Coll. Antropol. **27** (2003) 2: 769–778
UDC 616.314-007:616.899
Original scientific paper

Dental and Minor Physical Anomalies in Children with Developmental Disorders – A Discriminant Analysis

Ilija Škrinjarić[1], Jelka Jukić[1], Kristina Škrinjarić[1], Domagoj Glavina[1], Mario Legović[2] and Zlatko Ulovec[3]

[1] Department of Pedodontics, School of Dental Medicine, University of Zagreb, Croatia
[2] Department of Orthodontics, School of Dental Medicine, University of Rijeka, Croatia
[3] Department of Hygiene and Social Medicine, School of Dental Medicine, University of Zagreb, Croatia

A B S T R A C T

A discriminant analysis was performed in a sample of 303 children with developmental disorders (DD) and 303 healthy controls (C) in order to test whether some oro-dental and physical minor anomalies could discriminate these groups of children. DD sample comprised 176 mentally retarded (MR) children, 70 children with impaired hearing (IH) and 57 children with impaired vision (IV). The control group included 303 healthy subjects, matched for sex and age. The analysis comprised seven common oral and dental anomalies: median diastema, hypodontia, impacted teeth, microdontia, dens invaginatus, upper lip frenulum and frenulum of the tongue. Minor physical anomalies were assessed by the method proposed by Waldrop et al., as the average number of minor anomalies per individual (W1) and as the weighted score of minor anomalies (W2). Three discriminant functions were obtained by analysis of nine initial variables. Distinct discrimination and considerable distances were found between the centroids of the controls and all groups of DD children. The first two discriminant functions were significant for discrimination between the groups and they explained 98.6% of the total variance. The first function contained 90.2% of information and was defined by the number and weighted scores of minor anomalies. The second variable explained 8.4% of the total variability and was defined by three dental anomalies. The results obtained by the discriminant analysis show that application of dental and minor physical anomalies enables discrimination between the group of healthy children and the groups of children with different developmental disorders.

Key words: *developmental disorders, minor anomalies, dental anomalies*

Received for publication September 16, 2003

Introduction

Minor physical anomalies show significant correlation with different developmental disorders in children[1–4]. They are usually defined as mild malformations in which the form is primarily concerned. They represent the morphological defect of no serious medical or cosmetic consequence to the patient. Consequently the occurrence of a large number of minor anomalies in the newborn could be an indicator of seriously disturbed morphogenesis. They can occur in quite healthy individuals, or in association with various genetic syndromes and diseases[1,5,6]. In such situations minor anomalies have diagnostic and genetic significance. The majority of such anomalies manifest in the region of the head, palms and feet, where as many as 71% occur[1,7]

A finding of three or more minor anomalies in the newborn indicates, in 90% of cases, a major developmental disorder or anomaly. In the general population of newborn without major malformations the frequency of only one minor anomaly varies from 12.9% according to Meggessy et al.[8], 14.9% Marden et al.[9], 17.2% Méhes et al.[6], to around 44.9% Tsai et al.[10] A finding of a larger number of minor anomalies in some persons may be an indicator of disturbed development during morphogenesis. Thus their detection and evaluation in children could be useful as an important indicator of disturbed embryonic development[1,6]. In 1968 and 1971 Waldrop and coworkers developed a system for assessing minor anomalies and determining their weighted score[2,11,12]. It is considered that in children with high values of weighted scores for minor anomalies (values of 5 or more) specific harmful factors were active prenatally, causing underlying disturbance and increasing the weighted score of minor anomalies. At the same time the finding of a high frequency of minor anomalies or high value of their weighted score supports the assumption of the strong influence of disturbing factors (genetic or environmental) on determination of the disturbance during the first and/or early second trimester of prenatal development[5,8,13]. Mehes[6] considers that minor anomalies are the result of morphogenic disturbances, often connected with congenital disturbances in the broader sense. Opitz[14] pointed to the clear distinction between morphogenetic events during organogenesis (minor malformations) and during phenogenesis (resulting in minor anomalies or phenogenetic variants) which are developmentally identical to »normal variants«. Taking this into account it should be stressed that minor malformations occur in less than 4% of the newborn population, while normal phenotypic variants are found in more than 4% of this population[15].

