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Oral hygiene in children with Down's syndrome

Down's syndrome is a genetically conditioned aberration of autosomal chromosomes. Trisomy 21 develops as a result of nondisjunction during mitosis or meiosis of the cell nucleus.

In 1959 Lejeune et al. first discovered chromosomal aberration in humans, i.e. trisomy 21. The reasons for the missing disjuncture are not clear yet. Radiation, viruses, hormones, autoantibodies against thyroid tissue are likely to be involved. As a result the child has 47 chromosomes rather than the usual 46.

The majority of cases (93%) are regular trisomy 21. More rarely, in 4% cases the baby receives an additional copy of chromosome 21 from one of his parents, who is the carrier of balanced translocation of that chromosome or has *de novo* translocation. In such cases, part of chromosome 21 genetic material is translocated onto another chromosome, most often group D chromosome 14 or group G chromosomes. Those are Robertsonian translocations in which long arms of one chromosome join long arms of another. Thus a new chromosome is formed with two long arms coming from two different chromosomes joined by a centromere.

In the case of trisomy with translocation the number of chromosomes is 46, however, the cell has excessive genetic material from chromosome 21, which is most likely responsible for the phenotype of Down's syndrome. Least commonly, 1-2% of Down's syndrome demonstrate mosaic cariotype where trisomic cells are present in addition to euploidal cells. Nondisjunction during normal mitotic division once the cell has been fertilised results in formation of mosaic type of Down's syndrome. In that type part of the cells are normal and part are trisomic (3, 4, 5, 7, 8).

OBJECTIVE

The aim of the study was to evaluate clinically oral hygiene and analyse some environmental parameters in children with Down's syndrome, with regard to the grade of handicap.

MATERIAL AND METHODS

Clinical examination and survey covered 62 children with Down's syndrome. The children attended specialised kindergarten, Day Adaptation Centre, Specialist Primary School, specialist educational centres and boarding "School of Living". In the group examined the levels of intellectual development measured by IQ were the following: 12 children had low grade mental retardation, 36 children moderate grade mental retardation and 14 were with high grade mental retardation (Fig. 1). The grade of mental retardation is based on WHO classification of Jan. 1, 1968. Low grade retardation is defined by IQ 52–67, moderate by IQ 36–51 and high as IQ 20–35.

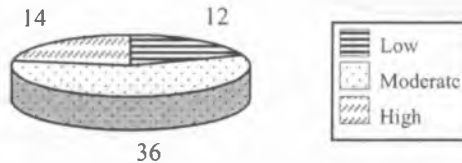


Fig. 1. Percentage of children depending upon retardation grade

Oral hygiene was evaluated clinically by OHI according to Green and Vermillion. Carietest (Septodont) colouring the plaque green was used to disclose calculus on the teeth. Data concerning the parameters of environment were obtained from the parents by means of a questionnaire. Data of birth weight and length come from children's individual health records "Health Record Book".

RESULTS AND DISCUSSION

Oral hygiene was worsening with deepening grade of mental retardation: the corresponding values in the groups of low, moderate and high grade retardation were: 1.47, 1.7, and 2.49 respectively. The group of high grade retardation was statistically significantly different from other two groups, with low and moderate grade retardation ($P < 0.05$).

Table 1. Oral hygiene depending on the grade of mental retardation

Grade of retardation	Number of children examined	M	SD	SE	V%	P
Low	12	1.47	1.01	0.29	68.9	ab
Moderate	33	1.70	0.80	0.14	46.8	b
High	14	2.49	1.42	0.38	56.8	c

M – arithmetic mean, SD – standard deviation, SE – standard error, V% – variability coefficient, P – probability; mean values in the groups are statistically different ($P < 0.05$) if the groups are not marked with the same letter

According to birth weight, the children were divided into a group with birth weight over 2,500g (93.4%) and a group with birth weight up to 2,500g (6.6%) (Fig. 2).



