

Comparison of Intramuscular and Submucosal Dexamethasone on Postoperative Sequale Following Third Molar Surgery

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ABSTRACT

Introduction: Transalveolar extraction of mandibular third molar is a cumbersome and dreaded procedure. Most of the patients are in awe for surgical extraction. It brings great discomfort to the patients and interferes with their daily chores because of postoperative pain, swelling and trismus. In this prospective randomised study, we evaluate the effect of 4mg dexamethasone given by either sub mucosal or intramuscular route on pain, swelling and trismus after third molar surgery

Material and Methods: A total of 44 patients were enrolled in this prospective study which were divided in two groups – Group A who received 4mg of submucosal dexamethasone and Group B who received 4 mg of intramuscular dexamethasone during the extraction of third molars. Swelling, trismus and VAS scores were measured in both the groups on 3rd and 7th postoperative days. SPSS software was used for analysis and Chi square test was applied.

Result: There was no significant difference in the demographic data and duration of surgery between the groups. Swelling was more marked on 3rd postoperative day which slowly reduced but there was no significant difference in swelling between the groups. Trismus index was also comparable between the groups, showing no significant difference.

Conclusion: Intramuscular or submucosal injection of dexamethasone produced comparable results when used intraoperatively during third molar surgery.

Keywords: Dexamethasone, Intramuscular, Prospective, Submucosal, Transalveolar

INTRODUCTION

Transalveolar removal of impacted third molars is the most commonly performed procedure by oral and maxillofacial surgeons.¹ It involves intentional and minor trauma to the hard and soft tissues which generally leads to pain, swelling and trismus. These things bring discomfort to the patient and interfere with its social well being.^{2,3} The prime concern of the specialist is to reduce the post-operative sequel.

Extraction involves injury which further causes tissue trauma leading to inflammation due to the action of phospholipase A₂ which catalyzes the conversion of phospholipids into arachidonic acid and forms leukotrienes, prostaglandins or thromboxane. These are referred to as mediators of inflammation. The symptoms peak during 2nd day after extraction.⁴ Corticosteroids act by inhibiting body's inflammatory response to injury hence lead to reduction in fluid transudation and a decrease in oedema.^{5,6} They inhibit the first step of inflammation.⁶ They can be administered by a variety of routes like intravenous, intramuscular, oral or sub mucosal. Even though there is presence of so many routes but routes there is no clear evidence as to which route provides best and quick relief. Most of the studies are not comparable with respect to patient selection,

timing, dosage and route of steroid administration.⁷ In this prospective randomised study, we evaluate the effect of 4mg dexamethasone given by either sub mucosal or intramuscular route on pain, swelling and trismus after third molar surgery.

MATERIAL AND METHODS

This study was conducted in the Department of Oral and Maxillofacial Surgery, Maharaja Ganga Singh Dental College and Research Centre, Sri Ganganagar, Rajasthan, India The study involved 44 patients with 22 patients in each group. Both men and women equally participated in the study. According to Pell and Gregory classification, Class II, class III impactions and Position A/B/C were included in the study. Patients between the ages of 18 years to 48 years with no active infection at the time of operation were enrolled in the study. Debilitated or immune compromised patients, patients allergic to local anaesthesia, patients on any existing steroid use, pregnancy or lactation, patients using antibiotics were excluded from the study. Patients who didn't report during follow up period or patients who used any other drug during study period were also excluded. Ethical committee clearance was obtained from the institute and all the patients were informed about the study and a written informed consent was obtained. After that they were randomly divided into Group A and Group B. Group A patients received 4 mg of dexamethasone sub mucosal during the procedure and Group B patients received 4 mg of intramuscular dexamethasone during the procedure.

