Malocclusions and dental anomalies in Albanian children with disabilities

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Abstract

Aim: The aim of this study was to determine the prevalence of malocclusion and dental anomalies in children with different disabilities attending different schools for disabled people in Albania.
Methods: This study was carried out in nine special schools for children with disabilities in Albania. Participants were grouped according to disability type as follows: Autistic Spectrum Disorder, Down syndrome, Cerebral Palsy, Mental Retardation, Blind, Deaf-Mute. Malocclusion and dental anomalies were examined and assessed according to the World Health Organization 1997 criteria.
Results: Overall, the prevalence of malocclusion for all groups of children was 51.2%. Of these, 21.9% of the children had slight malocclusion and 28.3% had severe malocclusion. Down syndrome had the highest value of malocclusion prevalence (69%), whereas cerebral palsy had the lowest (28.6%). Compared to boys, girls had slightly higher malocclusion prevalence (50.7%).
Conclusions: Our findings indicate a high prevalence of malocclusions in Albanian children with disabilities. Health professionals and policymakers should be aware of the poor oral health conditions among vulnerable children in transitional Albania.

***Keywords*:** dental anomalies, dentistry, disability, malocclusion, prevalence.

Introduction

Children with disabilities constitute a special group which suffers more than the other groups of children in terms of oral health issues (1-7). Several studies have noted that children with disabilities have higher levels of caries, periodontal diseases, and a much higher proportion of untreated lesions, and a lower treatment rate than children without disabilities. Oral health of these children depends on the age, type of disability, severity of impairment and the living conditions. According to the American Academy of Pediatric Dentistry (AAPD), children and adolescents with special health care needs include any physical, developmental, mental, sensory, behavioral, cognitive, or emotional impairment or limiting condition that requires medical management, health care intervention, and/or use of specialized services or programs (8). The condition may be congenital, developmental, or acquired through various diseases, trauma, or environmental causes and may impose limitations in performing daily self-maintenance activities, or substantial limitations in a major life activity. Caries and the premature loss of deciduous teeth may lead to malocclusion in the permanent dentition (9). The prevalence of malocclusion is reported to be higher among physically and/or mentally disabled children compared to healthy children (10). Very few studies have assessed the severity of maloc-clusion in children with disability and no data exist about the prevalence of malocclusion and dental anomalies among disabled children with disabilities in Albania.

In this context, the aim of the present study was to determine the prevalence of malocclusion in children with disabilities in transitional Albania.

Methods

The study population consisted of 725 children aged 3-18 years from nine special schools of Albania, located in six different cities. Informed consent of parents and school authorities was obtained before children were included in the study. Children that were not cooperative or whose parents did not give consent were excluded from the study. Clinical examinations were carried at school medical rooms or classrooms with good natural light. Each child was examined with the assistance of a class teacher. Occlusion was assessed through single use mirror, spatula and manipulation of the jaws to obtain centric occlusion. Subjects were lying down on a desk or an examination couch. The data for each subject were recorded on the standard proforma World Health Organization (WHO), 1997. Children were divided according to sex and type of disability (Autism, Cerebral, Palsy, Down syndrome, Mentally Retarded, Blind, Deaf-Mute). For each individual, the following malocclusions were diagnosed: anterior crowding, anterior spacing, open bite, deep bite, maxillary anterior overjet, mandibular anterior overjet, lateral crossbite, traumatic bite and several dental anomalies: anomalies of number, size, shape, morphology and timing. Two levels of malocclusion were registered: slight malocclusion-such as one or more rotated or twisted teeth, crowding, or spacing, anomalies of shape size and morphology of tooth; severe malocclusion-anomalies that cause an unacceptable effect on the facial appearance, significant reduction in masticator function, impairment of speech, etc. Malocclusions were recorded as: no malocclusion 0, slight malocclusion 1, and severe malocclusion 2.

Data analysis was conducted in SPSS, version 17.0. The chi-square test (x^2) was used to com-pare the malocclusion prevalence between different groups and for testing the statistical significance of the association. The critical level of statistical significance was set at 0.05.

Results

The demographic profile of the study population revealed that the majority of the patients were males (n=502; 69.2%, females n= 223; 30.3%) with an age ranging from 3-18 years (Table 1).

