

Efficacy of Intra Masseteric Dexamethasone in Reducing Pain and Swelling after Surgical Removal of Mandibular Third Molars

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Abstract

Aim: The aim of the study was to compare the efficacy of intra massetrically given dexamethasone through intrabuccal approach in reducing the post-operative sequelae after surgical removal of impacted mandibular third molars.

Materials and Methods: Twenty patients were selected, each of who required surgical extraction of a single impacted mandibular third molar. Patients were in the age range of 18–40 years. Patients were randomly set apart into two groups of 10 each. The experimental group received 8 mg dexamethasone which is injected into the masseter muscle intrabuccally. The control group did not receive any kind of steroids. Facial swelling was measured by an independent examiner preoperatively and 2nd day postoperatively. Visual analog scale is used to measure pain from patient's response.

Results: There is a significant reduction in swelling and pain in the dexamethasone group when compared with the control group.

Conclusion: Intra masseteric injection of 8 mg dexamethasone through intrabuccal approach is a better way to minimize swelling and pain after surgical removal of impacted third molars in the mandible.

Key words: Dexamethasone, Intra massetric, Mandibular third molars

INTRODUCTION

Inflammatory reaction of soft tissue is the end result of any surgical procedures. The most common surgical procedure in oral surgery is surgical removal of an impacted mandibular third molar. The most common post-operative sequelae were pain, trismus, and swelling.^[1]

Many different approaches including drains, medications with enzymes, laser therapy, corticosteroids, and muscle relaxants were clinically evaluated in an effort to minimize these post-operative sequelae. Corticosteroids have shown promising results. The two main groups of corticosteroids were the glucocorticoids and the mineralocorticoids. Due

to their anti-inflammatory activities, glucocorticoids are of interest here. Furthermore, glucocorticoids have little or no effect on fluid and electrolyte balance.

Extensive medications were used to control these post-operative complications. Corticosteroids have been widely used to reduce the inflammatory sequelae after third molar surgery due to its potent anti-inflammatory property.^[2] In the early 1950s Spies *et al.* and Streaan and Horton started using corticosteroids to prevent inflammation in oral surgery.^[1]

The anti-inflammatory property of corticosteroids was vascular dilatation inhibition, decreasing cellular exudation, reducing liquid transudation, and edema formation. The primary mechanism responsible for these effects includes leukocyte chemotaxis inhibition, blockade of fibroblast and endothelial cells function, and suppression of numerous chemical inflammatory mediators.^[3,4]

Corticosteroids in a single large dose or a short duration of therapy were preferred as it causes very few adverse

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effects. The adverse effects are not clinically significant when used in oral surgery cases. Delayed healing and increase in patient susceptibility to infection were noticed in case of prolonged use of corticosteroids. Dexamethasone is the most commonly used form of corticosteroid in dentoalveolar surgery. Dexamethasone is considered more potent than methyl prednisolone because of its longer duration of action.^[5]

MATERIALS AND METHODS

A total of 20 patients were selected for whom impacted mandibular third molar removal is needed. The procedure is done under local anesthesia. The study was approved by our Institutional Ethical Committee. Partially impacted mandibular third molars were selected according to Pell and Gregory classification A, B, and C on the radiograph. All the patients selected were 18 years of age or older. Patients on the day of tooth removal should be free of pericoronitis or infection. Patients with the history of immunocompromise, allergy to drug used, pregnancy or lactation or chronic use of any drugs were excluded from the study.

Surgical Procedure

All the surgical procedures for the 20 patients were done by the same surgeon. A standard inferior alveolar nerve block and long buccal nerve block were given using a solution of 2% lignocaine hydrochloride and adrenaline 1:80000. A ward's incision was made for surgical access, 702 straight fissure bur was used to remove bone around the tooth. Whenever necessary the crown or roots were sectioned. After complete removal of the tooth, the socket was irrigated copiously with normal saline and flap was sutured with 3-0 silk. Pressure pack with small gauze piece was applied to the site. Post-operative instructions were given to the patients.

Patients were divided randomly into two groups with 10 patients each. 8 mg dexamethasone was given into the masseter muscle through intrabuccal approach for the treatment group. Dexamethasone was injected preoperatively just before the surgery. No corticosteroid was given to the control patients. The study was not blinded. All the patients were aware of whether they had dexamethasone or not.

All the patients were given amoxicillin with clavulanic acid antibiotic and tab. Aceclofenac every 12 h orally for 5 days. The patients were advised for warm saline gargle from the day after surgery.

Follow-up

Facial measurements were made on three sites: Tragus-commissura labiorum, gonion-lateral canthus, and gonion-

commissure labiorum using a measuring tape. Measurements were made preoperatively and postoperatively on the 2nd day on the operated side. Measurements were made by an independent examiner.

