

Dental care for people with Down Syndrome¹

Atendimento odontológico a pessoas com Síndrome de Down

Atención odontológica a personas con Síndrome de Down

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ABSTRACT

Down Syndrome (DS) is a genetic condition resulting from trisomy of chromosome 21, representing the most common chromosomal alteration in humans. Individuals with DS present specific phenotypic characteristics and associated systemic conditions that directly affect their overall and oral health. In dentistry, common findings include delayed tooth eruption, hypodontia, microdontia, increased susceptibility to periodontal disease, variable risk of dental caries, and a high prevalence of malocclusions. Furthermore, behavioral challenges and barriers to accessing oral healthcare services hinder adequate care for this population. This study aims to analyze, through a literature review, the main aspects related to dental care for people with Down Syndrome, addressing oral characteristics, preventive strategies, clinical management, and barriers to treatment access. Based on the analysis of the literature, the importance of a multidisciplinary, humanized, and individualized approach is emphasized to promote oral health and improve the quality of life of these patients.

Keywords: Down Syndrome. Dental care. Periodontal disease. Dental caries. Access to health services.

RESUMO

A Síndrome de Down (SD) é uma condição genética resultante da trissomia do cromossomo 21, representando a alteração cromossômica mais comum em seres humanos. Indivíduos com SD apresentam características fenotípicas específicas e condições sistêmicas associadas que impactam diretamente sua saúde geral e bucal. No contexto odontológico, destacam-se alterações como atraso na erupção dentária, hipodontia, microdontia, predisposição a doenças periodontais, risco variável de cárie dentária e alta prevalência de má oclusões. Além disso, desafios comportamentais e barreiras no acesso aos serviços de saúde bucal dificultam o atendimento adequado dessa população. Este trabalho tem como objetivo analisar, por meio de uma revisão de literatura, os principais aspectos relacionados ao atendimento odontológico de pessoas com Síndrome de Down, abordando

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características bucais, estratégias preventivas, manejo clínico e barreiras enfrentadas no acesso ao tratamento. A partir da análise dos estudos, reforça-se a importância de um atendimento multiprofissional, humanizado e adaptado às necessidades individuais desses pacientes, visando promover a saúde bucal e melhorar sua qualidade de vida.

Palavras-chave: Síndrome de Down. Atendimento odontológico. Doença periodontal. Cárie dentária. Acesso aos serviços de saúde.

RESUMEN

El Síndrome de Down (SD) es una condición genética resultante de la trisomía del cromosoma 21 y representa la alteración cromosómica más común en los seres humanos. Las personas con SD presentan características fenotípicas específicas y condiciones sistémicas asociadas que repercuten directamente en su salud general y bucal. En el contexto odontológico, se destacan alteraciones como retraso en la erupción dentaria, hipodoncia, microdoncia, predisposición a enfermedades periodontales, riesgo variable de caries dental y alta prevalencia de maloclusiones. Además, los desafíos conductuales y las barreras de acceso a los servicios de salud bucal dificultan una atención adecuada. Este estudio tiene como objetivo analizar, mediante una revisión de la literatura, los principales aspectos relacionados con la atención odontológica de personas con Síndrome de Down, abordando características bucales, estrategias preventivas, manejo clínico y barreras de acceso al tratamiento. El análisis de los estudios refuerza la importancia de una atención multiprofesional, humanizada y adaptada a las necesidades individuales, con el fin de promover la salud bucal y mejorar la calidad de vida.

Palabras clave: Síndrome de Down. Atención odontológica. Enfermedad periodontal. Caries dental. Acceso a los servicios de salud.

