

## Prevalence of malocclusion in people with disabilities

Prevalência de más oclusões em pessoas com deficiência

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### ABSTRACT

**Objective:** To evaluate the prevalence of malocclusion in patients with disabilities. **Material and Methods:** The sample consisted in 98 patients of who had a previous diagnosis of disability. Patients were divided into three groups: Intellectual Disabilities (ID), Cerebral Palsy (CP) and Down Syndrome (DS). They were evaluated according to Angle malocclusion classification, presence or absence of posterior crossbite, anterior crossbite and anterior open bite. Statistical analysis of the data was performed using the Kruskal Wallis test at 5% significance level. **Results:** Class II malocclusion was more frequent in the three groups (CP 45.45%, ID 40.43% and DS 50.00%); the anterior and the posterior crossbite were more prevalent in DS ( $p < 0.0001$ ). The anterior open bite was more prevalent in CP ( $p < 0.0001$ ). **Conclusion:** Patients with disabilities have high rate of malocclusion and understanding this condition is essential to establish appropriate treatment.

### KEYWORDS

Orthodontics; Malocclusion; People with disabilities.

### RESUMO

**Objetivo:** Avaliar a prevalência de má oclusão em pacientes com deficiências. **Materiais e Métodos:** A amostra foi composta por 98 pacientes com o diagnóstico prévio da deficiência. Os pacientes foram distribuídos em três grupos: deficiência intelectual (DI), paralisia cerebral (PC) e síndrome de Down (SD). Eles foram avaliados de acordo com a classificação de Angle para má oclusão, presença ou ausência de mordida cruzada posterior, mordida cruzada anterior e mordida aberta anterior. A análise estatística dos dados foi realizada utilizando o teste de Kruskal Wallis com nível de significância de 5%. **Resultados:** A Classe II foi mais frequente nos três grupos (PC 45,45%, DI 40,43% and SD 50,00%); a mordida cruzada anterior e posterior foram mais prevalentes na SD ( $p < 0,0001$ ). A mordida aberta anterior foi mais prevalente na PC ( $p < 0,0001$ ). **Conclusão:** Pacientes com deficiência apresentam altas taxas de má oclusão e compreender esta condição é essencial para estabelecer o tratamento mais adequado.

### PALAVRAS-CHAVE

Ortodontia; Má oclusão; Pessoas com deficiência.

### INTRODUCTION

The World Health Organization in 2001 adopted the International Classification of Functioning, Disability and Health (ICF). The ICF reflects a biopsychosocial approach to describe health and disability in different components: body structure and body function,

activity, participation, environmental factors, and personal factors [1].

Caries and the premature loss of deciduous teeth are problems found in children with disabilities, who may lead to malocclusion in the permanent dentition [2]. In addition, studies revealed that the prevalence of malocclusion is

higher among disabled people if compared to healthy people [3,4].

Waldman et al. report that dental issues are associated to deleterious oral habits developed by people with disabilities as finger sucking, mouth breathing, tongue thrusting and problems in muscle development, associated with hereditary factors, aggravating malocclusion [5].

In patients with Down syndrome were found anterior open bite, narrow maxilla, a prognathic mandible [6], besides Angle's Class III malocclusion [7]. Furthermore, were found a higher prevalence of Angle Class II in patients with Cerebral Palsy besides overjet, crowding and cross bite due to lip hypertonicity, tongue thrusting and maxillary atresia [4].

There is not enough data to establish the prevalence of malocclusion in each disability or syndrome. Therefore, the evaluation of the malocclusion prevalence is mainly important to health and public services develop improvements in their preventive techniques and new treatment alternatives. Becker et al. showed that after orthodontic treatment, the improvement was not only dental or facial, but also in the functions of chewing and deglutition, besides progress in patient self-esteem [8]. Therefore, the aim of this study was to evaluate the prevalence of malocclusion in people with disabilities.

## METHODS

### *Ethics*

The Ethics Committee on Research Involving Human Subjects (CEP), with CAAE 02717112.3.0000.5420, approved this study.

### *Methods*

This cross sectional study was carried out among 98 patients with disabilities who were treated on Centro de Assistência Odontológica à Pessoa com Deficiência (CAOE) of Universidade Estadual Paulista "Júlio de Mesquita Filho"

– Araçatuba School of Dentistry – UNESP, Araçatuba, São Paulo, Brazil, and was conducted during the period between July 2012 and July 2013.

### *Inclusion Criteria*

Patients older than 7 years old, who already had the first permanent molar erupted.

