Determination of Dentofacial deformities & orthodontic treatment requirement in differentially abled children using IOTN

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ABSTRACT

Introduction: *Present study focuses in an insight into the prevalence and severity of different malocclusions in differentially abled children and adolescents and assessment of treatment needs using IOTN index.*

Methodology: *The mean age of the evaluated students (n=171) was 15.2+/- 1.6 years, with 79.3% ranging from 12 to 17 years old. Randomly selected sample consisted of mental retardation, locomotor disabled, speech disabled, vision disabled, hearing disabled and syndromic. Prevalance and treatment requirement was determined using six malocclusion parameters. Statistical analyses were carried out by using SPSS (Version 11.5, SPSS, Chicago USA). Chi-square test was used to determine if there were significant differences in the distribution of orthodontic problems according to age and sex of students.*

Results: *Chi Square value ($p < 0.05$) for six disabilities does not show a significant difference between male and female patients. No significant difference was observed between male and female patients in relation to prevalence of Class I, II & III malocclusion among loco-motor disability, vision disability, hearing disability and syndrome disability groups. Contrary to this, statistically significant difference was observed between male and female patients with respect to presence of Class I, II & III malocclusion among mentally retarded and speech disabled group. Chi square values ($p < 0.05$) for distribution of Altered Eruption, Impaction, and Cleft among six groups of disabilities do not show a significant difference between male and female patients. Treatment need score of six group of disabilities ranged from 3 (borderline need) to 5 (definite need) irrespective of age and sex.*

Conclusion: *Differentially abled children definitely have special orthodontic need in comparison to their normal counterparts and require similar attention and treatment without prejudice and discrimination.*

Key Words: *IOTN, Syndrome, Differentially abled children*

INTRODUCTION

'Special needs' is a term, which is used to describe individuals who require assistance for disabilities that may be physical, mental, or psychological. According to "Equal Opportunities, Protection of Rights and Full Participation" Act, 1995 as well as under the Rehabilitation Council of India Act, 1992, *"Person with Disability"* means a person suffering from not less than forty percent of any disability certified by a medical authority. *"Mental Retardation"* as defined in the Act, means a condition of arrested or incomplete development of mind of persons characterized by sub-normality of intelligence.[1]

On the basis of Intelligence Quotient (IQ) levels, categorization of mental retardation is as follows: a. Mild IQ 50-70 (Educable) b. Moderate IQ 35-49 (Trainable) c. Severe IQ 20-34 (Basic training) d. Profound IQ under 20 (under constant custody). Prevalence of mental retardation is 3% all over the world. However 75% of them fall into mild mental retardation category, while the rest 25% have IQ of below 50. Severe mental retardation is relatively uncommon.[2]

India is in the process of refining the procedure by which children with special needs can be identified. The first attempt in this regard was made during the national policy on education 1986 and plan of action 1992. It estimated the number of school going children with special needs as around 15.06 million, including 3.6 million mentally retarded children and 3.19 million children with physical disabilities in the age group of 5-14 yrs.[3] The data indicates that there are an increasing number of children with special needs in India, who may well be in need of orthodontic services. Such children occur in families irrespective of the socio-economic strata, caste, religion and education,

Children with special needs exhibit a higher percentage of malocclusions and craniofacial deformity than the normal population. This is related to more frequent abnormal growth and development, higher incidence of abnormal tongue posture and oro-facial muscular disturbances. A higher incidence of traumatic injuries is also prevalent in patients with special needs as a result of ambulatory problems. In addition, individuals with mental retardation may not comprehend the need for oral hygiene. Individuals

with physical disabilities may lack the dexterity to accomplish the needed oral hygiene.

Lyons[4] in 1951 found an increase in the prevalence of malocclusion in patients with cerebral palsy, but Magnusson (1964)[5] did not support this view. Fishman *et al.*[6] in 1967 reported three times the prevalence of 'definitely handicapping malocclusions' in the cerebral palsy group compared with their siblings. Gullikson[7] in 1969 reported that malocclusion occurs more frequently in children with physical or mental disability than in healthy children. Oreland *et al*[8]. In 1987 reported that investigators into Down's syndrome had found a higher prevalence of pre normal occlusion, independent of the age of the patient. For cerebral palsy the findings are not so consistent. Kleint G, et al[9]. In 2002 showed that mentally and physically handicapped children show motor-sensitivity disturbances and malocclusions of varying severity. These dysfunctions affect the breathing and speech ability and inhibit the food intake. Manish Jain et al[10] in 2009 in highlighted that the oral health status of mentally retarded population was poor and was influenced by etiology of the disability, IQ level and parents level of education.

