)</sup> such a combination should in theory results in maximal analgesic and anti-inflammatory effect because of the analgesics properties of NSAID and suppression of inflammation by both drugs. Moreover no previous study had evaluated the combined effect of pre-operative dexamethasone and ibuprofen.

Dexamethasone and ibuprofen combination has decreased pain intensity compared to the other two groups; this was significant at 24 hrs and 48 hrs post-operatively. There was no significant difference between the combination group and the dexamethasone group at 48 hrs post-operatively. The results for post-operative pain agree with previous studies in the literature.<sup>(4,5,11,15,16)</sup> This can be explained by the analgesic and the combined anti-inflammatory effect of both drugs. Klongnoi *et al.*<sup>(21)</sup> suggested that swelling made the tissue tense and caused tension pain and that was reduced when dexamethasone decreased the facial swelling.

The results for facial swelling showed that the combination group and dexamethasone group decreased post-operative facial swelling compared to the control group, as reported in previous literature reviews<sup>(1-9)</sup> by reducing the release of lymphokines, prostaglandins, serotonin and bradykinin from injured tissue. However there was no significant difference between the two groups. Significant difference was noted between the combination group and the two other groups regarding maximum mouth opening. There was smaller loss of mouth opening and this was significant at 24hrs and 48hrs post-operatively.

In our study, we used dexamethasone and ibuprofen one hour before surgery to give time for the action of these drugs to take place immediately after surgical trauma. No side effects were reported for both medications. The only disadvantage of this is that participants should have to stay a longer time in the clinic.

## Conclusion

The combination of preoperative dexamethasone and ibuprofen is associated with

reduced postoperative pain, trismus, and swelling after dental surgical procedures. Significant reduction in pain and trismus compared with dexamethasone alone was established. It should be used when extensive postoperative sequelae after lower third molar extraction are expected.

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