

## PERIODONTAL HEALTH AND ORAL FINDINGS IN PATIENTS WITH INTELLECTUAL DISABILITIES

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### ABSTRACT

Periodontal disease is a chronic pathology caused by many factors characterized by the progressive destruction of tooth-supporting structures. Patients with some types of disability have a higher predisposition to develop periodontal disease.

**Objective:** The purpose of this study was to evaluate and compare the periodontal status of a group of children with intellectual disabilities with a control group, so as to register the other oral findings at these groups.

**Materials and methods:** A hundred patients with mild mental retardation from Special needs school and 60 healthy patients ranging from 9 to 16 years were evaluated to determine their oral hygiene and gingival index, CPITN index and other oral findings. There was a statistically significant difference ( $P = 0.001$ ) between all age groups in all variables of Oral hygiene index, IGI and CPITN index. The oldest age group had the highest scores for all indices measured. Gingival hyperplasia, Gingival recession, Geographic and Fissured tongue and Ch. exfoliativa sicca) were observed as more frequent in ID subjects than healthy subjects.

**Results:** The present study highlighted that the oral health status of this mentally retarded population was poor. It signified that ID subjects had poor OHS and PS with the highest PTNs and they were influenced by age ( $p < 0.0001$ ). The present study underlines a considerable need for prevention and treatment of periodontal disease among ID subjects.

**Keywords:** Periodontal disease, patients with ID, gingival index, plaque index.

## Introduction

Intellectual disabilities (ID) refers to "a group of developmental conditions characterized by significant impairment of cognitive functions, which are associated with limitations of learning, adaptive behaviour and skills". This disorder is considered chronic and originates before the age of 18. ID individuals have an intelligent quotient (IQ) score of about 70 or below. ID often occurs with other mental conditions such as Down's syndrome (DS), cerebral palsy (CP), autism spectrum disorders, epilepsy, traumatic brain injury, Alzheimer's disease, attention deficit hyperactivity disorder (ADHD), developmental coordination disorder, learning disabilities, and sensory impairments. ID is divided on the bases of IQ score measured through standardized general aptitude evaluation tools, such as the Wechsler Intelligence Scales or Stanford-Binet Intelligence Scales. Various degrees of ID are mild (50 to 69), moderate (35 to 49), severe (20 to 34), and profound (less than 20) categories. IQ has been used as the sole criterion for deciding on educational programs for these individuals [1, 2].

Oral hygiene has been implicated as a casual factor in development of periodontal disease in ID individuals. These individuals have the highest unattended dental treatment needs as compared to general population [3, 4, 5, 6].

Evidence has existed in the literature for decades that individuals with ID have poor oral hygiene and higher rate of gingivitis and periodontal disease. Scientific research on ID in India has been predominant in the form of case reports. There is still paucity of the literature on ID subjects [7].

The oral health of the ID individuals directly depends on their physical and mental abilities. The oral health needs of these individuals are multifaceted, persistent, and expensive, and for various reasons they are not satisfactorily met. ID deserves the same opportunities for oral health and hygiene as those healthy ones. Unfortunately oral health care is one of the greatest unattended health need of individuals with ID. Information concerning the oral hygiene status, periodontal status, and periodontal treatment needs of individuals with ID is essential to develop compensatory strategies to promote and protect the oral health of this vulnerable population and to cre-

ate the best practices for inclusion in dental treatment guidelines.

This study therefore intended to determine the oral hygiene status, periodontal status and periodontal treatment needs and another oral findings in a group of patients with ID, (mild mental retardation), and to compare it with a control group of healthy children.

## Material and method

A study was conducted in 100 ID individuals, (mild mental retardation, IQ = 50-69), ageing from 9-16 years, attending a Special Needs school in Skopje, Macedonia. Control group was composed of 60 healthy children of the same age, attending a rural area school.

