



Comparison of twin mix and revamped twin mix in mandibular third molar surgery - A randomised controlled double blinded study

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ABSTRACT

Mandibular third molar surgery is one of the most common minor oral surgical procedures performed by oral and maxillofacial surgeons. It is vital to provide the most comfortable postoperative phase to the patient and for this reason dexamethasone, a corticosteroid, is popularly used in various routes. The intraspace injection of dexamethasone mixed with 2% lignocaine and 4% articaine named, Twin Mix and Modified Twin Mix respectively is gaining increasing popularity. 0.5% Centbucridine is a safe alternative to 2% lignocaine with more cardio stable properties. In this study we aimed to evaluate the comparability of Twin Mix (TM) and Revamped Twin Mix (RTM) (mixture of dexamethasone and centbucridine) with respect to its anesthetic properties and its effectiveness in managing postoperative sequelae following mandibular third molar surgery. For this, a randomised controlled double blinded study was conducted among patients reporting to the Out Patient Department of a dental college. The sample size of the population studied was 32, 16 in Group A (RTM) and 16 in Group B (TM). The primary outcomes measured were facial swelling and mouth opening on postoperative day (POD) 1, 3 and 7. The secondary outcomes were VAS score during the surgical procedure, duration and latency of anesthesia. The data were analysed descriptively and using Student's t Test. Representations were given in graphical and tabular forms. The mean postoperative mouth opening and facial swelling on POD 1, 3 and 7 were comparable and did not show any statistically significant difference. Similarly, the VAS score during procedure, latency and duration of anesthesia were comparable with no statistically significant difference. In conclusion, RTM can be used as an alternative to TM due to its comparable properties.



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INTRODUCTION

Mandibular third molars are the most commonly impacted ones and their surgical removal accounts for the major portion of minor oral surgery performed by oral and maxillofacial surgeons in their routine practice (Hashemipour *et al.*, 2013; Mitra *et al.*, N D; Msagati *et al.*, 2013; Santosh, 2015). The effective management of postoperative complication is a major determinant of patient satisfaction and the overall success of the procedure (Lopes *et al.*, 1995). For this reason, use of dexamethasone, a well documented corticosteroid, has become widely popular among oral and maxillofacial sur-

geons for the management of post operative complications pertaining to third molar surgery. Various routes have been tested and tried for administering dexamethasone in mandibular third molar surgery, namely, intravenous, submucosal, intramuscular, peroral and more recently intraspac

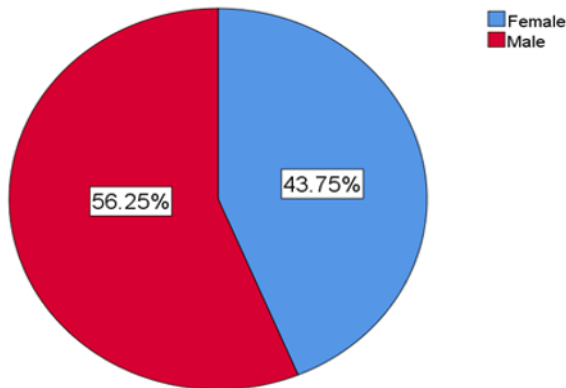


Figure 1: Pie chart representing gender distribution of study population with male (red) comprising 56.25% and female (blue) comprising 43.75%

(pterygomandibular space) (Bamgbose et al., 2005; Grossi et al., 2007; Neupert, 1991; Neupert et al., 1992; Schmelzeisen and Frlich, 1993; Troiano et al., 2018). Recent literature have accounted for the use of intraspac pterygomandibular injection of local anesthetic solution and dexamethasone for the management of postoperative sequelae. The local anesthetic solutions that have thus far been used in this combination are 2% lignocaine and 4% articaine (Beena et al., 2020; Bhargava et al., 2014). The combination of dexamethasone with 2% lignocaine and 4% articaine are popularised as Twin Mix and

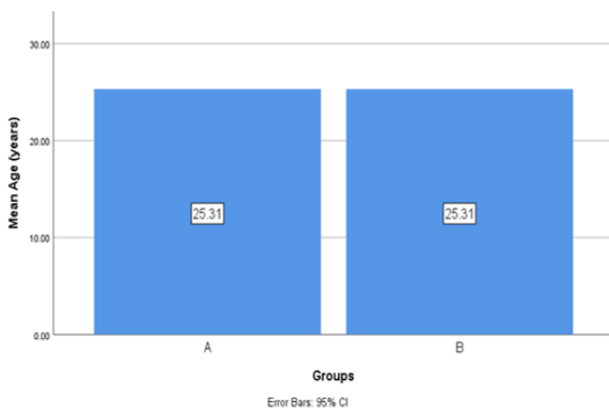


Figure 2: Simple bar representing age distribution of study population in years showing mean age in both groups to be 25.31yrs

