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Effectiveness Of Submucosal V/S Intramuscular Dexamethasone In Mandibular Third Molar Surgeries

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Abstract:
Complications like swelling, trismus, and pain are common after third molar surgery. This Study was conducted to compare and evaluate the therapeutic effect of dexamethsone intramuscular VS submucosal on these complications. Sixty patients with mandibular impaction were included in this study. Thirty patients were given 4mg submucosal dexamethasone and the control group was given 4 mg intra muscular dexamethasone immediatelyafter surgical extraction. Patients with contraindication to the use of steroids were excluded from this study. Facial swelling and maximal interincisal distance were measured by an independent examiner at baseline (preoperatively), and at 2nd, 3rd, 5th day and 7th days postoperatively. Pain was measured by the patients' response to a visual analogue scale.
Results: The submucosal dexamethasone group showed significant reduction in swelling (p<0.001) and pain (p<0.05) compared with the control group at all intervals. Intramuscular dexamethasone resulted in significantly more trismus on day 2 postoperatively (p= 0.037), but there was no significant difference among the groups at 7th day.
Conclusion: Dexamethasone 4 mg given submucosally is effective in minimizing swelling, pain and trismus than intra muscular after removal of impacted lower third molar.

Key words: Third molar tooth, Dexamethasone, Pain, Trismus.

I. INTRODUCTION

Minor Oral surgical procedures cause the most pain in Dentistry. During these procedures, damage caused to soft and hard tissues leads to an inflammatory reaction. The inflammatory reaction occurs during and after surgical procedure due to damage to the soft tissue. The biological mediators such as Histamine, Serotonin, kinin and Prostaglandin are released due to tissue damage [1].Pain after extracting third molar is high on the day of surgery and post operative swelling increases from the next day [2 – 5]. Age, Gender may or may not be associated with post operative pain and swelling [6].Some studies have recommended the use of steroids to minimize pain and swelling. Dexamethasone reduces pain and swelling following oral surgical procedures. Corticosteroids before or just after third molars surgery reduces pain and inflammation [7]. They act by inhibiting, through a variety of proposed mechanisms, the body's inflammatory response to injury, with a reduction of fluid transudation and studies have concluded that perioperative administration of corticosteroids has a mild to moderate value in reducing postoperative inflammatory signs and symptoms [8]. Several studies have shown a better effect in the control of

trismus, swelling and pain when using steroid anti-inflammatory drugs versus non steroidal anti-inflammatory drugs [9-12]. But, steroids used should be moderate because they cause immune suppression and it takes a longer period to return to normal levels.

Schmelzeisen and Frolich found that dexamethasone administered orally, preoperatively, and postoperatively reduced pain by 50% and postoperative analgesic needs by 37% in patients who had osteotomy of impacted molars [13]. In a double-blind study, Pedersen examined the effect of preventive dexamethasone on pain and swelling after removal of an impacted mandibular molar. Postoperative pain was reduced by 30%. In a randomized double-blind study, Baxendale et al examined the effect of a single prophylactic dose of oral dexamethasone, 8 mg, on postoperative complications after extraction of third molars and found a significant reduction in pain [14]. Submucosal injection of Dexamethasone (4mg) showed significant improvement in swelling, pain, and improving the recovery phase of the patient after surgical extraction procedure. The aim of this randomized controlled trial was to evaluate the effect of dexamethasone injection (submucosal) on patient's quality of life in the immediate postoperative period requiring surgical third molar extraction. Our study was done to determine whether patients receiving a 4-mg submucosal injection of dexamethasone compared to those receiving 4-mg of intramuscular dexamethasone in respect of pain, swelling and mouth opening.

MATERIAL AND METHODS

The inclusion criteria were as follows:

History of drug allergy, Medically compromised patients and pregnancy were excluded. Cases who were not on steroids for the last two weeks and also presently not on any medications were included in the study. All cases were selected and surgery done after clinical examination. Informed consent was taken from all the patients before the study was conducted.

Neither the patients nor the operator were blinded to the use of corticosteroids. There was no financial inducement to participate, and patients were given the opportunity to withdraw from the study at any time. The study was done after approval from the local ethical committee. Standard surgical procedure was done in all the patients by a same surgeon. Infiltration of 2% lignocaine with adrenaline 1:80,000 was used in all the patients. Standard wards incision was placed for surgical access. After elevating the muccoperiosteal flap and exposing the bone tooth was exposed and bone surrounding the tooth was cut with a round bur . In most of the cases tooth was divided and removed in to two pieces using a straight fissure bur.

