

Dexamethasone injection into the pterygomandibular space in lower third molar surgery

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Abstract. The objective of this study was to evaluate the effects of 8 mg dexamethasone injection into the pterygomandibular space on the postoperative sequelae of lower third molar surgery. A prospective, randomized, controlled, split-mouth study was designed involving 62 lower third molar extractions (31 patients). Prior to surgery, the study group received 2 ml of 4 mg/ml (8 mg) dexamethasone injection through the pterygomandibular space following local anaesthesia; the control group received 2 ml normal saline injection. Facial swelling, mouth opening, pain on a visual analogue scale (VAS), and the number of analgesics consumed were assessed. Descriptive statistics and the independent-samples *t*-test were used to compare the two groups at $P < 0.05$. There was a significant reduction in swelling on day 2 postoperative in the dexamethasone group. Mouth opening was also significantly greater on day 2 in the dexamethasone group. The VAS pain score was significantly lower on the day of the operation and first postoperative day in the dexamethasone group, but did not differ significantly between the groups on the other postoperative days. The injection of 8 mg dexamethasone into the pterygomandibular space was effective in reducing postoperative swelling, limited mouth opening, and pain following impacted lower third molar extraction.

Key words: lower third molar surgery; dexamethasone injection; pterygomandibular space; postoperative sequelae; facial swelling; VAS pain score.

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The surgical removal of impacted third molars is the most common surgical procedure performed by oral and maxillofacial surgeons¹. It usually involves surgical trauma in a highly vascularized area, leading to inflammatory sequelae such as pain, swelling, limited mouth opening, and general oral dysfunction during the immediate postoperative period². The pterygomandibular space is one of the important spaces related to the

lower third molar region and is where the inferior alveolar nerve block is generally administered. It is also a potential site for space infection, as it contains mostly loose areolar tissues and numerous blood vessels, with small fascia-lined clefts. One of the signs and symptoms of isolated pterygomandibular space infection is trismus or limited mouth opening^{3,4}. A good surgical technique and gentle manipulation of the tissues can

only partly eliminate the pain and discomfort associated with trismus¹.

The administration of various drugs has been considered to reduce the postsurgical inflammatory response related to lower third molar extraction, with many reports published in the literature. In 1965, Linenberg employed a synthetic adrenocortical steroid, dexamethasone, to control oedema and to decrease limited mouth opening and pain following oral surgery. Since

then, the use of synthetic steroids has become increasingly popular in oral surgical procedures due to its positive effects in reducing post-inflammatory signs and symptoms⁵⁻⁷.

Majid and Mahmood studied the effects of submucosal and intramuscular dexamethasone following lower third molar surgery⁸. They stated that submucosal dexamethasone was an effective alternative to systemic dexamethasone, with comparable results obtained for the two routes of administration. Antunes et al. studied the effects of 8 mg dexamethasone injected through the masseter muscle or taken orally and found that both administration routes not only demonstrated similar effects in reducing pain, oedema, and limited mouth opening following third molar extraction, but also showed improved effects compared to the control group³. Moreover, many studies have reported submucosal, intra-alveolar, intravenous, intramuscular, and oral uses of dexamethasone^{6,7}. In contrast, studies involving the injection of dexamethasone alone into the pterygomandibular space have rarely been conducted.

Therefore, the aim of this study was to evaluate the efficacy of a single dose of 8 mg dexamethasone injected preoperatively into the pterygomandibular space in reducing postoperative pain, swelling, and limited mouth opening following lower third molar surgery.

Materials and methods

The study sample consisted of 31 patients (11 male, 20 female; mean age 22 years, range 16–32 years) with similar bilaterally impacted lower third molars.

This was a prospective, randomized, controlled, split-mouth study involving 62 surgical extractions of lower third molars in 31 patients. The study was performed in the Department of Oral and Maxillofacial Surgery, Faculty of Dentistry, Mahidol University. Ethical approval was obtained from The Mahidol University Institutional Review Board.

All of the third molar extractions were performed under local anaesthesia. The sample was divided randomly into two sites: a study site and a control site (Table 1).

The positions and classes of the lower third molars included in this study are shown in Figs. 1 and 2, respectively⁹. Evaluation of the longitudinal axis of the third molars showed that 28 (45.2%) impactions were mesioangular, 20 (32.2%) were horizontal, 12 (19.4%) were vertical, and 2 (3.2%) were distoangular (Fig. 3).

Table 1. Study and control sites for the administration of dexamethasone or normal saline in the pterygomandibular space.

Study site	Control site
Dexamethasone used	No dexamethasone used
<ul style="list-style-type: none"> • 2 ml of dexamethasone (concentration 4 mg/ml, for a total of 8 mg) injected through the pterygomandibular space • Preoperatively, after local anaesthesia 	<ul style="list-style-type: none"> • 2 ml of normal saline injected as a placebo through the pterygomandibular space • Preoperatively, after local anaesthesia

The patients included in the sample were blinded to the use or not of dexamethasone. All operations were performed by the same surgeon using standard techniques. Local anaesthesia (4% articaine hydrochloride with 1:100,000 epinephrine) was delivered at each operation site by inferior alveolar nerve block and buccal nerve block. After the objective signs of anaesthesia were evident, 2 ml of 4 mg/ml dexamethasone (total 8 mg) or 2 ml of normal saline (as a placebo) were injected into the pterygomandibular space. For each patient, the contralateral third molar operation was performed 1 month later.

The standard technique was followed in each operation, which involved reflecting a mucoperiosteal flap to provide adequate

access to the surgical field, followed by bone removal and tooth sectioning. Following tooth removal, soft tissue curettage and socket irrigation were done. Finally, interrupted black silk sutures were placed to re-approximate the flap. Postoperatively, all patients received amoxicillin for 5 days (500 mg four times daily before meals) and acetaminophen for use only in the case of pain (500 mg every 6 h).

Assessments of facial swelling and mouth opening were done preoperatively before the procedure and on the second and seventh days postoperative^{6,7}. Three measurements were taken to assess facial swelling: lateral canthus of the eye to the gonion angle, tragus to the commissure of the mouth, and tragus to pogonion. For the

Position of Lower Third Molars each side

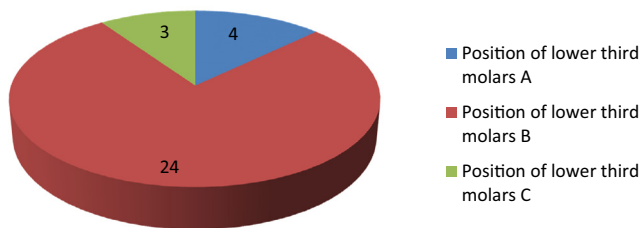


Fig. 1. Positions of the lower third molars in this study.

Classes of Lower Third Molars each side

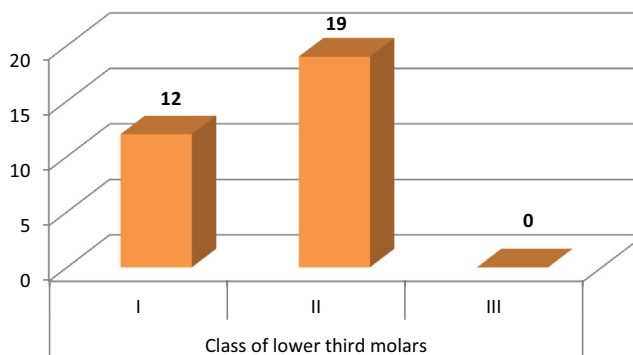


Fig. 2. Classes of the lower third molars in this study.

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