Oral health status in Greek children and teenagers, with disabilities

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Nowadays there is a sharp increase of population with disabilities. The aim of this investigation was a) to survey the dental health status, estimate the treatment requirements of children and adolescents with cerebral palsy, mental retardation and visual disorders and b) to compare the oral health status of these groups of individuals. The investigation entailed the clinical examination of 170 individuals, between 6 and 15 years old, who were attending four special schools in Athens, Greece. In conclusion, our investigation documented the following: The treatment needs regarding both dentitions are extremely high in all groups of individuals. The oral hygiene status is in general, moderate to low-grade, especially in the individuals with mental retardation. The highest rate of malocclusion is observed in the group of individuals with cerebral palsy.
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INTRODUCTION

The sharp increase of the population congenitally disabled, by age, accident and disease is a reflection of medical care progress. Many scientific advances have been achieved towards the increase of the average age of these persons, but it is also true that many disabling conditions of young people and the handicaps, which can occur in later life, have much in common.[1-4]

It is difficult to get a realistic idea of the numbers of handicapped people and how they will affect the numbers of patients treated by the dental practitioner. The numbers quoted are usually in thousands or even millions. The commonest major handicaps are disorders of the central nervous system, of the cardiovascular system and disorders of the mind.[1] According to some investigations the average dental practitioner should care for approximately 12 handicapped children and about 50 handicapped adults, if the number of people with severe mental or physical handicaps are shared out equally.[1] The 49% percent of general practitioners and the 96% of pediatric dentists reported treating handicapped children.[5]

There are a lot of definitions of the term "disability". According to the broadest definition, an individual is considered to be disabled if: a) he or she has a physical or mental impairment that substantially limits one or more major life activities, b) he or she has a record of such impairment, or c) is regarded as having such an impairment.[6]

It is also necessary to distinguish between the terms disability and handicap. Disability is the functional limitation within the individual, caused by physical, mental, or sensory impairments. Handicap is the loss or limitation of opportunities to take part in the normal life of the community on an equal level with others due to physical and social barriers.[6] The child with emotional and general mental health problems is an unfortunate outcome.[7]

According to the data from the 1988 National Health Interview Survey there are nearly 11 million children, at the age of 17 and under, with developmental, learning or emotional disorders.[5] A greater percentage are male than female, have had developmental delays, learning disabilities and emotional or behavioral problems.

There was a lower percentage of children with developmental delays, learning disabilities, and emotional or behavioral problems in families with higher income.[5] The average age at which developmental delays were first noted was between the first and second year of age between sixth and seventh year for

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learning disabilities; between seventh and eight year for emotional or behavioral problems.[5]

Nowadays dental disease and psychiatric disease are the most prevalent problems in the Western world.[5,8] Oral health, has strong biological, psychological and social projections, because it affects our aesthetics and our communication. The quality of life is affiliated with oral health status.[9] That is why people with handicaps deserve the same opportunities for dental services as those who are healthy. In the past the handicapped child has been reported to have had far less dental treatment than normal children. Characteristically, it has been reported that "dental treatment is the greatest unattended health need of the handicapped person."[1,3] These facts may explain why so many studies have been conducted to determine the dental health status among the population of handicapped children.

Advanced and continuing educational programs will be needed to prepare both general and pediatric practitioners to provide needed dental services for a population of children that represents a far larger component of the children in communities than many of us may have predicted.[5]

The aim of this investigation was a) to survey the dental health status, estimate the treatment requirements of children and adolescents with cerebral palsy, mental retardation and visual disorders and b) to compare the oral health status of these three groups of individuals. Apart from that it was considered necessary to inform the parents about the treatment needs and to give the children and the school staff instructions about dental health mailers.

The reason that this sample of individuals, was studied, is because, as far as we know, this is the first time an investigation of this kind has been held in a sample of Greek population.

MATERIALS AND METHODS

The investigation entailed the clinical examination of 170 individuals, who were attending four special schools in Athens, Greece. The individuals were between 6 and 15 years old and the average age of the sample was 9.9 years. According to sex distribution 100 individuals were males and 70 individuals were females. (Figures 1 and 2).

