



COMPARISON OF BRIEF RELAXATION AND MUSIC DISTRACTION IN THE TREATMENT OF DENTAL ANXIETY - A RANDOMIZED CONTROLLED CLINICAL TRIAL

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ABSTRACT

Background: Patients with dental anxiety are a heterogeneous group with origins, onset age and manifestations which vary to a great extent between individuals. Among the management options for dental anxiety, non-pharmacological management methods were found to be superior to anxiolytic drug therapies. Medications provide only short term cost effective solutions and an increased patient risk exists due to drug interaction or overdose. Present trend is towards non aversive techniques.

Aim and Objectives: To compare the effectiveness of music distraction and brief relaxation method in anxious pediatric patients.

Materials and methods: Ninety children of age group of 6-12years were selected randomly by simple random sampling and were divided into three groups with thirty children in each group grouped as - Group A: Control group, Group B: Patients treated with brief relaxation, Group C: Patients treated with music distraction. The patient's subjective anxiety recorded using modified version of the self-report Faces Scale by LeBaron et al. Study investigated using two physiological parameters i.e. heart rate and oxygen saturation, measured with pulse oximetry at different intervals.

Results: The study result showed the brief relaxation better efficacy than music distraction in reducing anxiety as indicated by both the subjective and objective parameters except oxygen saturation which were used. But music distraction also helps in lowering the anxiety in children when music distraction group was compared with the control group.

Conclusion: Our study found out that even though both brief relaxation and music distraction have the ability to reduce dental anxiety in children, brief relaxation showed more potential in reducing anxiety.

KEYWORDS: Anxiety. Relaxation. Music Distraction.

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INTRODUCTION

Dental anxiety has been identified as a significant and common problem in children and adults alike and

is considered an obstacle for dental care providers in the provision of quality oral care. It is reported that one in six adults suffer from some form dental anxiety and in children the prevalence ranged

between 5.7% and 19.5%.¹ Patients with dental anxiety tend to neglect dental care which poses a problem for dentists and patients alike. A dentist-patient relationship dominated by severe anxiety

may lead to misdiagnosis and wrong treatment.² Anxiety is a normal reaction to stress and represent a common human emotion. But when anxiety becomes an excessive, irrational dread of everyday situations, it has become a disabling disorder.

Although dental anxiety prevention is recommended, once established, a specific strategy for approaching the anxious patient is needed. The first step is to identify anxious patients and then to ascertain the severity degree of dental anxiety. After that, methods for reducing the anxiety level must be used, such as: relaxation, systematic desensitization and cognitive approaching. These methods have been compared in many specialized studies and have proven to be effective in reducing dental anxiety.³

'Functional relaxation' (FR) is a somato-psychotherapeutic intervention technique used for the treatment of a variety of disorders, like somatoform disorders, concentration and speech problems, depression, anxiety disorders, headaches and asthma. It was developed by the physiotherapist Marianne Fuchs.⁴ Relaxation is based upon the physiological impact of psychological feelings correlated with anxiety. As far as the patient learns and manages to use their imagination and to control their emotional manifestations, the anxiety level decreases to a great extent, according to the principle that one can't be relaxed and anxious at the same time. Therefore, relaxation methods, although require several sessions in order to be successful, are useful in dentistry as well. Systematic desensitization consists of training the patient to face gradually stimuli or situations that create anxiety. At first, fear-triggering stimuli should be identified and afterwards their hierarchy is to be ascertained. Then the patient

should be exposed repeatedly to anxiogenic stimuli, starting with the situation that induces the lowest degree of fear. The exposure takes place after the patient is taught how to relax, and the next stimulus is called in once the patient feels he/she is ready. At the end of each session, the patient is invited to face the reality of the situations for which the desensitization has been performed. Systematic desensitization method lasts 5-10 sessions, until the patient believes that the anxiogenic representations are tolerable.⁵