INTRODUCTION

Down Syndrome (DS) is a genetic condition resulting from trisomy of chromosome 21 and is the most common chromosomal abnormality among live births (Parker *et al.*, 2010 *apud* Abed; Tajú, 2024). Its prevalence is estimated at approximately 1 in every 700 births, with variations according to geographic, genetic, and maternal factors. The presence of an extra chromosome leads to changes in physical, cognitive, and systemic development, resulting in a characteristic set of clinical manifestations, such as a flattened facial profile, oblique palpebral fissures, a prominent tongue, muscle hypotonia, and cardiovascular and immunological disorders (Abed; Tajú, 2024).

These systemic and structural changes directly affect the general health of individuals with DS and, consequently, their oral health. The literature describes dental particularities in this population, including delayed tooth eruption, dental anomalies, and craniofacial changes (Botero *et al.*, 2024). In addition, immunological and microbiological factors and difficulties in biofilm control contribute to greater susceptibility to periodontal diseases, which may

present early onset and greater severity in individuals with DS (Ghaffarpour *et al.*, 2024; Rondón-Avalo *et al.*, 2024).

Dental caries experience in this population shows heterogeneous findings. Comparative studies indicate that caries prevalence may be similar to that observed in individuals without DS, while factors related to plaque control, habits, and preventive care may modify this risk (Scalioni *et al.*, 2024; Botero *et al.*, 2024). Another frequently reported feature is the high occurrence of malocclusions and orofacial alterations, reinforcing the need for individualized and early orthodontic assessment (Alessandri-Bonetti *et al.*, 2023; Möhlhenrich *et al.*, 2023).

In addition to biological aspects, dental care for people with Down Syndrome involves important behavioral and structural challenges. A shortage of trained professionals, lack of adequate reception and support, communication barriers, and difficulties accessing specialized services are still reported as significant obstacles to maintaining oral health in this population (Abed; Taju, 2024; Saitos *et al.*, 2025). These challenges reinforce the need for professional training focused on inclusive dentistry and clinical practice adapted to special needs.

In this context, it is essential that dentists be prepared to provide humanized, individualized, and multidisciplinary care, with preventive strategies initiated early and continuous follow-up. Studying the available scientific literature makes it possible to better understand the dental particularities of individuals with DS, identify existing gaps, and propose approaches that contribute to improving these patients' quality of life.

Thus, this study aims to review scientific literature on dental care for people with Down Syndrome, addressing their main oral characteristics, prevention and clinical management strategies, as well as the challenges faced in accessing dental services.

THEORETICAL BACKGROUND

Down Syndrome: general aspects

Down Syndrome (DS) is a genetic condition caused by trisomy of chromosome 21, representing the most frequent chromosomal abnormality among live births. The presence of the extra chromosome leads to changes in physical and cognitive development and is associated with several systemic conditions, such as congenital heart disease and endocrine

and immunological disorders. These conditions directly affect the general and oral health of individuals, making the participation of a multidisciplinary team that includes the dentist essential to comprehensive care.

Dental aspects of Down Syndrome

Patients with DS present characteristic dental alterations, such as delayed tooth eruption, hypodontia, microdontia, palatal clefts, and bruxism. Changes in salivary composition and flow are also reported and may affect the oral microbiota and favor gingival and periodontal inflammation. These characteristics require differentiated clinical planning by the dentist, both for preventive measures and restorative therapies.

Periodontal diseases in individuals with DS

Periodontal disease is the most prevalent oral condition in individuals with DS and tends to present earlier and more aggressively. Children and adolescents with DS show greater susceptibility to periodontitis, related to factors such as altered immune response, biofilm accumulation, salivary changes, and difficulties with oral hygiene. Conventional treatments, such as scaling and root planing, are effective; however, long-term maintenance requires frequent follow-up and individualized preventive strategies.

Dental caries and occlusal alterations

The prevalence of caries in people with DS is variable. Some studies indicate rates similar to or lower than those in the general population, whereas others point to a higher risk due to difficulties with oral hygiene. Malocclusions are extremely common, including anterior open bite, posterior crossbite, and mandibular prognathism, directly affecting masticatory function and aesthetics. Such alterations require individualized orthodontic intervention.

