

# Comparative Study Between Oral Lorazepam and Diazepam as Sedation in Oral and Maxillofacial Surgery

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## Abstract

**Purpose** The aim of the study was to compare the efficacy of oral lorazepam as night sedation and premedication with diazepam.

**Methods** A prospective, randomized, and double-blind study was done in 50 healthy patients in each drug group. The impacted third molar impaction was taken as the study model. Study was carried out after giving bioequivalent doses of respective drugs for either side. All the patients were assessed for quality of sleep, sedation, recall of visual stimuli, cooperation shown by patient and recovery postoperatively.

**Results** The study concluded that lorazepam showed more advantages than diazepam as well as patient's preference and satisfaction. However, postoperative recovery with lorazepam was longer than diazepam.

**Keywords** Lorazepam · Diazepam · Sedation · Premedication

## Introduction

Dentistry and anxiety are always closely associated with each other. Oral surgical procedures specifically have long been associated with pain and thus provoke fear leading to

lowering the demand for subsequent oral and maxillofacial surgery procedures [1, 2]. Intravenous sedation has been a well-established and a suitable method for the relief of anxiety associated with oral surgical procedures. But the use of intravenous drugs has its own array of complications. Patients with a moderate or high anxiety grade may benefit from the use of oral sedation or conscious sedation. Oral sedation has been well documented and is a suitable method for the relief of anxiety associated with minor oral surgical procedures performed under LA. Benzodiazepine (BZD) group is the most commonly prescribed drugs for management of anxiety. Two common drugs diazepam and lorazepam are well-known derivatives of BZD group that are widely used in oral surgery for sedation because they effectively reduce anxiety without producing significant cardio respiratory instability [3–5]. Diazepam produces sedation which lasts for 30–45 min as compared to lorazepam in which sedative effect last for 10–12 h because of high protein binding of lorazepam [6–8]. This study was done to evaluate the efficacy of oral lorazepam as compared to diazepam as night sedation and premedication prior to third molar extraction, which acted as a model surgery for establishing the use of these drugs for other oral surgical procedures which required more extensive intervention and thus longer duration of action with minimal complications.

## Patients and Method

Fifty healthy patients between 17 and 25 years of age with bilaterally impacted mandibular third molar were included in this double-blind, crossover, prospective, and randomized study. All patients having bilateral symmetrically impacted third molar in relation to angulation and depth on

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OPG were included in this study to keep the surgical experience similar [9]. Systemic conditions possibly altering the outcome, local hinderance like infection, and recent use of BZD and antidepressants were the exclusion criteria. The study was approved by the ethical committee.

All the patients were explained about the surgical procedure and informed consent was taken. Prophylactic antibiotics were given to each patient 1 h prior to the procedure as wound infection prophylaxis.

In each patient, impacted teeth were removed surgically in two different appointments separated by 4 weeks. One hour prior to the surgery, either lorazepam 2.5 mg marked as packet A or diazepam 10 mg as packet B was given on double-blind basis. The patients were consequently grouped under these two groups only. Both drugs were given at night before surgery as night sedation and again at 9:00 am on the morning 1 h before surgery as premedication.

Both the patients and operating surgeon were unaware of the contents. All the recordings were done by the operating surgeon unaware for which side which drug was administered. The follow-up was done, and following parameters were recorded.

Pittsburg Sleep Quality Index [10] was used to assess about the quality of sleep a night before the day of surgery prior the administration of morning dose of the drug. The lower the value on this index the better is the quality of sleep. Sedation was assessed by Ramsay Sedation Score [1, 11, 12]. This was done 30–40 min after premedication on the day of surgery. Recall of visual stimuli or assessment of amnesia was done by showing certain photographs after 30 min of premedication [13], and at the end of operation, inability to recall the objects or photographs was assessed as amnesia.

After completing the surgery, all the patients were shifted to recovery room where the operator assessed the cooperation score [1, 14] and lesser the value on cooperation scale the more cooperative the patient had been. Similarly the recovery of the patient was assessed on the basis of modified steward recovery score [1, 15]. The lesser the value on this scale more is the time required by the patient in the recovery room.

Contralateral side surgical extraction was done after an interval of 4 weeks after the first surgery and similar recordings were made by the operating surgeon. Consequently, both the sides were statistically analyzed individually with each other.

## Results

All the patients enrolled in the study tolerated both medications well. None of the patients reported any kind of complication with either of the drugs. No signs of hypotension and bradycardia were detected for either of the drugs. The overall mean age of the patients included in the study was 23 years with females being slightly predominant than males.

There was statistically significant difference in the quality of sleep between two groups. Thirty-three patients (66%) had better sleep in group A (lorazepam), while in group B (diazepam) 16 patients (32%) had better sleep than normal sleep (Tables 1, 2).

Recalling of shown photographs (Table 3) thus assessing the visual stimuli after the procedure was a statistically significant difference between the two groups. Twenty-three patients could not recall the shown photographs in group A, while 47 out of 50 patients in group B could easily recall the photographs shown to them before the surgery.

Recovery was assessed after the surgery in the recovery room by Modified Steward Recovery score. The results showed that there was statistically significant difference between two groups.

The difference in Ramsay Sedation score and cooperation scale score was not statistically significant between the two groups (Table 4).