Positive correlation between the occurrence of minor anomalies and disturbed behaviour and mental retardation has been determined in several studies[1,2,5,8,16-19]. Smith and Bostian[1] found high frequency of minor anomalies in a group of children with so-called idiopathic mental retardation (in as many as 78% of cases). They emphasise that a finding of minor anomalies in such children may be a useful indicator of disturbed embryonic development.

More recent studies confirmed a high incidence of minor anomalies and significantly increased value of their weighted scores in children with developmental disorders. It was also confirmed that children with developmental disorders show significantly greater frequency of certain dental and oral anomalies[3,4].

The aim of the present study was to perform a discriminant analysis for distinguishing among the groups of children with developmental disorders and normal subjects using oro-dental and minor physical anomalies as a set of independent predictors of disturbed development. The intention was also to determine the variables which best discriminate the above groups of subjects, and to what extent.

Subjects and Methods

A study of minor physical anomalies and oral and dental anomalies was performed in four groups of children of Croatian origin. The sample comprised 303 children with developmental disorders (DD) and 303 healthy controls (C). The age of the subjects ranged from 6–18 years. The group of children with developmental disorders included 176 mentally retarded children (MR), 70 children with hearing impairment (HI) and 57 children with vision impairment (VI). Distribution of subjects according to diagnosis and sex is presented in Table 1.

Mental retardation was defined as significantly sub-average intellectual function with intelligence quotients (IQ) below 70, accompanied by limitations in adaptive skills, with onset before 18 years[20]. Children with hearing impairment were defined as those in whom hearing level in the better ear was = 31 dB at 0.5–4 kHz[21,22]. Vision impairment was defined in those children in whom the best corrected visual acuity in the better eye was = 0.3[23]. The controls were healthy children who did not display any kind of developmental disorders during a systematic examination, before enrolment in school.

Analysis of minor physical anomalies and their weighted score in all groups of subjects was performed according to the modified methods and scoring system developed by Waldrop et al[2,11,12]. The examination of minor anomalies was done qualitatively (present or absent), and quantitatively where appropriate (head circumference, hypertelorism, and low-seated ears). Measurements were taken with a caliper and tape and compared to the standards obtained on healthy controls, matched in sex, age, and ethnic origin. The obtained frequencies and weighted scores of the analized minor anomalies were summed up for the analysis in the manner proposed by Waldrop et al. as the total number of anomalies per child (W1), and the sum of the weighted scores for each subject (W2)[11].

Oral and dental anomalies were determined by means of an intraoral examination. The assessments were made by the same examiner, a specialist in Pediatric dentistry with clinical experience of more than ten years. Seven of the most frequent oral and dental anomalies were included in the analysis: median diastema, hypodontia, microdontia, impacted teeth,

TABLE 1
DISTRIBUTION OF SUBJECTS ACCORDING TO DISORDER AND SEX

Subjects	Males		Females		Total	
	N	%	N	%	N	%
Children with DD	165	27.2	138	22.8	303	50.0
mentally retarded	98		78		176	29.0
children with hearing impairment	44		26		70	11.6
children with visual impairment	23		34		57	9.4
Control group	152	25.1	151	24.9	303	50.0
Total	317	52.3	289	47.7	606	100.0

dens invaginatus, upper lip frenulum and frenulum of the tongue.

The multivariate discriminant analysis was performed in the field of oro-dental and minor physical anomalies. The manifest space was defined by nine physical and oro-dental anomalies. The most frequent oral and dental anomalies were included in the analysis and the number of minor physical anomalies per child (W1) and their weighted scores (W2). Statistical package SPSS 9.0 (Chicago, IL) was used for the analysis. Differences between the groups were tested with univariate analysis of variance and Chi-square test in the area of nine original variables.

