

# Oral and intramuscular sedation in children with Autism Spectrum Disorder: a comparative analysis



**B. MAIA<sup>1</sup>, P. LIMA<sup>1</sup>, Y. BUSQUET<sup>1</sup>, A. BAUSEN<sup>1</sup>, G. SILVA-JÚNIOR<sup>2</sup>, B. LAVINAS<sup>1</sup>**

<sup>1</sup>Dentistry University, Fluminense Federal University, Nova Friburgo, Rio de Janeiro, Brasil

<sup>2</sup>Dentistry University, Rio de Janeiro State University, Rio de Janeiro, Brasil

## INTRODUCTION

Conscious sedation is a method of controlling fear and anxiety that provides safe and effective care. Patients with Autism Spectrum Disorder (ASD) have a high rate of oral diseases and often, for various reasons, such as sensory and cognitive dysfunctions, do not cooperate with dental care. Sedation is therefore indicated for these patients, but there are few studies in the literature that determine oral and/or intramuscular sedation protocols.

## AIM

To analyze and compare oral and intramuscular conscious sedation protocols in children with Autism Spectrum Disorder undergoing dental treatment.

## METHODS

The sample consisted of children with ASD who did not cooperate with dental care, of both sexes, from May 2023 to January 2024, at the Service for People with Disabilities (PwD) at the Nova Friburgo Health Institute, Fluminense Federal University, RJ, Brazil. The patients underwent an oral sedation protocol with 0.75mg/kg of Midazolam, not exceeding 20mg, and 25mg of Promethazine. Patients with a higher body mass index (BMI), more challenging behavior and/or more complex procedures underwent intramuscular sedation with 0.7mg/kg Ketamine, 0.5mg/kg Dexmedetomidine, 0.3mg/kg Midazolam and 0.3mg/kg Promethazine. Demographic data, procedures carried out, complications, use of central nervous system (CNS) depressors, procedure time, professional evaluation of the patient's response to the sedation and vital signs, blood pressure, heart rate and oxygen saturation were collected before, during and after the procedures. It is worth noting that in all cases, the medical opinion was obtained, there was an association with inhaled sedation with nitrous oxide and oxygen, use of mouth openers and protective stabilization. The variables studied were statistically described using proportions and means, standard deviations, minimum-maximum values and medians. All the statistical tests used in this study were carried out using the SPSS 22.0 statistical program. Analysis of variance (ANOVA) was used for numerical variables. Fisher's exact test was used for categorical variables. A p-value of <0.05 was considered statistically significant. The study was approved by the Research Ethics Committee of the Nova Friburgo Health Institute, UFF, under CAAE number: 62415822.2.0000.8160.

## RESULTS

The sample consisted of 36 sedations in 29 patients with ASD, of which 17 (47%) were oral sedations (GSO) and 19 (53%) were intramuscular sedations (GSIM). Males prevailed in the sample in more than 75% of cases. Ages ranged from 3 to 11 years, with an average of 7 years in GSO and 6 years in GSIM. The use of CNS depressants was found in 50% of the sample and surgical procedures were performed in 53% of the cases. We observed 6 (17%) cases of complications, 3 (50%) in each group, all of which had emesis. The average sedation time was 50 minutes, with the GSIM having a higher average of around 20 minutes compared to the GSO. In the GSO, 6% of professionals rated the patient's response as excellent, while in the GSIM 63% rated it as excellent, a significant difference (Chart 1). As for the vital signs, in general, in both groups, there was little variability in the average values, where the initial X final systolic blood pressure and the initial X final heart rate were lower in the GSIM. The GSO, on the other hand, had lower initial diastolic blood pressure (Chart 2).

## CONCLUSIONS

There was no statistically significant difference between the sedation protocols proposed for dental care for people with ASD, and both proved to be safe and efficient for the patient and the dental surgeon. The main difference concerns the professional's evaluation of the sedation: the intramuscular protocol was better than the oral protocol, which shows that the professional can consider which option would be most suitable for resolving the case. We emphasize that it is essential to be able to use this technique, knowing its risks and benefits, as well as the importance of monitoring these patients.

