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Original Article

Cry Analyser- A Tool for Behaviour Management

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Abstract

Aim & Objectives: To analyse the Type & Frequency of cry in Paediatric endodontic procedure and its variation after Audio analgesia as behaviour guidance.

Materials and Methods: Randomly 60 children in the age group of 4-8 were selected indicated to undergo single sitting pulpectomy procedure. Audio analgesia used along with Why Cry – cry analyser to record the type of cry and Audacity software was used to record frequency of the cry.

Results: Correlation established between Obstinate and Hunger, Frightened and stressed, compensatory with boredom cry. Audio analgesia was successful in 40% of cases.

Conclusion: Positive correlation was established between Cry Analyser and clinical diagnosis of type of cry. Audio analgesia proved to be effective method for behaviour guidance.

Keywords: Audio analgesia, Cry, Cry Analyser.

Introduction:

Crying, like other emotional manifestations of human behaviour is an expression of personality of an individual. Crying is liable to be the result of conflict with the developing ego and with his newly found interests. After the age of one and a half child develops a variety of fears and cries for the security of his mother's company.[1]

Previous works have demonstrated that applying signal processing techniques to analyze the sound of these cries, its possible determinate which features carry information about the context that evoked the cry.

Dental environment is a stressful place for most patients because of factors such as fear of injection and fear of unknown. Each dental visit is a new experience often accompanied with a certain degree of fear and anxiety. The most common way a child expresses fear is by crying at the dentist's office.

All dentists who treat children occasionally find themselves faced with a fearful child in his/her first visit to the dentist. The dentist performs a twofold role in managing the child with anxiety. Firstly to control and treat the problem and secondly educating the child to manage the anxiety.[2]

Anxious children demand a lot of expertise in child management techniques from the dentist and the dental staff. Previously used management techniques have been successful, but the trend has shifted balance towards non-aversive techniques.[3]

Dentists have a full spectrum of techniques available to them to assist in management of child with anxiety such as tell-show-do, relaxation, distraction systematic desensitization, modelling, audio analgesia, hypnosis, and behaviour rehearsal.[4] Since its introduction in1959 by Gardner and Licklider[5], audio analgesia, the production of in sensitivity to pain by the use of loud sound, has been the subject of much controversy.

The success of audio analgesia technique in medical settings and in adult patients is well documented, but there are very few studies done to evaluate the efficacy of this technique in paediatric dental patient.[2]

The aim and objective of this study was to evaluate and compare audio analgesia in management

of anxious paediatric dental patient using cry as a parameter.

Materials and Methods:

Sixty children aged between 4 to 8 years, were selected from patients who came to the department of Pedodontics of M.A Rangoonwala Dental College who required single sitting pulpectomy

Inclusion Criteria:

1. Children aged between 4 to 8 years.
2. Children requiring a single sitting pulpectomy procedure.

Exclusion Criteria:

1. Children presenting with mental or physical disability.
2. Children presenting with a dento-alveolar abscess.

Consent was taken from patient's parents along with brief medical and dental history of patient.

Cases were selected based on the signs and symptoms with which the child reported to the department. Radiographs were used to confirm the diagnosis and then the procedure was commenced.

Technique:

Pre-operatively, cry of the patient was recorded using "Why-cry" analyser. Cry analyser is kept near the patient mouth for 20 seconds which is analysis time. It analyses the frequency and temporal parameters of the sound defining the start and finish algorithm; these parameters are: frequency, intensity, form of sweep, repetition rhythm, energy content, pulse/beat duration, wave shape, autocorrelation, magnitude, density of crosses through zero, etc. The crying analyser is based on a digital signal processing that can carry out these tasks in real time using a fraction of the sound, this allows for repeated validation of the prognosis before illuminating the visual display icon. Recording of the cry was also done on the audacity software to record the frequency of the crying.

Crying was also recorded clinically by another examiner based on the Elsbach classification (1963). This was done to establish co-relation between Elsbach classification and "Why-cry" analyser recording.