Results

The examined groups of children with DD and controls differed significantly with regard to the number of minor anomalies (W1) and their weighted scores (W2) according to Waldrop (Table 2). Analysis of the average number of minor anomalies per child (W1) revealed that children with DD display significantly more anomalies than healthy controls ($p < 0.001$). Mentally retarded children had on average 3.95 minor anomalies compared to 1.99 in controls. The groups of DD children showed also significantly higher weighted scores (W2) than controls ($p < 0.001$).

Higher frequency of some oral and dental anomalies was also observed in children with developmental disorders (Table 3). Children with DD displayed significantly higher frequency of median diastema, hypodontia, impacted teeth, and frenulum linguae. The highest difference was found for the anomaly of hypodontia which appeared in MR and VI children with high frequency ($p < 0.001$).

Three discriminant functions were obtained by multivariate discriminant analysis of nine original variables (Table 4). Two discriminant functions statistically significantly differentiated the groups of subjects included in the analysis. The total loss of information during the analysis was minimum (1.4%). The first function explains 90.2% of the total variance, the second 8.4% and the third, which is not significant, only 1.4% of the total variability.

Obtained results showed that the initial space of nine initial variables of the analysed groups can be presented in two-dimensional discriminative space. The content of each of these dimensions (discriminant variables) can be determined on the basis of their correlation with the

TABLE 2
DIFFERENCES IN AVERAGE NUMBER OF MINOR ANOMALIES PER PERSON (W1) AND THE WALDROP WEIGHTED SCORE (W2) BETWEEN CHILDREN WITH DEVELOPMENTAL DISORDERS AND HEALTHY CONTROLS

		MR	HI	VI	DD	C	F	df	p
	N	176	70	57	303	303			
W1	X	3.955	3.900	3.263	3.81	1.993	72.731	3	< 0.001
	SD	1.730	1.787	1.685	1.75	1.335		602	
	N	176	70	57	303	303			
W2	X	3.960	3.671	3.439	3.80	1.818	65.390	3	< 0.001
	SD	1.972	1.839	2.062	1.96	1.528		602	

MR – mentally retarded; HI – hearing impairment; VI – visual impairment;
DD – all children with developmental disorders; C – healthy controls

TABLE 3
DIFFERENCES IN FREQUENCIES OF ORO-DENTAL ANOMALIES BETWEEN CHILDREN WITH DEVELOPMENTAL DISORDERS AND HEALTHY CONTROLS

Oro-dental anomaly	MR (N=176) N (%)	HI (N = 70) N (%)	VI (N = 57) N (%)	Controls (N = 303) N (%)	χ^2-test
1. Median diastema	39 (22.2)	13 (18.6)	11 (19.3)	35 (11.6)	$\chi^2 = 10.13$ $p = 0.017$*
2. Hypodontia	18 (10.2)	1 (1.4)	9 (15.8)	6 (2.0)	$\chi^2 = 28.09$ $p < 0.001$***
3. Impacted teeth	8 (4.5)	2 (2.9)	3 (5.3)	0 (0.0)	$\chi^2 = 14.28$ $p = 0.003$**
4. Microdontia	7 (4.0)	2 (2.9)	3 (5.3)	5 (1.7)	$\chi^2 = 3.63$ $p = 0.304^{ns}$
5. Dens invaginatus	21 (11.9)	5 (7.1)	3 (5.3)	22 (7.3)	$\chi^2 = 4.23$ $p = 0.238^{ns}$
6. Upper frenulum	47 (26.5)	17 (24.3)	10 (17.5)	51 (16.8)	$\chi^2 = 7.54$ $p = 0.057^{ns}$
7. Frenulum lingue	11 (6.3)	6 (8.6)	3 (5.3)	4 (1.3)	$\chi^2 = 12.15$ $p = 0.007$**

