



**Al Salam University  
Faculty of Dentistry  
Department of Oral and Maxillofacial Surgery**

**Efficacy of Preoperative long-acting Corticosteroids on  
Postoperative Pain, Swelling, and Trismus Following Impacted  
Mandibular Third Molar Surgery: A Randomized Controlled  
Clinical Trial**

**Research Proposal Prepared by:**

**Omaima Mahmoud Sakr, BDS, MSc, PhD**

**Ahmed Khalil Fawzi, BDS, MSc, PhD**

**NCT Number: [To be added after PRS assigns it]**

**Document Date: January 4, 2026**

# Efficacy of Preoperative long-acting Corticosteroids on Postoperative Pain, Swelling, and Trismus Following Impacted Mandibular Third Molar Surgery: A Randomized Controlled Clinical Trial

## Abstract

**Background:** Surgical removal of impacted mandibular third molars commonly results in postoperative pain, facial swelling, and trismus due to inflammatory mediator release. Corticosteroids suppress phospholipase A2 activity and reduce prostaglandin and leukotriene synthesis, thereby minimizing postoperative inflammation. Although corticosteroids are widely used in oral surgery, optimal timing, dosage, and clinical benefit of preoperative administration remain controversial, with conflicting evidence in the literature.

**Study objective:** Evaluate the effectiveness of a single preoperative dose of long-acting corticosteroids in reducing postoperative pain, facial swelling, and trismus after impacted mandibular third molar surgery.

- **Methods:** The study will be conducted as prospective, randomized, double-blind, placebo-controlled clinical trial at the department of Oral & Maxillofacial Surgery Alsalam university on 60 patients (30 per group), individuals aging between 18 and 35 years, which will be randomized and submitted to two interventions, one with 8mg dexamethasone and the other with normal saline (placebo) will administered intramuscularly. The primary outcome variable is the postoperative pain level which will be measured with a Visual Analogue Scale (VAS) recorded at 6, 24, 48, and 72 hours postoperatively, facial swelling which will be measured using standardized facial landmarks (tragus–pogonion, gonion–lateral canthus) preoperatively, day 2, and day 7 and trismus will be measured by the maximum interincisal mouth opening using calipers will recorded preoperatively, day 2, and day 7. The Secondary Outcome is analgesic consumption, number of rescue analgesic tablets taken postoperatively.

## Introduction

The inflammatory process triggered by tissue trauma from third molar surgery commonly results in pain, swelling and trismus, and is responsible for significant functional and aesthetic discomfort during the postoperative period <sup>(1,2)</sup>. In these cases, the preemptive use of anti-inflammatory drugs has the potential to reduce the intensity and morbidity of these events by inhibiting the inflammatory response prior to surgical trauma <sup>(3-6)</sup>.

Corticosteroids are drugs capable of suppressing the inflammatory response and immune function at various stages <sup>(7,8)</sup>. The perioperative use of systemic corticosteroids is a common

approach to control inflammatory events after third molars removal, with potential to reduce early and late swelling and trismus, although its effects on pain control are controversial <sup>(5)</sup>. Dexamethasone is a long-acting corticosteroid, a synthetic analogue of prednisolone, which has a potent anti-inflammatory effect, mainly by promoting the synthesis of regulatory proteins of the inflammatory process, such as lipocortin and vasocortin <sup>(9-12)</sup>. Dexamethasone was used effectively in the field of oral surgery . <sup>(6,12,13-17)</sup>. However optimal timing, dosage, and clinical benefit of preoperative administration remain controversial, with conflicting evidence in the literature.

## **Objectives**

- To compare postoperative pain levels between corticosteroid and placebo groups
- To assess facial swelling reduction postoperatively
- To evaluate improvement in mouth opening (trismus)
- To assess analgesic consumption post-surgery

## **Hypothesis**

Null hypothesis ( $H_0$ ): Preoperative corticosteroids have no significant effect on postoperative pain, swelling, or trismus following third molar surgery.

Alternative hypothesis ( $H_1$ ): Preoperative corticosteroids significantly reduce postoperative pain, swelling, and trismus compared to placebo.

## **Study Design**

**Design:** Prospective, randomized, double-blind, placebo-controlled clinical trial

**Study Setting:** Department of Oral & Maxillofacial Surgery Alsalam university

**Study Duration:** 3 months

**Sample size:** 60 patients (30 per group)

**Sample size calculation based on:**

Power: 80%

Alpha: 0.05

Effect size derived from previous similar studies

## **Inclusion Criteria**

Patients aged 18–35 years Indicated for surgical removal of impacted mandibular third molars (Pell & Gregory Class II–III) NASA I or II. Willing to provide informed consent

## **Exclusion Criteria**

- Known allergies to corticosteroids
- Systemic diseases contraindicating steroid use (e.g., uncontrolled diabetes, immunosuppression)
- Pregnancy or lactation
- Acute pericoronitis or local infection
- Current use of steroids or NSAIDs

### **Randomization & Blinding**

- Patients randomly will be assigned into two groups using computer-generated randomization
- Double-blind: neither surgeon nor patient knows group allocation
- Identical syringes will be prepared by an independent clinician

### **Intervention**

#### **Group A (Test Group)**

Dexamethasone 8 mg will administer intramuscularly 30 minutes preoperatively

#### **Group B (Control Group)**

Normal saline (placebo) will be administered intramuscularly

### **Surgical Procedure**

#### **Standardized surgical protocol:**

- Local anesthesia with 2% lidocaine + epinephrine
- Mucoperiosteal flap elevation
- Bone removal and tooth sectioning if required
- Primary closure using 3-0 silk sutures
- All surgeries performed by the same surgeon to reduce bias

### **Outcome Measures**

#### **Primary Outcomes**

**Pain:** Will be assessed using Visual Analog Scale (VAS) Recorded at 6, 24, 48, and 72 hours postoperatively

**Facial Swelling:** Will be measured using standardized facial landmarks (tragus–pogonion, gonion–lateral canthus) Recorded preoperatively, Day 2, and Day 7

**Trismus:** Maximum interincisal mouth opening will be measured using calipers' recorded preoperatively, Day 2, and Day 7

**Secondary Outcome:**

- Analgesic consumption
- Number of rescue analgesic tablets taken postoperatively

**Postoperative Care**

All patients receive:

- Standard antibiotics (if routinely prescribed)
- Ibuprofen 400 mg as rescue analgesic
- No additional steroids allowed

**Statistical Analysis**

- Data will be analyzed using SPSS
- Continuous variables expressed as mean  $\pm$  SD
- Independent T-test for intergroup comparison
- Repeated measures ANOVA for intra-group comparison
- Significance level set at  $p < 0.05$

**Ethical Considerations**

- Ethical approval will be obtained from Institutional Review Board
- Written informed consent obtained from all participants
- Study will be conducted according to the Declaration of Helsinki

**Expected Outcomes**

- Reduced postoperative pain scores
- Decreased facial swelling
- Improved mouth opening
- Lower analgesic consumption in corticosteroid group

**Clinical Significance**

This study may establish preoperative corticosteroid administration as a simple, safe, and effective protocol to reduce postoperative morbidity following third molar surgery.

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