Modified Twin Mix respectively. The intraspac injection of this mixture not only helps in increasing the postoperative comfort and quality of life but

also increases the latency, depth and duration of

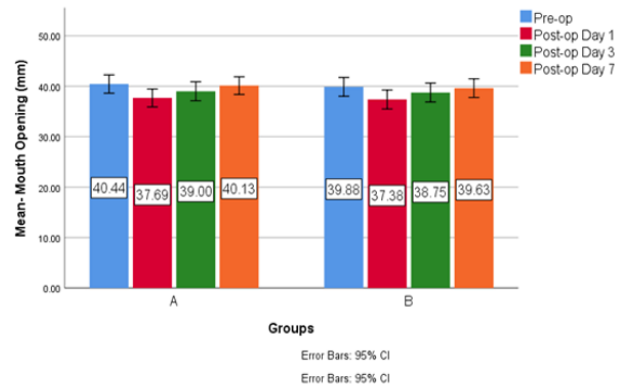


Figure 3: Clustered bar chart showing mean mouth opening of Group A and Group B during pre-op(blue), post-op day 1(red), day 3(green) and day 7(orange) at CI- 95%

anesthesia intra-operatively (Bhargava et al., 2015, 2016; Kharsan et al., 2020). Bhargava et al proposed the mechanism of action of these mixtures in 2018. They attributed it to the increase in pH from 4.5 to 6 when dexamethasone was mixed with local anesthetic(LA) solution. This change in pH is proposed to have a synergistic effect thereby increasing the latency and duration of anesthesia. It also reduces the sting-like pain usually felt during injection of LA.

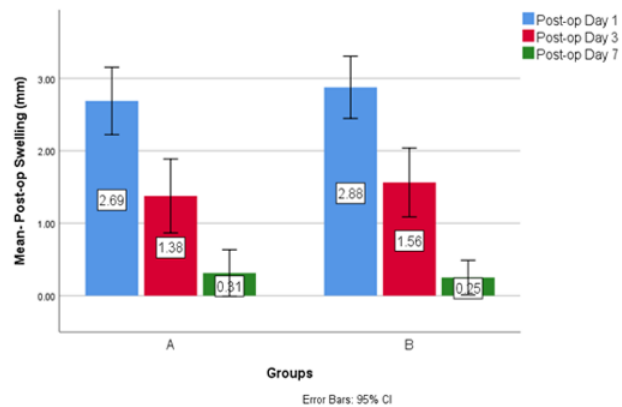


Figure 4: Clustered bar chart showing mean facial swelling of Group A and Group B during post-op day 1, day 3 and day 7 at CI- 95%

They put forth other theoretical propositions highlighting the vasoconstrictive property of dexamethasone which reduces the systemic loss of LA and concentrates the solution locally thereby increasing duration of anesthesia. According to the authors, the analgesic effect of the mixtures can be due to the increased activity of inhibitory potassium channel on nociceptive C fibres in the presence of dexamethasone (Bhargava et al., 2018).

Patnaik et al in 1982 introduced a quinolone derived local anesthetic solution chemically called 4-N-

butylamino 1,2,3,4-tetrahydroacridine hydrochloride and commercially popularised it as Centbucridine. The Uniqueness of Centbucridine is its inherent vasoconstrictive property (Patnaik *et al.*, 1982; Patnaik and Dhawan, 1982; Suri *et al.*, 1983).

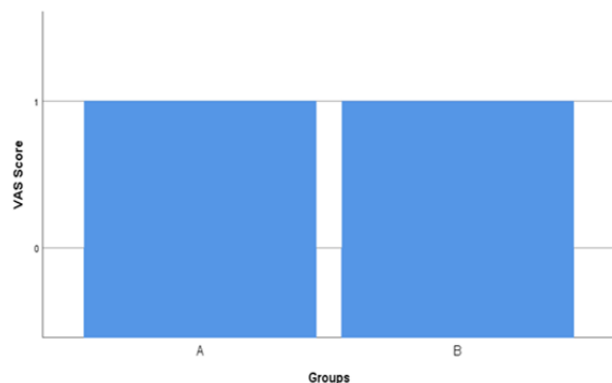


Figure 5: Simple bar showing VAS score of Group A and Group B

The Central Drug Research Institute of India accredited the local anesthetic solution and concluded the following advantages of 0.5% Centbucridine over 2% Lignocaine (Goyal *et al.*, 2013):

- Inherent vasoconstrictor property
- Improved cardiovascular stability
- Longer duration of action
- More potent
- Possesses antihistaminic property

These make Centbucridine a suitable alternative to Lignocaine and it will be interesting to assess the efficacy of intraspace injection of Centbucridine and dexamethasone in third molar surgery. For the purpose of this study, we formulated the mixture of centbucridine and dexamethasone as follows: 1.8ml of 0.5% Centbucridine + 1ml of 4mg dexamethasone, named Revamped Twin Mix.