Though studies have been performed in the past regarding oral findings in differentially abled children, but information is meager on orthodontic problems in these kids, especially in the categories of loco-motor disability, speech disability, vision disability and hearing disability, while only some studies are available on mental retardation and syndromic patients. There has been always a lack of comprehensive literature data regarding orthodontic and dentofacial problems in these kinds of patients so far. In this paper an attempt has been made to provide an insight into the prevalence and severity of different malocclusions in special children and adolescents and assessment of treatment needs using IOTN index.

MATERIAL AND METHODS

The study was performed over the period of 12 months from different centers of ASHA schools managed by AWWA (Army Wife's Welfare Association) for special children in five different cities of the country viz. Lucknow, Jammu, Pune, Delhi and Pathankot. A total of 171 children (79 male and 92 female) of disability groups (Table no 1) were randomly selected and examined. Index of Orthodontic Treatment Needs (IOTN) Index was used for quantitative assessment of treatment needs. The Study had ethical approval from ethical committee of medical branch corps HQ, c/o 56 APO, India

With prior informed consent of parents and written permission from Principal, structured face-to-face interviews were carried out with the caretaker before the respective clinical examination of each student A full medical history was taken, and in some cases patient's pediatricians or psychiatrist was consulted in order to get brief overview of the medical condition.

General extra-oral and intraoral examination was performed for each patient. Single orthodontist throughout the study took standardized orthodontic extra-oral and intra-oral photographs. However oral prophylaxis was done after the examination in required patients by team of dental surgeons. Statistical analyses were carried out by using SPSS (Version 11.5, SPSS, Chicago). Chi-square test was used to determine if there were significant differences in the distribution of orthodontic problems according to age and sex of students. The level of significance was determined at 0.05.

RESULTS

The mean age of the evaluated students (n=171) was 15.2+/- 1.6 years, with 79.3% ranging from 12 to 17 years old. Chi Square value ($p < 0.05$) for six disabilities does not show a significant difference between male and female patients. No significant difference was observed between male and female patients in relation to prevalence of Class I, II & III malocclusion among loco-motor disability, vision disability, hearing disability and syndrome disability groups. (Table 2) Contrary to this, statistically significant difference was observed between male and female patients with respect to presence of Class I, II & III malocclusion among mentally retarded and speech disabled group. ($p > 0.05$)

Chi square values ($p < 0.05$) for distribution of Altered Eruption, Impaction, and Cleft among six groups of disabilities do not show a significant difference between male and female patients. (Graph 1)

The findings show that 60% of patients with mental retardation had class I malocclusion with average IOTN index of 4, which indicates moderate need of treatment. Significant cases showed presence of altered dentition eruption schedule with as high as 34 % of impacted dentition creating problems of over-retained Deciduous teeth and impacted or ectopically erupted permanent teeth.

Malocclusion of class II and class III nature was observed in most of the syndromic patients in equal proportion of distribution, with 60 % showing altered eruption of teeth and more than 30% having impacted dentition. Patients with syndrome also show skeletal disturbances like mid face deficiency and cleft lip and palate, thus worsening their IOTN score as high as 5 (severe need).

Patients with loco-motor, hearing, vision and speech disability had maximum no of class I malocclusion having on an average normal proportion of distribution of malocclusion. However

speech disabled group patient showed as high as 30 % of cleft cases, thus raising their IOTN score up to 4 (moderate need) while other group of loco-motor, vision and hearing disability had IOTN average score of 3 (Border line).

Table I: Age Sex and disabilities wise distribution of sample

Variables	Female		Male		p Value	
	n	*%*	*n*	*%*	*n*	
Age group						
5-20 years	40	58.8	28	41.2	68	0.232
5-15 years	51	49.5	52	50.5	103	
Type of disability						
MR	40	58.8	28	41.2	68	0.668
Loco-motor	12	54.5	10	45.5	22	
Speech	7	43.8	9	56.2	16	
Vision	4	44.4	5	55.6	9	
Hearing	8	40	12	60	20	
Syndrome cases	20	55.6	16	44.4	36	
Treatment index score						
2	8	47.1	9	52.9	17	0.682
3	36	59.3	23	40.7	59	
4	33	51.6	31	48.4	64	
5	15	48.4	16	51.6	31	
Total	**92**	**53.2**	**79**	**46.8**	**171**	