Surgical Procedure

Inferior alveolar, lingual and long buccal nerve block was administered using 2% lignocaine HCl in 1:100000 adrenaline. A single surgeon performed all the surgeries. After giving Ward's incision, surgical access was made and a triangular full thickness mucoperiosteal flap was elevated. Buccal trough was prepared using round bur under copious irrigation with saline solution. Crown or roots sectioning was performed as required. Complete tooth was removed and debridement of the socket was performed and irrigation was done. Bone filing was done to smoothen any sharp bony margins. Primary closure of the socket

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How to cite this article: Navneet Singh, Lokender Singh Raghav, Gagandeep Kaur, Jasleen Kaur. Comparison of intramuscular and submucosal dexamethasone on postoperative sequelae following third molar surgery. International Journal of Contemporary Medical Research 2017;4(3):603-606.

with 3-0 mersilk interrupted sutures. The duration of operation was recorded from the start of incision to the last suture and was recorded. Postoperative antibiotics (Cap Amoxicillin 500mg TDS and Tab Metrogyl 400 mg tds) and analgesic (Tab Combiflam TDS) were prescribed to all the patients. Patients were also given antibacterial mouthwash twice daily for a period of 7 days.

Follow Up

Extraoral swelling, trismus index and postoperative pain were measured on 3rd and 7th post operative day. Swelling was recorded from tragus to midline and gonion to lateral canthus of eye with the help of tape measure. Both the values were added and taken as a reading. Mouth opening was recorded as distance between upper and lower incisors when mouth was maximally opened. Trismus was taken as the difference between this reading before and after surgery. Post operative pain was measured by the visual analogue scale in which 0 meant no pain and 100 meant worst possible pain.

STATISTICAL ANALYSIS

The data was analysed using SPSS software. Mean of the values were recorded and the test of significance that was applied was chi square test. Probability values of less than 0.05 considered as significant.

RESULT

A total of 44 patients were enrolled in this prospective study with the mean age of 28.3 +/- 2.4 years. The present study was conducted over a period of 3 month, from October 2016 – January,2017.

Table 1 illustrates the demographic data related to the patients and the mean duration of surgery amongst the groups. The mean age in Group A was 30.6 years and the mean age in Group B was 29.6 years. The mean duration of surgery in Group A patients was 34.1 +/- 1.3 minutes and the mean duration of surgery amongst Group B patients was 30.4 +/- 1.5 minutes. There was no significant difference amongst the groups and the p value was greater than 0.05.

Table 2 demonstrates the comparison of extraoral facial swelling on 3rd and 7th post operative days. There was considerable swelling present in both the groups on 3rd postoperative day which slowly diminished by 7th postoperative day. On both

3rd and 7th post operative day swelling was more in Group A compared to Group B. On 3rd postoperative day the mean swelling amongst Group A patients was 2.2 +/- 0.8 mm and amongst Group B patients it was 1.8 +/- 0.9 mm. The differences were statistically non significant (p>0.05) on both third and 7th postoperative days.

Table 3, Figure 1 illustrates the comparison of trismus index between the groups. There was more limitation in mouth opening during 3rd post operative day which steadily became lesser by 7th post operative day. The mean trismus index on 7th postoperative day in Group A was 5.8 +/-2.4 mm and that in Group B patients it was 4.3 +/- 1.2 mm. The difference between both the groups was not significant (p>0.05) between the groups on both postoperative days.

Table 4 enumerates the pain scores amongst both the groups. On 7th post operative day, in Group A and Group B, no patient had severe pain. In Group A, 3 patients had moderate pain, 10 patients patient had mild pain and 9 patients had no pain on 7th postoperative day. In group B, only 2 patients suffered from moderate pain, 8 patients had mild pain and 12 patients had no pain on 7th postoperative day. There was statistically no significant difference between the groups on 3rd and 7th post operative day.