Local anaesthesia was administered using 2% lignocaine with adrenaline. Audio analgesia was then used using latest songs. Access cavity was prepared with no.330 carbide bur. Canal orifices were located. The working length was measured using a no. 15 file and radiograph. Pulp extirpation was then carried out. Instrumentation was done with Kerr files till no.30, along with intermittent irrigation with 2.5% sodium hypochlorite and saline solution irrigation. The canal space was then dried using sterile paper points. Obturation was done using ENDOFLAS F.S. carried into the canal space with lentulo spiral.

Post- operatively, cry of the patient was recorded using "Why-cry" analyser. Recording of the cry was also done on the audacity software to record the frequency of the crying. Crying was also recorded clinically by another examiner. Then the results were obtained and were subjected to analytical tests.

Results:

Table 1 shows the co-relation between the cry on "Why-Cry" analyser and the clinical classification of cry. The results showed that most frequently seen cry on "Why-Cry" analyser during paediatric endodontic procedure was stressed followed by hunger and then bored. Positive co-relation was established between stressed and hunger with frightened cry and bored with compensatory cry. The type of cry by analyzer shows significantly higher agreement with the clinical perspective of type of cry.

Table 2 shows the post treatment efficacy of audio analgesia method of behaviour guidance. The success of audio analgesia was based on change in cry of the patient post-operatively. Significantly higher proportion of children had success (no cry) after the audio-analgesia treatment.

TABLE 1: THE AGREEMENT BETWEEN WHY-CRY ANALYZER AND CLINICAL PERSPECTIVE.

		Clinical perspective of type of cry				Total
		Compensatory	Hurt	Frightened	Obstinate	
Analyzer type of cry	Bored	14 (100.0)	0	0	0	**14 (100.0)**
	Stressed	6 (33.3)	0	12 (66.7)	0	**18 (100.0)**
	Hunger	0	0	14 (87.5)	2 (12.5)	**16 (100.0)**
	Total	**20 (41.7)**	**0**	**26 (54.2)**	**2 (4.1)**	**48 (100.0)**

Values are n (%). Chi-Square value =33.785, P-value = 0.001 (Significant).

TABLE 2: THE POST TREATMENT EFFICACY OF ANALGESIA METHOD OF BEHAVIOUR GUIDANCE.

		Post-Treatment		Total
		Failure (Cry)	Success (No Cry)	
Pre-Treatment type of cry	Bored	0	4 (100.0)	**4 (100.0)**
	Stressed	13 (59.1)	9 (40.9)	**22 (100.0)**
	Hunger	11 (32.4)	23 (67.6)	**34 (100.0)**
	Total	**24 (40.0)**	**36 (60.0)**	**60 (100.0)**

Values are n (%). Chi-Square value =6.836, P-value = 0.033 (Significant).

Fig.1 Pre-operative Recording of the cry using Why-Cry Analyzer.

Fig. 2 Why Cry Analyzer.

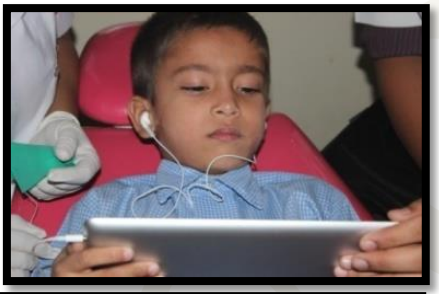

Fig. 3 Audio Analgesia Procedure.

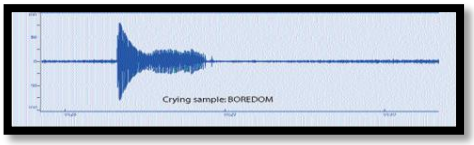

Fig.4 Frequency of boredom cry. uency of cry on Why Cry Analyzer (Boredom)

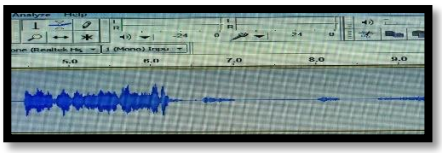

Fig. 5 Frequency of cry on AUDACITY software. (Boredom)

Fig. 6 Frequency of cry on Why Cry Analyzer. (Hunger)

Fig. 7 Frequency of cry on AUDACITY software. (Hunger)

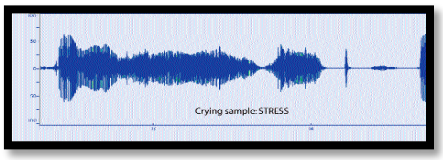

Fig. 8 Frequency of cry on Why Cry Analyzer. (Stress)