Barriers and challenges in dental care

Dental care for people with DS faces significant barriers, such as behavioral limitations, a lack of trained professionals, and communication difficulties. In addition, reports indicate insufficient reception and inadequate preparation of healthcare teams to address the

specific needs of this population. Overcoming these challenges requires appropriate professional training and strategies aimed at humanized and inclusive care.

Prevention strategies and clinical management

The literature recommends early implementation of preventive programs, with guidance for caregivers on supervised oral hygiene and periodic dental visits. Measures such as fluoride therapy, the use of oral antiseptics (for example, chlorhexidine), and desensitization techniques may be effective in controlling biofilm and reducing the progression of periodontal disease. In specific cases, conscious sedation or general anesthesia may be necessary, always with rigorous monitoring. Integration with other specialties is essential for a comprehensive care plan.

Synthesis of the literature and identified gaps

The studies analyzed indicate that periodontal diseases constitute the main dental challenge in people with DS, whereas caries prevalence varies according to the patient's profile and hygiene conditions.

Malocclusions are frequent findings and require specialized orthodontic attention. Despite advances, there is a need for more longitudinal studies evaluating preventive and therapeutic protocols, as well as research on the impact of humanized practices and professional training on the oral health of this population.

MATERIAL AND METHODS

Study design

This is a systematized literature review with a qualitative and descriptive approach, developed to identify, analyze, and synthesize the main scientific evidence on dental care for people with Down Syndrome, with emphasis on oral characteristics, preventive strategies, clinical management, and barriers to accessing health services.

Search strategy

The bibliographic search was conducted in the following electronic databases: PubMed/MEDLINE, SciELO, LILACS, Web of Science, and the Cochrane Library. In addition, manual search was performed in specialized journals and in reference lists of the selected studies in order to broaden the scope of data collection.

Publication period and languages

Articles published between 2015 and 2025 in Portuguese, English, and Spanish were included.

Descriptors used

The descriptors were defined according to DeCS/MeSH (Health Sciences Descriptors/Medical Subject Headings) and combined using the Boolean operators AND and OR. The terms used were: “Down Syndrome”; “dental care”; “oral health”; “periodontal disease”; “caries”; “malocclusion”; and “barriers to dental care”.

Inclusion and exclusion criteria

Original articles, systematic reviews, and meta-analyses addressing dental aspects related to Down Syndrome, including oral characteristics, prevention, treatment, and barriers to accessing services, were included. Isolated case reports, narrative reviews without a defined methodology, dissertations, and articles that did not directly address the proposed topic were excluded.

Study selection

The initial screening was performed by reading titles and abstracts. Articles that met the inclusion criteria were analyzed in full, and those that did not present relevant data or a methodology compatible with the objectives of the review were excluded.

Data analysis

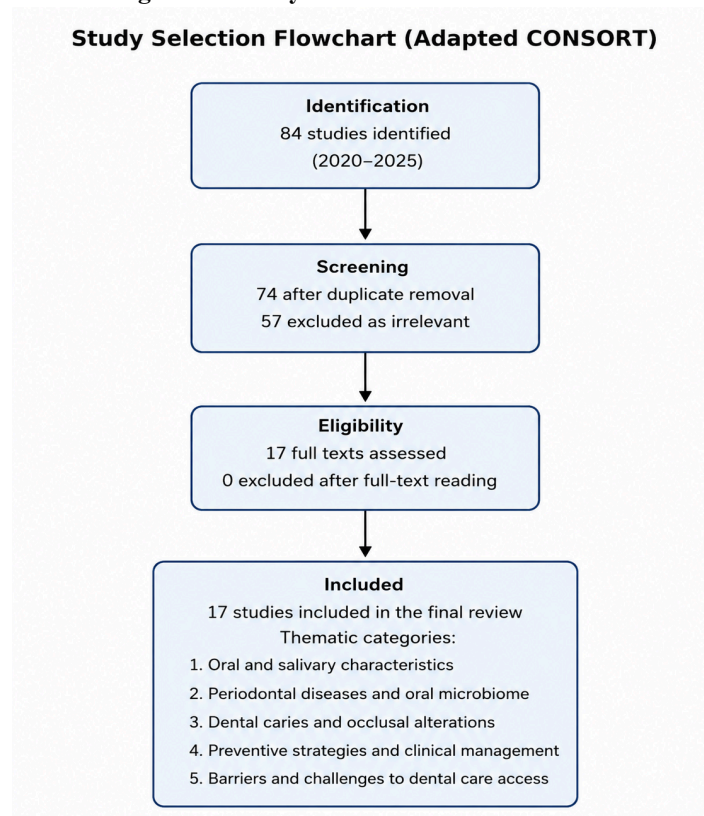
Data analysis was conducted qualitatively and descriptively, seeking to identify convergences and divergences among the studies regarding the prevalence of oral conditions, clinical management strategies, and preventive practices indicated for patients with Down Syndrome.