DISCUSSION

Removal of mandibular wisdom tooth is one of the most painful, dreadful and frightful situation amongst patients. Its associated post operative consequences like trismus, swelling

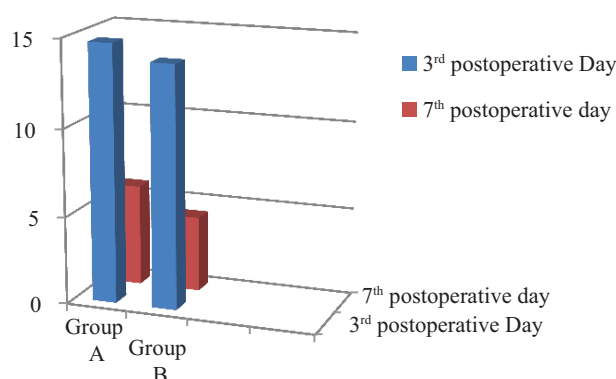


Figure-1: Comparison of trismus Index amongst both the groups

	Group A (Submucosal)	Group B (intramuscular)	P value	
Age (years)	30.6 yrs	29.2 yrs	>0.05	
Gender	Males	15	13	>0.05
	Females	7	9	>0.05
Duration of Surgery (mins) (Mean +/- SD)	34.1 +/- 1.3	30.4 +/- 1.5	>0.05	

Table-1: Demographic data related to the patients and duration of surgery

Time after surgery	Group A (Submucosal)	Group B (intramuscular)	P value
3 rd postoperative Day	2.2 +/- 0.8	1.8 +/- 0.9	>0.05
7 th postoperative day	1.1 +/- 0.2	1.0 +/- 0.3	>0.05

Table-2: Comparison of facial swelling amongst the groups

Time after surgery	Group A (Submucosal)	Group B (intramuscular)	P value
3 rd postoperative Day	14.7 +/- 2.5	13.8 +/- 3.1	>0.05
7 th postoperative day	5.8 +/- 2.4	4.3 +/- 1.2	>0.05

Table-3: Comparison of trismus Index amongst both the groups

Time after surgery		Group A (Submucosal)	Group B (intramuscular)	P value
3rd postoperative Day	No pain	0	0	>0.05
	Mild pain	4	6	
	Mod. Pain	9	9	
	Severe pain	9	7	
7 th postoperative day	No pain	9	12	>0.05
	Mild pain	10	8	
	Mod. pain	3	2	
	Severe pain	0	0	

Table-4: Comparison of pain scores

and pain interfere with patient's social well being. Operators are trying their best to reduce this discomfort. Various techniques and medications are being put into test in present scenario to reduce these sequels. Corticosteroids like dexamethasone and methylprednisolone because of their pure glucocorticoid and no mineralocorticoid effect have been used widely in dentoalveolar surgery and they have least adverse effects on leukocyte chemotaxis.^{8,9} They have gained widespread importance in this arena.¹⁰⁻¹² In a metaanalysis by Markiewicz et al,¹³ he inferred that giving corticosteroids perioperatively has mild to moderate value in reduction of postoperative inflammatory signs and symptoms.

El Hag et al in their study compared 1 mg dexamethasone injection 1 hour preoperatively and 10-18 hours postoperatively. He concluded that there is significant reduction in swelling and trismus following third molar surgery. A study by Hooley and Francis in 1969, they came to the conclusion that patients receiving betamethasone had less pain and needed much less analgesics postoperatively compared to the patients without betamethasone.¹⁴ Dexamethasone has a half life of 36-72 hours. Corticosteroids stabilize the lysosomal membrane and therefore prevent the release of proteolytic enzymes. They also decrease the capillary permeability and therefore lead to a decrease in oedema.

According to our study there was no significant difference in swelling and pain scores amongst both the groups. But Group B patients who received intramuscular dexamethasone showed more reduction in swelling and pain compared to Group A. According to a study by Sisk and Bennington¹⁵, a marked reduction in pain, swelling and trismus were seen after administration of intravenous 125 mg of methylprednisolone preoperatively following mandibular third surgery. According to a similar study conducted by Beirme and Hollander¹⁶, a marked reduction in oedema was seen on first postoperative day but there was a rebound increase in oedema on 2nd and 3rd post operative day.