### *Exclusion Criteria*

Patients undergoing or finished orthodontic treatment, edentulous or patients with extensive tooth loss whose evaluation of the molar relationship stayed hampered by missing teeth.

### *Clinical Evaluation*

The evaluation involved three essential phases. Initially, a neurologist diagnosed deficiencies on patients according to ICD-10. Second, patients were classified into three groups: Down syndrome (n = 18), Cerebral Palsy (n = 33) and Intellectual Disabilities (n = 47).

Finally, two dentists clinically evaluated malocclusions according to three aspects:

- Angle's malocclusion classification: Class I, Class II and Class III;
- Anterior cross bite and posterior cross bite;
- Anterior open bite (AOB).

The study group included 54 boys (55.1%) and 44 girls (44.9%) in the age range of 9 to 62 years.

### *Statistical*

The results were tested at a significance level of 5% ( $p < 0.05$ ) using BioStat 5.3. The analyzed data were nonparametric and performed with Kruskal-Wallis tests

## RESULTS

Class I was identified in 33.3% of Cerebral

Palsy (CP) patients, 29.8% of Intellectual Disabilities (ID) and 27.8% of Down Syndrome (DS). Class III malocclusion was less frequent in all three groups, with greater expression in ID, which reached 29.8% of patients. For these, there was no statistical difference between groups | $(p) = 0.3452$  Kruskal-Wallis | (Table I).

Anterior cross bite was more prevalent in DS compared to other groups, reaching 16.7% | $(p) < 0.0001$  Kruskal-Wallis|. The posterior cross bite was more prevalent than the anterior cross bite in all groups, and was present in 61.1% of patients with DS. This incidence was also statistically significant | $p < 0.0001$  Kruskal-Wallis|.

Anterior open bite (AOB) was more prevalent in CP (36.4%) if compared to other deficiencies (25.5% in ID and 22.2% in DS). The prevalence in CP was statistically significant | $p < 0.0001$  Kruskal-Wallis| (Table II).

## DISCUSSION

Malocclusion can affect people in different

aspects. Phonation, swallowing, chewing [5] and even appearance, leading to several problems including low self-esteem [8]. In this study, results showed a high rate of malocclusion among patients with deficiency.

A greater prevalence of Class II on patients evaluated in this study differs from the higher prevalence of Class I in patients without disabilities reported in the literature. Silva Filho et al. reported Class I was the most prevalent (55%) in healthy patients, followed by Class II malocclusion, and finally by Class III malocclusion [9].

Regarding anterior cross bite, it was found in 6.1% of CP, 6.4% of ID and 16.7% of DS. With the exception of DS, these numbers are similar to other analysis in patients without disabilities [10] and patients with CP [11].

Carvalho et al., evaluating patients without disabilities between 8 and 15 years old, found that 15.7% had posterior cross bite [12]. This percentage is lower than the numbers measured

**Table I** - Distribution of Angle's malocclusions per disability

	Class I		Class II		Class III	
Cerebral Palsy	33.3%	n = 11	45.5%	n = 15	21.2%	n = 7
Intellectual Disabilities	29.8%	n = 14	40.5%	n = 19	29.8%	n = 14
Down Syndrome	27.8%	n = 5	50.00%	n = 9	22.2%	n = 4

**Table II** - Distribution of Anterior Cross Bite (ACB), Posterior Cross Bite (PCB) and Anterior Open Bite (AOB) per disability

	ACB		PCB		AOB	
Cerebral Palsy	6.1%	n = 2	27.3%	n = 9	36.4%	n = 12
Intellectual Disabilities	6.4%	n = 3	36.2%	n = 17	25.5%	n = 9
Down Syndrome	16.7%	n = 3	61.1%	n = 11	22.2%	n = 4

in this study: 61.1% in DS, 36.2% in ID and 27.3% in CP. These results may derive from the fact that people with disabilities have a higher rate of non-nutritive habits [13] and physiological abnormalities that facilitate the appearance of this malocclusion [11].

Anterior open bite (AOB) was more prevalent in Cerebral Palsy (36.4%) if compared to other deficiencies (25.5% in ID and 22.2% in DS). The prevalence of this malocclusion was similar to studies that evaluated patients with DS and CP [11] and higher than the distribution in individuals without disabilities [14,15]. This difference may relate to a higher incidence of habits on patients with disabilities, caused by deleterious habits like thumb sucking, abnormal function and position of the tongue, as pointed out by current studies [16,17].

Although this study had included different age groups, age is not necessarily a limiting factor to the orthodontic treatment [18]. However, during the anamnesis and planning, the real benefits of a delayed treatment to a disabled patient should be evaluated considering their expectations and limitations.

