

## **A Clinical Comparative Study to Evaluate Anxiety in Children with the Use of Conventional and Camouflaged Syringe.**

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### **ABSTRACT**

**Background And Objectives:** Childhood dental anxiety is one of the most common challenges encountered in pediatric dental operator, as many children totally avoid the dental examination and treatment due to the same. Visual impact of syringes and needles may hinder the child's cooperation as successful administration of local anesthesia plays a pivotal part in pediatric dental procedures.

The aim of this study was to evaluate dental anxiety in children aged 6 to 8 years at the time of administration of local anesthesia, during intracanal irrigation and after treatment with the use of conventional and camouflaged syringe.

**Methods:** In this invivo study, sixty children in the age group of 6 to 8 years were included. Children were divided into 2 groups consisting of 30 children (15 males and 15 females) in each group. In Group A conventional syringe, and in Group B camouflaged syringe were used to administer local anesthesia and intracanal irrigation.

Dental anxiety was assessed using two parameters- The Pulse Rate and Facial Image Scale (FIS) score. Pulse rate was measured using pulse oximeter and FIS score was recorded using Facial Image Scale (FIS). Both the parameters were documented in experimental and control groups at the time of administration of local anesthesia, during intracanal irrigation and after treatment.

**Results:** A statistically significant difference was seen in pulse rate between group A and group B at the time of administration of local anesthesia, during intracanal irrigation and after treatment ( $p=0.00$ ). Intragroup comparison in both group A and group B shows significant difference in all the 3 time intervals showing pulse rate decreases during each time intervals.

Facial Image Scale values between the groups at different time intervals shows that the subjects were less anxious in group B compared to group A( $p=0.00$ ).

**Conclusion:** The study strongly favors the use of camouflaged syringes to reduce dental fear and anxiety in children and is therefore recommended as an alternative to the use of conventional syringes.

**KEYWORDS:** Camouflaged Syringes, Conventional Syringes, Dental Anxiety, Facial Image Scale, Local Anesthesia, Pulse Rate.

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### **ARTICLE DETAILS**

**Published On:**  
**06 July 2022**

**Available on:**  
<https://ijmscr.org/>

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### **INTRODUCTION**

The term 'Anxiety' was introduced in the field of Psychology from the German word 'Angst' which means feeling of

apprehension [1]. Anxiety is defined as a state of unpleasantness with an associated fear of danger from within or a learned process of one's own environment [2]. Dental

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anxiety can be defined as ‘A state of unpleasant feeling combined with an associated feeling of impending doom or danger from within rather than from without’ [3].

The etiology of dental anxiety is multifaceted, and is composed of exogenous (external) and endogenous (internal) factors. The external factors include fear of examination room, appearance and noise of equipment, unpleasant odour, fear of injections and high-speed instruments [4]. Internal factors include earlier traumatic experiences, negative attitudes in the family, peers and society, fear of pain and trauma and perceptions of a futile or a painful previous dental treatment [5].

“Trypanophobia” mostly exist in children and occasionally in adults too. The most critical part of pediatric dental procedure is the successful administration of local anesthesia since the cooperation of the child and subsequently, the quality of dental treatment depends on it. Visual impact of needles and syringes acts as a disincentive to the child’s cooperation during dental procedures. So, improvising the syringes to camouflage the needle will ease the child’s anxiety and will show enhanced outcomes related to anxiety and pain [6].

Hardly few studies were done where syringes have been camouflaged following the entire injection apparatus being hidden from the vision of children [7]; thus the data to date are limited. This study will evaluate whether camouflaging has a favourable influence on the behavior of children and causes less anxiety compared to conventional syringes.

Inclusion criteria:

- Patients who had never experienced dental injection.
- Patients aged 6 to 8 years
- Patients who were categorised under Frankl’s positive and definitely positive behavior.

Exclusion criteria:

- Patients with painful dental experiences in the past.
- Medically compromised and mentally challenged patients.

### Method of study

The study was done on 60 children between the age group of 6 to 8 years of both the genders who reported to the out patient department of pediatric and preventive dentistry. Consent forms were prepared and typed in English and local language and were taken from parents prior to the study.

The children were randomly divided into 2 groups consisting of 30 children (15 males and 15 females) in each group. In Group A conventional syringe, and in Group B camouflaged syringe were used to administer local anesthesia and intracanal irrigation.

Dental anxiety was evaluated using two parameters- The Pulse Rate and Facial Image Scale (FIS) score. Pulse rate was measured using pulse oximeter and FIS score was recorded using Facial Image Scale (FIS). Both the parameters were documented in experimental and control groups at the time of administration of local anesthesia, during intracanal irrigation and after treatment.