The whole procedure was done with copious saline irrigation.After removal of the tooth the area was inspected, copiously irrigated, and the flap was sutured back by 3 to 4 interrupted stitches using a 3–0 silk suture. A small gauze pack was then applied to the surgical site, and the usual post surgical instructions were given to the patient.

Sixty patients (18 women and 42 men), average age 30 years (range 20–50) were randomly divided into 2 groups, with 30 patients in each. Group A received 4 mg decadron as a submucosal injection immediately after surgery. It was injected into the labial vestibule near the surgical site. In the second group the patients received intramuscular dexmethasone. Apart from dexamethasone treatment, all patients in the study routinely received Augmentin (oral 625 mg every 8 hours) for 3 days after surgery. In addition, a chlorhexidine mouth rinse was prescribed twice daily to be started the day after surgery for 5 days.

Facial swelling and pain were objectively measured once on 2^{nd}, 3^{rd}, 5^{th},and 7^{th} postoperative days by an independent examiner. Swelling on the operated side was measured as follows: mild, moderate and severe. Postoperative pain was evaluated using a visual analog scale, 100 mm in length, ranging from 0 for "no pain" to 100 for "the worst possible pain."Pain and

swelling were recorded by the surgeon on 2nd, , 3rd , 5th, and 7th post op day.

Descriptive statistics were calculated. The variables analyzed include demographic (age, sex), VAS for pain and swelling. The age was presented as Mean ± SD.The frequency and intensity were calculated as percentages for each age group. Variance homogeneity was verified. The results were found to be significant, and the application of non parametric tests as required. Statistical significance was considered for *P* less than or equal to 0.05.

RESULTS

Postoperative mouth opening.

In group A, 25 out of 30 patients (83.3%) had normal mouth opening on 7th day. In control group B, 03 patients (10%) were having normal mouth opening. There is a statistically significant difference in mouth opening on 1st day (P = .004), 3rd day (P=.004), 5th day (p=.04) and 7th day (p=.02) postoperatively.

Postoperative Pain

In group A, 1 out of 30 patients (3.3%) had severe pain on 1st day. In control group B, 11 patients (36.6%) were having severe pain. Statistically significant difference between VAS score for pain on 1st day (P = .004), 3rd day (P = .004), 5th day (p=.04) and 7th day (p=.02) postoperatively.

Postoperative swelling.

04 Patients (13.3%) in group A showed moderate swelling. 20 patients (66.6%) in group B were having moderate swelling. Statistically significant difference Postoperative swelling on 1st day (P = .003), 3rd day (p= .01), 5th day (P = .01) and 7th day(p=.001).

DISCUSSION

Our study proved that submucosal injection of 4mg dexamethasone reduced pain and swelling compared to intramuscular dexamethasone. Studies have shown that corticosteroids reduce the pain & edema due to transudate from the surgical side. Post-surgical pain and facial swelling affects the daily life of the patient. Many authors have advocated the use of corticosteroids to limit postoperative pain & edema due to their suppressive action on transudation but few have made definitive recommendations Ustun supported the study of steroids by randomized clinical trials [15]. Kvist and Reit proved that all patients after surgical endodontics experienced pain [16]. In the above studies, no effort was made to reduce post-operative pain.

Maxillofacial surgeons have obtained good results after the use of peri-operative steroids [17-19]. Steroids prevents the formationof prostaglandin by disrupting the arachidonic acid pathway. Dexamethasone is used in minor oral surgical procedures due to long half life and high potency. Patients would also not incur the risk of pharmacological over-treatment or side effects. Despite the frequent clinical use of dexamethasone, the post-surgical efficacy of either intra-alveolar or sub-mucosal perioperative administration remains poorly investigated.

In our study, VAS score was used to assess the pain, which is a valid scale for recording pain. The intensity of the pain is easy to measure in VAS scale. Sometimes, steroids are related to reduce pain as the same as analgesics. Corticosteroids particularly Dexamethasone have been used for more than 25 years to prevent post-operative symptoms after surgical removal of third molar. The dose and the route of administration of steroids plays an important role on the efficiency of the agent.

