Alleviation of Children's Anxiety using Buzzy® During Injection of Dental Anesthesia

Aryan N, Zhai G, Jackson JG, Cheon K

Department of Pediatric Dentistry, School of Dentistry, University of Alabama at Birmingham, AL

ABSTRACT

- This study examines how the Buzzy® device helps ease anxiety in young dental patients during local anesthesia.
- Sixty participants, aged 3 to 13, were randomly assigned to either receive the Buzzy® treatment or serve as controls.
- Throughout the dental procedures, their heart rate, oxygen levels, and behavior were monitored.
- Results showed significant anxiety reduction in the Buzzy® group compared to controls, particularly during anesthesia administration.
- These findings highlight the potential of non-drug solutions like Buzzy® in managing anxiety during pediatric dental care.

INTRODUCTION

- Dental procedures often trigger heightened apprehension despite the use of local anesthetics.
- Non-pharmacological solutions like Buzzy® (Figure1) have been developed to address these concerns, employing methods such as cold and vibrations to elevate pain thresholds and reduce sensitivity.
- This study aims to explore variations in anxiety levels based on patients' gender, age, and the method of dental anesthetic administration, with and without the use of the Buzzy® device.

Figure 1: Buzzy® Device

MATERIALS AND METHODS

•Sixty participants, aged 3 to 13, who were scheduled for dental procedures at the University of Alabama in Birmingham and Children of Alabama Hospital, were randomly split into two groups:

- Buzzy® application group (30 participants)
- Control group (30 participants without Buzzy®)
- Assignment to groups was based on odd or even days.
- The Buzzy® device was applied to the subject's cheek or angle of Mandible near the injection site, after desensitization, during the administration of local anesthesia. (Figure 2)
- Heart rate and oxygen saturation were monitored using a pulse oximeter on the subject's index finger before, during, and after treatment. (Figure 3)
- Behavior was assessed using the Frankl Scale, and statistical analysis included the student's t-test for continuous variables and the exact Cochran-Mantel-Haenszel test for categorical variables.

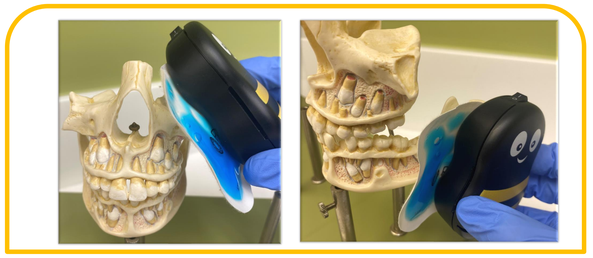

Figure 2: Buzzy® Device placement

Figure 3: Pulse Oximeter

RESULTS

- Noticeable variations in heart rate and behavior, as measured by the Frankl Scale, were noted between the Buzzy® application group and the control group from before treatment to during treatment (P<.0001).
- There was a significant difference in oxygen saturation observed after treatment with Buzzy® (P =.04).
- Subjects who received inferior alveolar nerve block anesthesia with Buzzy® showed significantly reduced anxiety levels (P<.0001).
- No significant differences were found in anxiety levels among different gender and age subgroups.

Table 1: Change in Baseline Frankl Score During and After Local Anesthetic Injection

Ftype D*				
	W*	N*	I*	Total
0	15	15	0	30
1	2	26	2	30
Exact Cochran-Mantel-Haenszel Test :				*p=0.0002*

Ftype A*				
	W*	N*	I*	Total
0	10	19	1	30
1	0	17	13	30
Exact Cochran-Mantel-Haenszel Test :				*p<0.0001*

Ftype D* = Change in Frankl score from Baseline to During the Anesthetic Injection
Ftype A*= Change in Frankl score from Baseline to After the Anesthetic Injection
0= Control , 1= Buzzy®
W*= Worse , N*=No change , I*= Better

Table 2: Change in Baseline SPO2 After Local Anesthetic Injection

SPO2 A*			
	N	Mean	Std Dev
0	30	-0.606	0.982
1	30	-0.131	0.74
t-test : *p* value =0.04			

SPO2 A* : Change in Oxygen Saturation from Baseline to After-Local Anesthetic Injection

RESULTS

Table 3: Change in Baseline Heart rate During and After Local Anesthetic Injection