Individuals could be divided by the nature of their disorder into three groups as follows: (Figure 2)

- 54 individuals suffered from cerebral palsy, (33 males and 21 females),
- 70 individuals suffered from mental retardation (38 males and 32 females),
- 46 individuals suffered from problems of vision(29 males and 17 females).

Because of the variety in the cooperation of the individuals, we excluded from this investigation individuals, who were uncooperative.

The WHO oral health survey form was used as a model for the records. However several changes were made and a special survey form was developed. The same team of examiners performed all examinations and evaluations.

No radiographs were utilized to detect caries, because of the difficulty of achieving satisfactory radiographic images of these patients. So all data reflect clinical findings only. Caries examination was performed under good lighting conditions, using a single-use plain mirror and a sham probe. A dental cabinet was used in those schools that had one. The mean examination time per patient was 30 minutes.

In every individual, we assessed incidence of caries and treatment needs in the primary and permanent dentition as well as the periodontal hygienic status. We also examined the mucus membrane, the occlusion, the palate, the tongue, and the lips. In particular,

- the deft Index (decayed, extracted and filled primary teeth) described the caries experience in primary dentition.
- the DMFT Index (Decayed, Missing, and Filled teeth) assessed the caries experience in the permanent dentition, using 32 teeth as basis for the calculation.
- the d/(d+f) and D/(D+F) indices assessed the treatment needs for primary and permanent dentition respectively.
- the O.H.I.-S Index of Greene and Vermillion, which is the cumulative result of the D.I.-S. (soft deposition index), and C.I.-S. (calculus deposition index) indices, assessed the periodontal hygienic status.

When the dental examination was completed, instructions about dental hygiene were given both to the children and to the educational staff. By that we intended to influence the adoption the recommended behavior for dental hygiene.

STATISTICAL EVALUATION

By using quantitative analysis of the data of the oral health status from the individuals examined, the trend predominating in every group was estimated.

Statistical analysis of the data aimed at comparing the oral health status of the three groups of individuals. The statistical analysis was performed using Statistica / W.V.5,1 1998 software program.

Analytically we used single analysis of variability and multivariate analysis of variance. For the statistical presentation we have used the means (in) and one standard deviation (SD)

RESULTS

In children with cerebral palsy: dental caries experience reported as deft and DMFT (means and SD) and treatment needs d/(d+f) % and D/(D+F)%, for the primary

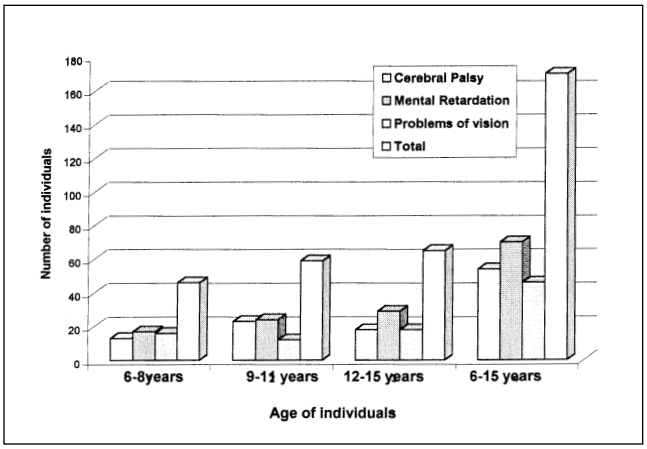

Figure 1. Demographic data of the total group of individuals we examine.

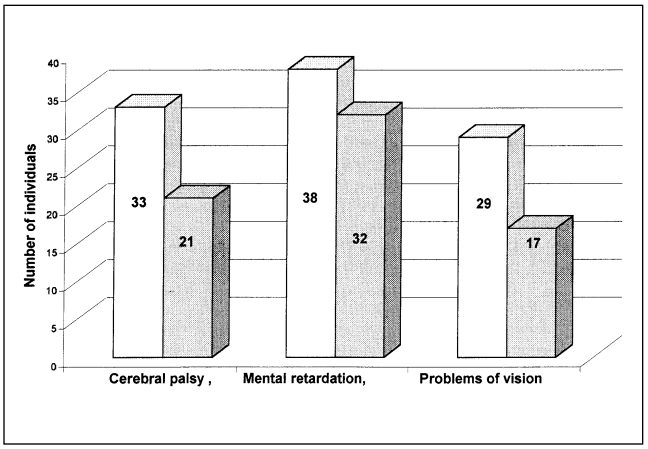

Figure 2. Sex distribution of the total group of individuals.

