



Prevalence of Malocclusion among Children with Special Health Care Needs and the Awareness of Their Parents towards Pediatric Orthodontic Care

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Authors' contributions

This work was carried out in collaboration between all authors. Authors AMH, AAS and NL designed the study, analyzed the findings and reviewed the manuscript. Author DJN collected the data did the statistical analysis, wrote the first draft of the manuscript, reviewed and prepared the manuscript for submission. Author HSN collected the data, managed the literature searches and reviewed the manuscript. All authors read and approved the final manuscript.

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ABSTRACT

Aims: Children with special health care needs often have poor oral health and depend on caregivers for oral care. This study looked at the prevalence of malocclusion among a group of such children and the awareness of pediatric orthodontic care among their parents

Methodology: Clinical examination of 100 children aged 7-18 years who were physically/ mentally challenged or with speech or hearing deficits was carried out in a school. A validated questionnaire was given to 52 parents

Results: Class I malocclusion was seen in 77.8%, Class II in 6.1% and Class III in 8.1%. Other findings were anterior crowding (43%), spacing (19%), deep bite (12%), open bite (6%) and cross bite (10%). Class I malocclusion was most common in all the three groups (p=0.144); physically challenged (73.3%), mentally challenged (82.8%), speech and hearing disorders (76.4%). Other

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abnormalities in the above groups in order with the 'p' value are as follows.; spacing (12.5%,31%,14.5%,p=0.144); crowding (50%,37.9%,43.6%,p=0.729); open bite (6.3%,6.9%,5.5%,p=0.790); deep bite (18.8%,0%,16.4%,p=0.060). 69.2% of the parents were not aware of these abnormalities. Due to malalignment, 57.7% of the parents were not able to maintain oral hygiene. Though 53.8% preferred correction, only 51% were aware of the treatment options. The reasons for not obtaining treatment were the cost (55.1%), coping issues (24.5%) and lack of access (8.2%).

Conclusion: Some form of malocclusion is prevalent in children with special health care needs, Class I malocclusion, anterior crowding and spacing being more common. Majority of the parents were not aware of the abnormalities and the barriers to treatment were affordability, lack of access and the coping issues. Creating awareness among caretakers and making the treatment more accessible will improve oral health of children with special care needs.

Keywords: Malocclusion; parental awareness; pediatric orthodontic care; special care children.

1. INTRODUCTION

Children with special health care needs (CSHCN) are defined as, 'those who have or are at increased risk for a chronic physical, developmental, behavioural or emotional condition and who also require health and related services of a type or amount beyond that required by children generally.' [1,2] WHO estimated that individuals with disabilities comprise nearly 10% of the population in developed countries and about 12% in the developing countries [3]. In India, it is estimated that about 6–10% of children born have special health care needs [4].

Children with special health care needs are seen to have poorer oral health status than their otherwise healthy counterparts. Dental caries, periodontal disease, missing teeth, prolonged retention of primary teeth, delayed eruption of both primary and permanent teeth, supernumerary teeth and malaligned teeth leading to various malocclusions are frequently seen in this population. Poor oral health status, in turn, has a deleterious impact on nutrition, facial aesthetics, speech and overall growth and development of these children [3].

The term malocclusion is defined as, 'any teeth or dental arch anomalies that can cause aesthetic discomfort or functional incapacities.' Malocclusion is quite common in various populations and is considered to be more of a morphological variation than a pathological condition.[5] The risk factors for malocclusion can originate from various physical, behavioural or other disease mechanisms. Some individuals are genetically susceptible to malocclusion. Other factors may include premature loss of teeth, missing teeth, the discrepancy in the jaw and tooth size, deleterious habits, certain

diseases like congenital malformations, musculoskeletal disorders or oro-facial dyskinesias [6].

Malocclusions with the malaligned teeth make maintenance of oral hygiene difficult predisposing these individuals to dental caries and periodontal disease. These children are incapable of identifying dental disease early. Not only that, teeth especially the anterior ones are vulnerable to traumatic injuries. Moreover, malocclusions can further alter the masticatory function, cause speech deficits and temporomandibular joint abnormalities. They are often dependent on parents, siblings or caregivers for general care including oral health. Unfortunately, the caregivers are more focused on improving the general health of the child and may not consider oral health that important [7]. Thus, oral health care is one of their greatest unmet needs [4].

The dental issues of CSHCN have to be identified for ensuring adequate care that can help them in overcoming their difficulties. This will improve both their development and quality of life. Thus, this study was undertaken to analyze the prevalence of malocclusion among a group of children with special health care needs and also to assess the awareness among their parents towards pediatric orthodontic care.