The pain was also assessed visual analog scale (VAS) was used to evaluate pain that ranged from "no pain" for 0 to "the worse possible pain" for 10. The pain was evaluated on the 2nd day postoperatively.

Statistical analysis was done using SPSS 15. Nonparametric Mann-Whitney U test was used to compare the difference between facial measurements in the study and control groups.

RESULTS

Mean pain on 2nd day in the control group was 4.6 on VAS and in the study group was 1.95 on VAS. Higher mean pain was recorded in the control group without steroids when compared to the study group given perioperative steroids, and difference between them was found to be statistically significant. Surgical sites were recovered uneventfully. No complications such as muscular necrosis, fatigue, pruritus, nausea, or vomiting followed by steroid injection occurred.

Statistically significant differences were observed between the control and study groups in all day 2 measurements (tragus-commissura labiorum, gonion-lateral canthus, and gonion-commissure labiorum) [Table 1]. In the study group, post-operative edema was significantly reduced.

DISCUSSION

Corticosteroids were used perioperatively for reducing edema, pain, and trismus after removal of impacted mandibular third molars. Parenteral administration of corticosteroids taken before rather than after surgery seems to be more effective than oral administration of steroids.^[6]

Although intravenous administration affords excellent and immediate plasma drug levels, this route is infrequently used in an outpatient clinical setting, unless patients are receiving intravenous sedation at the same time.^[7] Two other routes of administration other than intravenous are the intramuscular and subcutaneous routes. Intramuscular injections are effective irrespective of the site of injection.^[8-10]

Due to religion and cultural restrictions, intramuscular injections at the gluteus or deltoid muscle may not be a convenient procedure. Due to needle phobia, patients may decline receiving injections away from the oral cavity.

Table 1: Outcome difference between study and control groups

2 nd day measurement	Median cm (minimum – maximum)	control group	study group	Asym. significance	Group 2-tailed
Tragus-commissura labiorum	12.4 (10.6–15.7)	11.7 (10.6–14.0)		<i>P</i> =0.001*	
Gonion-commissura labiorum	12.5 (10.5–14.0)	10.5 (9.1–12.4)		<i>P</i> <0.001*	
Gonion-lateral cantus	12.6 (10.0–14.1)	10.6 (9.4–12.2)		<i>P</i> <0.001*	

**P*<0.05 was considered statistically significant

The masseter muscle makes a good alternative site. This site of administration is convenient for the surgeon as the injection is given close to the surgical area. For the patient intra masseteric injection is painless as it is usually given after the area was anesthetized. Intra masseteric injection effectiveness does not depend on the patient's compliance.^[10]

Markiewicz *et al.* conducted a meta-analysis to measure the effect of corticosteroids on trismus, edema and pain at both early and late post-operative periods after surgical removal of third molars. Markiewicz concluded that perioperative corticosteroids played a key role in mild-to-moderate reduction of edema and good improvement in range of motion.^[11]

Brignardello-Petersen *et al.* concluded that low-level laser energy irradiation had no role in decreasing pain, trismus, and swelling after surgical removal of mandibular third molars.^[12] The effect of low power laser irradiation after lower third molar surgery is enhanced by simultaneous local intramuscular use of dexamethasone.^[13] Intraoral injection of dexamethasone 8 mg at the time of surgery decreases post-operative edema same as dexamethasone 4 mg. No extra benefits obtained by increasing dosage of parenteral dexamethasone from 4 mg to 8 mg.^[14]

8 mg of dexamethasone was more efficient in the trismus and swelling control than the lower dosage after surgery.^[15] Submucosal injection of dexamethasone 4 mg is comparable to intramuscular injection in reducing the post-operative swelling after impacted third molar surgical removal.^[16] Oral bromelain is an effective method in improving the post-operative sequelae after impacted mandibular third molar surgical removal comparable to that of diclofenac sodium.^[17]

Vegas-Bustamante *et al.* reported a decrease in pain, trismus, and swelling after injecting methylprednisolone into the masseter muscle.^[18] Messer and Keller reported similar results after injecting dexamethasone into the masseter muscle.^[19] Nandini in her study proved a decrease in pain, swelling after injecting dexamethasone into the masseter muscle as in the present study.^[20] The intra masseteric injection is convenient for an oral surgeon, as it is injected into the area near to the surgical site that is still anesthetized.

In the present study, we found that injecting dexamethasone into the masseter muscle significantly reduced swelling on 2nd day postoperatively compared with controls. All patients had significantly less pain at the evaluation time in the dexamethasone group when compared to the control group.

CONCLUSION

The results obtained showed that dexamethasone injected into the masseter is a better alternative route to that given systemically. Intra masseteric injection technique is less invasive, painless, and more convenient for the oral surgeon.

In the study, we conclude that intraoperative injection of 8 mg of dexamethasone into the masseter muscle significantly reduces pain and swelling postoperatively in surgical removal of mandibular third molar extraction.

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