**Oral Hygiene Status.** Oral hygiene status was assessed by Simplified Oral Hygiene Index (OHI-S) which has two components, the Debris Index-Simplified (DI-S) and the Calculus Index-Simplified (CI-S), which are calculated separately and are summed up to get OHI-S for an individual. The examination was done using mouth mirror and explorer. The interpretation of index is as follows: good-0 to 1.2, fair-1.3 to 3.0, and poor-3.1 to 6.0 [8].

**Index of Gingival Inflammation (IGI),** Löe and Silness: It was recorded at each of four surfaces (buccal or labial, mesial, distal and palatal or lingual). The selected teeth are: upper right first molar, upper right lateral incisors, upper left first premolar, lower left first molar, lower left lateral incisor and lower right first premolar [9].

**Periodontal Status and Periodontal Treatment Needs.** The Community Periodontal Index of Treatment Needs (CPITN) was used to record periodontal status and periodontal treatment needs; it was assessed by CPITN probe [10]. The periodontal status was expressed in terms of Community Periodontal Index (CPI) code and loss of attachment score (LOA). The specified index teeth for CPITN index were 16, 11, 26, 36, 31, and 46. Pocket depths were measured at six sites around each tooth (mesial, middle, and distal on vestibular and lingual/palatal surfaces). The highest CPITN scores for the sextants examined in a person were taken as the respective CPITN for the person. The individuals were classified

into different treatment need categories according to the highest scores which were recorded during the examination, as recommended. The assessment was made as follows: code 0: healthy/TN 0 (no need for treatment); code 1: bleeding on probing/TN1 (need for instruction to improve oral hygiene); code 2: supra-gingival calculus found/TN2 (need for instruction in oral hygiene and calculus removal); code 3: pocket 4-5mm deep/TN2 (need for instruction in oral hygiene and calculus removal and/or scaling and root planning); and code 4: pocket 6mm deep or more/TN3 (need for instruction in oral hygiene, calculus removal, and complex periodontal treatment). Throughout the study only one examiner conducted the examination and the assistant, who was trained and recorded the data. Examination was carried out in school classrooms with a mouth mirror and explorer under natural light.

**Other oral findings:** (Gingival hyperplasion, Gingival recession, Geographic and Fissured tongue and Ch.exfoliativa sicca was recorded at examined and control group.

**Statistical Analysis.** Data was analysed using the Statistical Package for Social Sciences (6.0 for

Windows; SPSS). The Mean and Standard Deviation were used to describe the pattern of oral hygiene status, periodontal status, periodontal treatment needs, and also for another oral findings among the groups. The level of significance was set at  $p < 0.05$ .

## Results

**Table 1** illustrates the general profile of the study population. It shows distribution of study individuals according to age. There were 100 examined individuals, 62 male and 38 female, ageing range from 9-16 and 60 control individuals, 27 male and 33 female of the same age.

**Table 2** shows the OHI mean scores in both age groups. There were high statistical and significant differences ( $p < 0,000000$ ) between all age groups. The oldest age group had the highest OHI score being 2.63 at ID subjects and 1,5 at control individuals respectively. There was a definite trend of mean scores for all the indices to gradually increase with the increase in age.

	Age (years)	Male	Female	Total
Mental handicapped children (examined group)	9 - 12	27	13	40
	13 - 16	35	25	60
Healthy children (control group)	9 - 12	9	21	30
	13 - 16	18	12	30

**Table 1.** Age distribution of examined (mental handicapped children) and control group (healthy children)

Age (years)	Mental handicapped children (examined group)		Healthy children (control group)		t	p
	X	SD	X	SD		
9 - 12	2,20	0,50	2,00	0,52	0,94	0,35
13 - 16	2,63	0,43	1,50	0,50	10,84	0,000000
Total	2,46	0,55	1,75	0,57	5,48	0,000001

**Table 2.** OHI values at examined (mental handicapped children) and control group (healthy children)

Age (years)	Mental handicapped children (examined group)		Healthy children (control group)		t	p
	X	SD	X	SD		
9 - 12	1,82	0,63	1,11	0,75	5,88	0,00061
13 - 16	2,25	0,43	1,43	0,50	5,88	0,000002
Total	2,08	0,59	1,26	0,66	7,10	0,000000

