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Orthodontic Treatment of Patients with Mental and Intellectual Disabilities: A Systematic Review

▷ **Abstract.** Patients with mental and intellectual disabilities exhibit higher levels of anxiety when anticipating orthodontic treatment compared to the general population. Despite this, the literature lacks systematic reviews addressing behavioral modification methods and the specific features of orthodontic therapy for this patient group**.**

The aim of this review was to identify the main orthodontic problems and barriers in treating individuals with mental disorders, with a focus on developing recommendations to optimize orthodontic care.

Materials and Methods. A literature review was conducted, including studies that examined behavior modification strategies and/or physical restraint methods used in the orthodontic treatment of patients with intellectual disabilities. The search was performed using the PubMed, Scopus, Embase, Cochrane Oral Health Group, and Dentistry & Oral Sciences Source databases for the period from 2002 to 2022. English-language articles meeting the inclusion criteria were selected, and the quality of the included studies was assessed using the Joanna Briggs Institute critical appraisal tools.

Results. The review showed that most studies were descriptive and included individual clinical cases, while systematic studies and randomized controlled trials were largely absent. The main challenges in treatment included low patient motivation, difficulty maintaining oral hygiene, the need to adapt behavior management techniques, and the use of pharmacological or physical methods to ensure effective and safe treatment.

Conclusions. The success of orthodontic therapy in patients with mental disorders depends on a combination of appropriate mechanotherapy, behavior modification techniques, and a multidisciplinary approach. Important factors include patient motivation and the cooperation of parents or caregivers. Further systematic studies are required to develop clear guidelines for providing orthodontic care to individuals with mental and intellectual disabilities.

Keywords: *orthodontics; mental disorders; intellectual disabilities; behavior modification; special healthcare needs; physical restraint; orthodontic treatment.*

Introduction

Children and adolescents with special healthcare needs (SHCN) demonstrate a higher prevalence of dentofacial anomalies compared to their peers without associated conditions. This group includes patients with various types of impairments—physical, mental, sensory, cognitive, behavioral, or emotional—as well as those with chronic or limiting conditions requiring ongoing medical supervision, specialized care, and additional resources.

In recent decades, there has been a steady increase in the number of children and adolescents with SHCN, which can be attributed to several factors, including population growth, increased life expectancy, improved access to healthcare services, and the development and implementation of more sensitive early diagnostic methods [1].

Patients with disabilities, once they gain access to healthcare services, generally prefer to continue treatment with professionals who demonstrate empathy, attentiveness, and professional responsibility. However, the initial stage of access to healthcare remains a key barrier, as it requires an adequate understanding of the patient's condition and the provision of continuous care at all stages of treatment, which is a critical component in the management of patients with SHCN [2].

According to statistical data, in the United States, approximately one in five children belongs to the

category of individuals with special healthcare needs [3]. The results of a pilot study conducted in India in 2002 showed that more than a quarter of patients undergoing orthodontic treatment had comorbid conditions that could influence the course and outcomes of therapy. Therefore, practicing orthodontists must possess the necessary knowledge and skills for the diagnosis and treatment of this patient population [4].

Patients with Down syndrome are generally classified within the group of moderate to severe intellectual disabilities, as their IQ values typically range from 25 to 50 [5].

The use of non-pharmacological behavior management techniques, particularly the "tell–show–do" approach, allows for effective dental treatment in a significant proportion of patients with special healthcare needs (SHCN) [6]. However, in cases of severe dental pathology and associated disabilities, pharmacological behavior management methods may be required, including inhalation sedation with nitrous oxide and oxygen or treatment under general anesthesia, which improve the quality of care provided [7].

It should be noted that most children with developmental disorders experience higher levels of anxiety before treatment compared to patients without such conditions. Therefore, establishing a trusting relationship between the clinician and the patient plays a key role and requires empathy, patience, and a careful approach [8]. Despite the relevance of this issue, there is currently a lack of systematic reviews addressing behavioral modification and the specific features of orthodontic treatment in patients with mental disorders. Therefore, the aim of this review is to analyze the main orthodontic problems in this patient population and to identify ways to optimize the provision of specialized care.