Table II: Age, Sex and disabilities wise malocclusion and IOTN

SN	MENTAL RETARD (in %) (m-male f-female)	LOCOMOTOR DISABILITY (in %) (m-male f-female)	SPECCH DISABILITY (in %) (m-male f-female)	VISION DISABILITY (in %) (m-male f-female)	HEARING DISABILITY (in %) (m-male f-female)	SYNDROMIC CASES (in %) (m-male f-female)
CLASS I	60 m-45 f-55	72 m-50 f-50	70 m-65 f-35	50 m-55 f-45	66 m-50 f-50	20 m-45 f-55
CLASS II	25 m-55f -45	10 m-40 f-60	30 m-45 f-55	25 m-40 f-60	18 m-45 f-55	40 m-50 f-50
CLASS III	15-m 70 f - 30	18 m-45 f-55	-	25 m-50 f-50	16 m-55 f-45	40 m-45 f-55
ALTERED ERUPTION	62 m-60 f 40	-	5 m-50 f-50	10 m-45 f-55	12 m-50 f-50	60 m-55 f-45
CLEFT	-	-	30 m-45 f-55	-	2 m-40 f-60	14 m-45 f-55
IMPACTION	34 m-65,f -35	-	-	2 m-40 f-60	5 m-45 f-55	30 m-55 f-45
AVERAGE IOTN	4 m60 f 40	3 m-45 f-55	4 m-50 f-50	3 m-35 f-65	3 m-50 f-50	5 m-60 f-40