Table 1. Caries prevalence and treatment needs in the primary dentition of the children with cerebral palsy aged 6-11 years.

Age (yrs)	N	Caries-free patients N	%	d	e	f	deft means±sd	d (d+f) %
6	7	2	28,57	3,57	0,00	1,43	5,00±5,13	71,43
7	4	1	25,00	3,50	0,00	0,75	4,25±3,68	83,33
8	1	0	0,00	8,00	0,00	2,00	10,00±0,00	80,00
9	11	3	27,27	1,91	0,09	1,64	3,63±3,07	87,50
10	4	3	75,00	1,75	0,00	0,75	2,50±3,32	70,00
11	8	2	25,00	1,62	0,50	0,12	2,25±2,86	92,86
6-11	**35**	**11**	**31,43**	**2,51**	**0,14**	**1,06**	**3,71±2,86**	**80,18**

Table 2. Caries prevalence and treatment needs in the permanent dentition of children with cerebral palsy aged 6-15 years.

Age (yrs)	N	Caries-free patients N	%	D	M	F	DMFT means±sd	D (D+F) %
6	7	7	100,0	0,00	0,00	0,00	0,00±0,00	0,00
7	4	3	75,00	0,25	0,50	0,00	0,75±1,50	100,00
8	1	0	0,00	3,00	0,00	2,00	5,00±0,00	60,00
9	11	4	36,36	1,91	0,18	0,18	2,27±2,05	61,30
10	4	2	50,00	1,75	0,25	0,50	2,50±1,91	77,78
11	8	1	12,50	2,50	0,12	0,00	2,62±1,92	100,00
6-11	**35**	**17**	**48,57**	**1,48**	**0,17**	**0,17**	**1,83±1,98**	**89,65**
12	11	3	27,27	1,91	0,73	0,73	2,63±1,86	72,41
13	2	0	0,00	4,00	0,00	0,00	4,50±0,71	100,00
14	3	0	0,00	4,67	1,00	1,00	6,33±3,78	82,35
15	2	0	0,00	6,00	8,00	8,00	14,5±3,53	66,67
12-15	**18**	**3**	**16,57**	**3,05**	**1,50**	**1,50**	**4,78±4,36**	**67,07**
6-15	**53**	**20**	**37,73**	**2,02**	**0,62**	**0,62**	**2,83±3,28**	**76,43**

Table 3. Caries prevalence and treatment needs in the primary dentition of children with mental retardation aged 6-11 years.

Age (yrs)	N	Caries-free patients N	%	d	e	f	deft means±sd	d % (d+f)
6	0	-	-	-	-	-	- -	-
7	7	5	71,43	0,71	0,00	0,00	0,71±1,49	100,00
8	10	4	40,00	3,10	0,00	0,20	3,30±3,62	93,94
9	6	1	16,67	1,67	0,00	1,17	2,83±2,14	58,82
10	11	5	45,45	2,18	0,18	0,73	3,00±3,01	75,00
11	7	3	42,86	1,28	0,00	0,28	1,57±1,27	81,82
6-11	**41**	**18**	**43,90**	**1,93**	**0,05**	**0,46**	**2,44±2,71**	**80,61**

Table 4. Caries prevalence and treatment needs in the permanent dentition of children with mental retardation, aged 6-15 years.