MR – mentally retarded; HI – hearing impairment; VI – visual impairment

TABLE 4
CANONICAL DISCRIMINATIVE FUNCTIONS FOR THE GROUP OF CHILDREN WITH DEVELOPMENTAL DISORDERS AND THE CONTROL GROUP

Discr. funct.	Eigen-value	% of vari-ance	Cumul. %	Canon. correl.	After discr. funct.	Wilks λ	χ^2	df	p
					0	0.657	251.122	27	<0.001
1	0.450	90.2	90.2	0.557	1	0.953	28.796	16	0.025
2	0.042	8.4	98.6	0.200	2	0.993	4.268	7	0.748
3	0.007	1.4	100.0	0.084					

initial manifest variables. Total number of minor anomalies per person (W1), the sum of their weighted scores (W2), and median diastema displayed the highest correlations with the first discriminant function. In other words it can be said that minor physical anomalies and median diastema explain the first function. The second discriminant function was mainly defined by three dental anomalies (hypodontia, impacted teeth, and microdontia) which had the highest correlations with this function. Correlations of initial variables with the obtained discriminant functions are grouped according to size in Table 5.

The position of particular groups of subjects presented by their centroids in the territorial map is shown in Figure 1. The small dots mark the position of each subject, while the positions of particular

TABLE 5
FUNCTION-VARIABLE CORRELATIONS FOR THE GROUP OF CHILDREN WITH DEVELOPMENTAL DISORDERS AND THE CONTROL GROUP

Variable	Function 1	Function 2	Function 3
1. Waldrop 1 (W1)	**0.892**	–0.315	–0.032
2. Waldrop 2 (W2)	**0.851**	–0.009	–0.002
3. Median diastema	**0.193**	0.056	0.154
4. Hypodontia	0.235	**0.753**	0.098
5. Impacted teeth	0.221	**0.222**	–0.090
6. Microdontia	0.101	**0.178**	–0.120
7. Dens invaginatus	0.077	–0.052	**0.769**
8. Upper lip frenuluma	0.152	–0.156	**0.413**
9. Frenulum linguae	0.201	–0.164	**–0.386**

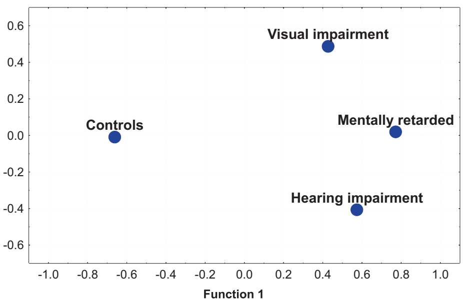

Fig. 1. A plot of the four group discriminant scores.

groups of subjects are represented by their centroids. The first two discriminant variables are significant for discrimination of the control group from the groups of children with developmental disorders, while the third discriminant variable does not contribute to significant differentiation between the groups. This third function is defined by three oral and dental variables: frenulum linguae, frenulum of the upper lip and dens invaginatus.

On the basis of the discriminant variables it is possible to predict the appurtenance of particular entities to particular groups. The probability of predicted group membership of subjects, expressed in percentages, is shown in Table 6. Percentages in the diagonal of the table, shown in fat type, denote those subjects who, according to the prediction of the discriminant analysis, remained in their initial groups. The percentages of subjects who, according to their characteristics (values of variables for description of oro-dental and minor physical anomalies) should fall into the second group, are shown outside the diagonal.