**Table 3.** IGI values at examined (mental handicapped children) and control group (healthy children)

Age (years)	Gender	CPITN (0)	CPITN (1)	CPITN (2)	CPITN (3)	CPITN (4)	Ukupno
9 - 12	male	0	7	14	6	0	27
	female	0	5	8	0	0	13
	total (%)	0%	30%	55%	15%	0%	40

13 - 16	male	0	2	12	16	0	35
	female	1	7	10	12	0	25
	total (%)	1,6%	15%	36,6%	46,6%	0%	60

**Table 4.** CPITN values at examined group (mental handicapped children)

Age (years)	Gender	CPITN (0)	CPITN (1)	CPITN (2)	CPITN (3)	CPITN (4)	Ukupno
9 - 12	male	01	7	1	0	0	9
	female	6	10	5	0	0	21
	total (%)	23,3%	56,6%	20%	0%	0%	30

13 - 16	male	3	14	1	0	0	18
	female	0	9	3	0	0	12
	total (%)	10%	76,6%	13,3%	0%	0%	30

**Table 5.** CPITN values at control group (healthy children)

Oral findings	X mental handic.	X healthy	SD mental handic.	SD healthy	t	df	p
Gingival hyperplasia	0,55	0,10	0,50	0,30	6,30 -6,30	158	0,000000*
Gingival recession	0,45	0,10	0,50	0,30	4,90 -4,90	158	0,000002*
Geographic tongue	0,35	0,10	0,47	0,30	3,62 -3,62	158	0,000387*
Fissured tongue	0,20	0,05	0,40	0,21	2,65 -2,65	158	0,008635
Cheilitis exfoliativa	0,55	0,15	0,50	0,36	5,40 -5,40	158	0,000000*

**Table 6.** Oral findings at examined (mental handicapped children) and control group (healthy children)

**Table 3** shows the IGI values at examined (mentally handicapped children) and control group (healthy children). There was a statistically significant difference ( $p= 0,000002$ ) between the age groups for Gingival inflammation index. The oldest age group had the highest scores for all the indices measured and mean scores for all the indices tended to increase gradually with an increase in age.

**Table 4** shows CPITN scores of ID individuals at the age of 9-12 and 13-16 years. With a healthy periodontium (CPITN=0) at the age of 9-12 years was 0,0 %, respectively at the age of 13-16 it was 1,6% . The subjects with presence of bleeding on probing (CPITN=1) were 30% and 15 % .Presence of calculus (CPITN=2) was shown by 55% and 36,6 % of individuals. The proportion of individuals with periodontal pocket of 4-5mm (CPITN=3) was 15% and 46,6% respectively.

**Table 5** shows CPITN of healthy individuals ageing from 9-12 and 13-16 years. With healthy periodontium (CPITN=0) at the age of 9-12 years there was 23,3% and respectively at the age of 13-16 it was 10,0%. The individuals with bleeding presence on probing (CPITN=1) amounted to 56,6% and 76,6%. Presence of calculus (CPITN=2) was shown by 20% and 13,3% of individuals. No individual had the score (CPITN=3) (periodontal pocket of 4-5 mm).

**Table 6** shows another oral findings (Gingival hyperplasia, Gingival recession, Geographic and Fissured tongue and Cheilitis exfoliativa) at examined and control group.

## Discussion

Individuals with intellectual disabilities (ID) constitute an unique but heterogeneous population including great variety of mental and developmental disorders as well as congenital syndromes [3]. The oral health of the handicapped may be neglected because of their disability, a demanding disease or their limited access to oral health care. Adequate maintenance of the oral cavity in most individuals depends on effective tooth brushing. The poor oral hygiene leads to periodontal problems and dental caries. Most studies assessing oral health status among

people with mentally handicapped individuals reported for poor periodontal status, being in accordance with the findings in our study [11, 12, 13].

