

Oral Hygiene Needs of Special Children and the Effects of Supervised Tooth Brushing

Radhika Lamba¹, Harsh Rajvanshi², Zeeshan Sheikh³, Manpreet Khurana⁴, Rooposhi Saha⁵

¹Student, Department of Pedodontics and Preventive Dentistry, ITS Centre for Dental Studies and Research, Muradnagar, Uttar Pradesh, India, ²Intern, Department of Pedodontics and Preventive Dentistry, ITS Centre for Dental Studies and Research, Muradnagar, Uttar Pradesh, India, ³Post Doctoral Clinician Fellow, Faculty of Dentistry, University of Toronto, Toronto, Canada, ⁴Post-graduate Student, Department of Public Health Dentistry, ITS Centre for Dental Studies and Research, Muradnagar, Uttar Pradesh, India, ⁵Reader, Department of Pedodontics and Preventive Dentistry, ITS Centre for Dental Studies and Research, Muradnagar, Uttar Pradesh, India

Abstract

Introduction: Individuals with disabilities comprises 10% of the total population in developed countries and 12% in developing countries. Providing both primary and comprehensive preventive and therapeutic oral health care to individuals with special health care needs is an integral part of pediatric dentistry specialty. The aim of this study was to assess the oral hygiene status before and after supervised tooth brushing education among institutionalized differently abled children between the age of 6 and 18 years.

Materials and Methods: The oral health status was assessed for 60 children with physical and mental disabilities from a special need school in India. The Fone's/circular scrub method of tooth brushing was taught. Oral hygiene was assessed before tooth brushing education and again after 15 days expecting a distinct and significant improvement in the oral hygiene post health education. Caries index, plaque accumulation, and gingival health were assessed using decayed, missing and filled teeth index, plaque index, and gingival index, respectively.

Results: The effect of supervised tooth brushing and changes in the plaque and gingival index in mentally challenged children were statistically insignificant. The effect of supervised tooth brushing and changes in the plaque and gingival index in children with cerebral palsy were also insignificant. The group with orthopedic disability and hearing impairment showed vast improvements in their gingival and plaque index readings and significance improvement was also observed in the group with autistic children.

Conclusion: The disabled groups showed poor oral hygiene even after the education which may be attributed to the lack of coordination, understanding, physical disability or muscular limitations. More attention needs to be given to the long-term dental needs of these special children through accurate disease detection, diagnosis, prevention through habit forming and relevant treatment interventions.

Key words: Disabled children, Oral hygiene, Special needs children, Tooth brushing

INTRODUCTION

According to World Health Organization, individuals with disabilities comprises 10% of the total population in developed countries and 12% in developing countries.¹⁻³ According to the United Nations, 80% of all individuals with a disability live in developing countries.^{4,5} The

American Health Association defines a child with disability as a child, who, for various reasons, cannot fully make use of all his or her physical, mental, and social abilities⁶⁻⁸ – in other words, a child who cannot play, learn, or do things that other children can of similar age. Children with disabilities have been shown to have poorer oral health than their non-disabled counterparts.^{4,9,10} Variable access to dental care, inadequate oral hygiene, and disability-related factors could be the few main reasons for this observation.^{11,12} The type of dental care received is determined more by the disability than the oral condition, which compounds the chronicity of dental disease.^{10,13} Multiple factors including disability type and institutionalization can contribute to the observed oral health status.^{14,15}

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Corresponding Author: Harsh Rajvanshi, 12/44, Vasundhara, Ghaziabad - 201 012, Uttar Pradesh, India. Phone: +91-9582117261.
 E-mail: rajvanshiharsh@gmail.com

The American Academy of Pediatric Dentistry (AAPD) recognizes that providing both primary and comprehensive preventive and therapeutic oral health care to young individuals with special health care needs (SHCN) also referred to as “The Special Child” is an integral part of the specialty of pediatric dentistry.¹⁶ The AAPD defines SHCN as “any physical, developmental, mental, sensory, behavioral, cognitive, or emotional impairment or limiting condition that requires medical management, health care intervention, and/or use of specialized services or programs.”¹⁷ The condition may be congenital, developmental, or acquired through disease, trauma or environmental cause and may impose limitations in performing daily self-maintenance activities or substantial limitations in major life activity.¹⁸ Health care for individuals with special needs requires specialized knowledge acquired by additional training, as well as increases awareness and attention, adaptation, and accommodative measures beyond what are considered as routine.¹⁹

Oral health is an integral part of overall well-being.²⁰ Individuals with SHCN are at an increased risk of developing oral diseases throughout their lifetime.²⁰⁻²² These individuals are also at a risk of developing systemic complication arising from oral diseases such as compromised immunity, endocarditis, etc.²³ The patients with mental, physical, or developmental disabilities who do not have the ability to understand, assume responsibility for, or cooperate with preventive oral health practices are susceptible as well.²⁴ The aims and objectives of this study were to assess the oral hygiene status before and after supervised tooth brushing education among institutionalized children with special needs of 6-18 years of age.