Music is the "art of arranging sounds in time so as to produce a continuous, unified, and evocative composition, as through melody, harmony, rhythm, and timbre". Music has many relaxation benefits and can have a positive influence on the patient by making concentration easier and easing anxiety.⁶ Music has been used in different medical fields to meet physiological, psychological, and spiritual needs of patients. Research on the effects of music and music therapy for medical patients has burgeoned during the past 20 years and has included a variety of outcome measures in a wide range of specialty areas.⁷ There is a distinction between music interventions administered by medical or healthcare professionals (passive music listening) and those implemented by trained music therapists (active music therapy). Active music therapy is the planned and creative use of music by a music therapist to attain and maintain health and well being. People of any age or ability may benefit from a music therapy programme regardless of musical skill or background (Australian Music Therapy Association). Passive music listening is the passive listening to pre-recorded music offered by dental practitioners and dental

personnel without the involvement of music therapist.⁸

MATERIALS AND METHODS

A randomized controlled trial was conducted on 90 normal healthy school children aged between 6 – 12 years of age who reported to the department of pediatric and preventive dentistry, Kannur Dental College seeking dental treatment. Inclusion criteria for the study was children aged 6-12 years undergoing restorative fillings.

By simple random sampling, ninety subjects will be divided into three groups with twenty five children in each group grouped using lottery method as follows.

Group A: Control group

Group B: Patients treated with brief relaxation,

Group C: Patients treated with music distraction

In the control group patients treatment was carried out using the standard aseptic protocols.

BRIEF RELAXATION GROUP

In the brief relaxation group initially the treatment was explained to the child and parents and a modified video demonstration of Jacobsons relaxation technique was carried out.⁹⁻¹¹ The operator then explained and demonstrated how to perform brief relaxation by himself and the treatment was started. During the treatment the patient was encouraged to perform the brief relaxation as explained by the operator and as demonstrated in the video shown initially

MUSIC DISTRACTION GROUP

In the music distraction group after the treatment was instituted the patients were made to hear Mozart music using standard speakers during the course of treatment.

The patient's subjective anxiety will be recorded using modified version of the self-report Faces Scale by LeBaron et al.^{12, 13} It comprises a row of five faces ranging from 'relaxed' to 'very worried' in combination with a visual analogue scale of 0 - 10. Each child was asked to point to the face or choose the number which most closely depicted its state anxiety.

The present study investigated two physiological parameters of stress-heart rate and oxygen saturation, measured with pulse oximetry at 3 different intervals:

1. Before treatment;
2. During treatment;
3. After treatment.

The data for each patient was entered on pre-printed proformas which had the subject's demographic characteristics, parameters to assess the dental anxiety and evaluated using the Mann Whitney U test were used, while a p-value of <0.05 was considered statistically significant.

RESULTS

In control group, out of 30 subjects, 20 (66.7%) were males and 10 (33.3%) were females. In Brief Relaxation group, out of 30 subjects, 14 (46.7%) were males and 16 (53.3%) were females. In Music Distraction group, out of 30 subjects, 16 (53.3%) were males and 14 (46.7%) were females.

Table 1 shows the comparison of the study variables between different times of treatment. The Oxygen saturation before treatment was

Table 1. Comparison of oxygen saturation, heart rate and faces scale at different treatment intervals in control group using Wilcoxon Signed rank test

		Mean	N	Std. Deviation	P-value
Oxygen saturation	Before treatment	97.97	30	0.718	0.419
	During treatment	98.17	30	0.913	
	Before treatment	97.97	30	0.718	0.484
	After treatment	97.80	30	0.887	
	During treatment	98.17	30	0.913	0.088
	After treatment	97.80	30	0.887	
Heart rate	Before treatment	103.40	30	5.049	0.082
	During treatment	105.43	30	2.300	
	Before treatment	103.40	30	5.049	0.082
	After treatment	105.43	30	2.300	
	During treatment	105.43	30	2.300	1.000
	After treatment	105.43	30	2.300	
Faces scale	Before treatment	4.60	30	2.044	0.242
	During treatment	5.07	30	1.311	
	Before treatment	4.60	30	2.044	<0.0001*
	After treatment	4.10	30	1.022	
	During treatment	5.07	30	1.311	<0.0001*
	After treatment	4.10	30	1.022	

97.97±0.718 and during treatment was 98.17±0.913, the difference was not statistically significant using Wilcoxon Signed rank test with p-value=0.419. The Oxygen saturation before treatment was 97.97±0.718 and after treatment was 97.80±0.887, the difference was not statistically significant using Wilcoxon Signed rank test with p-value=0.484. The Oxygen saturation during treatment was 98.17±0.913 and after treatment was 97.80±0.887, the difference was not statistically significant using Wilcoxon Signed rank test with p-value=0.888.

