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Research Article

TO COMPARE AUDIO AND AUDIO TACTILE METHODS IN IMPROVING ORAL HYGIENE STATUS AND TO CHECK THE EFFICACY OF TWO BRUSHING TECHNIQUES IN VISUALLY IMPAIRED CHILDREN

Sreedevi S and Shivaprakash P.K

Department of Pediatric and Preventive Dentistry, P.M.N.M Dental College and Hospital, Bagalkot, Karnataka

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Fones method, Modified Bass method, Health education, oral hygiene, visual impairment

A B S T R A C T

AIM: To evaluate and compare the effectiveness of audio and audio-tactile methods in improving oral hygiene status of visually impaired school children and also to compare the effectiveness of two brushing techniques.

Materials and Methods: Forty eight visually impaired children, aged between 4-15 years were randomly selected.

Baseline Oral hygiene scores were recorded using Simplified Oral hygiene index (OHI-S). These children were randomly divided into four groups – Group A receiving Audio Method along with Fones technique, Group B- Audio method and Modified Bass technique, Group C- Audio tactile method and Fones technique and Group D- Audio tactile method and Modified Bass technique. Re-examination was done after two months to assess oral hygiene scores. Data was statistically analyzed using paired *t*-test.

Results: Both Fones and Modified Bass method showed improvement in oral hygiene with Audio Tactile Performance (ATP) method with a greater efficacy by Fones method which was statistically significant.

Conclusion: Visually impaired children could maintain an acceptable level of oral hygiene when taught using special customized methods like ATP technique. However, reinforcement at regular intervals is required for the maintenance of oral hygiene.

INTRODUCTION

Visual perception is the ability to interpret the surrounding environment using light in the visible spectrum reflected by the objects in the environment. It is also known as eyesight, sight or vision. According to WHO (2017), 253 million people live with vision impairment: 36 million are blind and 217 million have moderate to severe vision impairment.[1,2] Visual impairments vary from total blindness to slight limitations of size, colour, distance and shape.[3,4]

Knowledge of dental health is very important; since it can promote the maintenance of oral health and general health. [5,6] Visually impaired children are at a higher risk of having bad oral health status when compared with that of general population as they have difficulty in accessing dental care.[7,8]

Hence, the present study was planned to compare the best method of tooth brushing in visually impaired children by audio and audio tactile method. The second objective was to assess and compare the simplified oral hygiene index before and after health education.

Corresponding author:* **Sreedevi S
Department of Pediatric and Preventive Dentistry, P.M.N.M Dental College and Hospital, Bagalkot, Karnataka

MATERIALS AND METHODS

Forty eight visually impaired children between ages 4 – 15 yrs were randomly selected from "Sajeevi Blind School", Bagalkot, Karnataka. Among them 26 were boys and 22 were girls. All of them belonged to ICD (International Statistical Classification of Diseases) code: H54.0 group of visual impairment (Blindness, both eyes: Visual impairment categories three, four, five in both eyes) as per the classification of visual impairment by International Statistical Classification of Diseases and related health problems by WHO.[9] Informed consent from parents and school authorities as well as institutional ethical clearance was obtained.

Study Protocol

The study was conducted at 4 stages.

Stage 1 (Interactive session)

On the first day, a series of interactive sessions were conducted in order to create a good rapport with the children in a friendly atmosphere. The personal details of the children were recorded on a proforma which also included their age, gender and method of brushing.

Stage 2 (Recording Baseline scores)

Simplified oral hygiene index (OHI-S) of children was recorded two hours after breakfast, seated on an ordinary chair, under visible daylight using a pen torch, sterile mouth mirror and CPI probe.[10]

Simplified Oral hygiene score was calculated and based on those scores the children were categorized as good (0.0-1.2), fair (1.3-3.0) and poor (3.1- 6.0).

Stage 3 (Demonstration of Brushing technique)

During the health education sessions it was found that they knew the importance of oral health but lacked appropriate knowledge about oral hygiene technique. Hence, it was decided that they required a special health education method by which they could easily master the brushing technique. The children were randomly divided into four groups of 12 members each.

Group A [Audio + Fones Brushing Technique]

Children were educated about the importance of teeth and Fones brushing technique.

Group B [Audio + Modified Bass Brushing Technique]

Children were taught Modified Bass technique instead of Fones technique.