MATERIALS AND METHODS

The study was conducted under the aegis of ITS Dental College, Muradnagar, India. A total of 60 subjects between the ages of 6 and 18 years were selected for the study attending “Bhagirath Special School for Differently Abled Children,” Ghaziabad, India (Figure 1). The participants were divided into five groups depending upon their disability, as follows: (1) Mentally challenged ($n = 29$); (2) cerebral palsy ($n = 2$); (3) orthopedic disabled ($n = 9$); (4) hearing impaired ($n = 17$); (5) autistic ($n = 3$), where “ n ” is equal to the number of participants. Approval from Ethical Committees and informed consent was taken from the chief inspector of the school along with the principal of our institution for conducting the study. The aim and procedure of the study were explained thoroughly to the concerned authorities. Dental examinations were done by a single examiner in school where the subject was seated

on a simple chair under natural light as the illumination source. The participants did not have their teeth brushed or professionally cleaned before the examination. Dental examinations were done using a mouth mirror and probe in accordance with the World Health Organization criteria and methods.²⁵ The total number of decayed, missing and filled primary, and permanent teeth (decayed, missing, and filled teeth (dmft), DMFT - 1997) were recorded for each subject.²⁶ No radiographic examination was undertaken. The Silness and Loe index (1964) was evaluated visually by assessing the buccal and lingual surfaces of the teeth.²⁷ Gingival index (1963) was also taken and recorded for each subject.²⁸ Following these indices, an oral hygiene importance and instructional talk along with teaching the subjects the Fone’s/Circular scrub method²⁹ of tooth brushing on a study models was performed (Figure 2). The supervising staff was also given oral health instructions and asked to ensure the practice of the taught technique amongst the children. Free samples of oral hygiene aids in the form of tooth brushes and fluoridated toothpastes were distributed (Figure 3). A subsequent visit was



Figure 1: Front of the school



Figure 2: Education about tooth brushing method



Figure 3: Free toothpaste sample distribution

made after 3 months, and all the above said procedures (examinations and oral hygiene instructions) were repeated. Statistical analysis was carried out using the Statistical Package for Social Sciences (SPSS), Version 19.0. Armonk, NY: IBM Corp. Student's paired *t*-test was used to determine significant differences in data with the *P*-value set at 0.05.

RESULTS

The effect of supervised tooth brushing and changes in the plaque and gingival index in mentally challenged children were statistically insignificant ($P = 0.058$ and 0.187 , respectively) (Table 1). The effect of supervised tooth brushing and changes in the plaque and gingival index in children with cerebral palsy were also insignificant ($P = 0.205$ and 0.090 , respectively) (Table 2). The group with an orthopedic disability (Table 3) and hearing impairment (Table 4) showed vast improvements in their gingival and plaque index readings ($P < 0.001$). Significance improvement was observed in the group with autistic children after oral hygiene instructions and the improved tooth brushing technique being employed ($P = 0.034$ and 0.026) (Table 5).

DISCUSSION

Oral disease represents a major health problem among individual with disabilities.²⁰⁻²² The prevalence and severity of these diseases are much higher as compared to general population.^{3,20} Poor oral hygiene was observed in the special children that were part of this study. This observation may be attributed to the reduced physical and mental abilities of these individuals and consequent difficulties in tooth brushing. Proper behavioral and habitual management are required in dealing with such cases. Oral health status and maintenance may be affected detrimentally by poor communication skills,³⁰ diminished motor skills,³¹ the

impact of anticonvulsant medications on gum health,³² self-mutilating behaviors (excessive tooth grinding/bruxism), cariogenic effect of medicines with high sugar content, and parents having difficulty in carrying out regular oral hygiene measures.³³

The oral hygiene condition noted during an initial examination in our study for subjects was very poor. Upon supervised brushing and providing oral hygiene instructions to the patients and their care providers, significant improvement was noticed in children with orthopedic disabilities and hearing impairments. Improvements were also observed in autistic children (although the sample size for autistic subjects was extremely low, and future studies with an increased cohort would be required to show definitive results). Children suffering from mental challenges and cerebral palsy did not show any significant improvement in oral hygiene status. This gives a clear indication that just providing instructions is not sufficient enough to improve their oral hygiene.

There is a need for the development of more clear and the efficient methods for improving oral health in such individuals to achieve a more sustainable and long-term effect. The results from our study indicate that children with special needs that were orthopedic limitations and difficulties showed an improvement after oral hygiene instructions were provided and tutorials on improved brushing techniques conducted. Conversely, children with reduced mental and/or motor skills did not show any considerable improvements in oral hygiene. It seems that learning difficulties and the inability to properly control the tooth brush to provide adequate cleaning of teeth is to be blamed. These children require not only supervised brushing and oral hygiene care, but also regular dental visits and help with tooth brushing using electronic brushes.