The extracted information was organized into thematic topics for subsequent discussion and synthesis.

Study selection flow

The study selection process was organized into identification, screening, eligibility, and inclusion stages. A total of 84 studies were identified and, after application of the criteria described, 17 studies comprised the final review. Because the source material does not provide validated intermediate quantitative data, these values were not estimated.

Figure 1 – Study Selection Flowchart.



Source: CONSORT adapted by the authors (2026).

RESULTS

The database search resulted in a total of 84 studies, of which 17 met the inclusion criteria (2020–2025). The publications analyzed were predominantly international, with emphasis on clinical, preventive, and social aspects of dental care for people with Down Syndrome.

The results were grouped into five thematic categories:

1. Oral and salivary characteristics;
2. Periodontal diseases and oral microbiome;
3. Dental caries and occlusal alterations;
4. Preventive strategies and clinical management;
5. Barriers and challenges in access to dental care.

Oral and salivary characteristics

The main oral alterations described in individuals with Down Syndrome include hypodontia, microdontia, a high-arched palate, a prominent tongue, and delayed tooth eruption, as reported by Alessandri-Bonetti et al. (2023) and Möhlhenrich et al. (2023). These alterations compromise masticatory and speech functions, requiring interdisciplinary follow-up.

Regarding saliva, recent studies have demonstrated alterations related to oxidative stress. Hamonari (2024) observed significantly higher salivary malondialdehyde (MDA) levels in children with Down Syndrome, associated with a higher gingival index, supporting a possible role of oxidative stress in the periodontal vulnerability of this population.

Periodontal diseases and oral microbiome

Periodontal disease remains the most recurrent and early oral finding in the population with Down Syndrome. Rondón-Avalo et al. (2024) confirmed a higher prevalence and severity of periodontitis compared with the general population, with onset as early as adolescence.

Literature associates this condition with immunological alterations and microbial dysbiosis. Mitsuhashi et al. (2022) and Willis et al. (2020) demonstrated a less diverse oral

microbiome dominated by *Porphyromonas gingivalis* and *Fusobacterium nucleatum*, bacteria associated with aggressive periodontitis.

Ghaffarpour *et al.* (2024) highlight that immunological and microbiological factors contribute to the greater prevalence, severity, and recurrence of periodontal disease in individuals with Down Syndrome. Yehia *et al.* (2024), in a systematic review and meta-analysis, found that professional tooth cleaning combined with oral hygiene instructions may be less effective in reducing probing pocket depth in people with DS than in controls, reinforcing the need for enhanced monitoring and individualized periodontal strategies.

Dental caries and occlusal alterations

The prevalence of dental caries varies among studies. Martins *et al.* (2022) and Elrefadi *et al.* (2022) describe heterogeneous findings in this population. Botero *et al.* (2024) emphasize that insufficient biofilm control, distinctive oral characteristics, and difficulties related to dental care may contribute to caries risk, indicating that this outcome should be assessed individually.