Table 6 shows the high stability of the control group, in which 90.4% of all subjects remained in their initial group. On the other hand there are groups of DD children in which considerable redistribution of subjects occurred. In the group of MR children 52.8% remained in their initial group. Altogether 60.9% of all subjects were correctly classified. There is marked discrimination and considerable distance of the centroids of the control group from the other groups of DD children. This distinct discrimination of the control group of healthy children determined the first discriminative function, which in the initial discriminative solution explains 90.2% of the total variabil-

TABLE 6
CLASSIFICATION OF GROUPS OF CHILDREN WITH DEVELOPMENTAL DISORDERS AND HEALTHY CHILDREN

Actual group	N	Predicted group			
		MR	HI	VI	C
MR	176	**93**	4	10	69
		52.8%	2.3%	5.7%	39.2%
HI	70	34	**2**	0	34
		48.6%	**2.9%**	0.0%	48.6%
VI	57	26	0	**0**	31
		45.6%	0.0%	**0.0%**	54.4%
C	303	24	1	4	**274**
		7.9%	0.3%	1.3%	**90.4%**

MR – mentally retarded; HI – hearing impairment; VI – visual impairment; C – control group

ity between all subjects. Thus, little scope remains for better insight into the structure of the mutual distances of specific groups of DD children.

Discussion

Earlier investigations of minor physical anomalies indicated that children with developmental disorders significantly differ from control groups of healthy children, according to the number and weighted scores for some minor anomalies[4,5,9,16–19,23,24]. Although minor anomalies can occur in completely healthy individuals, their frequency is much higher in individuals with various developmental disorders[5–7]. Investigations so far have shown that minor anomalies with higher weighted scores are not found in groups of healthy schoolchildren (e.g. low set ears, epicanthus completely covering the inner eye angle, clinodactyly, the third toe longer than the second). The number of minor anomalies per child in the group of children with developmental disorders most frequently ranged from 3 to 5 anomalies, and in the group of healthy children from 1 to 2[4,18]. In the present study the discriminant analysis also demonstrated that it is possible to recognise groups of children with developmental disorders and control group on the basis of dental and minor physical anomalies.

The best discrimination was achieved between healthy and mental retarded children. The control group showed the greatest stability, in which 93.4% of subjects remained in their initial group after the analysis. In the group of MR children 52.8% remained in the same group (Table 6). The variables which highly correlated with the first function were most significant for discrimination of groups. In the first place the number of minor anomalies per child (W1) and their weighted scores (W2). The second function was defined by three dental variables (hypodontia, impacted teeth and microdontia). Of which hypodontia showed the most significant correlation with the second function (0.753) (Table 5). The brain, some minor physical anomalies, and teeth derived from the ectomesenchyme, have common ectodermal origin. It could be expected that the maldevelopment of the brain, eyes and ear sensitive nerves might be accompanied by increased incidence of dental and minor physical anomalies.

Variables which correlated with the third discrimination function did not significantly contribute to discrimination of the groups.

It was also confirmed that the average number of minor anomalies per child (W1) was low in the control group, amounting to only 1.993, while in the group of children with developmental disorders it was 3.81. The average weighted score according to Waldrop (W2) was also much higher in the group of subjects with developmental disorders and amounted to 3.80, and for the healthy children only 1.818. These data show that minor physical anomalies were more frequent in the group of subjects with developmental disorders. Exceptionally high frequency of minor physical anomalies was observed in the mentally retarded children and children with behavioural disturbances taken together.

Previous investigations showed that groups of healthy children significantly differ from children with developmental disorders, according to the frequency of minor physical anomalies[4,18]. The frequency of minor anomalies (W1) and their weighted score per person (W2) significantly varies between particular groups of children with developmental disorders. The highest average number of minor anomalies per child (3.955) was found in the group of mentally retarded children, followed by the group of HI children, with an average 3.900 anomalies, and a group of VI children with 3.263 anomalies. The mean value of the minor anomalies per child (W1) in the control group was 1.993. A high prevalence of oral and dental anomalies, and their significant correlation with Waldrop's weighted score, was determined in other studies of subjects with developmental disorders[4]. In his investigation of a large sample Ulovec and coworkers found a high incidence of minor anomalies and high value of their weighted scores in mentally retarded children[3]. These data are important for interpretation of the results obtained by discriminant analysis.