Dionne et al¹⁷ reported no analgesic effect after giving 4 mg of dexamethasone orally 12 hours before the surgery or 4 mg intravenously preoperatively. In a study by Giovanni et al¹⁸ submucosal injection of 4 mg of dexamethasone was efficient in preventing post operative oedema but when the dose was increased to 8 mg, it produced no extra effects. In a study by Majid et al¹⁹, on comparing submucosal and intramuscular 4 mg dexamethasone injection with controls, a significant reduction in swelling and pain was observed in both the groups who received dexamethasone compared to placebo. In a study by Warraich et al also concluded that submucosal dexamethasone

was effective in reducing post operative complication following third molar surgery.²⁰

In our study, there was no significant difference in trismus index between both the groups. This was similar to a study by Graziani et al.²¹, where endoalveolar application of dexamethasone produced marked reduction in trismus but its submucosal administration did not produce notable results. According to a similar study conducted by Majid et al¹⁹ submucosal administration of dexamethasone resulted in significantly less trismus only on first postoperative day.

Various factors such as age, surgeon, gender and operating time have also been seen to influence healing and swelling after surgery.²²⁻²⁸ But in our study these variables were insignificant and same surgeon performed all the surgeries, therefore they had no impact.

CONCLUSION

Corticosteroids can play an important role in the reduction of postoperative complications of third molar surgery and hence may lead to a significant improvement in patient's social well being. From our study, we can conclude that submucosal or intramuscular dexamethasone has no significant difference in the postoperative sequel and therefore any route can be used after surgery without much variations.

REFERENCES

1. Shepherd JP, Brickley M. Surgical removal of third molars. *BMJ*. 1994;309:620-1.
2. Grossi GB, Maiorana C, Garramone AR, et al: Assessing postoperative discomfort after third molar surgery: A prospective study. *J Oral Maxillofac Surg*. 2007;65:901.
3. Savin J, Ogden GR: Third molar surgery—A preliminary report on aspects affecting quality of life in the early postoperative period. *Br J Oral Maxillofac Surg*. 1997; 35:246.
4. Troullos ES, Hargreaves KM, Butler DP, et al: Comparison of non-steroidal anti-inflammatory drugs, ibuprofen and flurbiprofen, with methylprednisolone for acute pain, swelling and trismus. *J Oral Maxillofac Surg*. 1990; 48:945.
5. Messer E, Keller J. The use of intraoral dexamethasone after extraction of mandibular third molars. *Oral Surg Oral Med Oral Pathol*. 1975;40:594-8.
6. Milles M, Desjardins P. Reduction of postoperative facial swelling by low-dose methylprednisolone: an experimental study. *J OralMaxillofac Surg*. 1993;51:987-91.
7. Alexander RE, Thronson RT: A review of perioperative corticosteroid use in dentoalveolar surgery. *Oral Surg Oral Med Oral Pathol*. 2000;90:406.
8. Peterson LJ. Principles of management of impacted teeth.