TABLE 1:

CATEGORIES Variables	Oral sedation N = 17 (%)	Intramuscular sedation N = 19 (%)	Total N = 36 (100%)	P* value
GENDER# Female Male	2 (17) 10 (83)	4 (23) 13 (77)	6 (21) 23 (79)	0,828
AGE (years)** Min-Max Average (standard deviation) Median	3-11 7 (2) 7	3-9 6 (2) 5	3-11 6 (2) 6	0,143
USE OF CNS## DEPRESSORS Yes No	6 (50) 6 (50)	9 (53) 8 (47)	15 (52) 14 (58)	0,725
PROCEDURES Surgery Restoration Prophylaxis/Scraping	9 (53) 6 (35) 2 (12)	10 (53) 8 (42) 1 (5)	19 (53) 14 (39) 3 (8)	0,997
COMPLICATIONS No Yes	14 (82) 3 (18)	16 (84) 3 (16)	30 (83) 6 (17)	>0,999
PROFESSIONAL EVALUATION Excellent Good Bad	1 (6) 16 (94)	12 (63) 7 (37)	13 (36) 23 (64)	<0,005

\*Fisher's Exact Test; \*\*ANOVA Test; #Oral Group = 12 patients e Intramuscular Group = 17 patients; ##Central Nervous System

Table 1. Distribution of the sample into groups according to demographic and clinical data and professional evaluation.

Table 2. Distribution of the sample, in groups, according to the vital signs measured using initial and final numerical variables.

TABLE 2:

CATEGORIAS Variáveis	Oral sedation N = 17 (%)	Intramuscular sedation N = 19 (%)	Total N = 36 (100%)	P* value
Initial Systolic Blood Pressure Min-Max Average (standard deviation) Median	95-140 117 (13) 120	89-140 114 (16) 111	89-140 115 (14) 118	0,544
Final Systolic Blood Pressure Min-Max Average (standard deviation) Median	94-150 118 (16) 120	83-130 110 (15) 112	83-150 113 (15) 112	0,130
Initial Diastolic Blood Pressure Min-Max Average (standard deviation) Median	59-90 80 (10) 80	43-90 69 (12) 70	43-90 73 (12) 76	0,005
Final Diastolic Blood Pressure Min-Max Average (standard deviation) Median	47-110 81 (18) 80	47-100 73 (15) 76	47-110 76 (16) 79	0,155
Initial Heart Rate Min-Max Average (standard deviation) Median	72-145 100 (20) 100	70-184 108 (25) 100	70-184 104 (22) 100	0,300
Final Heart Rate Min-Max Average (standard deviation) Median	71-140 104 (20) 110	65-142 102 (17) 104	65-142 103 (18) 104	0,747
Initial Oxygen Saturation Min-Max Average (standard deviation) Median	94-100 98 (2) 98	96-100 99 (1) 99	94-100 98 (1) 99	0,062
Initial Oxygen Saturation Min-Max Average (standard deviation) Median	90-100 97 (2) 98	94-100 98 (2) 99	90-100 97 (2) 98	0,143

\*ANOVA Test

## REFERENCES

- Hanamoto H, Boku A, Sugimura M, Oyamaguchi A, Inoue M, Niwa H. Premedication with midazolam in intellectually disabled dental patients: intramuscular or oral administration? A retrospective study. *Med Oral Patol Oral Cir Bucal*. 2016 Jul 1;21(4):e470-6. doi: 10.4317/medoral.21086. PMID: 27031068; PMCID: PMC4920461.
- Ansari G, Toomarian L, Masoum T, Shayeghi S, Eftekhari L. Evaluation of the sedative effect of intranasal versus intramuscular ketamine in 2-6-year-old uncooperative dental patients. *Dent Med Probl*. 2024 Jan-Feb;61(1):35-41. doi: 10.17219/dmp/144364. PMID: 38375967.
- Alyahyawi A, Barry M, Helal NM. Dental Conscious Sedation for the Treatment of Children With Autism Spectrum Disorder: A Narrative Review. *Cureus*. 2024 Jul 18;16(7):e64834. doi: 10.7759/cureus.64834. PMID: 39156420; PMCID: PMC11330301.
- L.C. Lima, D.O. Cumino, A.M. Vieira et al., Recommendations from the Brazilian Society of Anesthesiology (SBA) for difficult airway management in pediatric care, *Brazilian Journal of Anesthesiology* (2023), <https://doi.org/10.1016/j.bjane.2023.12.002>
- Lucas R et al. A new approach for procedural sedation: the intramuscular dextroketafamine and Dexmedetomidine Association. *J Anesth Clin Care* 2019, 6: 038.
- Picciani BLS, dos Santos BM, Silva-Júnior GO, Marinho MA, Papa EG, Faria MDB, Bastos LF, de Gouvêa CVD. Contribution of benzodiazepines in dental care of patients with special needs. *J Clin Exp Dent*. 2019;11(12):e1170-4.

## ACKNOWLEDGEMENTS

Fluminense Federal University - Nova Friburgo Health Institute

## CONTACTS

[brenomaia@id.uff.br](mailto:brenomaia@id.uff.br)

[brunapicciani@id.uff.br](mailto:brunapicciani@id.uff.br)