2. MATERIALS AND METHODS

The study population consisted of 100 children in the age group of 7-18 years attending the Mangal Jyothi Integrated School, Mangaluru, India. Fifty-two parents of these children were also included in the study to assess their awareness regarding pediatric orthodontic care. Ethical clearance from the institution's ethics board and permission from the school authorities

were obtained prior to the study. Children who were physically or mentally challenged or who had any speech or hearing deficits were selected for the study. Children who had any other systemic diseases, other disabilities or those who were uncooperative were excluded from the study.

The clinical examination of the children was carried out within the school premises on a simple chair, in natural daylight with a sterile mouth mirror and an explorer. Before the start of the examination, each instrument and its uses were explained to the child. The children were also allowed to handle the instruments so as to get a feel of it and this ensured their cooperation during examination. The clinical examination was carried out by a single person well trained in the evaluation of orthodontic care and community dental assessments while the other documented the findings and the demographic data. Parents of these selected children were invited to visit the school and their awareness was assessed after obtaining consent to participate in the study. Occlusion was assessed through manipulation of the jaws to obtain centric occlusion. Class I, II and III malocclusion based on Angle's classification were identified. In addition, anterior crowding, anterior spacing, open bite, deep bite, and cross bite were also looked for. The malocclusion status of the whole population was assessed. However, no correlation between the type of disability and its influence on the malocclusion status was attempted.

A validated questionnaire was given to the parents to assess their knowledge and awareness about the existence of malocclusions

in their children and the need for pediatric orthodontic care. Eight questions were included with a simple yes or no response. The questions were related to recognition of any abnormalities in the appearance or functioning of their child's teeth, preferences in getting the abnormality corrected, awareness on the available treatment options, access to such care, the reasons for not seeking treatment, personal experience of orthodontic treatment and maintenance of oral hygiene practices in their child. The questionnaire was constructed as per the standard norms [8]. It was then validated by doing a pilot run on 10 parents on an earlier visit and later modified by correcting the ambiguities.

After the dental examination and questionnaire survey, a health education talk was given to the children and their parents stressing upon the various malocclusions and the need for its correction. All data obtained was statistically analyzed using descriptive statistics and cross tabulation using the SPSS package version 23.

3. RESULTS AND DISCUSSION

The study population consisted of 100 children aged 7-18 years and 52 parents. The children included had some form of physical, mental or speech and hearing disabilities. There were 16 (16%) children with physical handicap, 29 (29%) with mental disability and 55 (55%) with speech or hearing disability. The proportion of boys (51%) and girls (49%) was more or less similar. The mean age of the children was 11.05 ±4.2 years. The demographic features are given in Table 1.

Table 1. Demographics of the study groups

	Characteristics	n	%
Gender	Male	51	51
	Female	49	49
Disability	Physical	16	16
	Mental	29	29
	Speech & Hearing	55	55
Age	<10 years	41	41
	10 – 15 years	43	43
	>15 years	16	16
Paternal Literacy	No formal education	6	11.5
	Up to 10 th Standard	27	51.9
	12 th standard or above	19	36.5
Maternal Literacy	No formal education	13	25
	Up to 10 th Standard	31	59.6
	12 th standard or above	8	15.4
Family Type	Nuclear	38	73.1
	Extended	13	25