Fig. 2. Birth weight of children examined

Birth lengths in the groups studied were: 52.75 ± 2.30 (M+SD) cm in the group with low grade retardation, 51.80 ± 2.26 cm in the group with moderate grade retardation and 49.93 ± 1.77 cm in the group with high grade retardation. In the group with high grade retardation birth length was highly significantly shorter ($P < 0.01$) in comparison to two other groups studied. However, no statistically significant difference was found between the group with moderate grade retardation compared to the group of children with low grade retardation ($P > 0.20$) (Table 2).

Table 2. Birth length (cm) in children with Down's syndrome

Grade of retardation	n	M	SD	SE	V%	Grade of retardation compared to controls				
							t	P	c	P
Low	12	52.75	2.30	0.66	4.4	L-U	1.251	>0.20	2.874	<0.01
Moderate	35	51.80	2.26	0.38	4.4	L-Z	3.526	<0.01	3.845	<0.001
High	14	49.93	1.77	0.47	3.6	U-Z	2.768	<0.01	5.756	<0.001

t – value of t-Student function, c – value of c- Cochran and Cox function, n – number of children examined

The subsequent question asked about the number of siblings and order of birth of the child with Down's syndrome. In 45 families (72.6%) the child with Down's syndrome was the last baby born among other healthy siblings; in 17 families (27.4%) the children with Down's syndrome had younger siblings. Out of 62 children studied 10 were the only child in the family; 23 had 1 sibling, 8 had 3 siblings, 1 had 4 and 1 had 5 siblings (Fig. 3).

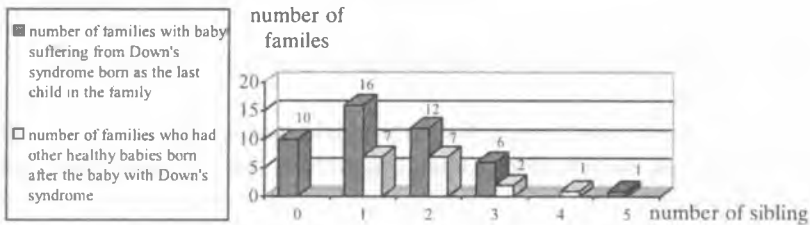


Fig. 3. Number of siblings in families studied

Evaluation of education among the children with Down's syndrome revealed that out of 62 children 9 (14.5%) did not attend any educational institution and stayed at home, 33 children (53.2%) attended specialised kindergarten: 29% of children continued education in specialised schools and 3.2% in the "School of Living"; 30 children (48.4%) attended specialised school: 7 children (11.3%) continued education in the "School of Living" having completed specialised school; 17 children (27.4%) stayed in the boarding "School of Living".

Differences in the educational career were statistically significant only between the group with high grade retardation and the others. Out of 12 children with low grade retardation none was at the "School of Living", out of 36 children with moderate grade retardation 7 children (19.4%) stayed at the "School of Living"; however out of 14 children with high grade retardation 10 children (71.4%) stayed at the "School of Living" ($P < 0.001$). The comparison of children with high grade retardation also showed significant differences in kindergarten attendance: as much as 60.4% of children with low and moderate grade retardation attended kindergarten compared to only 28.6% with high grade retardation; the difference is statistically significant ($P < 0.05$) (Fig. 4).

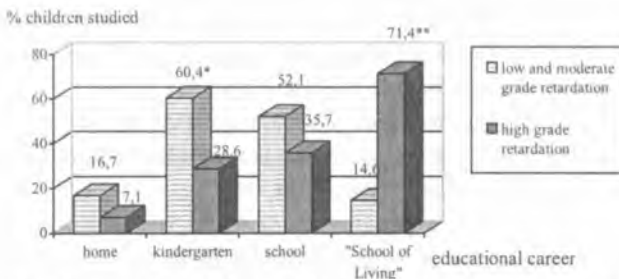


Fig. 4 Educational career in children with Down's syndrome expressed as percentage of the children studied

* Degree of significance $P < 0.05$, ** Degree of significance $P < 0.001$

The study found that oral hygiene was unsatisfactory and was found to be dependent upon the grade of mental retardation (1, 2, 6, 10, 11).