Age (yrs)	N	Caries-free patients N	%	D	M	F	DMFT Means±sd	D % (D+F)
6	0	-	-	-	-	-	- ± -	-
7	7	5	71,43	0,57	0,00	0,00	0,57±0,97	100,00
8	10	3	30,00	1,30	0,00	0,50	1,80±1,62	72,22
9	6	2	33,33	1,83	0,00	0,17	2,00±1,67	91,66
10	11	5	45,45	1,64	0,00	0,00	1,64±1,69	100,00
11	7	2	28,57	2,71	0,14	1,00	3,86±3,58	73,08
6-11	**41**	**17**	**41,46**	**1,58**	**0,24**	**0,32**	**1,93±2,17**	**83,33**
12	8	4	50,00	1,62	0,00	0,87	2,50±2,93	86,66
13	10	5	50,00	1,70	0,00	0,50	2,20±2,82	77,27
14	4	0	0,00	3,50	0,25	3,50	7,25±4,99	57,57
15	7	2	28,57	1,86	0,28	1,43	3,57±3,64	56,52
12-15	**29**	**11**	**37,93**	**1,96**	**0,10**	**1,24**	**3,31±3,62**	**66,67**
6-15	**70**	**28**	**40,00**	**2,41**	**0,68**	**1,33**	**3,24±2,92**	**74,27**

and permanent dentition, are shown in Tables 1 and 2 respectively. As it can be seen in Table 1 there was a large number of caries-free individuals (31.4%) in the primary dentition. Nevertheless the d index was higher than e and f and the treatment needs were huge (80.18%).

As it can be seen in Table 2, there was also a large number of caries-free individuals (37.73%) in the permanent dentition. The D index was higher than M and F and respectively the treatment needs were high (76.43%).

In children with mental retardation: Tables 3 and 4 illustrate, caries experience deft and DMFT, and treatment needs d/(d+f)***%***, *DI(D+F)* ***%.*** The number of caries-free individuals is almost 44% in the primary dentition, the d index is higher than e and f. Also, there was a high level of treatment needs (80.61%). (Table 3).

As seen in Table 4, in the permanent dentition, the caries-free individuals are 40 % and the D index is 2.41. The treatment needs still remain at a high level (74.27%).

In children with problems of vision: Tables 5 and 6 illustrate the same indices and show that the caries-free individuals in this group is almost 41% in the primary dentition; the d Index had again the highest rate and the treatment needs are again huge (82.54%)(Table 5)

In the group of individuals with problems of vision almost half of the sample were caries-free in the permanent dentition. The D Index is 1.73 and the treatment needs seemed to be lower (64.5%)(Table 6).

Table 5. Caries prevalence and treatment needs in the primary dentition of children with problems of vision aged 6-11 years.

Age (yrs)	N	Caries-free patients N	%	d	e	f	deft means±sd	d / (d+f) %
6	5	1	20,00	2,20	0,00	0,00	2,20 ± 2,39	100,00
7	3	0	0,00	2,00	0,00	1,67	3,67 ± 2,08	54,54
8	7	2	28,57	3,14	0,00	0,57	3,71 ± 4,19	84,61
9	2	2	100,00	0,00	0,50	0,50	1,00 ± 1,41	0,00
10	5	2	40,00	2,40	0,00	0,00	2,40 ± 2,88	100,00
11	5	4	80,00	0,20	0,00	0,20	0,40 ± 0,55	50,00
6-11	**27**	**11**	**40,74**	**1,92**	**0,04**	**0,41**	**2,37 ± 2,87**	**82,54**

Table 6. Caries prevalence and treatment needs in the permanent dentition of children with problems of vision, aged 6-15 years.

Age (yrs)	N	Caries-free patients N	%	D	M	F	DMFT means±sd	D / (D+F) %
6	5	5	100,00	0,00	0,00	0,00	0,00±0,00	0,00
7	3	3	100,00	0,00	0,00	0,00	0,00±0,00	0,00
8	7	5	71,43	05,7	0,00	0,57	1,14±1,57	50,00
9	2	2	100,00	0,00	0,00	0,00	0,00±0,00	0,00
10	5	2	40,00	1,40	0,00	1,60	3,00±4,24	46,67
11	5	2	40,00	1,80	0,00	1,00	2,80±2,59	64,28
6-11	**27**	**19**	**70,37**	**0,74**	**0,00**	**0,63**	**1,37±2,45**	**54,05**
12	10	3	30,00	3,10	0,10	1,40	4,60±3,10	68,89
13	3	1	33,33	1,67	0,00	2,00	3,67±0,58	45,45
14	3	0	0,00	3,33	0,00	2,00	5,33±2,31	62,50
15	2	0	0,00	6,00	0,00	0,00	6,00±1,41	100,00
12-15	**18**	**4**	**22,22**	**3,22**	**0,55**	**1,44**	**4,72±2,52**	**69,05**
6-15	**45**	**23**	**51,11**	**1,73**	**0,02**	**0,95**	**2,71±2,96**	**64,46**