In our study, pain was more on the 3rd and the 5th day of the surgery. There is a good correspondence between the present findings for pain intensity and previous studies that have used VAS scores, even though these studies were conducted in 5 countries over a period of 20 years. Furthermore, it suggests that pain may not be the main factor for postoperative discomfort.

Route of administration of steroids depends upon the surgeon's preference. If orally administered, repeat doses are required. But, if given intravenously, repeat doses are not required. Studies of intramuscular and intraregional doses suggest that this route of administration can be effective in a single dose given either preoperatively or postoperatively.These results imply that with intraregional administration, the symptoms are significant after the 3rd day.

The investigations in our study indicate that intraregional dexamethasone tested was more effective in reducing the pain and swelling as compared to the patients without steroid injection. Christiansen as well as by Al khateeb et al showed that swelling was more on the 2nd post-operative day in contrast to penarrocha. Based on earlier clinical studies that postoperative pain can be reduced by combining long-acting anesthetics with non-steroidal anti-inflammatory agents, it can be concluded that further clinical trials are needed to compare the effect of steroids, nonsteroidal anti-inflammatory drugs and long-acting local anesthetics in reducing postoperative sequelae. Additional studies are also necessary to further define the benefits of preoperative intraregional administration of dexamethasone.

The risk factors of edema, pain and swelling after surgery have been reported by many investigators and included age, gender, smoking, oral hygiene, duration and difficulty of the operation, and surgical experience.

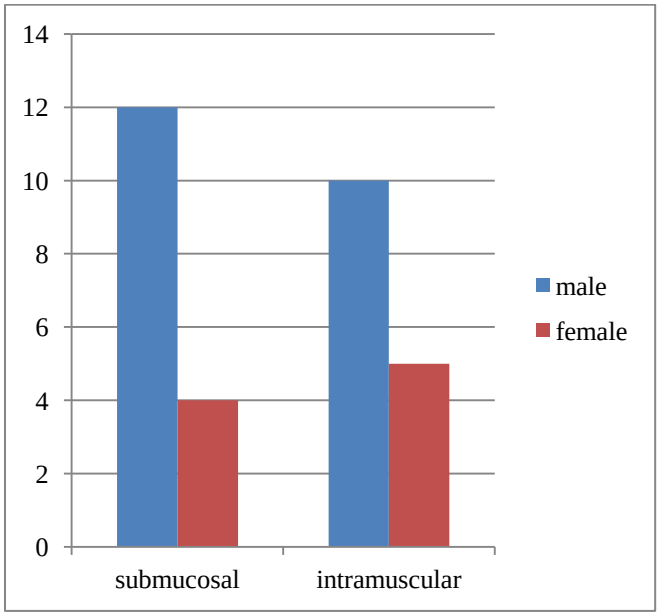
The findings of this study may have a significant clinical impact as submucosal dexamethasone injection is an effective therapeutic strategy for improving the quality of life of the patient. Overall, the present study have shown the advantage of submucosal dexamethasone as an effective alternative to intramuscular dexamethasone. Injection after surgery offers the advantage of concentrating the drug near the surgical area with less systemic absorption.

*A.***Figures and Tables**

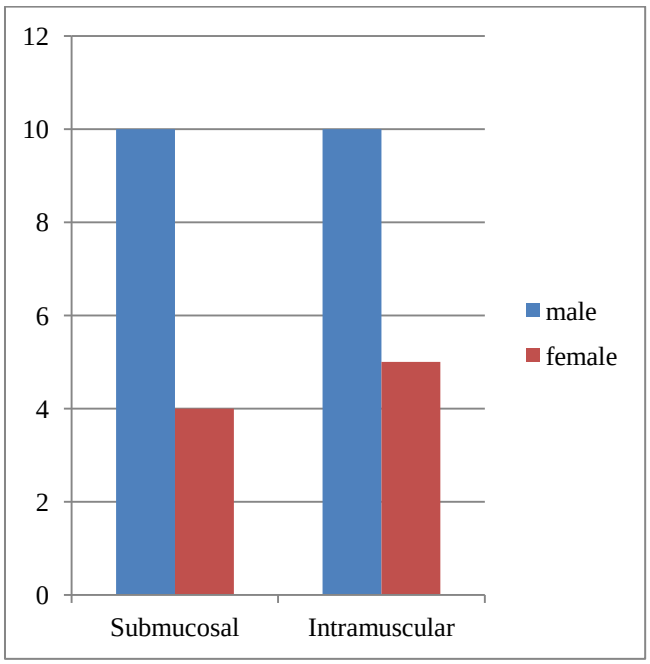
Type of	**Group A**	**Group B**

	Submucosal	intramuscular
mesioangular	16	15
horizontal	14	15
total	30	30

(Table 1- Impacted tooth)