Our study shows that children who were more dependent on care providers for oral hygiene maintenance activities to have poorer oral health status. It has also been previously shown that children requiring tooth brushing assistance have poorer oral hygiene and more periodontal disease than those able to brush their teeth, reflecting the inadequacy or discrepancy in the efficiency with which oral care may be provided by care providers.³⁴⁻³⁶ In assessing the oral health status of those with disabilities, it seems that the functional ability may be more important than the medical diagnosis.^{31,37-39} The severity of the disability and its effect on the child's ability to accept dental treatment or the use of preventive measures can also influence disease more than the disability.^{7,40-43}

Table 1: Relationship between effects of supervised tooth brushing and changes in the plaque and gingival index in mentally challenged children

Index	Paired differences					t	Significance (two-tailed)
	Mean	Standard deviation	Standard error	95% confidence interval of the difference			
				Lower	Upper		
PI ₂ -PI ₁	0.00929	0.02478	0.00468	-0.00032	0.01890	1.982	0.058
GI ₂ -GI ₁	0.00500	0.01953	0.00369	-0.00257	0.01257	1.355	0.187

PI₁: Plaque index recorded before tooth brushing education, PI₂: Plaque index recorded after tooth brushing education, GI₁: Gingival index recorded before tooth brushing education, GI₂: Gingival index recorded after tooth brushing education

Table 2: Relationship between the effects of supervised tooth brushing and changes in the plaque and gingival index in children with cerebral palsy

Index	Paired differences				t	Significance (two-tailed)	
	Mean	Standard deviation	Standard error	95% confidence interval of the difference			
				Lower			Upper
PI ₂ -PI ₁	0.6000	0.2828	0.2000	-1.9412	3.1412	3.000	0.205
GI ₂ -GI ₁	0.17500	0.03536	0.0250	-0.14266	0.4926	7.000	0.090

PI₁: Plaque index recorded before tooth brushing education, PI₂: Plaque index recorded after tooth brushing education, GI₁: Gingival index recorded before tooth brushing education, GI₂: Gingival index recorded after tooth brushing education

Table 3: Relationship between effects of supervised tooth brushing and changes in the plaque and gingival index in children with orthopedic disability

Index	Paired differences					t	Significance (two-tailed)
	Mean	Standard deviation	Standard error	95% confidence interval of the difference			
				Lower	Upper		
PI ₂ -PI ₁	0.71556	0.31093	0.10364	0.47655	0.95456	6.904	0.000
GI ₂ -GI ₁	0.40667	0.11325	0.03775	0.31962	0.49372	10.773	0.000

PI₁: Plaque index recorded before tooth brushing education, PI₂: Plaque index recorded after tooth brushing education, GI₁: Gingival index recorded before tooth brushing education, GI₂: Gingival index recorded after tooth brushing education

Table 4: Relationship between effects of supervised tooth brushing and changes in the plaque gingival index in children with hearing impairment

Index	Paired differences				t	Significance (two-tailed)	
	Mean	Standard deviation	Standard error	95% confidence interval of the difference			
				Lower			Upper
PI ₂ -PI ₁	0.75294	0.30118	0.07305	0.59809	0.90779	10.308	0.000
GI ₂ -GI ₁	0.46588	0.13440	0.03260	0.39678	0.53498	14.292	0.000

PI₁: Plaque index recorded before tooth brushing education, PI₂: Plaque index recorded after tooth brushing education, GI₁: Gingival index recorded before tooth brushing education, GI₂: Gingival index recorded after tooth brushing education

Table 5: Relationship between effects of supervised tooth brushing and changes in the plaque and gingival index in autistic children

Index	Paired differences					t	Significance (two-tailed)
	Mean	Standard deviation	Standard error	95% confidence interval of the difference			
				Lower	Upper		
PI ₂ -PI ₁	1.53000	0.50090	0.28919	0.28570	2.77430	5.291	0.034
GI ₂ -GI ₁	0.74667	0.21079	0.12170	0.22303	1.27030	6.135	0.026

PI₁: Plaque index recorded before tooth brushing education, PI₂: Plaque index recorded after tooth brushing education, GI₁: Gingival index recorded before tooth brushing education, GI₂: Gingival index recorded after tooth brushing education

Future Directions

Oral health awareness programs should be aimed specifically toward the improvement of oral hygiene in children with special needs. Personnel working at special needs schools and parents of disabled children need to be educated and made aware to the long-term importance of maintaining good oral hygiene in these children. The dental team should plan on providing comprehensive school-based initiatives and workshops, including oral health education to help children develop skills, provide fluoride supplements and sealants, offer dietary and nutrition counseling to promote oral health. Primary health care providers may influence access to dental care by assessment of oral health assessment dental referral. An epidemiological survey followed by the implementation and evaluation of a long-range public dental healthcare plan for children with disabilities and special needs is urgently required.

CONCLUSION

The subjects studied in the disabled groups showed poor oral hygiene even after the education which may be attributed to the lack of coordination, understanding, physical disability, or muscular limitations. Although improvements were observed in some of the groups, the results still highlight the urgent need for further work in this field. More attention is required directed toward the fulfillment of long-term dental needs of these special children through accurate disease detection, diagnosis, prevention through habit forming and relevant treatment interventions.

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