Table 1. Number and percentage of participants by disability type

Disability type	Frequency	Percent
Autism	119	16.4
Mentally retarded	245	33.8
Cerebral Palsy	28	3.9
Deaf mute	162	22.3
Down syndrome	42	5.8
Blind	129	17.8
Total	**725**	**100.0**

Overall, the malocclusion prevalence in this sample was 51.2%, of which, 21.9% with slight malocclusion and 28.3% with severe malocclusion (Table 2). According to the type of disability, subjects with Down syndrome had the highest prevalence of malocclusion 69% (slight malocclusion 35.7% and severe malocclusion 33.3%), and children with cerebral palsy had the lowest prevalence (28.6% overall; slight malocclusion 3.6% and severe malocclusion 25%).

Table 2. Distribution (in percentage) of malocclusion according to severity and disability type

Type of Malocclusion		Disability Type						Total
		Autism	Mentally Retarded	Cerebral Palsy	Deaf-Mute	Down syndrome	Blind	
No Malocclusion	n	68	106	20	82	13	72	**361**
	%	57.1%	43.3%	71.4%	50.6%	31.0%	55.8%	**49.8%**
Slight Malocclusion	n	17	54	1	51	15	21	**159**
	%	14.3%	22.0%	3.6%	31.5%	35.7%	16.3%	**21.9%**
Severe Malocclusion	n	34	85	7	29	14	36	**205**
	%	28.6%	34.7%	25.0%	17.9%	33.3%	27.9%	**28.3%**
Total	n	119	245	28	162	42	129	**725**
	%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	**100.0%**

The prevalence of malocclusion according to sex was slightly higher in female subjects (50.7%/ 49.3%, Table 3), with no statistical significance though.

Table 3. Distribution of malocclusion according to sex

		Sex		Total
		Male	Female	
No Malocclusion	n	251	110	**361**
	%	50.7%	49.3%	**49.8%**
Slight Malocclusion	n	106	53	**159**
	%	21.1%	23.8%	**21.9%**
Severe Malocclusion	n	145	60	**205**
	%	28.9%	26.9%	**28.3%**
Total	n	502	223	**725**
	%	100.0%	100.0%	**100.0%**

The prevalence of malocclusions for the total sample was as follows: anterior maxillary overjet 9.4%, anterior mandibular overjet 1.2%, open bite 4%, anterior crossbite 3.6%, posterior cross bite 6.5%,

Table 4. Distribution of malocclusion and dental anomalies components according to various disability conditions