Regarding occlusion, Alessandri-Bonetti *et al.* (2023) and Möhlhenrich *et al.* (2023) documented high rates of anterior open bite, posterior crossbite, and mandibular prognathism, conditions that affect aesthetics and mastication and require individualized orthodontic attention.

Preventive strategies and clinical management

Recent literature emphasizes the need for an early preventive approach involving caregiver guidance and continuous follow-up.

Richter *et al.* (2025) and Hung *et al.* (2025) highlight that reinforcement of supervised hygiene habits and regular fluoride use are effective strategies for biofilm control.

In cases of non-cooperative behavior, adapted behavioral management is recommended and, when clinically indicated after individual assessment, sedation techniques may be considered to enable safe dental care (Yang *et al.*, 2024; Gao; Wu, 2023).

The American Academy of Pediatric Dentistry (2024) reinforces that treatment success depends on professional training and the creation of an inclusive dental environment.

Barriers and challenges in access to dental care

Barriers to access remain an important obstacle to the oral health of people with Down Syndrome. Saitos *et al.* (2025) and Hung *et al.* (2025) report a lack of trained professionals, inadequate infrastructure, and communication difficulties as the main barriers.

In addition, an individualized and integrated approach, coordinated with caregivers and other health professionals, when necessary, supports prevention, access to treatment, and continuity of dental care for people with Down Syndrome (Botero *et al.*, 2024; Hung *et al.*, 2025).

Overall synthesis of findings

In summary, the recent literature (2020-2025) indicates that:

Periodontal disease remains the main oral condition in Down Syndrome, with early onset and aggressive progression.

Salivary and microbiological alterations contribute to worsening inflammatory processes.

Dental caries shows variable behavior, depending on behavioral and motor factors.

Malocclusions are frequent and require a specialized orthodontic approach.

Early prevention, family education, and professional training are fundamental to humanized and effective care.

Structural and social barriers persist, reinforcing the need for public policies focused on inclusive dentistry.

Table 1 - Synthesis of the main findings on dental care for people with Down Syndrome (2020–2025).

Author/Year	Study Objective	Main Results	Conclusions/Contributions
Willis <i>et al.</i> , 2020	Evaluate the oral microbiome in individuals with Down Syndrome.	Reduced microbial diversity and greater presence of <i>P. gingivalis</i> and <i>F. nucleatum</i> .	Dysbiosis contributes to the early development of periodontal disease.
Martins <i>et al.</i> , 2022	Review the prevalence of caries in children with Down Syndrome.	Rates similar to or lower than those of the general population.	Delayed eruption and a controlled diet may reduce caries risk.
Mitsuhata <i>et al.</i> , 2022	Characterize the oral microbiome in children with DS.	Predominance of periodontopathogenic bacteria and an elevated inflammatory response.	Oral dysbiosis is associated with early periodontitis.
Elrefadi <i>et al.</i> , 2022	Evaluate overall oral health in individuals with DS.	High prevalence of gingivitis and periodontitis, even with a low caries rate.	Need for preventive programs and caregiver guidance.
Möhlhenrich <i>et al.</i> , 2023	Investigate orofacial findings and orthodontic conditions.	Open bite and mandibular prognathism are frequent.	Early orthodontic interventions improve function and aesthetics.
Alessandri-Bonetti <i>et al.</i> , 2023	Determine the prevalence of malocclusions in DS.	Posterior crossbite and anterior open bite are the most common.	Highlights the importance of specialized orthodontic follow-up.
Yang <i>et al.</i> , 2024	Review sedation techniques in patients with special needs.	Safe conscious sedation protocols were effective in DS.	Sedation may enable humanized dental treatment.
Gao; Wu, 2023	Review the use of sedation in pediatric dentistry.	Modern sedatives reduce anxiety and increase cooperation.	Reinforces the importance of safe pharmacological management.
Hamonari, 2024	Evaluate oxidative salivary markers in DS.	Increased MDA and IL-6; reduced antioxidant capacity.	Indicate chronic inflammation and greater periodontal risk.
Ghaffarpour <i>et al.</i> , 2024	Review predisposing factors for periodontitis in DS.	Immune dysfunction and microbial imbalance associated with inflammation.	Reinforces the need for personalized preventive approaches.
Sato <i>et al.</i> , 2024	Analyze the oral immune response in DS.	Reduced salivary IgA and increased pro-inflammatory cytokines.	Demonstrates local immunological vulnerability.
Rondón-Avalos <i>et al.</i> , 2024	Review the prevalence of periodontitis in DS.	High prevalence and severity since childhood.	Supports the aggressive nature of periodontal disease.
Ferrari <i>et al.</i> , 2023	Evaluate multidisciplinary care models in DS.	Integrated approaches improve hygiene and treatment adherence.	Emphasizes the importance of interdisciplinary dentistry.
Botero <i>et al.</i> , 2024	Review the relationship between DS and overall oral health.	Caries and periodontitis influenced by motor and immune factors.	Need for family education and multidisciplinary support.
Hung <i>et al.</i> , 2025	Analyze barriers to dental care in DS.	Lack of training and inadequate physical infrastructure.	Reinforces public policies aimed at inclusion.
Saitos <i>et al.</i> , 2025	Investigate parental perceptions of oral health in DS.	Parents report difficulty accessing care and poor communication.	Greater humanization and professional preparation are urgently needed.