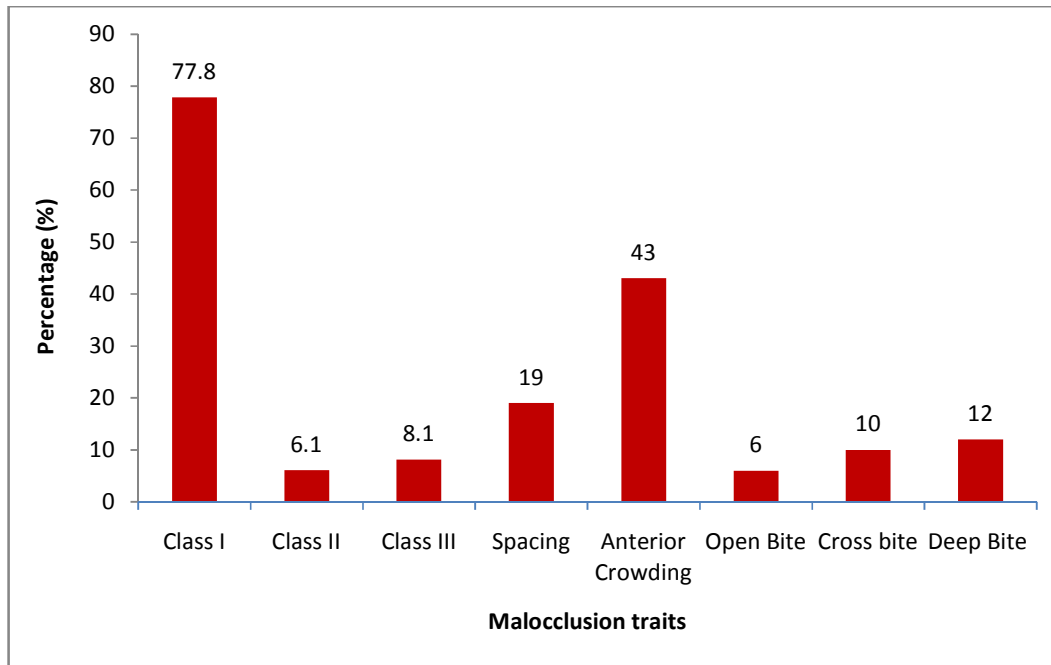


Fig. 1. Status of malocclusion among the study population

In the overall study population, Class I malocclusion was seen in 77.8% of the children followed by Class III in 8.1% and Class II in 6.1%. Anterior crowding was present in 43% of these children while spacing was seen in 19%. Deep bite was observed in 12% of the children while open bite was seen among 6% of them. Cross bite was noted in 10% of these children. (Fig. 1.).

Among the physically challenged children, Class I (73.3%) was the most prevalent abnormality while open bite was the least prevalent with only

6.3% of the children exhibiting this trait. Class I remained the most prevalent trait among the mentally challenged children with 82.8% of them manifesting it. Deep bite was not found among the mentally challenged children. In children with speech and hearing disorders, Class I malocclusion was widely seen (76.4%) while both Class II malocclusion and open bite were the least prevalent. Table 2 shows the malocclusion status among the three groups of disabilities. There was no statistically significant difference in the malocclusion status among the children in these three groups of disabilities.

Table 2. Distribution of the children exhibiting various traits of malocclusion among the three groups of disabilities

	Disability						P value
	Physical (n=16)		Mental (n=29)		Speech & Hearing (n=55)		
	n	%	n	%	n	%	
Class I	11	73.3	24	82.8	42	76.4	
Class II	1	6.7	2	6.9	3	5.5	.14
Class III	2	13.3	1	3.4	5	9.1	
Spacing	2	12.5	9	31	8	14.5	.14
Crowding	8	50	11	37.9	24	43.6	.73
Open bite	1	6.3	2	6.9	3	5.5	.97
Cross bite	2	12.5	2	6.9	6	10.9	.79
Deep bite	3	18.8	0	0	9	16.4	.06

Table 3. Table showing the questionnaire response of the parents and their awareness towards pediatric orthodontic treatment

S.No	Questions	Percentage response	
		YES	NO
1	Awareness of any abnormalities in the teeth	30.8	69.2
2	Awareness of any crooked or protruding teeth	51.9	48.1
3	Preferred correction of the teeth	53.8	46.2
4	Awareness of available treatment options for the correction of malaligned teeth	49	51
5	Access to such facilities	52.9	27.5
6	History of orthodontic treatment among parents	29.4	70.6
7	Ability to maintain oral hygiene	42.3	57.7

A total of 52 parents participated in the questionnaire survey. Most of the parents who attended were females (94.2%). Majority, 69.2%, of the parents reported that they were not aware of any abnormalities in their child's teeth while only 30.8% could identify such abnormalities. (Table 3). However, when asked specifically if their child's teeth were crooked or protruding, a vast majority provided a positive response (51.9%). Many (53.8%) parents wanted their child's teeth to be corrected while only 46.2% of them thought that their child's teeth were acceptable as they were. 57.7% of the parents also reported that they were not able to maintain the necessary oral hygiene in their children due to the altered alignment of the teeth.

Only 51% of the parents were aware of the orthodontic treatment options for the correction of such abnormalities. While 52.9% of the parents had access to such orthodontic treatment facilities, 19.6% did not know about the existence of such services in their locality. Parents reported numerous reasons for not obtaining treatment for the malocclusions. While 55.1% of the parents felt that the treatment was expensive, 24.5% of them felt that their child will not be able to cope up. 8.2% of them reported lack of access to such treatment facilities as their reason for not obtaining treatment while 12.2% of the parents did not know about the available treatment facilities. Majority of the parents were educated till 10th standard; 59.6% of the mothers and 51.9% of the fathers. 11.5 % of the male and 25% of female parents did not receive any formal education. Parents literacy was not related to the awareness of abnormalities ($P=.19$) or the knowledge of the available treatment options ($P=.35$)

3.1 Discussion

Children with special health care needs often have poor oral health status, with a detrimental

impact on nutrition, facial aesthetics, speech and overall development. They are dependent on caregivers whose knowledge and attitudes goes a long way in seeking specialist care. In the present study, Class I malocclusion was the most prevalent occlusal finding followed by anterior crowding, least common one being open bite. We also found that most of the parents were not aware of the abnormalities in their child's teeth. Even though some parents desired treatment for the same and had access to such facilities, majority felt that it was expensive.