## MATERIALS AND METHODS



Figure 1: Administration of LA using conventional syringe(Group A)

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**Figure 2: Angelus Alligator Sleeve**



**Figure 3: Administration of LA using Camouflaged syringe (Group B)**

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**Figure 4: Measuring pulse rate using pulse oximeter**



**Figure 5: Recording FIS values using Facial Image Scale**

**Statistical analysis**

Obtained data was tabulated and statistically analysed. Data was entered in the excel spread sheet. Descriptive statistics like mean, standard deviation was calculated. Inferential statistics like Mann-Whitney U test was used to compute the statistical significance between the groups (intergroup comparison) with respect to pulse rate and anxiety

scores .Wilcoxon sign rank test was used to compare the pre and post pulse rate and anxiety scale using SPSS (Statistical Package for Social Sciences) version 20.(IBM SPASS statistics [IBM corp. released 2011] .

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### RESULTS

Table 1 compared the pulse rate between the groups at different time intervals. At the time of LA, group A showed minimum pulse rate of 90 and maximum of 112 with a mean of 99.63. Group B showed minimum pulse rate of 79 and maximum of 94 with a mean of 84.37. Mean difference between the group is 15.26 which is statistically significant ( $p=0.00$ ).

During irrigation, group A showed minimum pulse rate of 89 and maximum of 103 with a mean of 96.33. Group B showed

minimum pulse rate of 75 and maximum of 92 with mean of 82.03. Mean difference between the two groups during irrigation is 14.3 which is statistically significant ( $p=0.00$ ). After treatment group A showed minimum pulse rate of 85 and maximum of 100 with a mean of 94.37; Group B showed minimum pulse rate of 72 and maximum of 89 with a mean of 78.13. Mean difference between the groups were 16.23 which is statistically significant ( $p=0.00$ ).

**Table 1. Comparison of pulse rate between the groups at different time intervals using independent sample t test.**

Time intervals	Groups	Minimum	Maximum	Mean	Std. Deviation	Mean diff	p value
At the time of LA	Group A	90	112	99.63	5.980	15.26	0.00*
	Group B	79	94	84.37	3.978		
During irrigation	Group A	89	103	96.33	4.213	14.3	0.00*
	Group B	75	92	82.03	3.469		
After treatment	Group A	85	100	94.37	4.056	16.23	0.00*
	Group B	72	89	78.13	3.521		

\*significant

Table 2 compared Facial Image Scale values between the groups at different time intervals. At the time of LA, group A showed a minimum FIS value of 2 and maximum of 5 with a mean of 2.63, Group B showed minimum value of 3 and maximum value of 4 with a mean of 3.47. Mean difference between the group is -0.83 which is statistically significant ( $p=0.00$ ).

During irrigation, group A showed a minimum FIS value of 2 and maximum of 4 with a mean of 2.73, Group B showed minimum value of 3 and maximum value of 5 with a mean of

4.13. Mean difference between the group is -1.40 which is statistically significant ( $p=0.00$ ).

After treatment, group A showed a minimum FIS value of 2 and maximum of 4 with a mean of 2.83, Group B showed minimum value of 3 and maximum value of 5 with a mean of 4.50. Mean difference between the group is -1.66 which is statistically significant ( $p=0.00$ ). Thus it can be Inferred that subjects were less anxious at the time administration of local anesthesia, during intracanal irrigation and after treatment in group B compared to group A.

**Table 2. Comparison of facial image scale between the groups at different time intervals using independent sample t test**

Time intervals	Groups	Minimum	Maximum	Mean	Std. Deviation	Mean diff	p value
At the time of LA	Group A	2	5	2.63	.765	-0.83	0.00*
	Group B	3	4	3.47	.507		
During irrigation	Group A	2	4	2.73	.583	-1.40	0.00*
	Group B	3	5	4.13	.507		
After treatment	Group A	2	4	2.83	.648	-1.66	0.00*
	Group B	3	5	4.50	.572		

\*significant



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Table 3 compared pulse rate between the groups using post-hoc bonferroni which shows significant difference within group A and group B at the time of LA and during irrigation with a mean difference of 3.3 and 2.33, at the time of LA and

After treatment with a mean difference of 5.26 and 6.23, during irrigation and after treatment with a mean difference of 1.96 and 3.9 respectively.

**Table 3. Comparison of pulse rate between the groups (post-hoc bonferroni)**

	Group A		Group B	
	Mean diff	p value	Mean diff	p value
At the time of LA v/s During irrigation	3.3	0.00*	2.33	0.00*
At the time of LA v/s After treatment	5.26	0.00*	6.23	0.00*
During irrigation v/s After treatment	1.96	0.00*	3.9	0.00*

\*significant

Table 4 shows intragroup comparison in group B using post-hoc bonferroni showing significant difference in anxiety level while using facial image scale at the time of LA and during irrigation with a mean difference of -0.10 and -0.66, At the

time of LA and After treatment with a mean difference of -0.20 and -1.03, During irrigation and After treatment with a mean difference of -0.10 and -0.36 respectively.

