

Prevalence of Malocclusion in Patients with Down's Syndrome

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Summary

Significant alterations of the cranio-orofacial region have been observed in subjects with Down's syndrome. The aim of this study was to assess the frequency of particular orthodontic malocclusion in these subjects. A group of 112 subjects with cytogenetically confirmed diagnosis of Down's syndrome was examined. All the subjects underwent a complete dental examination. The following classification was used to determine malocclusion of crowding, premature tooth loss, class III malocclusion, open bite, class II division 2 malocclusion, unilateral cross bite and bilateral cross bite. Clipper language programs were designed for data processing. Malocclusion was found in 92% of the subjects. Class III malocclusion was most frequently observed (43.8%). Crowding and unilateral cross bite were found in 15% of the subjects respectively. Bilateral cross bite was present in 5.4% of the subjects. Premature tooth loss was observed in only 1% of the subjects whereas class II division 2 malocclusion was not recorded in any of the subjects examined.

Key words: malocclusion, Down's syndrome.

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Introduction

All subjects with a chromosomal disbalance (trisomy or monosomy) in each individual cell of their body, have some feature in common, i.e. they resemble other subjects with the same genetic disturbance, like siblings and differ considerably from their own relatives (1). Genetic disturbances cause alterations in the structure and function of the organs and the body as a whole, which make the carrier of a genetic disbalance differ from his family's genetic basis (2). Thus, subjects with Down's syndrome can

readily be recognized according to the phenotype, as well as to the development and history of the disease, i.e. a whole array of symptoms (3, 4). The cranio-orofacial region is involved by considerable alterations. Cohen and Winer recorded dentition disturbances in 73% of cases with Down's syndrome (5). Delayed tooth eruption in both deciduous and permanent dentition has been reported by many authors (5-18). Tooth malocclusion, most frequently in the form of hypodontia and microdontia, is also characteristic of the disturbance (5, 8, 10, 16, 17).

Epidemiologic studies have shown that subjects with Down's syndrome are predisposed to certain types of malocclusion, e.g., class III malocclusion, usually associated with mandibular overjet and open bite. These types of malocclusion are otherwise very rare in the healthy population (18). Open bite is also quite frequent in other mentally retarded subjects, free of Down's syndrome. In contrast, deep bite and maxillary prognathism are very rarely observed. In deciduous dentition, Spee's curve is slightly deeper as compared to that in the normal population. During mixed dentition, the curve tends to decline in depth, and in some subjects it may even become inverse. With aging, the depth of Spee's curve increases very slightly once again, most probably due to premolar hypodontia, but never reaches the depth found in the normal population (16).

In subjects with Down's syndrome guidance of the mandible into the centric occlusion is absent. The mandible is permanently pushed to the right, to the left or forward, always reacting with different occlusion on demand. Therefore, the subjects tend to mandibular prognathism (19). Jensen et al. (16) compared the width, length and perimeter of dental arches between subjects with Down's syndrome and the normal population. In the normal population, the maxillary arch width exceeds the mandibular arch width, in contrast to the subjects with Down's syndrome in whom the width of both arches is equal or the mandibular arch is even wider. Of course, this is related to a high frequency of unilateral cross bite and class III malocclusion. The length and perimeter of the maxillary dental arch are smaller in subjects with Down's syndrome than in the normal population, while the size of the mandible is equal in the two groups of subjects.

The aim of the study

The aim of the study was to assess the frequency of particular types of malocclusion in subjects with Down's syndrome.

Subjects and methods

In total, 131 subjects with cytogenetically confirmed diagnosis of Down's syndrome, aged 2-36

years, were examined. As the number of teeth was inadequate in 19 subjects, they were excluded from the study. Thus, a sample of 112 subjects, 68 (60.7%) males and 44 (39.3%) females, were studied. All subjects underwent a complete dental examination, performed in the dental surgery of their home institutions. A WHO 1983 E questionnaire for oral health and need assessment (CPITN) was used for data recording. A new item had to be added to the questionnaire for this study, for the finding of malocclusion. The following classification was used to designate the malocclusion observed:

1. Crowding
2. Premature tooth loss
3. Class III malocclusion
4. Open bite
5. Class II division 2 malocclusion
6. Unilateral cross bite
7. Bilateral cross bite.