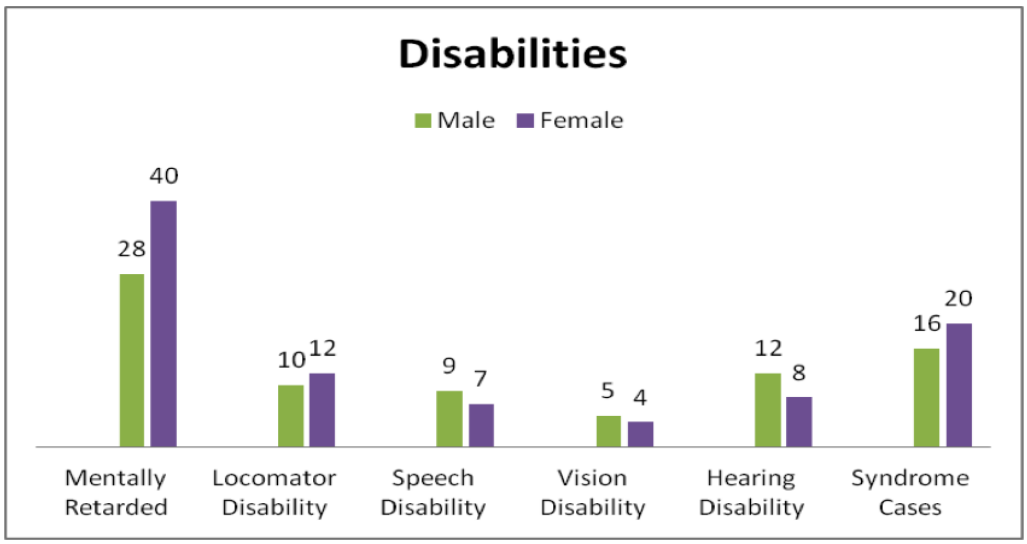

Fig. 1

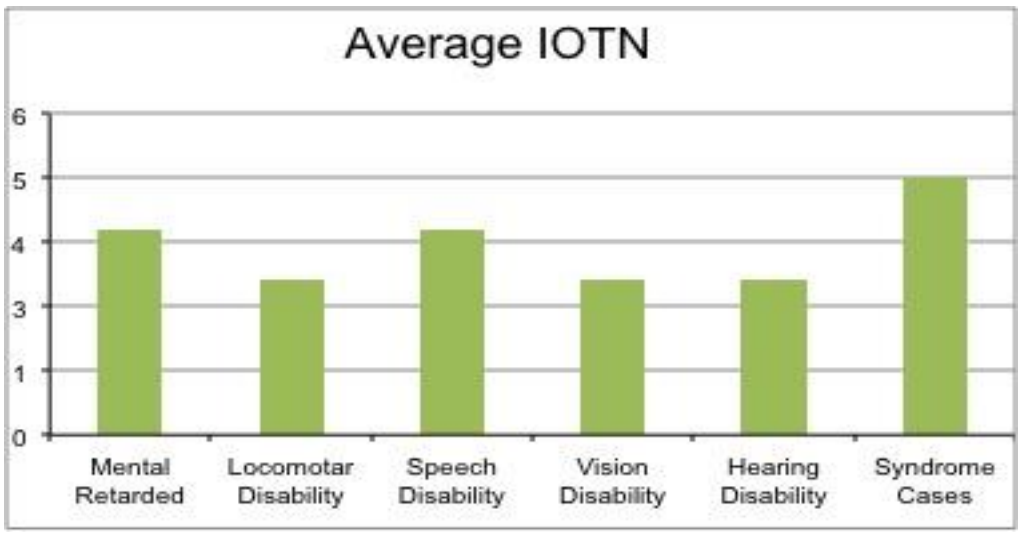

Fig. 2

DISCUSSION

Research indicates that physical appearance is important in biasing judgments of social acceptability, ability and personality, whether the judges are adults or other children. (Shaw, 1980)[11] This was supported by Langlois and Stephan (1981) [12] who found that adults link behavioral expectations of children to their physical appearance and that can affect their learning opportunities.

Patient with mental retardation showed high percentage of class I malocclusion with delayed eruption of teeth and multiple impacted permanent teeth. This can be attributed to the finding that all other vital growth parameters of these patients are overall retarded including height, weight and secondary sexual characteristics reflecting same in case of eruption of both primary and permanent dentition, thus leading to malocclusion and abnormalities in dentofacial development.

Downs', autism and cerebral palsy were the most commonly present syndromes among overall sample size in study. Three cases had Asperger syndrome. Bhowate and Dubey[13] in 2005 showed as high as 30 -35 percentage of prevalence of malocclusion in Down and cerabral palsy patients. They also reported delayed eruption of permanent teeth in 14 % and 71 % of Downs' and cerabral palsy patients respectively. Similar findings are substantiated by the present study with 60 % of altered eruption pattern and 30 % of impaction of permanent teeth observed in these patients.

Cohen[14] and Ardran[15] in late 1966 and 1971 respectively showed the presence of mid face hypoplasia and macroglossia in syndromic patients. The present study also confirms high number of the class III findings in these syndromic cases due to skeletal dysplasia.

Patel[16] in 1985 and Tondon[17] in 1990 also found as high as 45 % and 60% of malocclusion in syndromic cases. This study also confirms high number of class II and class III finding with high arch palate and cleft in syndromic patient. This could be due to retardation of growth of maxilla and mandible on cranial base.

Patients with loco-motor, hearing and speech disability had maximum number of class I malocclusion having on an average normal proportion of distribution of malocclusion. However speech disabled group patient showed as high as 30 % of cleft case raising their IOTN upto 4(moderate need) while other group of loco-motor and hearing disability had IOTN average of 3 (Border line).

Jain M, Mathur A et al[18] in 2008 also demonstrated that young people with impaired hearing have a high prevalence of dental caries, poor oral hygiene, and extensive unmet needs for dental treatment. This highly alarming situation requires immediate attention. Similar findings were also confirmed by the present study in relation to orthodontic treatment need.

Kleint G, Kanitz G, Harzer W[9] in 2002 observed motor-sensitivity disturbances in orofacial system and malocclusions of varying severity in mentally and physical handicapped children. These dysfunctions affect the breathing and speech ability and inhibit the food intake. Myo-therapeutic exercises for strengthening of lip and tongue muscles and orthodontic treatment of the malocclusions help provide esthetic and functional improvement in these patients.

The aim of orthodontic treatment for patients with disability must be modified from 'ideal'. The clinicians should aim for an aesthetically acceptable and functional result, but not necessarily striving for orthodontic perfection. This requires pragmatism and an ability to choose less conventional treatment plans at times.

CONCLUSION

The ability to identify and quantify malocclusion in special children poses a challenge to the clinician. Special children definitely have special Orthodontic need in comparison to their normal counterparts and require similar attention and treatment without prejudice and discrimination. Strict standard norms should not be adhered to while assessing treatment needs and rendering treatment to patients with special needs. Patients' appropriate concerns and expectations must be taken into consideration during assessment of severity of malocclusion and determining treatment needs for a particular patient.

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