The heart rate before treatment was 103.40±5.049 and during treatment was 105.43±2.30, this difference was

statistically not significant using Wilcoxon Signed rank test with p-value=0.082. The heart rate before treatment was 103.40±5.049 and after treatment was 105.43±2.30, this difference was statistically not significant using Wilcoxon Signed rank test with p-value=0.082. The heart rate during treatment was 105.43±2.30 and after treatment was 105.43±2.30, this difference was statistically not significant using Wilcoxon Signed rank test with p-value 1.000.

The faces scale score before treatment was 4.60±2.044 and during treatment was 5.07±1.311, this difference was statistically not significant using

Wilcoxon Signed rank test with p-value=0.242. The faces scale score before treatment was 4.60 ± 2.044 and after treatment was 4.10 ± 1.022 , this difference was statistically significant using Wilcoxon Signed rank test with p-value <0.001. The faces scale score during treatment was 5.07 ± 1.311 and after treatment was 4.10 ± 1.022 , this difference was statistically significant using Wilcoxon Signed rank test with p-value <0.0001.

Table 2 shows the comparison of the study variables between different times of treatment in Brief relaxation group. The Oxygen saturation before treatment was 98.27 ± 0.450 and during treatment was 98.27 ± 0.619 , the difference was not statistically significant using Wilcoxon Signed rank test with p-value=1.000. The Oxygen saturation before treatment was 98.27 ± 0.450 and after treatment was 97.70 ± 1.149 , the difference was statistically significant using Wilcoxon Signed rank test with p-value=0.011. The Oxygen saturation during treatment was 98.27 ± 0.619 and after treatment was 97.70 ± 1.149 , the difference was statistically significant using Wilcoxon Signed rank test with p-value=0.023.

The heart rate before treatment was 104.47 ± 1.456 and during treatment was 99.33 ± 1.37 , this difference was statistically significant using Wilcoxon Signed rank test with p-value <0.001. The heart rate before treatment was 104.47 ± 1.456 and after treatment was 97.47 ± 1.57 , this difference was statistically significant using Wilcoxon Signed rank test with p-value <0.001. The heart rate during treatment was 99.33 ± 1.37 and after treatment was 97.47 ± 1.57 , this difference was statistically significant using Wilcoxon Signed rank test with p-value <0.001.

Table 2. Comparison of oxygen saturation, heart rate and faces scale at different treatment intervals in Brief relaxation group using Wilcoxon Signed rank test

		Mean	N	Std. Deviation	P-value
Oxygen saturation	Before treatment	98.27	30	0.450	1.000
	During treatment	98.27	30	0.691	
	Before treatment	98.27	30	0.450	0.011*
	After treatment	97.70	30	1.149	
	During treatment	98.27	30	0.691	0.023*
	After treatment	97.70	30	1.149	
Heart rate	Before treatment	104.47	30	1.456	<0.0001*
	During treatment	99.33	30	1.37	
	Before treatment	104.47	30	1.456	<0.0001*
	After treatment	97.47	30	1.57	
	During treatment	107.97	30	1.564	<0.0001*
	After treatment	97.47	30	1.57	
Faces scale	Before treatment	4.90	30	2.057	<0.0001*
	During treatment	3.00	30	0.695	
	Before treatment	4.90	30	2.057	<0.0001*
	After treatment	2.37	30	0.964	
	During treatment	3.00	30	0.695	0.016*
	After treatment	2.37	30	0.964	

The faces scale score before treatment was 4.90 ± 2.057 and during treatment was 3.00 ± 0.695 , this difference was statistically significant using Wilcoxon Signed rank test with p-value <0.001. The faces scale score before treatment was 4.90 ± 2.057 and after treatment was 2.37 ± 0.964 , this difference was statistically significant using Wilcoxon Signed rank test with p-value <0.001. The faces scale score during treatment was 3.00 ± 0.695 and after treatment was 2.37 ± 0.964 , this difference was statistically significant using Wilcoxon Signed rank test with p-value =0.016.

Table 3 shows the comparison of the study variables between different

times of treatment in Music distraction group. The Oxygen saturation before treatment was 98.30 ± 0.466 and during treatment was 98.40 ± 0.498 , the difference was not statistically significant using Wilcoxon Signed rank test with p-value=0.439. The Oxygen saturation before treatment was 98.30 ± 0.466 and after treatment was 98.47 ± 0.507 , the difference was not statistically significant using Wilcoxon Signed rank test with p-value=0.132. The Oxygen saturation during treatment was 98.40 ± 0.498 and after treatment was 98.47 ± 0.507 , the difference was not statistically significant using Wilcoxon Signed rank test with p-value=0.593.