**Table 4. Comparison of facial image scale between the groups (post-hoc bonferroni)**

	Group A		Group B	
	Mean diff	p value	Mean diff	p value
At the time of LA v/s During irrigation	-0.10	1.00	-0.66	0.00*
At the time of LA v/s After treatment	-0.20	0.89	-1.03	0.00*
During irrigation v/s After treatment	-0.10	0.97	-0.36	0.027*

\*significant

### DISCUSSION

In the current study, sixty children in the age group of six to eight years were selected. This age group was included as it accords with the stage of industry versus inferiority by Erik Erikson and concrete operational stage of cognitive development theory by Jean Piaget, thus shows an improved ability of children to reason [4], whereas study done by Melwani AM et al, 2017 compared the efficiency of camouflaged syringe in 6-11 year old children [7] and (S Ujaoney et al, 2013) conducted similar study in the age group of children less than 15 years[8].

Pulse rate is defined as the number of heart beats per minute. The resting pulse rate for a child of 6 to 12 years is 70 to 110 beats per minute [9]. In the current study fingertip pulse oximeter was used to measure pulse rate because the device is handy, involves no tissue preparation and is a painless procedure. It is based on the concept that pulsatile changes in

the light transmission through living tissues are due to alteration in the arterial blood volume[10].

According to a study by Rosenberg and Katcher et al, 1976 the anxiety inducing situations alter the physiological parameters like blood pressure and pulse rate. This change in pulse rate can be used to evaluate dental anxiety in children[11].

The current study compared pulse rate between the groups at different time intervals. At the time of administration of LA the pulse rate was maximum. This could be because the sight of needle for the first time induced anxiety in children and later a constant decrease in pulse rate was observed with progress in time. Thus it can be inferred that pulse rate decreases with progress in treatment, with a minimum value noted at the end of the treatment.

Study done by Rayen et al, 2006 concluded that most anxiety generating situations were found to be at the time and before the procedure, with a decrease in anxiety seen after

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completion of treatment and showed a significant increase in pulse rate during dental procedures when compared with normal[12].

Similar results were done by Sowjanya et al,1995 and Sanadhya et al,2013. They reported that there was a statistically significant difference in physiological parameters before and after dental procedures. They observed that pulse rate was more before the administration of LA and gradually decreased after the procedure[13,14]. This is in accordance with the present results.

Facial Image Scale (FIS) was introduced by Buchanan in 2002. It is a valid measure to assess dental anxiety in young children. FIS constitute a row of five faces ranging from very sad (score 1) to very happy (score 5). Children were asked to point at which face they felt most like at that moment. The scale is scored by giving a value of one to the most negative face and five to the most positive face [15].

In the present study Facial Image Scale was used to assess dental anxiety between the groups at different time intervals. The results showed that the subjects were less anxious at the time administration of local anesthesia, during intracanal irrigation and after treatment in group B compared to group A.

Study by Liau et al, 2008 concluded that the dental anxiety scale was able to assess anxiety during anaesthetic procedure[16]. Similar results were reported by Muinelo Lorenzo et al, 2014 suggesting that changes in the Facial Image Scale were consistent with changes in pulse rate[17]. Study done by Khokhar et al,2017 evaluated anxiety levels of children aged 6 - 9 years by using FIS also concluded that children were less anxious after treatment which is in accordance with the current study[4].

In the current study a simple and child-friendly sleeve for the disposable dental syringe introduced by AngelusTM was used. The advantage of using Alligator sleeve by AngelusTM is that it is playful, it conceals the needle, it acts as a distraction tool, it is autoclavable, and it is commercially available. The aim was to hide the needle from the child's sight while still keeping the syringe functional.

In the present study children in the age group of 6 to 8 years preferred camouflaged syringe because they are more easily distracted and the toy like alligator appearance of the camouflaged syringe carried away the fear inducing stimuli of conventional syringe.

Study done by S.Ujaoney et al, 2013 evaluated the effectiveness of the camouflage syringe to minimize dental anxiety and their results favoured the use of camouflage syringe to reduce dental anxiety[8]. Similar study done by Babaji P et al, 2017 also preferred the use of camouflage syringe over conventional syringe[18].

Studies done by Nikolova et al 2008 and Maragakis et al 2007 evaluated the response of children to dental injection after seeing the needle and they concluded that showing or hiding the needle had no influence on the response of children, which

is contradictory to the present study as the needle hidden in the camouflaged syringe had a positive influence on behavior and anxiety[19,20].

The results of the current study strongly recommend the use of camouflaged syringes to reduce dental anxiety in children, which is in concurrent to the reports of Babaji P et al 2017 and S.Ujaoney et al,2013 [18,8]

### **CONCLUSION**

Dental anxiety has a negative impact on children as well as dental professionals. Therefore understanding the causes which are responsible for the development of dental anxiety is important for behavior management and clinical success in pediatric dental practice. This study strongly favoured the use of camouflaged syringes. More elaborate studies with increased sample size and different types of camouflaged syringes are warranted in pediatric dentistry to decrease dental anxiety among children.

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