BPM D*			
	N	Mean	Std Dev
0	30	13.139	6.211
1	30	1.762	1.962
t-test : *p* value <0.0001			

BPM A*			
	N	Mean	Std Dev
0	30	8.203	6.546
1	30	-0.0627	1.744
t-test : *p* value <0.0001			

BPM D* : Change in Baseline Heart rate During Local Anesthetic Injection
BPM A* : Change in Baseline Heart rate After Local Anesthetic Injection

Table 4: Change in Baseline Frankl Score During and After Inferior Alveolar Block Injection

Ftype D1**				
	W	N	I	Total
0	12	5	0	30
1	1	17	2	30
Exact Cochran-Mantel-Haenszel Test :				*p* <0.0001

Ftype A1**				
	W	N	I	Total
0	9	8	0	30
1	0	12	8	30
Exact Cochran-Mantel-Haenszel Test :				p<0.0001

Ftype D1=** Change in Frankl Score from Baseline to During the Inferior Alveolar Block Injection
FtypeA1=** Change in Frankl Score from Baseline to After the Inferior Alveolar Block Injection

Table 5: Change in Baseline Heart rate During and After Inferior Alveolar Block Injection

BPM D1**			
	N	Mean	Std Dev
0	17	12.859	6.494
1	20	1.507	1.901
: *p* value <0.0001			

BPM A1**			
	N	Mean	Std Dev
0	17	8.1563	7.551
1	20	-0.331	1.383
: *p* value <0.0001			

BPMD1=** Change in Heart rate from Baseline to During the Inferior Alveolar Block Injection
BPMA1=** Change in Heart rate from Baseline to After the Inferior Alveolar Block Injection

CONCLUSIONS

- The study shows that Buzzy® device helps reduce anxiety in kids during dental treatments, especially when getting local anesthesia.
- It suggests that Buzzy® can make dental procedures better for kids and is useful for managing anxiety in pediatric dentistry.

REFERENCES

1)Buzzy® ®. (2019). About Buzzy® ®. Retrieved from https://Buzzy® ®helps.com/pages/Buzzy® ®
2) Canbulat, N., Ayhan, F., & Inal, S. (2015). Effectiveness of external cold and vibration for procedural pain relief during peripheral intravenous cannulation in pediatric patients. Pain Management Nursing, 16(1), 33–39.
3) Şahin, M., & Eşer, İ. (2018). Effect of the Buzzy® application on pain and injection satisfaction in adult patients receiving intramuscular injections. Pain Management Nursing, 19(6), 645–651
4) Cho YH, Chiang YC, Chu TL, Chang CW, Chang CC, Tsai HM. The Effectiveness of the Buzzy® Device for Pain Relief in Children During Intravenous Injection: Quasirandomized Study.
5) Susam V, Friedel M, Basile P, Ferri P, Bonetti L. Efficacy of the Buzzy® System for pain relief during venipuncture in children: a randomized controlled trial. Acta Biomed. 2018 Jul 18;89(6-S)
6) Ballard, A., Khadra, C., Adler, S., Doyon-Trottier, E., & Le May, S. (2018). Efficacy of the Buzzy® device for pain management of children during needle-related procedures: A systematic review protocol.
7) Bilsin, E., Güngörmüş, Z., & Güngörmüş, M. (2019). The efficacy of external cooling and vibration on decreasing the pain of local anesthesia injections during dental treatment in children: A randomized controlled study. Journal of PeriAnesthesia Nursing. https://doi.org/10.1016/j.jopan.2019.06.007
8) Hedén L, von Essen L, Ljungman G. Children's self-reports of fear and pain levels during needle procedures. Nurs Open. 2019 Oct 15;7(1):376-382. doi: 10.1002/nop2.399. PMID: 31871722; PMCID: PMC6917931.
9) Subramaniam, P., & Ghai, S. K. (2021). Efficacy of an innovative device in reducing anxietyduring local anesthesia administration in children: A clinical study. International Journal of Clinical Pediatric Dentistry, 14(3), 353–356.
10) Moadad, N., Kozman, K., Shahine, R., Ohanian, S., & Badr, L. K. (2016). Distraction using the BUZZY® for children during an IV insertion. Journal of Pediatric Nursing, 31(1), 64– 72.