Group C [Audio Tactile Performance + Fones Brushing Technique]

In this group children were educated with a specially designed health education method "Audio tactile performance technique" (ATP), regarding oral hygiene maintenance. The ATP technique incorporates three components namely- Audio, Tactile and Performance. The children were first verbally informed about the importance of teeth and method of brushing (AUDIO). They were made to feel the teeth on a large sized model (TACTILE). The children were then taught to brush on the model with assistance. They were asked to feel their own teeth with their tongue and deposits, if present, were identified with the feeling of roughness. The children were taught to brush their own teeth with assistance (PERFORMANCE).[11] In this group children were taught to perform Fones technique on the model and thereafter on their teeth. This was repeated until the children could perform with ease.

Group D [Audio Tactile Performance+ Modified Bass Brushing Technique]

Similar to Group C, the children were taught to perform Modified Bass brushing technique with Audio Tactile Performance method.

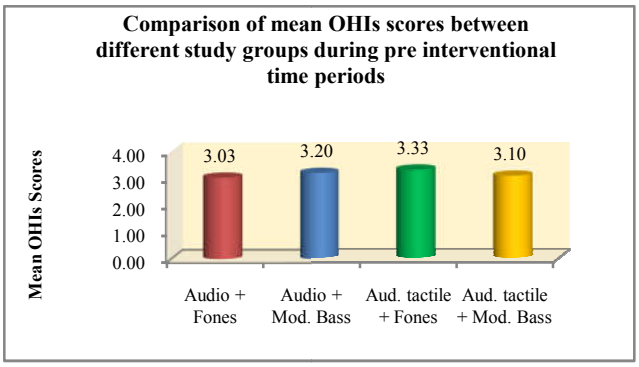
The teachers were asked to supervise the children daily during tooth brushing. They constantly motivated the children regarding the importance of oral hygiene and the correct method of tooth brushing.

Stage 4 (Re evaluation of status of oral hygiene)

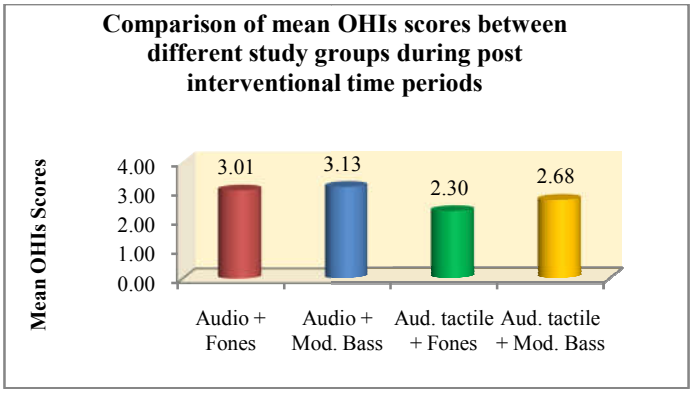
Periodic reinforcement using the same methods was performed at an interval of 2 months to assess simplified oral hygiene scores. The children were asked to recollect from their first oral health education session. Based on that, reinforcement was performed for all the children. All the data obtained were statistically analysed using Student's paired t-test. The difference in oral hygiene scores before and after health education was noted. The statistical significance was evaluated to determine the effectiveness of Audio and Audio tactile methods in training visually impaired children and the efficacy of Fones method & Modified Bass method.

RESULTS

The OHI- S scores of pre interventional time period are represented in Graph 1. The scores of Group A, B, C and D were 3.03, 3.20, 3.33 and 3.10 respectively. All scores were poor before oral hygiene education.



Graph 1 Mean OHI-S scores during pre interventional time period



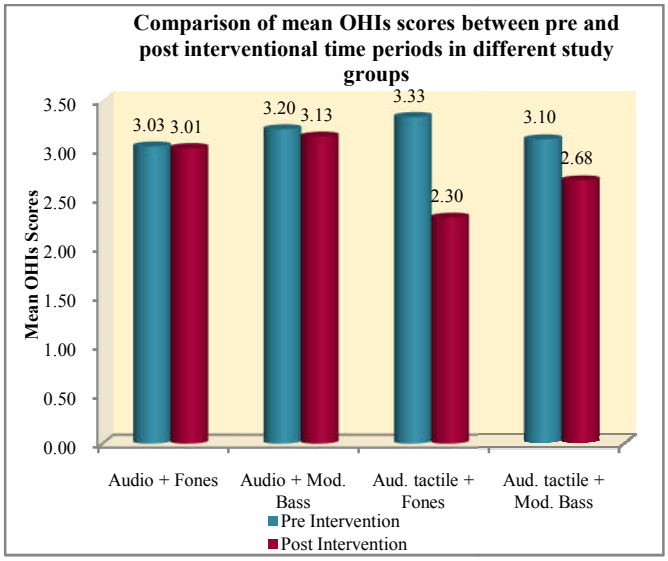
Graph 2 Mean OHI-S scores during post interventional period