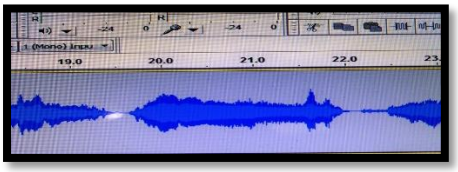

Fig. 9 Frequency of cry on AUDACITY software. (Stress)

Discussion:

This study aimed at to analyse the type & frequency of cry in paediatric endodontic procedure and its variation after audio analgesia as behaviour guidance. The age group selected for this study 4-8 years shows the most disruptive or negative behaviour and are difficult to manage.

The most commonly observed cry during the initial examination was hungry cry accounting for 56.67% cases followed by stressed accounting for 36.67% and bored accounting for 6.66%.This was expected because most of the patients were brought to the department with the chief complaint of pain. The results from the study indicated a positive correlation between Stressed cry and Hunger cry with frightened cry and boredom cry with compensatory cry. Crying is a mode of expression of the personality traits, the crying can be used as an asset in diagnosis.[1].

Following types of cries are commonly encountered

- ✓ Pain cry: This cry is characterised by nonstop and uncontrollable crying which is high pitched and loud.
- ✓ Frightened cry: This cry is characterized by a sharp shrilled extremely high pitched cry followed by small breath catching sobs followed by a sharp shrilled extremely high pitched cry.
- ✓ Obstinate cry: it is loud high pitched & characterized as a siren like wail, a pause and repeated over and over again. This forms a belligerent cry, represents the child external response to anxiety. Child throws a temper tantrum to thwart dental treatment.
- ✓ Compensatory cry: Slow monotonous cry, the crying serves to "compensate" for the noise. It's a kind of coping mechanism to unpleasant stimuli.

Dentists have wide variety of behaviour modification techniques available to them. Distraction techniques which are non-aversive in nature are soon becoming popular.

Distraction techniques involve diverting the patients' attention from perceived unpleasant stimuli. Audio analgesia can be used as a distraction technique to alter the child's behaviour in dental setting. In our study audio analgesia was used a behaviour guidance technique considering cry as a parameter. The choice of music was left to the patients.

According to Klein and Winklestein this will allow the child to gain control over the unpleasant stimulus and give them feeling of being in familiar environment.[5] Other studies suggest that there is a little impact of whether the patient chooses the music themselves or is chosen for them.[6]

Best et al obtained very favourable results in dentistry by supplying music via earphones built into the headrest.[7] Brown et al reported the use of "silent music" to soothe surgical patients.[8] Gardner et al reports that out of1000 dental patients who previously required nitrous oxide or a local anaesthetic, pain relief was fully effective for 65 percent using audio analgesia.[9]

Gardner and Licklider originally listed seven factors contributing to the audio analgesic effect.[5, 9]

1. The noise appears to directly suppress the pain caused by dental operation.
2. The noise removes a source of anxiety by masking the sound of the dental drill.
3. The music, and the noise, which sounds like a waterfall, has a relaxing effect.
4. When both music and noise are presented, the music can be followed only through concentration which distracts attention away from the dental operation.
5. Active participation gives the patient a feeling of control over a situation which formerly seemed completely out of his hands.
6. The dentist can judge the patient's state of anxiety or discomfort by noting whether the patient is using music or noise, and by observing the intensity of each signal.
7. Suggestion.

   Studies of young children (up to age 6 years) undergoing either dental or medical procedures have generally found little or no effect of music on anxiety levels, as manifest in disruptive behaviour or self-report.[10,11] Aitken et al observed that audio distraction did not have a significant effect on reducing anxiety.[10]

The results obtained from our study contradicted these studies.

Music distraction may be helpful as an adjunct along with other behaviour management techniques; hence there is need of more research to be conducted in relation to this study.[12]

Conclusion:

Positive correlation was established between Cry Analyser and clinical diagnosis of type of cry. Audio analgesia proved to be effective method for behaviour guidance. Audio analgesia is not a panacea. While its limitations in use must be recognized, at the same time, its advantages must not be ignored.

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