The heart rate before treatment was 103.90 ± 2.412 and during treatment was 101 ± 1.72 , this difference was statistically significant using Wilcoxon Signed rank test with p-value < 0.001 . The heart rate before treatment was 103.90 ± 2.412 and after treatment was 99.33 ± 1.37 , this difference was statistically significant using Wilcoxon Signed rank test with p-value < 0.001 . The heart rate during treatment was 101 ± 1.72 and after treatment was 99.33 ± 1.37 , this difference was statistically significant using Wilcoxon Signed rank test with p-value < 0.001 .

The faces scale score before treatment was 4.60 ± 2.472 and during treatment was 3.67 ± 0.84 , this difference was not statistically significant using Wilcoxon Signed rank test with p-value 0.067 . The faces scale score before treatment was 4.60 ± 2.472 and after treatment was 2.83 ± 1.555 , this difference was statistically significant using Wilcoxon Signed rank test with p-value < 0.001 . The faces scale score during treatment was 3.67 ± 0.84 and after treatment was 2.83 ± 1.555 , this difference was statistically significant using Wilcoxon Signed rank test with p-value $= 0.014$.

Table 4 shows the comparison of the study variables before treatment between groups. The Oxygen saturation in control group was 97.967 ± 0.718 , in Brief relaxation group was 98.267 ± 0.45 and in music distraction group was 98.300 ± 0.466 , the difference was not statistically significant using Kruskal Wallis ANOVA with p-value $= 0.100$. The heart rate in control group was 103.400 ± 5.049 , in Brief relaxation group was 104.467 ± 1.456 and in music distraction group was 103.900 ± 2.412 , the difference was not statistically significant using Kruskal Wallis ANOVA with p-value $= 0.429$. The faces scale score

Table 3. Comparison of oxygen saturation, heart rate and faces scale at different treatment intervals in Music distraction group using Wilcoxon Signed rank test

		Mean	N	Std. Deviation	P-value
Oxygen saturation	Before treatment	98.30	30	0.466	0.439
	During treatment	98.40	30	0.498	
	Before treatment	98.30	30	0.466	0.132
	After treatment	98.47	30	0.507	
	During treatment	98.40	30	0.498	0.593
	After treatment	98.47	30	0.507	
Heart rate	Before treatment	103.90	30	2.412	$< 0.0001^*$
	During treatment	101	30	1.72	
	Before treatment	103.90	30	2.412	$< 0.0001^*$
	After treatment	99.33	30	1.37	
	During treatment	101	30	1.72	$< 0.0001^*$
	After treatment	99.33	30	1.37	
Faces scale	Before treatment	4.60	30	2.472	0.067
	During treatment	3.67	30	0.84	
	Before treatment	4.60	30	2.472	$< 0.0001^*$
	After treatment	2.83	30	1.555	
	During treatment	3.67	30	0.84	0.014 [*]

Table 4. Comparison of oxygen saturation, heart rate and faces scale in different groups before treatment using Kruskal Wallis ANOVA

	Before treatment	N	Mean	Std. Deviation	P-value
Oxygen saturation	Control	30	97.967	0.718	0.100
	Brief Relaxation	30	98.267	0.450	
	Music Distraction	30	98.300	0.466	
Heart rate	Control	30	103.400	5.049	0.429
	Brief Relaxation	30	104.467	1.456	
	Music Distraction	30	103.900	2.412	
Faces scale	Control	30	4.600	2.044	0.904
	Brief Relaxation	30	4.900	2.057	
	Music Distraction	30	4.600	2.472	

in control group was 4.600 ± 2.044 , in Brief relaxation group was 4.900 ± 2.057 and in music distraction group was 4.600 ± 2.472 ,

the difference was not statistically significant using Kruskal Wallis ANOVA with p-value $= 0.904$.