The results obtained in this study show that it is possible to discriminate children with developmental disorders from healthy children on the basis of dental and minor physical anomalies. The results of the analysis also show that the variables which correlated with the first and second function significantly contributed to discrimination of the groups of children with developmental disorders from the control group. Although the variables W1 and W2 are suitable for differentiating children with developmental disorders from a control group of healthy children, they are not sufficient for recognition of particular groups of children with different types of developmental disorders (i.e. mentally retarded, HI children, and VI children). The results show that there is an overlap between the groups of children with developmental disorders.

For subtle structural differences between the groups of children a larger number of oral and dental variables and specific minor physical anomalies should be included. Thus, the variable hypodontia significantly contributed to differentiation of the groups of children with developmental disorders, because its high frequency in the groups of children with vision impairment and mentally retarded children and low frequency in children with hearing impairment was confirmed[4].

The results obtained by the discriminant analysis show that application of dental and minor physical anomalies enabled discrimination between the group of healthy children and the groups of children with different developmental disorders. The considerable distance between the centroids of the control group and the other groups of children with developmental disorders shows distinct discrimination between the subjects (Figure 1). However, the applied variables are not sufficiently sensitive for clear differentiation of the three groups of children with developmental disorders. Consequently, further investigations based on specific minor anomalies in the groups are needed. This might not only provide better discrimination between particular entities within the groups but also illuminate more specifically the neurodevelopmental abnormalities involved. Additional methodological approaches have to be employed to establish if there is a specific pattern of minor physical and dental abnormalities in patients with developmental disorders and controls.

R E F E R E N C E

1. SMITH, D. W., K. E. BOSTIAN, J. Pediatr., 65 (1964) 189. — 2. WALDROP, M. F., F. A. PEDERSON, R. Q. BELL, Child Development, 39 (1968) 391. — 3. ULOVEC, Z., I. ŠKRINJARIĆ, Z. ŠOŠIĆ, L. SZIROVICZA, J. JUKIĆ, Coll. Antropol., 26 (2002) 119. — 4. JUKIĆ, J., I. ŠKRINJARIĆ, D. GLAVINA, Z. ULOVEC, Acta. Stomatol. Croat., 36 (2002) 71. — 5. STEG, J. P., J. L. RAPOPORT, J. Autism. Child. Schizophr., 5 (1975) 299. — 6. MÉHES, K., J. MESTYÁN, V. KNOCH, M. VINCELLÉR, Helv. Pediatr. Acta., 28 (1973) 477. — 7. ŠKRINJARIĆ, I., Genetičke abnormalnosti orodentalnih struktura. In: ZERGOLLERN, LJ. (Ed.): Medicinska genetika 1. (Školska knjiga, Zagreb, 1991). — 8. MEGGESSY, V., M. RÉVHELYI, K. MÉHES, Acta Paediatr. Acad. Sci. Hungar., 21 (1980) 175. — 9. MARDEN, P. M., D. W. SMITH, M. J. McDONALD, J. Pediatr., 64 (1964) 357. — 10. TSAI, F.-J., C.-H. TSAI, C.-T. PENG, J.-Y. WU, C.-H. LIEN, T.-R. WANG, Acta Pediatr., 88 (1999) 323. — 11. WALDROP, M. F., C. F. HALVERSON Jr., Minor physical anomalies and hyperactive behavior in young children. In: HELLMUTH, J. (Ed.): Exceptional infant: Studies in abnormalities, Vol. 2. (Brunner & Mazel, New York, 1971). — 12. WALDROP, M. F., J. D. GOERING, Am. J. Orthopsychiatry., 41 (1971) 602. — 13. HOOK, E. B., P. M. MARDEN, N. P. REISS, D. W. SMITH, Teratology, 13 (1976) 47. — 14. OPITZ, J. M., Eur. J. Pediatr., 144 (1985) 252. — 15. NYHAN, W..L., Clin. Symp., 42 (1990) 1. — 16. FIRESTONE, P., S. PETERS, M. RIVIER, R. M. KNIGHTS, J. Child. Psychol. Psychiatry, 19 (1978) 155. — 17. LOHR, J. B., K. FLYNN, Schizophrenia Bull., 19 (1993) 551. — 18. ŠKRINJARIĆ, I., J. JUKIĆ, K. ŠKRINJARIĆ, Z. ULOVEC, Pediatr. Croat., 46 (2002) 115. — 19. GOURION, D., C. GOLDBERGER, M. C. BOURDEL, F. J. BAYLE, B. MILLET, J. P. OLIE, M. O. KREBS, Schizophr Res 63 (2003) 181. — 20. AMERICAN PSHYCHIATRIC ASSOCIATION: Diagnostic and statistical manual of mental disorders. DSM IV. (APA, Washington, 1994). — 21. WHO: Report of the Informal Working Group on Prevention of Deafness and Hearing Impairment: Programme planning. (World Health Organization, Geneva, 1991) — 22. WHO: Report of the First Informal Consultation on Future Programme: Developments for the prevention of deafness and hearing impairment. (World Health Organization, Geneva, 1997) — 23. GREEN, M. F., P. SATZ, H. V. SOPER, F. KHARABI, Am. J. Psychiatr., 144 (1987) 666. — 24. WALKER, H. A., J. Autism. Child Schizophr., 7 (1977) 165.

