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BUZZING PAINLESS DENTISTRY WITH A BEE

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Abstract: Needle phobia is one of the most common fear inducing, painful and uncomfortable procedure in pediatric dentistry. Managing procedural distress can provide both short- and long-term benefits by increasing compliance and reducing avoidance behavior in dental care. Therefore, an expanded focus on fear-reducing interventions is advised for needle operations in addition to pain management. The purpose of the current study is to examine and assess the efficiency of intraoral vibrations, extraoral vibrations and cooling on alleviating pain perception during administration of inferior alveolar nerve block

Keywords: local anaesthesia ; pain ; extraoral vibration ; cooling

Introduction

Fear of needles, especially in young patients, causes noncompliance and treatment avoidance. Despite constant technological advancement fear has not decreased among the world's population but has actually increased. Over the past four decades, clinicians and researchers have exhibited a rising interest in this subject and have worked to better grasp its numerous dimensions. As a result of the close relation between the issue of dental phobia and the dentist, it is more crucial than ever that a dentist has the ability to recognize it and comprehend the best ways to handle it especially when dealing with pediatric population. Increased compliance and decreased avoidance can result from managing procedural distress, which has both immediate and long-term advantages in medical care [1].Pain management during dental procedures therefore becomes of utmost importance in pediatric dental practice[2]. Among injections administered in routine dental care in children, palatal injections and Inferior alveolar nerve block are deemed to be the most painful injections as opposed to infiltrations [3,4]

Studies on the use of vibration to lessen discomfort during medical procedures such as phlebotomy, vaccinations, and other needle-related procedures in children have been conducted. Multiple methods such as application of topical anesthesia[5] modifying rate of the infiltration by lowering speed of injection[6], distraction techniques[7] vibrating the tissue while administration of local anesthetic[8] and applying pressure to the site of injection and precooling [9] buffered vs unbuffered [10] breathing exercise using a bubble blower [11] LA have been studied.

However, there is no evidence of comparing the effectiveness of extraoral vibrations and extraoral vibration along with cooling .

2. Methods

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The present study was carried out in Department of Pediatric and Preventive Dentistry, D Y Patil Dental College and Hospital, Pune. Clearance from the institutional ethics committee was received and recorded with the university. The parents or guardians of the children participating in the study provided written informed consent.

The majority of the samples were from children who were seeking dental care at the department.

Inclusion criteria

- Children of 7–13 years old age.
- Patient requiring inferior alveolar nerve block for dental treatment
- Cooperative child with Frankl behavior rating of 2 and 3
- Healthy children with no systemic illness.
- Children with informed assent and parental consent.
- Children without previous experience with local anesthetic injection
- Child free from any neurological or psychological disorder

Exclusion criteria

- Children with behavioral management problem.
- Children with known allergy to local anesthetic agents.
- History of a specific phobia or unpleasant experience related to dental settings
- Patients with congenital syndromes or intellectual disability.

The samples of 33 children were randomly divided into 2 groups.

Group 1: Extraoral vibration

Group 2: Extraoral vibration + Cooling

Group 1 : Extraoral vibrations was delivered using a commercially available device Buzzy (Buzzy®, MMJ Labs, Atlanta, GA, USA). When using the device technique, the parent and kid were first shown the device. The gadget was made accessible to the kids so they could touch it and use it. Readings from the pulse oximeter, MCDAS and FLACC scale were noted. The device was then placed extraorally over the area to be anesthetized and switched on. Vibrations were delivered throughout the injection and deposition of local anaesthetic solution was carried out. Throughout this phase, readings from the MCDAS, FLACC scale, and pulse oximeter were recorded. After completing the procedure the pain assessment was done using the Wong-Baker FACES scale and the child is invited to choose one face. (fig 1)

Group 2 : Extraoral vibrations along with cooling was delivered using the same commercially available device Buzzy. The ice pack wings of the device were used to deliver cold stimulus. The readings were obtained in the manner similar to as described in group 1 (fig 2)

Figure 1

Figure 2

3. Results

Table 1. Mean pulse rate among pre-treatment and post-treatment.

PULSE RATE	MIN	MAX	MEAN (SD)
PRE-TREATMENT	82	96	88.89 (3.60)
POST-TREATMENT	80	96	84.96 (3.11)

Table 2. Comparison of MCDAS Anxiety scale before treatment and after treatment in each group using Wilcoxon-sign rank test.

MCDAS	GROUP 1		GROUP 2	
	Pre-treatment	Post-treatment	Pre-treatment	Post-treatment
ANXIETY ABSENT	00 (0%)	21 (21.21%)	0 (0%)	25 (25.25%)
ANXIETY PRESENT	13 (13.13%)	12 (12.12%)	18 (18.18%)	08 (8.08%)
SEVERE PHOBIC DISORDER	20 (20.20%)	00 (0%)	15 (15.15%)	00 (0%)

Table 3. Frequency and Percentage distribution of study subjects in individual group according to the WBFPS scale.

WBFPS		GROUP 1	GROUP 2
SCORE	LABEL		
0	No hurt	00 (0.00%)	07 (21.20%)
2	Hurts little bit	01 (3.00%)	11 (33.30%)
4	Hurts little more	18 (54.50%)	9 (27.30%)
6	Hurts even more	12 (36.40%)	6 (18.20%)
8	Hurts whole lot	02 (6.10%)	0 (0.00%)

Table 4. Frequency and Percentage distribution of study subjects according to the FLACC scale.

FLACC		N	%
SCORE	LABEL		
0	Relaxed & comfortable	17	17.2%
1 -3	Mild discomfort	63	63.6%

4-6	Moderate pain	19	19.2%
7-10	Severe discomfort / pain	00	0.00%

4. Discussion

The gate control theory of pain by Melzack and Wall (1965) proposed that the gate is substantia gelatinosa in the dorsal horn. This gate modulates the transmission of sensory information. This gate is controlled by activity of A delta and C fibres. Large diameter (C fibres) closes the gate and small diameter (A delta) opens it. [12] Stimulation of these large diameter fibres with appropriate coldness, warmth or vibration closes the gate and lessens the pain sensation. This forms the working principle of Buzzy device. Evidence from literature suggests DentalVibe as one more device to reduce pain. However, this was not effective in reducing injection pain perception. Buzzy device used in this study showed results comparable to previous studies showing reduction in pain and controlling anxiety. This device also proved to be a distraction aid for children helping in calming and familiarizing them to dental set-up. Dental fear is a complex phenomenon and it is affected by various emotional and physiological parameters therefore a combination of different scales to measure three variants for anaesthesia namely pain, fear and anxiety was undertaken in current study. Combined application of external old and vibrations at the site of injection is therefore a significant method in reducing acquired pain perception. This innovation offers the paediatric dental community a promising breakthrough in efficient pain management.

5. Conclusion

Within the scope of this study it can be concluded that vibratory device with coolant can be an effective alternative in reducing pain and anxiety in children receiving inferior alveolar nerve block and can be a promising tool in pediatric dentistry as compared to only vibratory stimulus. Children receiving LA treatment can benefit from the distraction provided by the Buzzy device, which is a useful behaviour guidance tool for reducing dental anxiety and panic. Compared to other recently deployed LA devices, the Buzzy device is more affordable, optimised, and accessible, and it can be added as an adjunct to paediatric dental practice.

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