- In: Peterson LJ, Ellis E III, Hupp JR, Tucker MR, eds. Contemporary Oral and Maxillofacial Surgery. 4th ed. St Louis: CV Mosby. 2003:184-213.
9. Montgomery MT, Hogg JP, Roberts DL, Redding SW. The use of glucocorticosteroids to lessen the inflammatory sequelae following third molar surgery. *J Oral Maxillofac Surg.* 1990;48:179.
 10. Alexander RE, Thronson RT: A review of perioperative corticosteroid use in dentoalveolar surgery. *Oral Surg Oral Med Oral Pathol.* 2000;90:406.
 11. Gersema L, Baker K: Use of corticosteroids in oral surgery. *J Oral Maxillofac Surg.* 1992;50:270.
 12. Montgomery MT, Hogg JP, Roberts DL, et al: The use of glucocorticosteroids to lessen the inflammatory sequelae following third molar surgery. *J Oral Maxillofac Surg.* 1990; 48:179.
 13. Markiewicz MR, Brady MF, Ding EL, Dodson TB. Corticosteroids reduce postoperative morbidity after third molar surgery: a systematic review and meta-analysis. *J Oral Maxillofac Surg.* 2008;66:1881-94.
 14. Hooley JR, Francis FH. Betamethasone in traumatic oral surgery. *J Oral Surg.* 1969;27:398-403.
 15. Sisk AL, Bonnington GJ. Evaluation of methylprednisolone and flurbiprofen for inhibition of the postoperative inflammatory response. *Oral Surg Oral Med Oral Pathol.* 1985;60:137-45.
 16. Beirne OR, Hollander B. The effect of methylprednisolone on pain, trismus and swelling after removal of third molar. *Oral Surg Oral Med Oral Pathol.* 1986;61:134.
 17. Dionne RA, Gordon SM, Rowan J, et al: Dexamethasone suppresses peripheral prostanoid levels without analgesia in a clinical model of acute inflammation. *J Oral Maxillofac Surg.* 2003;61:997.
 18. Giovanni Battista Grossi, Carlo Maiorana, Rocco Alberto Garramone, Andrea Borgonovo, Davide Farronato: Effect of Submucosal Injection of Dexamethasone on Postoperative Discomfort After Third Molar Surgery: A Prospective Study. *J Oral Maxillofac Surg.* 2007;65:2218-2226.
 19. Omer Waleed Majid, Waseem Khalid Mahmood: Effect of submucosal and intramuscular dexamethasone on postoperative sequelae after third molar surgery: comparative study. *British Journal of Oral and Maxillofacial Surgery.* 2011;49:647-652.
 20. Riaz Warraich, Muhammad Faisal, Madiha Rana, Anjum Shaheen, Nils-Claudius Gellrich, and Majeed Rana: Evaluation of postoperative discomfort following third molar surgery using submucosal dexamethasone e a randomized observer blind prospective study *Oral Surg Oral Med Oral Pathol Oral Radiol.* 2013:1-7.
 21. Graziani F, D'Aiuto F, Arduino PG, et al: Perioperative dexamethasone reduces post-surgical sequelae of wisdom tooth removal. A split-mouth randomized double-masked clinical trial. *Int J Oral Maxillofac Surg.* 2006;35:241.
 22. Hargreaves KM, Shmidt EA, Mueller GP, Dionne RA. Dexamethasone alters plasma levels of beta-endorphin and postoperative pain. *Clin Pharmacol Ther.* 1987;42:601.
 23. Capuzzi P, Montebugnoli L, Vaccaro MA. Extraction of impacted third molars. A longitudinal prospective study on factors that affect postoperative recovery. *Oral Surg Oral Med Oral Pathol.* 1994;77:341.
 24. Monaco G, Staffolani C, Gatto MR, Checchi L. Antibiotic therapy in impacted third molar surgery. *Eur J Oral Sci.* 1999;107:437.
 25. Ruchi Mitra, V K Prajapati, Vinayak KM, Sonia Nath, Nitesh Sharma. Prevalence of mandibular third molar impaction. *International Journal of Contemporary Medical Research.* 2016;3:2625-2626.
 26. Nikhil Srivastava, Vivek Adlakha, Ashutosh Bhardwaj, Himanshu Shrivastava. Autotransplantation of 3rd molar with open apex: a case report. *International Journal of Contemporary Medical Research.* 2016;3:1268-1269.
 27. Premit Kumar Pokharel. Assessment of prevalence and pattern of impacted third molar among kathmandu population: a retrospective analysis. *International Journal of Contemporary Medical Research.* 2016;3:1658-1660.
 28. Akash Azad, Rupal Vaidya, Shradha Chokshi, Zarna Sanghvi, Pruthvi Patel. Morphology of maxillary second molars analyzed by cone beam computed tomography in western indian population. *International Journal of Contemporary Medical Research.* 2016;3:3156-3159.

Source of Support: Nil; **Conflict of Interest:** None

Submitted: 25-02-2017; **Accepted:** 17-03-2017; **Published:** 28-03-2017