I. Škrinjarić

Department of Pedodontics, School of Dental Medicine, Gundulićeva 5, 10000 Zagreb, Croatia

DENTALNE I TJELESNE MINOR ANOMALIJE U DJECE SA SMETNJAMA U RAZVOJU – DISKRIMINACIJSKA ANALIZA

SAŽETAK

Diskriminacijska analiza provedena je na uzorku od 303 djece sa smetnjama u razvoju (SR) i 303 zdrave djece kontrolne skupine da se utvrdi da li neke oro-dentalne i tjelesne minor anomalije diskriminiraju te skupine djece. Uzorak djece sa smetnjama u razvoju uključivao je 176 mentalno nedovoljno razvijene djece (MNR), 70 nagluhe i gluhe djece (NG) i 57 slabovidne i slijepe djece. Kontrolnu skupinu činilo je 303 zdrave osobe istog spola i dobi. Multivarijatna diskriminacijska analiza provedena je u prostoru oro-dentalnih i tjelesnih minor anomalija. U analizu je uključeno sedam najučestalijih oralnih i dentalnih anomalija: diastema mediana, hipodoncija, impaktirani zubi, mikrodoncija, dens invaginatus, frenulum gornje usne i frenulum jezika. Tjelesne minor anomalije procijenjene su metodom po Waldropu i promatrane kao prosječan broj anomalija po osobi (Waldrop 1) i težinski skor anomalija po osobi (Waldrop 2). Analizom devet izvornih varijabli dobivene su tri diskriminacijske funkcije. Postoji jasna diskriminacija i velika udaljenost centroida kontrolne skupine od ostalih skupina djece sa smetnjama u razvoju. Za razdvajanje skupina značajne su prve dvije diskriminacijske varijable koje objašnjavaju ukupno 98.6 % ukupne varijance. Prva varijabla nosi 90.2 % informacija i definirana je brojem i težinom tjelesnih minor anomalija. Druga varijabla objašnjava 8.4% ukupnog varijabiliteta, a definirana je trima dentalnim anomalijama. Treća funkcija, koja nije značajna, sadrži svega 1.4% ukupnog varijabiliteta. Rezultati dobiveni diskriminacijskom analizom pokazuju da primjena dentalnih i minor tjelesnih anomalija omogućuje diskriminaciju između skupina zdrave djece i skupina djece s različitim razvojnim poremećajima.