Table 7. Means and SD of the OHI-S index (Greene and Vermillion) for each one of the three groups and for the total group.

AGE (yrs)	Cerebral Palsy				Mental Retardation				Problems of vision			
	N	DI-S means ±sd	CI-S means ±sd	OHI- S means ±sd	N	DI-S means ±sd	CI-S means ±sd	OHI- S means ±sd	N	DI-S means ±sd	CI-S means ±sd	OHI- S means ±sd
6-8	12	0,66±0,65	0,03±0,09	0,69±0,69	17	1,05 ±0,88	0,04±0,07	1,09±0,94	16	1,18±0,68	0,11±0,09	1,29±0,70
9-11	23	1,29±0,89	0,47±0,66	1,76±1,43	24	1,49±0,71	0,28±0,35	1,77±0,95	12	0,93±0,61	0,22±0,36	1,15±0,83
12-15	18	1,58±0,84	0,93±0,66	2,52±1,43	29	1,16±0,81	0,52±0,57	1,68±1,26	18	1,06±0,64	0,22±0,25	1,28±0,82
6-15	53	1,25±0,88	0,53±0,67	1,77±1,45	70	1,25±0,80	0,32±0,46	1,57±1,11	46	1,07±0,64	0,18±0,31	1,25±0,84

*(Two individuals of the group did not cooperate, so we did not include them in the statistical analysis)

Concerning the primary dentition the caries-free individuals, in the whole sample that was examined, were 39%, the d index had the highest rate and the treatment needs were almost 81%. Concerning the permanent dentition, the caries free individuals were 42%, the D Index was 1.83 and the treatment needs were 72%.

The results concerning the periodontal hygienic status, assessed by the OHI-S index of Greene and Vermillion (which is a cumulative result of the DI-S and CI-S indices) are shown for children with cerebral palsy, mental retardation and visual problems in Table 7. The rate of the OH I-S index in the group of individuals with cerebral palsy was almost 1.8, in the group of individuals with mental retardation almost 1.6, and in the group of individuals with problems of vision 1.25. That means that the individuals with problems of vision had better oral hygiene. As it can be seen, the whole group of individuals had a level of oral hygiene moderate to low.

Other findings concerning malocclusions, the condition of the palate, the tongue, the lips were as follows: Almost the 53% of the whole group of individuals we examined exhibited malocclusion. The higher percentage was found in individuals suffering from cerebral palsy, being 59%; those suffering from mental retardation followed with a percentage of 57%, while those suffering from problems of vision showed the lowest incidence only 39%.

DISCUSSION

According to recent literature, individuals with any kind of disability or illness, usually have poor oral health in comparison with the general population. The interpretation of this finding has to do probably with poor oral hygiene, undesirable side-effects of medications, the high degree of dental needs neglect, because of the severity of the other systemic health problems, or the problems related to dental management.[10]

In the present investigation the highest percentage of caries-free individuals was found in individuals with mental retardation and problems of vision in both dentitions. Nevertheless the d and D indexes were higher than e, f and M, F respectively. The interpretation of this finding is, that the decayed teeth were much more, in both dentitions, than the missing or the filled teeth. As it is known the prevalence of caries is depended from factors like living environment, dietary and hygiene habits.[10-13] Also there is a trend indicating an increased possibility of developing dental caries when there are long recall intervals.[14] The resultant conclusion is that these individuals did not receive the proper dental care. However, other studies concerning the incidence of dental caries show various results.[10,13,14,16-19]