## Discussion

The use of local anesthesia makes most of the minor oral surgical procedures absolutely painless. However, surgical intervention frequently leads to anxiety manifestations with

**Table 1** Group statistics

Groups	N	Mean	SD	SE mean
Quality of sleep				
Lorazepam	50	3.0667	.70373	.18170
Diazepam	50	4.8667	.74322	.19190
Sedation				
Lorazepam	50	3.7667	.31997	.08262
Diazepam	50	3.6333	.31997	.08262
Recovery scale				
Lorazepam	50	3.6667	.39940	.10313
Diazepam	50	4.6000	.50709	.13093
Cooperation score				
Lorazepam	50	.6667	.61721	.15936
Diazepam	50	1.0667	.59362	.15327

**Table 2** Independent samples test

	Levene's test for equality of variances		t test for equality of means				
	F	Sig.	T	Df	Sig. (two tailed)	Mean difference	SE difference
Quality of sleep							
Equal variances assumed	.226	.638	– 6.811	28	.000	– 1.80000	.26427
Equal variances not assumed			– 6.811	27.917	.000	– 1.80000	.26427
Sedation							
Equal variances assumed	1.007	.324	1.009	28	.322	.13333	.13214
Equal variances not assumed			1.009	26.728	.322	.13333	.13214
Recovery scale							
Equal variances assumed	2.544	.122	– 4.090	28	.000	– .93333	.22817
Equal variances not assumed			– 4.090	25.076	.000	– .93333	.22817
Cooperation score							
Equal variances assumed	1.375	.251	– 1.809	28	.081	– .40000	.22111
Equal variances not assumed			– 1.809	27.958	.081	– .40000	.22111

**Table 3** Visual stimuli \* groups crosstabulation

	Groups		Total
	Lorazepam	Diazepam	
Visual stimuli			
Absent			
Count	23	3	26
% Within groups	46%	6%	26%
Present			
Count	27	47	74
% Within groups	54%	94%	74%
Total			
Count	50	50	100
% Within groups	100.0%	100.0%	100.0%

different clinical implications. Generalized anxiety disorder may lead to muscle pain, fatigues, headaches, nausea, breathlessness, and insomnia. Results associated with any study of stress are complicated although there are currently many objective methods used in the assessment of anxiety. Certain authors have observed elevated levels of cortisol following exodontias procedures. Other than the symptoms mentioned above, elevated anxiety levels may lead to psychogenic reactions or hyperventilation syndrome or may worsen systemic conditions like diabetes mellitus or certain cardiomyopathies. Fear and anxiety are the two inevitable component of oral surgical procedure.<sup>1</sup> The majority of people admit that they are fearful to go for

<sup>1</sup> Sedation is the depression of the patients awareness to the external environment and also reduces the responsiveness to any such stimulation

dental treatment. Surgical treatment of third molar is one of the most common procedures in oral surgery. However, LA provides good anesthesia, or analgesia still patient feels certain kind of discomfort and pain while tooth elevation and initial administration of LA [1, 2].

The majority of these fearful patients can be treated with oral sedation as they are easily taken by mouth. In this study, common oral sedation drug diazepam was compared with other sedation agent lorazepam which is commonly used for other surgical procedures but rarely is used for oral and maxillofacial surgical procedures used as night sedation and premedication before surgical extraction of third molar. Both drugs are under the BZD family. These drugs are used for the treatment of anxiety and for sedation. Both drugs used in our study showed no side effects. In group A 46% of the patients could not recall the shown photographs after the procedure. On the other hand, 94% of the patients in group B could easily recall the photographs, thus no anterograde amnesic effects of diazepam were observed. In our study with both drugs, sufficient sedation was achieved. In group A, lorazepam provided better night sedation and preoperative sedation than diazepam (group B). But results were statistically insignificant [16, 17].

As the absence of amnesia in diazepam group was evident, consequently the recovery in the diazepam group(-group B) was faster than lorazepam (group A), and so stay in the hospital was longer for out patients in group A.

Quality of sleep was the other parameter which was assessed between two groups. 66% of the patients in group A had better sleep than normal. On the other hand, 32% of the patients in group B had better sleep than normal. The quality of night sleep was better in lorazepam group as compared to the diazepam group.

**Table 4** Chi-square tests

	Value	Df	Asymp. Sig. (two sided)	Exact Sig. (two sided)	Exact Sig. (one sided)
Pearson Chi-square	6.136 <sup>a</sup>	1	.013		
Continuity correction <sup>b</sup>	4.261	1	.039		
Likelihood ratio	6.719	1	.010		
Fisher's exact test				.035	.018
No. of valid cases	30				

<sup>a</sup>Two cells (50.0%) have expected count < 5. The minimum expected count is 4.00

<sup>b</sup>Computed only for a 2 × 2 table

Despite the similar level of sedation in both the groups, the patients in lorazepam group (group A) showed more cooperation than patients on diazepam (group B), but results were statistically insignificant. In our study, we also found that patients preference and satisfaction were more for lorazepam than diazepam.

When compared with diazepam, lorazepam may be advantageous because of its longer duration of action without the risk of loss of anxiolytic effect [7, 18] during surgery as well as patients preference for lorazepam over diazepam. The only drawback for lorazepam as sedation was longer stay in the hospital. Thus lorazepam can be used as ideal oral sedation agent for procedure which may require more extensive intervention and longer duration, and also in patients who can be under a potential risk under general anesthesia.

#### Compliance with Ethical Standards

**Conflict of interest** The authors declares that they have no conflict of interests.

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