Table 5. Comparison of oxygen saturation, heart rate and faces scale in different groups during treatment using Kruskal Wallis ANOVA

During treatment		N	Mean	Std. Deviation	P-value
Oxygen saturation	Control	30	98.167	0.913	0.766
	Brief Relaxation	30	98.267	0.691	
	Music Distraction	30	98.400	0.498	
Heart rate	Control	30	105.433	2.300	<0.0001*
	Brief Relaxation	30	99.33	1.37	
	Music Distraction	30	101	1.72	
Faces scale	Control	30	5.067	1.311	<0.0001*
	Brief Relaxation	30	3.000	0.695	
	Music Distraction	30	3.67	0.84	

Table 6. Comparison of oxygen saturation, heart rate and faces scale in after groups after treatment using Kruskal Wallis ANOVA

Oxygen saturation	Control	30	97.800	0.887	0.004*
	Brief Relaxation	30	97.700	1.149	
	Music Distraction	30	98.467	0.507	
Heart rate	Control	30	105.433	2.300	<0.0001*
	Brief Relaxation	30	97.47	1.57	
	Music Distraction	30	99.33	1.37	
Faces scale	Control	30	2.300	1.022	0.495
	Brief Relaxation	30	2.367	0.964	
	Music Distraction	30	2.833	1.555	

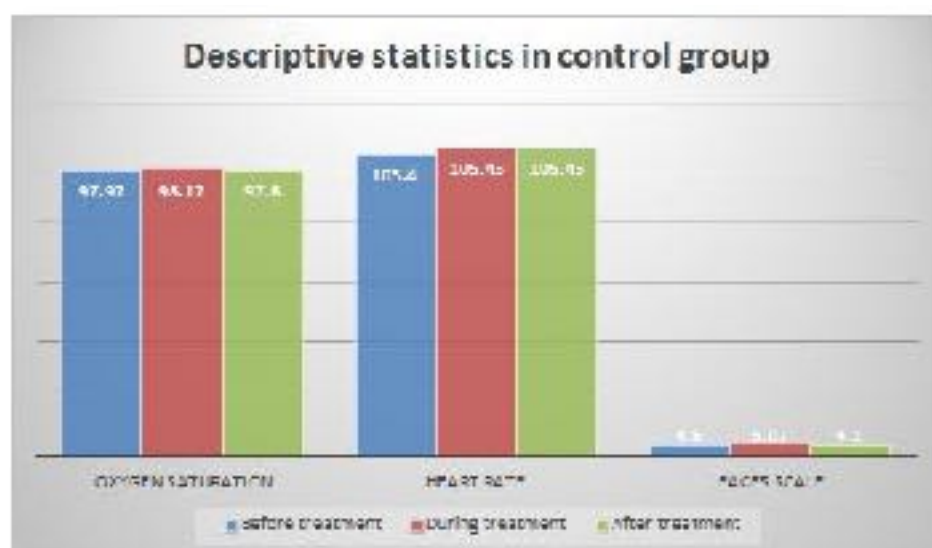


Figure 1. Descriptive statistics in control group

Table 5 shows the comparison of the study variables during treatment between groups. The Oxygen saturation in control group was 98.167 ± 0.913 , in Brief relaxation group was 98.267 ± 0.691 and in music distraction group was 98.40 ± 0.498 , the difference was not statistically significant using Kruskal Wallis ANOVA with p-value = 0.766. The heart rate in control group was 105.433 ± 2.300 , in Brief relaxation group was 99.33 ± 1.37 and in music distraction group was 101 ± 1.72 , the difference was statistically significant using Kruskal Wallis ANOVA with p-value < 0.001. The faces scale score in control group was 5.067 ± 1.311 , in Brief relaxation group was 3.000 ± 0.695 and in music distraction group was 3.67 ± 0.84 , the difference was statistically significant using Kruskal Wallis ANOVA with p-value < 0.001.

Table 6 shows the comparison of the study variables during treatment between groups. The Oxygen saturation in control group was 97.800 ± 0.887 , in Brief relaxation group was 97.700 ± 1.149 and in music distraction group was 98.467 ± 0.507 , the difference was statistically significant using Kruskal Wallis ANOVA with p-value = 0.004. The heart rate in control group was 105.433 ± 2.300 , in Brief relaxation group was 97.47 ± 1.57 and in music distraction group was 99.33 ± 1.37 , the difference was statistically significant using Kruskal Wallis ANOVA with p-value < 0.001. The faces scale score in control group was 2.300 ± 1.022 , in Brief relaxation group was 2.367 ± 0.964 and in music distraction group was 2.833 ± 1.555 , the difference was not statistically significant using Kruskal Wallis ANOVA with p-value = 0.495.