The above ascertainment comes to an agreement with the finding that the d/(d+f) % and D/(D+F)% indices assessing the treatment needs, for both ,the primary and permanent dentition, respectively, had extremely high rates. The d/(d+f) index was higher than 80% for all the groups that were examined. The D/(D+F**)** index was higher 76% in the group of individuals with cerebral palsy and lower 65% in the group with problems of vision. This come to an agreement with previous studies, which reported that the level of restorative treatment fell below that occurring in normal children.[16,17,20]

Although, there are many epidemiological studies, concerning individuals with some kind of disability or illness there is a paucity of information about the planning, implementation and evaluation of respective dental programs.[20] Unfortunately the main content of the treatment planning is, even today, extraction of the decayed teeth.[10]

Regarding the oral hygiene status, it can be clear from the tables that, the individuals with problems of vision had better oral hygiene that the other handicapped children. Not surprisingly the interpretation is, that, these individuals can comprehend better the oral hygiene instructions and also have better kinetic skills. On the other hand this might come in contrast with the difficulty of these children to see and remove plaque.[20] In general there is a wide range in tooth brushing ability related to coordinated muscular movements innate skills, the ability to understand instruction and age of the individual.[22] The rates of the calculus (CI-S) index can be considered high as they concern the mixed dentition and the first three years of permanent dentition. Conclusively, the oral hygiene status in the three groups that we examined was moderate to low-grade. This is came to an agreement with other studies which reported that the oral hygiene is poorer in handicapped than in normal patients.[18,20,22]

Most investigations reported a low prevalence of caries and possibly an improvement in periodontal health, in the general population, in most countries during the last decades.[20,24,25] In opposition, the handicapped children seems to have a high proportion of carious lesions and a low level of restorative treatment.[16] In a study of children and adolescents with hearing defects in Greek population high numbers of untreated carious lesions were found and the oral hygiene was fair.[26]

In our study we found that the higher percentage of malocclusions was found in individuals suffering from cerebral palsy. This came to an agreement with the current bibliography. Malocclusion has been reported to be higher in mental retardates and in cerebral palsy.[17,20,23,27] This seems to be related with the abnormal or immature oral function in children with mental retardation and cerebral palsy.[27]

In spite of the high rate, (53% of the whole group) of the individuals with malocclusions, only 5 individuals were under orthodontic treatment. This finding, also comes to an agreement with the ascertainment that individuals with disabilities or illnesses receive less oral care. Some of the most important reasons may be insufficient recall systems, practical difficulties during the

treatment sessions, socioeconomic status, underestimation of treatment needs or pain, communication problems and bad cooperation.[3,10,29-33] Despite the specialized knowledge now days, and the approaches taken by dental practitioners to enable treatment under normal conditions, it still remains impossible to treat certain patients conventionally.[3]

To provide treatment to individuals with disabilities or illnesses is not easy but, also it is not difficult, if the dentist has the right education. Due to the fact that this population is increasing dramatically, advanced and continuing education programs will need to prepare both general and pediatric practitioners.[5,17,32-35] As both, dental health status and handicap are related with the patient social acceptability, it's important for handicapped children to have the proper dental care.[34-40]

However, with the right planning, clear communication and carefully drawn limits to services provided, the dramatic dental neglect experienced by so many of these individuals can be successfully alleviated.[20] As more than 90% of dental disease is preventable, dental treatment without preventive measures is invalid for such populations.[18,38-41] Preventive dental programs are painless, require short-term cooperation between patient and dentist and carry less risk, so there are more acceptable for patients with disabilities.[44,45]

It is useful to keep always in mind that: the way the society looks after its handicapped members, is a perceptive reflection of, its cultural level.

CONCLUSION

In conclusion, our investigation documented the following:

1. The treatment needs regarding both primary and permanent dentitions, are extremely high in all groups of individuals**.** The only exception is the permanent dentition, in the group of individuals with problems of vision, which showed the fewest treatments needs.
2. The oral hygiene status is in general, moderate to low-grade, especially in the individuals with mental retardation.
3. The highest rate of malocclusion is observed in the group of individuals with cerebral palsy.

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