Considering the deinstitutionalization of people with disabilities and the increasing demand for orthodontic treatments, it is crucial to understand these patients' needs and peculiarities. Furthermore, parents must be aware about the importance of preventive and interceptive care of these patients.

## CONCLUSION

Patients with disabilities have high malocclusion rates and understanding and confirming this are essential to establish best treatments. Class II malocclusion was more frequent in all three groups; the anterior and posterior cross bite were more prevalent in DS and it was statistically significant. The open bite was more prevalent in CP.

## REFERENCES

1. Anner J, Schwegler U, Kunz R, Trezzini B, de Boer W. Evaluation of work disability and the international classification of functioning, disability and health: what to expect and what not. *BMC Public Health*. 2012 Jun 21;12:470. doi: 10.1186/1471-2458-12-470.
2. Northway WM, Wainright RL, Demirjian A. Effects of premature loss of deciduous molars. *Angle Orthod*. 1984 Oct;54(4):295-329.
3. Orelund A, Heijbel J, Jagell S. Malocclusions in physically and/or mentally handicapped children. *Swed Dent J*. 1987;11(3):103-19.
4. Franklin DL, Luther F, Curzon MEJ. The prevalence of malocclusion in children with cerebral palsy. *Eur J Orthod*. 1996 Dec;18(6):637-43.
5. Waldman HB, Perlman SP, Swerdloff M. Orthodontics and the population with special needs. *Am J Orthod Dentofacial Orthop*. 2000 Jul;118(1):14-7.
6. Desai SS. Down syndrome: a review of the literature. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod*. 1997 Sep;84(3):279-85.
7. Bauer D, Evans CA, Begole EA, Salzmann L. Severity of Occlusal Disharmonies in Down Syndrome. *Int J Dent*. 2012;2012:872367. doi: 10.1155/2012/872367.
8. Becker A, Shapira J, Chaushu S. Orthodontic treatment for the special needs child. *Prog Orthod*. 2009;10(1):34-47.
9. Silva Filho OG, Freitas SFd, Cavassan AdO. Prevalência de oclusão normal e má oclusão em escolares da cidade de Bauru (São Paulo). Parte I: relação sagital. *Rev. Odontológica da USP*. 1990;4(2):130-7
10. Carvalho AC, Paiva SM, Viegas CM, Scarpelli AC, Ferreira FM, Pordeus IA. Impact of Malocclusion on Oral Health-Related Quality of Life among Brazilian Preschool Children: a Population-Based Study. *Braz Dent J*. 2013 Nov-Dec;24(6):655-61. doi: 10.1590/0103-6440201302360.
11. Oliveira AC, Paiva SM, Martins MT, Torres CS, Pordeus IA. Prevalence and determinant factors of malocclusion in children with special needs. *Eur J Orthod*. 2011 Aug;33(4):413-8. doi: 10.1093/ejo/cjq094.
12. Carvalho OE, Silva ACPS, Carlini MG. Estudo da prevalência de mordidas cruzadas em dentes decíduos e permanentes em pacientes examinados na disciplina de ortodontia da UERJ. *Rev Dent Press Ortodon Ortop Facial*. 2000;5(2):29-34.
13. Ortega AO, Guimarães AS, Ciamponi AL, Marie SK. Frequency of parafunctional oral habits in patients with cerebral palsy. *J Oral Rehabil*. 2007 May;34(5):323-8.
14. Sousa RV, Pinto-Monteiro AKA, Martins CC, Granville-Garcia AF, Paiva SM. Malocclusion and socioeconomic indicators in primary dentition. *Braz Oral Res*. 2014;28:54-60.
15. Thomazine GDPA, Imparato JCP. Prevalência de mordida aberta e mordida cruzada em escolares da rede municipal de Campinas. *Jornal brasileiro de odontopediatria & odontologia do bebê*. 2000;3(11):29-37.
16. Oliveira AC, Pordeus IA, Torres CS, Martins MT, Paiva SM. Feeding and nonnutritive sucking habits and prevalence of open bite and crossbite in children/adolescents with Down syndrome. *Angle Orthod*. 2010 Jul;80(4):748-53. doi: 10.2319/072709-421.1.

17. Chawla HS, Suri S, Utreja A. Is tongue thrust that develops during orthodontic treatment an unrecognized potential road block? J Indian Soc Pedod Prev Dent. 2006 Jun;24(2):80-3.
18. Valle-Corotti KM, Valle CVM, Neves LS, Henriques JFC, Pinzan A. A Ortodontia na atuação odontogeriátrica. R Dental Press Ortodon Ortop Facial. 2008;13(2):84-93.

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