Programs in the Clipper language were designed for processing of the data obtained.

Results and discussion

Among the 112 subjects examined, malocclusion was present in 92% (Figure 1). This percentage greatly exceeds those observed by others in a healthy population (20-26). Only 8% of the subjects were free of malocclusion, which was by almost less than half the figure reported by Štefanac in children from Zagreb (21). She found 15% of eugathic children, 13% and 15% of boys and girls, respectively. Vrbić et al. (20) examined children aged 6, 12, 15 and 18 years. Malocclusion were found in 45.5% of the cases. Radica (22) examined 1600 children aged 7-14 years in Split and observed malocclusion in 52.8% of the cases. In their study carried out in 366 children aged 12.5-13.5 years in the Poreč area, Legović and Cekić (23) found malocclusion to be present in 63.7% of the cases. Cipruš (24) examined children aged 7-14 years on the island of Rab, reporting 66.8% of cases with malocclusion. Ceranić (25) studied 990 children aged 7-15 years in the Požega area. Malocclusion was observed in 54.14% of the children.

In the examined sample of subjects with Down's syndrome (Table 1), class III malocclusion was most frequently present, i.e. in 43.8% of the cases,

which was considerably different from the results reported by authors who examined a healthy population. Cipruš (26) found class III malocclusion in 8.27%, Radica (22) in 5.8%, Legović and Cekić (23) in 6.44%, and Ceranić (25) in 14.34% of the subjects examined. Crowding and unilateral cross bite occupied second place, with 17% each. Legović (27) found crowding in 33.3%, Cipruš (26) in 56.93%, Radica (22) in 34.67%, Legović and Cekić (23) in 60.5%, and Ceranić (25) in 14.34% of the cases. The frequency of open bite was 8%. Cipruš (26) recorded it in 0.81%, Legović and Cekić (23) in 4.7%, and Ceranić (25) in 2.32% of the subjects examined. According to Gorlin (7), open bite is present in 15% of subjects with Down's syndrome. Fisher-Brandies (28) reported on open bite in subjects with Down's syndrome to be of a dento-alveolar nature. According to Weyman (29) and Desai (30), most subjects with Down's syndrome have a normally sized tongue, but the size of the oral cavity is reduced, resulting in open bite. In subjects with Down's syndrome, bilateral cross bite occurred in 5.4% of the cases. The malocclusion of premature tooth loss was less frequent, i.e. in only 0.9% of the cases. Radica (22) found premature tooth loss in 13.4%, Legović and Cekić (23) in 19.4%, and Ceranić (25) in 5.86% of the subjects examined. Muretić et al. (31) examined 10 000 orthodontic patients and found crowding to be the most frequent diagnosis (60.2%).

In our study, none of the subjects examined was found to have class II division 2 malocclusion, which differed considerably from the frequency of this malocclusion in the healthy population. Cipruš (23), Radica (19), Legović and Cekić (20), and Ceranić

(22) reported on the frequency of class II division 2 malocclusion of 4%, 13.53%, 4.7% and 6.77%, respectively. Class III malocclusion was found to occur twice as frequently in male subjects than in female with Down's syndrome. In contrast, the frequency of unilateral and bilateral cross bite in females was three-fold that found in males. The frequency of other malocclusions was equal in both sexes. In the total number of malocclusions (Table 2), class III malocclusion was most frequently observed, i.e. in 47.6% of the cases (in 36.9% and 10.7% of the boys and girls, respectively). Cohen (32) considers class III malocclusion in subjects with Down's syndrome to be induced by inadequately developed maxilla, and increased by enlarged tongue and its movements. The frequency of crowding and unilateral cross bite was found in 18.5% of the cases. Unilateral cross bite was present in 5.8% of the boys, which was by half as low as in the girls, in whom it was found in 12.6% of the cases. The frequency of open bite and bilateral cross bite was 8.7% and 5.8%, respectively. The malocclusion of premature tooth loss was less frequently observed (1%).

Conclusions

Malocclusion was observed in 92% of subjects with Down's syndrome. Class III malocclusion was most frequently observed, i.e. in 43.8% of the cases. Crowding and unilateral cross bite were found in 15% of the subjects respectively. Bilateral cross bite was present in 5.4% of the subjects. Premature tooth loss was observed in only 1% of the subjects.