Table 1 Comparison of mean OHI-S scores between pre and post interventional time periods

Comparison of mean OHIs scores between pre and post interventional time periods in different study groups using Student paired t test								
S.Group	Time	N	Mean	SD	S.E.M	Mean Diff	t	P-Value
Audio + Fones	Pre	12	3.03	0.87	0.25	0.02	1.483	0.17
	Post	12	3.01	0.89	0.26			
Audio + Mod. Bass	Pre	12	3.20	1.30	0.38	0.08	2.691	0.02*
	Post	12	3.13	1.32	0.38			
Aud. tactile + Fones	Pre	12	3.33	1.47	0.42	1.03	11.646	<0.001*
	Post	12	2.30	1.28	0.37			
Aud. tactile + Mod. Bass	Pre	12	3.10	1.53	0.44	0.42	4.110	0.002*
	Post	12	2.68	1.33	0.38			
* - Statistically Significant								

After health education and tooth brushing training post interventional time period are represented in Graph 2.The scores obtained were 3.01, 3.13, 2.30 and 2.68 respectively. A change from poor to fair was noticed in Group C and D i.e. the Audio Tactile group + Fones technique and Audio tactile group + Modified Bass technique.

Comparison of Mean OHI –S scores between pre and post interventional period are represented in Graph 3.



Graph 3 Comparison of mean OHI-S scores between pre and post interventional time period

The differences were statistically significant as in Table 1.
For Group C (Audio tactile + Fones technique) - p-value <0.001
For Group D (Audio tactile + Modified Bass technique) – p-value 0.002

DISCUSSION

Visual impairment is the loss of vision that varies in degree between individuals which results from disease, trauma, congenital malformations or degenerative conditions.[12,13] These children are challenged in learning everyday skills, maintaining proper oral hygiene being one amongst them. They have been found to have poorer oral hygiene as compared to their sighted peers. Adequate instructions towards proper care of the teeth and oral tissues are essential in these children .[14, 15]

Proper tooth brushing is one of the most effective practices for removing the dental deposits as well as to prevent major dental and periodontal problems. Therefore, the method of tooth brushing has been proved to have a noted impact on the oral hygiene and other dental diseases. It is difficult for the children with visual impairment to brush their teeth properly as they need to place toothbrush at the gum line which can be challenging for them because of the uncertainty of visual clues to locate the gum line.[4, 16]

The children in the present study were in an institutionalised setting, so it was easy for them to learn the brushing technique. Moreover, as the teachers were also given a demonstration about tooth brushing , they were able to provide a positive reinforcement to the children about the importance and the correct method of tooth brushing. The importance of positive reinforcement in improving the oral health status was similarly suggested in a study conducted by Hebbal *et al* where they reported that, meticulous training and reinforcement by health educators leads to success of oral health programs.[17]

In a study conducted by R. Krishnakumar *et al*, it was concluded that visually impaired children could maintain an acceptable level of oral hygiene when taught special customized techniques like Audio tactile technique.[11] Another study conducted by Ambrina Qureshi *et al* concluded that guided manual brushing technique is effective in improving oral hygiene status of visually impaired individuals.[16] Both Fones and Modified Bass method showed reduction in plaque level in visually impaired children in a study conducted by Chrishantha Joybell *et al*.[8]

The results of this study were in accordance with the above mentioned studies. The present study showed that Audiotactile method and health education gave a strong motivation to the visually impaired children. Both Fones and Modified Bass method gave good results, but a greater efficacy was seen in Fones technique. The Modified Bass technique is superior in cleansing the interproximal areas & gingival third of tooth surfaces.[18, 19] But Fones method was easily understood and remembered by the children.[20] The present study showed that health education and use of manual tooth brush was effective in improving the oral hygiene of visually impaired children by the introduction of ATP technique.

Limitations of the Study

Children at ages 4, 7, 12 and 15 differ in their cognitive ability and manual dexterity to perform tooth brushing. Since tooth brushing is a fine motor activity younger children cannot perform it completely without assistance. The time taken by each child for tooth brushing everyday differs, which can also be considered as a limitation of the present study.

CONCLUSION

Both Fones method and Modified Bass method of tooth brushing were effective in improving the oral hygiene of visually impaired children when it was taught using Audio Tactile Performance (ATP) technique. But the best result was given by Fones method of toothbrushing using ATP technique because it was easier to perform and remember.

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