CONCLUSIONS

1. Oral hygiene is unsatisfactory and is worsening with deepening grade of mental retardation.
2. Majority of children examined had birth weight over 2,500g.
3. Birth length shows dependence upon the grade of mental retardation in children with Down's syndrome.
4. In most families the child with Down's syndrome was the last baby born among other healthy siblings.
5. Educational career in children with Down's syndrome was found to be dependent upon the grade of mental retardation.

REFERENCES

1. Barańska-Gachowska M. et al: Ocena stanu uzębienia i przyzębia u dzieci upośledzonych umysłowo. *Czas. Stomat.*, 39, 2, 87, 1986.
2. Barnett M. L. et al: The prevalence of periodontitis and dental caries in Down's syndrome population. *J. Periodontol.*, 5795, 288, 1986.
3. Connor J. M., Ferguson-Smith M. A.: *Podstawy genetyki medycznej*, PZWL, Warszawa 1991.
4. Cunningham C.: *Dzieci z zespołem Downa*. WSiP, Warszawa 1992.
5. Goodman R., Scott S.: *Psychiatria dzieci i młodzieży*. Wyd. Med. Urban & Partner, 197, Wrocław 2000,
6. Mielnik-Błaszczak M., Pels E.: Wybrane zagadnienia z zakresu promocji zdrowia dzieci specjalnej troski leczonych w Katedrze i Zakładzie Stomatologii Wieku Rozwojowego AM w Lublinie. Gdańskie sympozjum Naukowe Stomatologów, Gdańsk, Streszczenia Referatów, 92, 18-20.06.1998.
7. Popielarska A.: *Psychiatria wieku rozwojowego*. PZWL, 209, Warszawa 1989.
8. Rowicka G., Hozyasz K.: Opis przypadku współwystępowania fenylketonurii i zespołu Downa. *Przegl. Pediatr.*, 1999, 29, 4, 335.
9. Stabholz A. et al: Caries experience, periodontal treatment needs, salivary pH, and *Streptococcus mutans* counts in preadolescent Down syndrome population. *Spec. Care Dentist.*, 11, 203, Sep.-Oct. 1991.
10. Yarat A. et al: Salivary salic acid, protein, salivary flow rate, pH, buffering capacity and caries indices in subjects with Down's syndrome. *J. Dent.*, 27 (2), 115, 1999.

11. Vigild M.: Dental caries experience among children with Down's syndrome., J. Ment. Defic. Res., 30 (3), 271, 1986.

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SUMMARY

The clinical examination comprised 62 children with Down's syndrome: 12 children had low grade mental retardation, 36 children – moderate grade mental retardation and 14 children – high grade mental retardation. The study showed that oral hygiene was unsatisfactory and was found to be dependent upon the grade of mental retardation. Most children had birth weight over 2,500 g. Besides, also birth length was found to be dependent upon the grade of mental retardation. In most families the child with Down's syndrome was the last baby born among other healthy siblings. Educational career in children with Down's syndrome was found to be dependent upon the grade of mental retardation.

Stan higieny jamy ustnej u dzieci z zespołem Downa

Badaniem klinicznym objęto 62 dzieci z zespołem Downa. Zbadano 12 dzieci z lekkim stopniem upośledzenia, 36 dzieci z umiarkowanym stopniem upośledzenia i 14 dzieci ze znacznym stopniem upośledzenia umysłowego. Stan higieny jamy ustnej jest niezadowolający i pogarsza się wraz z pogłębiającym się stopniem upośledzenia dzieci. Większość badanych dzieci miała masę urodzeniową większą od 2500 g. Długość urodzeniowa wykazuje zależność w odniesieniu do stopnia upośledzenia. W większości badanych rodzin dziecko z zespołem Downa było ostatnim urodzonym niezależnie od liczby rodzeństwa. Droga edukacji dzieci z zespołem Downa wykazuje zależność w odniesieniu do stopnia upośledzenia umysłowego.