(Graph 1 Group – A)



(Graph 2 Group – B)

Age group of males	Group A (submucosal)	Group B (intramuscular)
20-30 yrs	13(54.2%)	11(45.8%)
30-40 yrs	06(60%)	04(40%)
40-50yrs	03(37.5%)	05(62.5%)

(Table 2 – Age group- Males)

Age group of females	Group A (submucosal)	Group B (intramuscular)
20-30 yrs	4(44.4%)	5(55.6%)
30-40 yrs	2(40%)	3(60%)
40-50yrs	2(50%)	2(50%)

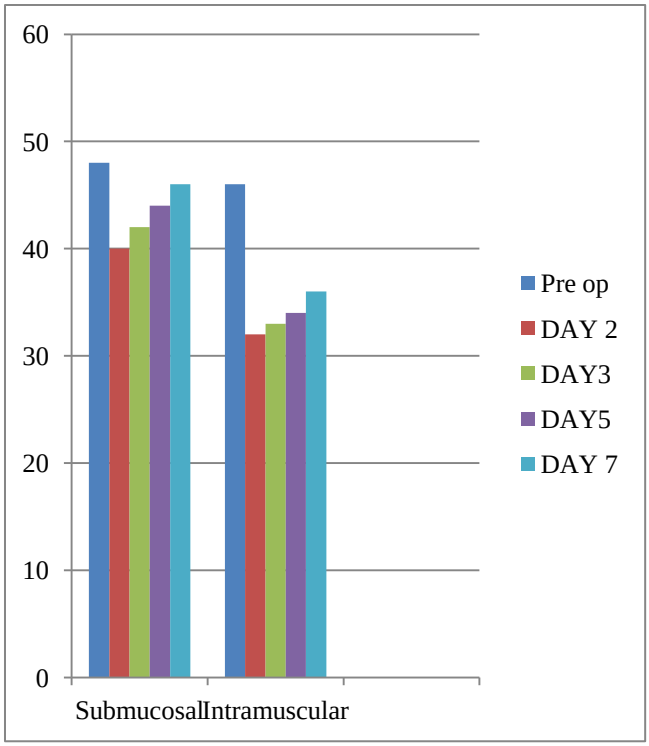
(Table 3 – Age group – Females)

SEX	AGE	PRE OP MOUTH OPENING IN mm	1ST DAY	3RD DAY	5TH DAY	7TH DAY
M	22	52	44	47	49	52
M	26	44	38	40	42	42
F	34	45	39	42	42	44
M	34	56	50	52	54	56
M	28	42	36	38	42	42
M	29	50	40	42	44	46
F	24	46	38	40	42	46
M	38	58	48	48	52	54
M	21	41	36	39	41	41
M	26	38	32	34	36	36
F	23	42	38	38	40	42
M	28	38	34	36	38	38
M	34	44	36	38	40	44
M	39	41	37	39	41	41

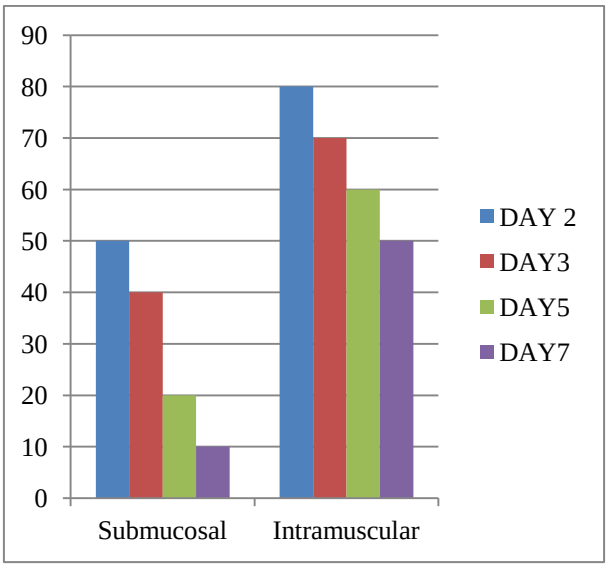
(Table 4 - Mouth opening - Group A)