In this study we aim to compare Twin Mix(TM) and Revamped Twin Mix(RTM) with respect to its effect on the anesthetic efficacy intraoperatively and its efficiency in managing postoperative sequelae.

MATERIALS AND METHODS

After getting approval from the Institutional Ethical Committee, a randomized controlled double blinded study was conducted in the Department of Oral and Maxillofacial Surgery, Saveetha Dental College and Hospital, Chennai, between October 2019 and January 2020.

The inclusion criteria required the participants to be ASA Class I subjects, 18yrs to 35yrs of age with impacted mandibular third molar. The difficulty index of the third molar to be included in the study was standardized to Class II, Position A or B according to Pell and Gregory Classification.

Patients presenting with acute infection or swelling at the time of surgery, medically compromised patients with systemic illness and those having previous history of allergy to local anesthetic solution were excluded from the study.

From our Out Patients, 32 patients requiring removal of mandibular third molar who fulfilled our criteria and willing to participate in the study were included in the study after obtaining a signed written informed consent. Block randomization of the samples was done where the block size was set as 16 and the study had two groups, Group A and Group B. The study was carried out with double blinding where the patient and the operating surgeon were unaware of the type of anesthetic solution that was being used. To avoid bias, surgical removal of the mandibular third molar for all the patients included in the study was done by a single operator.

Group A consisted of Twin Mix (1.8ml of 2% lignocaine with 1:2,00,000 adrenaline + 1ml of 4mg dexamethasone). Group B consisted of Revamped Twin Mix (1.8ml of 0.5% Centbucridine 1ml of 4mg dexamethasone)(Table 1).

Measured Outcomes

Primary Outcomes- Post operative mouth opening and swelling on first, third and seventh post-operative days (POD) in both groups; Secondary Outcomes- Latency and duration of anesthesia, discomfort during procedure measured by Visual Analogue Scale (VAS) score in both groups.

Facial swelling was measured as the distance between the tragus of the ear and corner of the mouth of the same side. Latency refers to the duration between the stimulus and the detection of symptoms. Here, latency was measured as the duration between administration of the mixture (denoted by full needle withdrawal) and the onset of subjective signs of anesthesia. Duration of action of anesthetic mixture was recorded as the time from initial patient perception of the anesthetic effect to the moment in which the effect began to fade, sting on injection using a 10-point Visual Analog Scale and the need to re-anesthetize the site was recorded.

Surgical Procedure

Twin Mix and Revamped Twin Mix were freshly prepared by a trained nurse just prior to their admin-

Table 1: Shows the composition of local anesthetic mixtures of Group A and B

		Groups
Group A	Twin Mix	1.8ml of 2% lignocaine with 1:2,00,000 adrenaline + 1ml of 4mg dexamethasone
Group B	Revamped Twin Mix	1.8ml of 0.5% Centbucridine + 1ml of 4mg dexamethasone

Table 2: Mean and stand deviation of Latency of Anesthesia of Group A and Group B

	Group	N	Mean	Std. Deviation	Std. Error Mean
Latency	A	16	58.0625	5.73258	1.43315
	B	16	63.4375	6.34527	1.58632

Table 3: Inter-group comparison to assess latency of anesthesia with Independent t test

	t	df	t-test for Equality of Means		Std. Error Difference	95% Confidence Interval of the Difference		Levene's Test for Equality of Variances	
			Sig.(2-tailed)	Mean Difference		Lower	Upper	F	Sig.
Latency Equal variances assumed	-2.514	30	.018	-5.37500	2.13783	-9.74103	1.00897	3.112	.088
Latency Equal variances not assumed	-2.514	29.696	.018	-5.37500	2.13783	-9.74290	1.00710		

Table 4: Mean and standard deviation of Latency of anesthesia of Group A and Group B

	Group	N	Mean	Std. Deviation	Std. Error Mean
Duration	A	16	317.5000	24.61978	6.15494
	B	16	365.2500	14.72639	3.68160

istration. After standard surgical draping of the patient, the freshly prepared mixture of either Twin Mix or Revamped Twin Mix was administered by the blinded surgeon to all the patients as per their allotted group. As an attempt of standardization, Unolok aspirating leur-lock syringe (HMD, India) fitted with a 26 gauge needle (Hindustan Syringes and Medical Devices Ltd, India) was used to dispense the anesthetic solution in all patients. The rate of administration was also standardized as 1ml/min and conventional inferior alveolar nerve block technique was used in both groups.