Class I malocclusion was the most prevalent abnormality among the three groups of disabilities examined. Open bite was the least prevalent among physically challenged and in those with speech and hearing deficits. Interestingly, deep bite was not found in the mentally challenged children. Prevalence of poor oral health status and malocclusions in CSHCN have been reported worldwide with different frequencies. Similar to our results a higher prevalence of Class I malocclusion (83.3%) was reported from Nigeria in these group of children [7]. Forty percent of 1621 children from Iran had malocclusions with Class I in 57%. Class II malocclusion was seen more in mentally retarded and visually impaired children [9]. However, in a similar study concerning the different malocclusion traits the prevalence of anterior crowding (27.37%) and Class I malocclusion (14.34%) were much lower than that found in our group [2]. Purohit et al reported a significantly higher prevalence of malocclusion, caries and poorer periodontal status in CSHCN as compared to healthy controls. They noted malocclusion in 66.4% of the disabled children [4]. Similarly, severe malocclusion was considered to be present in 29 per cent (93 of 322) of the children from Singapore [10]. A study from Columbia reports mild to severe anomalies in 88.1% of the CSHCN, half of them as occlusal

anomalies, one-third as space discrepancies, and one-fifth as dental anomalies [11]. Pini et al noted Class I malocclusion in 48.9% with poor oral hygiene in 53.2% and a high dental caries index [12]. In an extensive review of available literature, the authors report 27% to 97% prevalence of malocclusion in children with different disabilities [6]. Children with neuropsychological disabilities were found to have a higher rate of malocclusion (75.9%) than other group of disabilities, open bite (25%), increased overjet (18.8%) % and deep bite 10.7% being more common [13].

Among the malocclusions studied, cross bites are the only ones that demand immediate treatment because it does not self-correct and creates skeletal alterations that make it difficult for later correction. Anterior crowding may result in an early establishment of proximal contacts, resulting in an increased risk for initiation of proximal carious lesions. The vertical problems (open bite and deep bite) should be registered and the parents should receive orientation regarding the evolution and time for orthodontic treatments. Usually, open bite arising from sucking habits may be self-corrected by ceasing the habit [5]. Oral health and quality oral health-care contribute to an overall health status, which is more of a right than a privilege [2]. The multitude of disabilities in children with special health care needs should not be a barrier to receiving the necessary orthodontic care [7].

There are numerous barriers to receiving oral health care, the most important being the low priority placed on oral health by parents. The National Survey of Children's Health from the US showed that despite improvements in access to preventive care, gaps in dental health for CSHCN are based on income level, parent education, and having dental insurance coverage [14]. The percentage of guardians that selected irregular teeth and a wish for their child to look 'pretty' as reasons for seeking orthodontic treatment were 77 and 54, respectively [15]. The parents, who were former orthodontic patients, were more concerned about their child's dentofacial health [16,17]. A report from a private institution, patronized mostly by parents from the upper and middle socioeconomic status showed a better exposure to oral health care services than those subjects from public schools. This shows that the educational status of parents has a positive effect on the dental care of CSHCN [7]. Most parents thought that orthodontic treatment

was difficult to obtain, expensive and that their child would find difficulty in coping with the treatment [18]. Studies have shown that parents' motivation is not the only factor in initiating orthodontic treatment. But, the need for the treatment has to be considered important by the parents rather than by the child. The current study, however, found that that most of the parents were not aware of the abnormalities in their child's teeth. This lack of awareness was not related to their literacy or the occupational status. Even though some parents wanted corrective treatment and had access to such facilities, majority of them felt it was expensive and was beyond their means.

In these children, oral health-related problems can co-exist with the medical condition. The consequences of the unmet oral health care needs include infection of the oral tissues, negative behaviour and aggravation of concomitant medical conditions. Therefore the care offered by health professionals should be integral and multidisciplinary, especially in encouraging the guardians to seek dental care for younger children, when preventive procedures are still possible [2].

4. CONCLUSION

Some form of malocclusion is prevalent in children with special health care needs, Class I malocclusion, anterior crowding and spacing being more common. Majority of the parents were not aware of the abnormalities and the barriers to treatment were affordability, lack of access and the coping issues. Early identification and interception is the key to avoid the burden of oral health disease to their already existing medical condition. Creating awareness among caretakers and making the treatment more accessible may go a long way in improving oral health of children with special care needs.

CONSENT

As per international standard or university standard, patient's written consent has been collected and preserved by the author(s)

ETHICAL APPROVAL

Ethical clearance from the ethics board of A.B.Shetty Memorial Institute of Dental Sciences and NITTE University were obtained prior to the study.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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