Dental hygiene is usually poor, with higher occurrence of plaque and calculus [14]. Clinical findings proved that the plaque index in patients with special needs was 1.08 and the gingival index was 1.06 in this study. Gerreth et al. [4] performed a study to evaluate the gingival and oral status of intellectually disabled children and adolescent in Polonia and determined a plaque index of 1.33 and a gingival index of 1.67. These results confirmed findings of other studies concerning the poor level of oral hygiene and a high prevalence of periodontal disease among individuals with disabilities. Shanb-hog et al. [15] evaluated 488 children between 12-14 years living in five different orphanage houses in Mysore district, India. The GI showed 36.1% of children with mild gingival inflammation and 27.9% with moderate gingival inflammation. Our study, also reports a higher prevalence of poor oral hygiene and gingivitis in disabled children than in their normal counterparts, thus agreeing with previous findings. The mean oral hygiene index of the population study was 2,46, whereas it was observed to be in the range of 1,75 among healthy school children ( $p<0,05$ ). In this study, the presence of calculus was diagnosed at 55% of patients with disabilities at the age of 9-12, 36% at the age of 13-16, in 20% of the control group at the age of 9-12 and 13,3% at the age of 13-16 years. These rates were lower than the rates found by Simon et al. [16], who diagnosed calculus in 82.8% of the students evaluated. Donell et al. [17] performed a study in a centre for disabled patients in Hong Kong and concluded that calculus was not observed in 4-year old patients, but 20.2% of 14-year had calculus as did 56.3% of the 25 to 35-year old. Jain et al. [18], who evaluated 225 mentally retarded individuals ageing between 12-30 years attending a special school in Udaipur, India, concluded that 25.3% of the patients had calculus.

Furthermore, the proportion of individuals with periodontal disease (CPITN=3) in the examined population was observed to be 15 % at the age of 9-12 and 46,6% at the age of 13-16, where the proportion of 9-12- and 13-16 year-old healthy children without periodontal disease (CPITN=3) was 0,0%.

The higher score among ID subjects could be due to their inefficiency to brush their teeth themselves or dependence of individuals for oral hygiene

maintenance on parents or caregivers. The mean OHI-S was found to be increasing with increase in age. The general increase in OHI scores with increase in age could be due to cumulative effect of plaque and calculus. This is consistent with previous studies [19, 20, 21, 22].

A high correlation between poor oral hygiene and the development and progression of

Periodontal disease has been well documented and the role of poor oral hygiene as a risk factor of PD is well established [7].

In our study another oral findings (Gingival hyperplasia, Gingival recession) was observed as more frequently at ID individuals than at healthy ones, resulting from poor oral hygiene and inadequate tooth brushing technique.

Geographic and fissured tongue is also registered with prevalence at ID individuals. It is also seen at Down Syndrome individuals [23]. Fissured or scrotal tongue consists of various patterns, lengths and depths: single midline fissure, double fissures, or multiple fissures of the dorsal surface of the anterior two thirds of the tongue [24]. This condition is asymptomatic; however it may cause food impaction and subsequently halitosis.

This study has highlighted important aspects in the oral hygiene status, periodontal status, and periodontal treatment needs of the ID institutionalized population. It has shown that poor oral health is a major problem for ID and the oral hygiene status of these individuals seemed to indicate a cumulative neglect of oral health. The lack of regular dental care, which is available to normal schoolchildren, was reflected in the dental status of the disabled when their oral health was compared with that of normal schoolchildren. In comparison with normal children, the disabled individuals were not given enough dental care with respect to their treatment needs. The study confirmed the need for strengthening organized preventive strategies and care for this population.

## Conclusion

ID patients have higher plaque and gingival index than the control group. Also, the presence of calculus

is higher in special children because of neglected oral hygiene. There is a need for an educational program for patients themselves as well as for their parents or caregivers to improve the quality of life of this population. Management of ID should be included in dental curriculum and necessary training should be given. Constant motivation of the parent and caregivers is essential to bridge the gap.

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