Richter <i>et al.</i> , 2025	Explore caregivers' and dentists' experiences in providing care to people with DS.	Behavioral challenges and lack of institutional support were identified.	Advocates multidisciplinary training and clinical empathy.
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Source: Prepared by the authors (2025), based on the selected studies (2020-2025).

DISCUSSION

The findings of this review confirm that periodontal disease is one of the main oral health problems in individuals with Down Syndrome, with greater prevalence and severity. This association has been observed in systematic review and meta-analysis and is consistent with the combined contribution of immunological, microbiological, and biofilm-related factors to periodontal progression (Rondón-Avalo *et al.*, 2024; Ghaffarpour *et al.*, 2024; Willis *et al.*, 2020). In addition, salivary findings of increased oxidative stress, such as elevated MDA levels, reinforce the periodontal vulnerability profile of this population (Hamonari, 2024).

Dental caries experience showed heterogeneous findings among studies, indicating that this outcome should be interpreted considering individual factors, oral hygiene habits, family support, and access to preventive measures (Martins *et al.*, 2022; Botero *et al.*, 2024; Scalioni *et al.*, 2024). Malocclusions, in turn, were recurrently observed and associated with typical craniofacial alterations, reinforcing the need for early orthodontic assessment (Alessandri-Bonetti *et al.*, 2023; Möhlhenrich *et al.*, 2023).

In the clinical context, studies converge on the need for intensified preventive protocols and frequent dental follow-up, with emphasis on behavioral management, accessible communication, active caregiver participation, and individualized planning (Richter *et al.*, 2025; Hung *et al.*, 2025; Botero *et al.*, 2024).

The methodology of this review – based on recent literature (2020–2025) and studies with higher levels of evidence – made it possible to identify not only the clinical profile of these patients but also current gaps, particularly regarding comparative periodontal maintenance protocols and biomarker-based risk stratification. The results therefore confirm the need for intensive, interdisciplinary, family-centered preventive care aligned with the clinical and behavioral specificities of DS.

CONCLUSION

Dental care for people with Down Syndrome requires a preventive and humanized approach, with special attention to the high susceptibility to periodontal diseases and barriers to autonomy in oral hygiene. The literature demonstrates that successful care depends on periodic maintenance, family involvement, and adaptation of clinical approaches to the patient's functional and behavioral needs, ensuring inclusion, supportive care, and quality of life.

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