Figure 1, Figure 2 and Figure 3 shows descriptive statistics in control

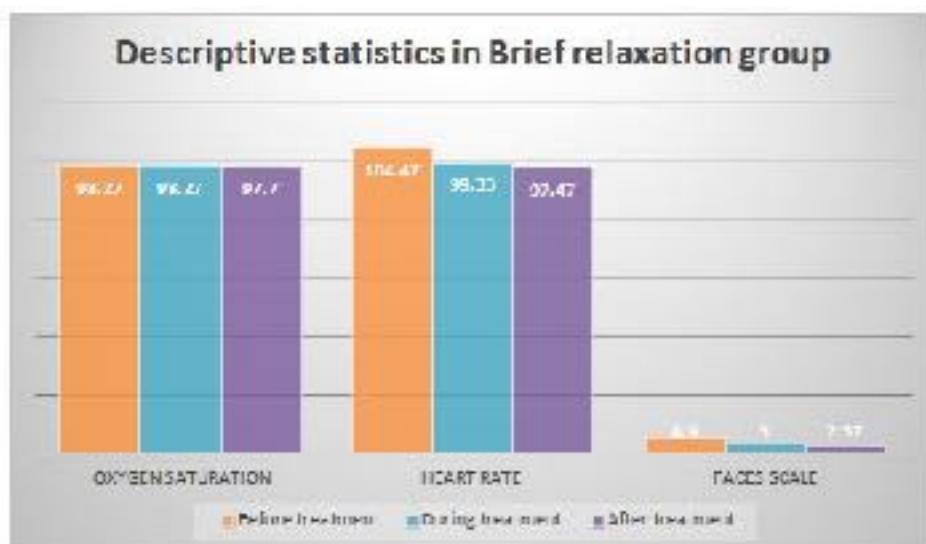


Figure 2. Descriptive statistics in brief relaxation group

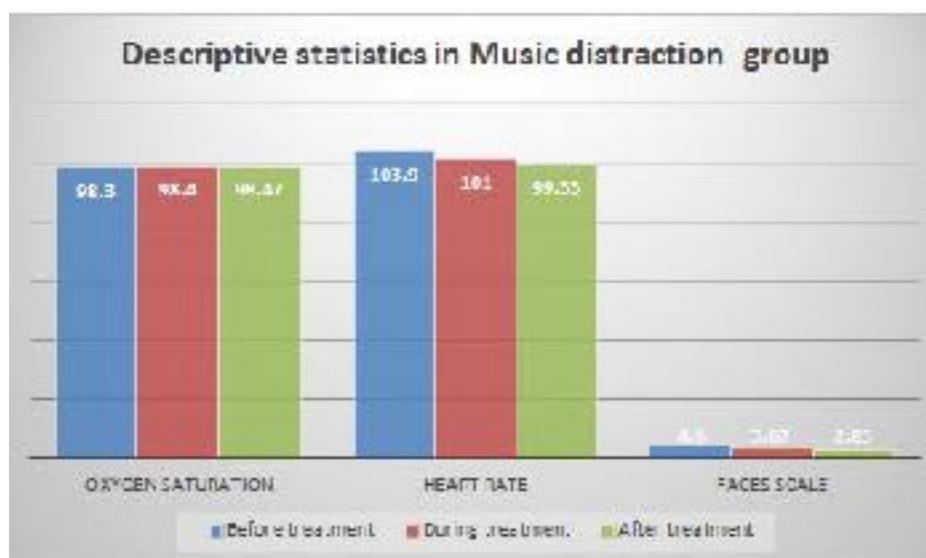


Figure 3. Descriptive statistics in music distraction group

group, functional relaxation group and music relaxation group respectively.

DISCUSSION

Anxiety associated with the thought of visiting the dentist for preventive care and over dental procedures is referred to as dental anxiety. Fear and anxiety toward the dentist and dental treatment are both significant characteristics that contribute to avoidance of dental care. It has been cited as the fifth-most common cause of anxiety by Agras et al.¹⁴ Anxiety is an emotional state that precedes the actual

encounter with the threatening stimuli, which sometimes is not even identifiable.

Dental anxiety in children poses a significant problem for the Pedodontists. Dental care in children demands multiple visits for adequate preventive and restorative treatment. However, the beneficial effects of the preventive dental care are limited in uncooperative children afflicted by severe dental anxiety and distress. It is for this reason that many a times dental care is often avoided or delayed thus resulting in unnecessary complication and poor oral health status. Alleviating a child's anxiety about the dental treatment procedure is therefore important in preventing

apprehension that may later continue into adulthood.