SEX	AGE	PRE OP MOUTH OPENING IN mm	1ST DAY	3RD DAY	5TH DAY	7TH DAY
M	22	47	33	35	37	39
M	24	42	27	30	32	32
M	32	51	37	40	41	43
F	22	55	38	40	42	44
F	24	45	30	32	34	36
M	26	49	38	38	40	40
M	29	42	29	31	32	34
M	42	43	25	26	28	30
M	38	53	40	41	43	45
M	26	52	39	39	41	41
F	38	40	25	27	30	32
F	24	48	35	35	37	39
M	28	49	35	37	40	40
M	29	41	27	29	30	33

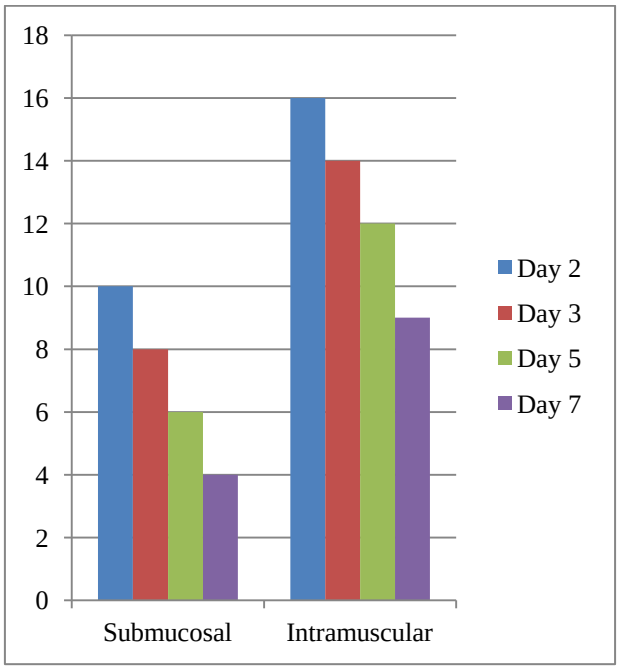
(Table 5 – Mouth Opening - Group B)



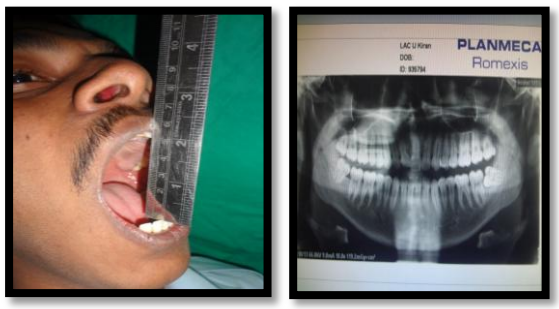
(Graph -3; Mouth opening)



(Graph -4; Pain score)



(Graph 5 – Post Op swelling)



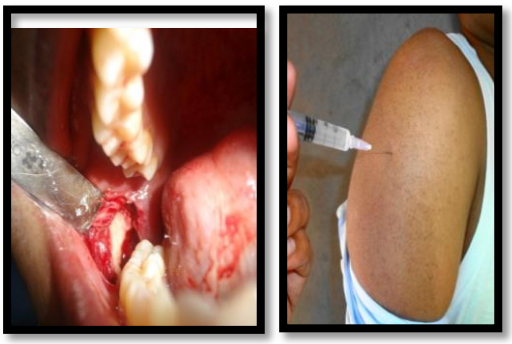
(Figure 1 – Pre Operative Group A)

(Figure2 –Intra Operative Group A)

(Figure 3 – Post Operative mouth opening - Group A)

(Figure 4 – Post Operative swelling- Group A)

(Figure 5 – Pre Op Group B)



(Figure 6 –Intra Operative - Group B)

(Figure 7 – Post Operative Mouth opening- Group B)

(Figure 8 – Post Operative Swelling - Group B)

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