Types of Malocclusion and Dental Anomalies		Disability Type: Autism		Mentally Retarded		Cerebral Palsy		Deaf-Mute		Syndrome Down		Blind		Total		
		n	%	n	%	n	%	n	%	n	%	n	%	n	%	
Supranumerary Tooth	No	119	100.0%	242	98.8%	28	100.0%	162	100.0%	41	97.6%	128	99.2%	720	99.3%	$X^2 = 4.937$
	Yes	0	0.0%	3	1.2%	0	0.0%	0	0.0%	1	2.4%	1	0.8%	5	0.7%	P = 0.424
Ectopic Tooth	No	116	97.5%	234	95.5%	28	100.0%	161	99.4%	38	90.5%	123	95.3%	700	96.6%	$X^2 = 11.222$
	Yes	3	2.5%	11	4.5%	0	0.0%	1	0.6%	4	9.5%	6	4.7%	25	3.4%	P = 0.47
Missing Teeth	No	118	99.2%	241	98.4%	28	100.0%	159	98.1%	42	100.0%	129	100.0%	717	98.9%	$X^2 = 3.756$
	Yes	1	0.8%	4	1.6%	0	0.0%	3	1.9%	0	0.0%	0	0.0%	8	1.1%	P = 0.585
Delayed Eruption	No	116	97.5%	232	94.7%	28	100.0%	159	98.1%	29	69.0%	127	98.4%	691	95.3%	$X^2 = 73.412$
	Yes	3	2.5%	13	5.3%	0	0.0%	3	1.9%	13	31.0%	2	1.6%	34	4.7%	P = 0.000*
Diastema	No	107	89.9%	232	94.7%	28	100.0%	151	93.2%	38	90.5%	126	97.7%	682	94.1%	$X^2 = 9.807$
	Yes	12	10.1%	13	5.3%	0	0.0%	11	6.8%	4	9.5%	3	2.3%	43	5.9%	P = 0.081
Crowed, Incisal segment	No	116	97.5%	236	96.3%	28	100.0%	140	86.4%	40	95.2%	125	96.9%	685	94.5%	$X^2 = 26.977$
	Yes	3	2.5%	9	3.7%	0	0.0%	22	13.6%	2	4.8%	4	3.1%	40	5.5%	P = 0.000*
Space, Incisal segment	No	116	97.5%	239	97.6%	28	100.0%	154	95.1%	39	92.9%	128	99.2%	704	97.1%	$X^2 = 8.227$
	Yes	3	2.5%	6	2.4%	0	0.0%	8	4.9%	3	7.1%	1	0.8%	21	2.9%	P = 0.144
Tooth Malposition	No	112	94.1%	217	88.6%	28	100.0%	143	88.3%	34	81.0%	116	89.9%	650	89.7%	$X^2 = 9.870$
	Yes	7	5.9%	28	11.4%	0	0.0%	19	11.7%	8	19.0%	13	10.1%	75	10.3%	P = 0.079
Dental Anomalies	No	118	99.2%	230	93.9%	27	96.4%	154	95.1%	41	97.6%	118	91.5%	688	94.9%	$X^2 = 8.901$
	Yes	1	0.8%	15	6.1%	1	3.6%	8	4.9%	1	2.4%	11	8.5%	37	5.1%	P = 0.113
Other Anomalies	No	119	100.0%	239	97.6%	28	100.0%	160	98.8%	42	100.0%	127	98.4%	715	98.6%	$X^2 = 4.757$
	Yes	0	0.0%	6	2.4%	0	0.0%	2	1.2%	0	0.0%	2	1.6%	10	1.4%	P = 0.446

Types of Malocclusion and Dental Anomalies		Disability Type														
		Autism		Mentally Retarded		Cerebral Palsy		Deaf-Mute		Syndrome Down		Blind		Total		
		n	%	n	%	n	%	n	%	n	%	n	%	n	%	
Maxillary	No	104	87.4%	214	87.3%	25	89.3%	155	95.7%	42	100.0%	117	90.7%	657	90.6%	$X^2 = 13.829$
Anterior Overjet	Yes	15	12.6%	31	12.7%	3	10.7%	7	4.3%	0	0.0%	12	9.3%	68	9.4%	$P = 0.017^*$
Mandibulary	No	119	100.0%	242	98.8%	27	96.4%	161	99.4%	40	95.2%	127	98.4%	716	98.8%	$X^2 = 7.598$
anterior overjet	Yes	0	0.0%	3	1.2%	1	3.6%	1	0.6%	2	4.8%	2	1.6%	9	1.2%	P = 0.180
Anterior Open-	No	117	98.3%	229	93.5%	27	96.4%	159	98.1%	38	90.5%	126	97.7%	696	96.0%	$X^2 = 11.992$
bite	Yes	2	1.7%	16	6.5%	1	3.6%	3	1.9%	4	9.5%	3	2.3%	29	4.0%	$P = 0.035^*$
Anterior	No	114	95.8%	239	97.6%	27	96.4%	153	94.4%	40	95.2%	126	97.7%	699	96.4%	$X^2 = 3.625$
Crossbite	Yes	5	4.2%	6	2.4%	1	3.6%	9	5.6%	2	4.8%	3	2.3%	26	3.6%	P = 0.605
Posterior	No	115	96.6%	224	91.4%	26	92.9%	155	95.7%	37	88.1%	121	93.8%	678	93.5%	$X^2 = 6.998$
Crossbite	Yes	4	3.4%	21	8.6%	2	7.1%	7	4.3%	5	11.9%	8	6.2%	47	6.5%	P = 0.221
Overbite/Deep	No	112	94.1%	235	95.9%	28	100.0%	157	96.9%	41	97.6%	117	90.7%	690	95.2%	$X^2 = 9.243$
bite	Yes	7	5.9%	10	4.1%	0	0.0%	5	3.1%	1	2.4%	12	9.3%	35	4.8%	P = 0.100
Traumatic	No	111	93.3%	231	94.3%	28	100.0%	160	98.8%	39	92.9%	126	97.7%	695	95.9%	$X^2 = 10.215$
Occlusion	Yes	8	6.7%	14	5.7%	0	0.0%	2	1.2%	3	7.1%	3	2.3%	30	4.1%	P = 0.069