Effective treatment options include an explanation of the treatment procedure, pharmacological strategies involving the use of benzodiazepines and antidepressants, biofeedback, hypnosis and behavioral interventions. Behavioral management seems to be superior to anxiolytic drug therapy, and dentally anxious patients reported that they prefer non pharmacological interventions. Most of the behaviorally oriented treatments include components based on systematic desensitization and use of relaxation to counteract and weaken the fear response during gradual exposure to treatment.^{15,16} Brief relaxation is a somato-psychotherapeutic intervention technique commonly used in Germany, Austria and Switzerland for the treatment of psychosomatic disorders. The therapeutic effects are assumed to be delivered by positive stimulation of the autonomic nervous system as well as by facilitation of proprioceptive awareness. Minute movements of small joints, hardly noticeable to observers, are performed during relaxed expiration, accompanied by a focus on and exploration of the perceived differences of body feelings triggered by these movements. The focus of attention is thereby directed towards the way the person relates to the environment, particularly the floor as the foundation and as the 'outer support' to the bony skeleton (referred to in brief relaxation as 'the frame' or the 'inner support'), to the interior regions of the body and to the skin as an 'outer border'. Unlike exercise-based methods, such as progressive muscle relaxation, the bodily perceptions are explicitly verbalized and processed in the therapeutic relationship.

Music distraction is another effective non pharmacological behavioral method used in the management of dental anxiety. Historically, music has been used in a healing manner alongside other available treatments of the given time period. Music therapy has long been part of various interdisciplinary teams that provide services to many populations. Music distraction is a non-aversive technique in which patients listen to music during a stressful procedure. Because of its success in medical settings and with adult dental patients, many pediatric dentists and parents believe that this technique can reduce pain and anxiety in pediatric dental patients despite a lack of evidence to support its effectiveness in this setting.

In this study, we investigated the effectiveness of two interventions—Brief relaxation and music distraction—in reducing dental anxiety in comparison with no intervention. The results show that brief relaxation was more effective than music distraction. Although music distraction also proved to be beneficial in reducing state anxiety in comparison with no intervention, the effect sizes were moderate.

The oxygen saturation was evaluated in all the three groups at three intervals using pulse oximeter. In all three groups no significant variation was found in the oxygen saturation in all three instances. Our findings are line with other studies. Though insignificant highest values of oxygen saturation were found during the treatment on similar results has been shown by Sharat Chandra Pani et al and Divya Singh et al.

18, 19.

Heart rate was also evaluated by pulse oximeter. In the control group heart rate was found maximum during the treatment but significant difference

has not been found in various intervals. In the group where brief relaxation was used there has been a significant reduction in heart rate in the intra operative and post operative periods as compared to the before treatment value. Similarly in music distraction there has been a significant reduction in heart rate in during the treatment and after the treatment group compared to the base line group. Similar results were found out by Maria Shindova et al.²⁰

Brief relaxation and music distraction offers a reduction in the anxiety and improves the overall comfort and compliance of children. Brief relaxation have an edge over music distraction even though oxygen saturation levels are similar in all other groups, there is a significant reduction in the anxiety as per the self reported Lebaron et al faces scale and reduction in the heart rate which has been taken as a objective parameter. The superiority of brief relaxation might be due to a better neuro endocrine control of the bodily systems.

Audio music distraction did not produce significant a reduction in pain, anxiety or disruptive behavior in young pediatric dental patients. Despite a lack of an effect on pain and anxiety levels, patients had an overwhelmingly positive response to the music and would choose to listen to it at subsequent visits.

Brief relaxation appears to be a safe, economically sound and effective non -pharmacological approach to the short-term reduction of dental anxiety. Additional research involving different treatment modalities is needed to heighten the different levels of dental anxiety to replicate the results of study.

CONCLUSION

The following conclusions were drawn from the present study:

- Both brief relaxation and music distraction has been found to be useful in reducing anxiety.
- Brief relaxation technique has been found to be more capable in reducing anxiety in children .
- Oxygen saturation levels are similar in all other groups in all the intervals and were not statistically significant.
- Patients aged between 6-12 years showed more anxiety during the treatment and showed less anxiety after the treatment.

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