The surgical site was accessed with modified wards incision and a mucoperiosteal flap was raised. Bone guttering was done with 702 carbide straight fissure bur (SS White, Lakewood, NJ, USA) held on a

straight handpiece(Marathon Clinical). The apparatus was micro motor driven (Marathon M3 Champion). Throughout the procedure, copious irrigation was done using an external source by a trained assistant. Depending on the clinical scenarios, the third molar was removed after odontectomy or intoto following which the sockets were examined and hemostasis was achieved. Flap was reapproximated. A simple interrupted suturing technique and silk sutures were used to close the surgical site primarily. Duration of the surgical procedure was recorded in all cases using the digital stopwatch in a Smartphone. Standard post-operative instructions were given and all the patients were prescribed 500mg of amoxicillin (thrice daily), 400mg of metronidazole (thrice daily) and 500/100mg of zerodol p (twice

daily). Additionally, 40mg of pantoprazole was prescribed for patients with existing gastritis. The patients were reviewed by the operating surgeon on 1st, 3rd and 7th postoperative days.

The study parameters were recorded on 1st, 3rd and 7th postoperative days by the blinded operating surgeon.

Statistical Analysis

Data was tabulated and statistically assessed using IBM SPSS software version 20. Demographic data were analyzed using descriptive statistics measuring mean, frequency and percentage. The study parameters were analyzed using independent student's t test at $p < 0.05$ and confidence interval (CI) 95%. The output was procured in graphical and tabular representations.

RESULTS AND DISCUSSION

The demography of the study population is represented in Figures 1 and 2. The comparison between the mean postoperative mouth opening and facial swelling of Group A and B did not show any significant difference with $p > 0.05$ at CI 95% (Figures 3 and 4). The comparison of VAS score during the surgical procedure between Group A and B was statistically insignificant with $p > 0.05$ at CI 95% (Figure 5). The latency and duration of anesthesia of Group A and B did not show statistical significance ($p > 0.05$ at CI 95%) (Tables 2, 3 and 4)

In recent times, intraspace injection of dexamethasone and local anesthetic solutions have gained the attention of oral and maxillofacial surgeons due to their obvious advantages in improving the intraoperative patient comfort and postoperative quality of life (Bhargava et al., 2014). Beena et al in 2019 compared the latency and efficacy of twin mix (TM) (1.8 ml of 2% lignocaine with 1:200,000 epinephrine + 1 ml/4 mg dexamethasone) and modified twin mix (MTM) (1.7 ml of 4% articaine with 1:100,000 epinephrine + 1 ml/4 mg dexamethasone) with 2% lignocaine and 4% articaine containing vasoconstrictor adrenaline. They concluded that TM and MTM were superior over conventional local anesthetic solutions in reducing postoperative complication and maintained the anesthetic effect for longer duration. Also, MTM was more potent in reducing the postoperative complications while TM had faster latency period (Beena et al., 2020).

Centbucridine possessing innate vasoconstrictive ability and being on par with the gold standard lignocaine is a safe alternative (Dugal et al., 2009). We wanted to study the comparability of dexamethasone and centbucridine mixture (christened

Revamped Twin Mix) with that of Twin Mix. We hypothesised the efficacy of the mixture to be comparable to that of Twin Mix in terms of anesthetic property and the management postoperative sequelae. The results of our study showed the same. Though, the latency and duration of anesthesia of RTM was more than that of TM, the difference did not show any statistical significance ($p > 0.05$ at CI 95%). Similarly, the mean VAS score for pain/ discomfort during the procedure was similar in both groups and did not hold any statistically significant difference. The mean mouth opening of RTM on POD 1, 3 and 7 was 37.69mm, 39 mm and 40.13mm respectively while for TM it was 37.338mm, 38.75mm and 36.63mm respectively which do not show any statistical difference. Similarly, the mean facial swelling (measured from tragus of ear to corner of mouth) on RTM on POD 1, 3 and 7 was 2.69mm, 1.38mm and 0.31mm respectively while for TM it was 2.88mm, 1.56mm and 0.25mm respectively which did not show any statistical difference. Thus, the assessment of primary outcomes, viz., postoperative swelling and mouth opening also revealed the comparability of TM and RTM.

Our study is limited in the fact that the sample size was small as this was a preliminary attempt and further research is needed in the same to broaden the scope and knowledge of RTM.

CONCLUSIONS

We conclude that the efficacy of Revamped Twin Mix is comparable to Twin Mix with respect to its anesthetic properties and in its ability to enhance the postoperative quality of life by reducing facial swelling and improving mouth opening. Hence, RTM can be used as a safe alternative to TM. We also acknowledge the need for further research in the same.

Conflict of Interest

The authors declare that they have no conflict of interest for this study.

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The authors declare that they have no funding support for this study.

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