*The chi-square statistic was significant at the 0.05 level.

deep bite 4.8%, and traumatic bite 4.1% (Table 4). The prevalence of dental anomalies for the total sample was as follows: supernumerary teeth 0.7%, ectopic teeth 3.4%, diastema 5.9%, anomalies of position 10.3%, space 2.9%, crowded 5.5%, dental anomalies 5.1%, other anomalies 1.4%, delayed eruption 4.7%, missing teeth 1.1% (Table 4). Children with Down syndrome had the largest proportion of most malocclusion and dental anomalies: delayed eruption 31%, ectopic teeth 9.5%, mandibulary overjet 4.8%, posterior cross bite 11.9%, traumatic bite 7.1%, anterior open bite 9.5%, space 7.1%, anomalies of tooth position 10.1%. More detailed data about the prevalence of malocclusion and dental anomalies according to disability are shown in Table 4. There were significant statistical differences between the groups of disabilities for these anomalies: delayed eruption (P=0.0001), crowed at incisal segment (P<0.0001), malposition of the tooth (P=0.004), dental anomalies (P<0.0001), maxillary anterior

Discussion

The prevalence of malocclusion in children with different disabilities according to our data is 51.2% (Table 2). We found similarities with other authors which emphasize that children with disabilities have a high rate of malocclusion (6,7,10-12). Our data for the prevalence of malocclusion (Table 2) are similar with those reported elsewhere (1,5,13,14), but lower than results of some other studies (15-19). Down syndrome had the highest prevalence of malocclusion among all study groups, which is an accordance with other studies (15,18,20).

According to the type of disability:

- *Down syndrome* prevalence of malocclusion in our study (Table 2) was similar with results reported by Farah et al. (21), lower than values reported by Meštroviæ et al. (22), and higher than results reported by Oredugba et al. and Bhowate et al. (2,23).
- *Autism* prevalence of malocclusion in our

study (Table 2) was lower than the result reported by Shukla et al. and DeMattei et al. (18,24) and higher than results reported by Muppa et al. (25).

- *Mentally retarded* prevalence of malocclusion in our study (Table 2) was lower than results reported by Shukla et al. and Muppa et al. (18,25).
- *Blind* children: the prevalence of malocclusion in this group in our study (Table 2) was similar with result reported by Shyama et al. (15) and lower than results report by Avasthi et al. (26).
- *Cerebral Palsy:* Our results for the prevalence of malocclusion (Table 2) are similar with values reported by Onyeaso et al. and Muppa et al. (17,25) and lower than results reported by Shukla et al. and Dougherty et al. (18,27).
- *Deaf mute* prevalence of malocclusion in our study (Table 2) was lower than results reported by Shyama et al. and Onyeaso et al. (15,17), and higher than results reported by Muppa et al. (25).

According to the type of anomaly:

- *Incisal segment spaces*. In our study, 2.9 % of the study population (Table 4) had incisal segment spacing ei-ther in one or both arches. Shivakumar et al. (28) reports a prevalence of 15.7% of anterior incisal spacing, while other authors report higher values (17,25,29). Down syndrome has the highest value, whereas other authors (30,31) confirm that anterior incisal spacing is a common anomaly among children with Down syndrome.
- *Incisal segment crowding*. Our study found lower results (Table 4) than Shivakumar et al. (28) who report a prevalence of 38.7% of incisal spacing, while other authors report higher values (17,25,29).
- *Midline diastema.* Our data shows lower prevalence of midline diastema than previous studies (28,29).
- *Missing teeth*. Our sample of children shows a lower prevalence (Table 4) of missing teeth than the results reported by Vellappally et al. (29). Deaf mute group had the highest prevalence of 1.9%, while Ciger et al. (32) found a prevalence of 6% in a study with deaf mute people in Turkey.
- *Delayed eruption.* Down syndrome group had the highest prevalence (Table 4). Other studies confirm the fact that individuals with Down syndrome have a high prevalence of delayed eruption (33-37).
- *Ectopic teeth.* Down syndrome group had the highest prevalence of ectopic tooth (Table 4). Ondarza et al. (39) in a study conducted in Chilean children with Down syndrome state that children with Down syndrome have a high rate of ectopic teeth.
- *Supranumerary teeth.* Down syndrome group had the highest prevalence of supranumerary teeth (Table 4); our values are similar with values found by Mellara et al. (38) which found a prevalence of 3.1% of supranumerary teeth among individuals with Down syndrome.
- *Tooth malposition.* Down syndrome group had the highest prevalence of tooth malposition (Table 4). Ondarza et al. (39) in a study conducted in Chilean children with Down syndrome state that children with Down syndrome have a high rate of tooth malposition.
- *Dental anomalies*. Blind group had the highest prevalence of dental anomalies (Table 4). Mahoney et al. (40) state that children with visual impairment suffer from several dental anomalies, especially from enamel hypoplasia, amelogenesis imperfecta. One report suggested an association between coloboma of the iris, hypodontia and amelogenesis imperfecta (41).
- *Anterior maxillary overjet.* Our sample prevalence of anterior maxillary overjet was 9.4% (Table 4). Other authors report different results, lower (17), or higher (28,29) than our results. Mentally retarded group has the highest prevalence of anterior maxillary overjet. Vellappally et al. (29) report a higher prevalence of maxillary anterior overjet at mentally retarded children than our study.
- *Anterior mandibular overjet.* Prevalence of anterior mandibular overjet in our sample was 1.2% (Table 4). Other authors report higher (28),

or lower (29) results. In our study, Down syndrome had the highest prevalence of mandibulary anterior overjet compared to other groups, but our values are lower than values reported by Vellappally et al. (29).

- *Anterior open bite*. Our result for the total sample (Table 4) are similar with Muppa et al. (25) higher than Shivakumar et al. (28), but lower than the results reported by Oliveira et al. and Vellappally et al. (20,29). Down syndrome had the highest prevalence compared to other groups and other authors report a high prevalence of anterior open bite in Down syndrome (29,42,43) and higher values than our estimate.
- *Anterior crossbite.* The prevalence of anterior crossbite in our sample (Table 4) is similar with Muppa et al. (25) and very low compared with studies of other authors (20) which report a prevalence of 20.4%. Deaf mute group had the highest prevalence of 5.6%. Ciger et al. (32) in a study conducted in deaf-mute population of Turkey found a prevalence of 2.9%.
- *Posterior crossbite.* Prevalence of posterior crossbite in our sample (Table 4) was very low compared with data from other studies (20,43) which report a prevalence of 21.5-82.1%. Down syndrome had the highest prevalence among all groups in our sample (Table 4), but our value is lower than values reported by De Faria et al. (42) and Marques et al. (43) which report a prevalence of 31-82.1% for posterior crossbite in individuals with Down syndrome.
- *Deep bite/overbite.* Our data (Table 4) shows a lower prevalence than values reported by Onyeaso et al. and Muppa et al. (17,25) which report a prevalence of 12.5% and 45.4%, respectively.
- *Traumatic occlusion.* Our data shows a prevalence of 4.1% (Table 4) in the total sample. Down syndrome group had the highest prevalence 7.1%.

According to the severity of malocclusion, in our sample we found a prevalence of 21.9% with slight malocclusion and 28.3% with severe malocclusion, which are lower than result reported by other studies (15,16,29).

It is difficult to compare our data with other authors because of differences in groups of disability, age, number and race between our study and those conducted by other authors.

Conclusions

We can conclude that Albanian children with disabilities have a high prevalence of malocclusion. Tooth malposition, maxillary anterior overjet and posterior crossbite are the most common orthodontic anomalies found among children with disabilities in Albania. Down syndrome has the highest prevalence of most of orthodontics anomalies and tooth anomalies in Albanian children with disabilities. Based on these findings, health professionals and policymakers should be aware of the poor oral health conditions among vulnerable children in transitional Albania.

Conflicts of interest: None declared.

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