Materials and Methods

Focused research question:
Do established orthodontic guidelines contribute to achieving predictable clinical outcomes in patients with mental and intellectual disorders?

Search strategy

A literature search was conducted in the electronic databases PubMed, Scopus, Embase, Cochrane Oral Health Group, and Dentistry & Oral Sciences Source. The analysis included English-language publications published between January 2002 and December 2022 that were potentially relevant to the aim of the study.

One study described the use of staged desensitization followed by a six-year follow-up in a 10-year-old patient with a pronounced skeletal Class II anomaly. Functional appliances, such as a Twin-block, were used in combination with extraoral traction (headgear). At the final stage, fixed orthodontic appliances were successfully placed, and the patient adapted to them without significant difficulties [9].

Another clinical report examined the treatment of a 12-year-old patient with cerebral palsy and an 8-year-old patient with autism spectrum disorder. Therapy was carried out in accordance with specialized orthodontic recommendations for this patient population. General anesthesia was used in both cases to perform the necessary procedures. The authors emphasized that practice-oriented training (including clinical internships) plays an important role in ensuring high-quality orthodontic care for such patients [10].

Prior to initiating orthodontic treatment, it is important to educate parents on maintaining their children's oral hygiene [11].

In providing orthodontic care to patients with intellectual disabilities, intravenous sedation may be considered a less invasive alternative to general anesthesia, allowing for adequate behavior control during treatment [12].

Several studies have conducted a comprehensive analysis of different approaches to managing this category of patients, including psychosocial methods, pharmacological support, and, when necessary, the use of physical restraints. Such a multifactorial approach allows orthodontic treatment to be adapted to the individual characteristics of the patient and improves its effectiveness [13].

The authors also analyzed clinical recommendations and possible modifications to treatment plans aimed at achieving maximum therapeutic outcomes. Particular attention was given to the management of patients with attention deficit hyperactivity disorder and autism spectrum disorders. It is emphasized that the treatment of children with mental disorders requires significant time and organizational resources and is usually carried out in several stages [14].

Orthodontists must consider potential modifications of standard therapeutic and orthodontic approaches to optimize care for patients with special needs. Effective communication with parents plays a key role in achieving positive treatment outcomes, even in cases where it is not possible to fully achieve the initially planned goals or ensure full patient compliance [15].

Planned and individualized orthodontic treatment contributes to improvements in both functional and aesthetic outcomes [16].

Several studies have analyzed the behavioral characteristics of patients with Down syndrome and proposed various strategies for behavior manage-

ment aimed at improving the effectiveness of orthodontic treatment [17].

Discussion

An analysis of four clinical cases and eight review papers showed that orthodontic treatment in patients with mental disorders can be carried out using behavioral and pharmacological methods, as well as, when necessary, physical restraint techniques. The findings of this systematic review indicate that the number of studies investigating factors influencing patients' responses to orthodontic interventions, as well as parental attitudes toward such care, remains limited, which is consistent with previously published data [18].

A key objective of modern dentistry is to reduce, and ultimately eliminate, disparities in oral health status between patients with disabilities and the general population. This is due to the fact that individuals with special needs often experience difficulty in maintaining basic oral hygiene and have an increased susceptibility to dentofacial anomalies. Parents play a crucial role in decision-making regarding orthodontic treatment, acting as the primary motivating factor. The most common reasons for seeking treatment include the desire to improve the child's appearance and facilitate successful social adaptation [19].

According to available estimates, between 12% and 18% of the global pediatric population has cognitive or motor impairments. The term "special needs" encompasses patients with developmental disorders (including intellectual disabilities, cerebral palsy, autism spectrum disorders, and Down syndrome), as well as individuals with severe somatic conditions requiring a specialized approach to treatment.

At the pretreatment stage, the clinician must carefully collect a detailed medical history and, if necessary, collaborate with the patient's primary care physicians. During the initial visit, it is important to obtain information from parents or caregivers regarding the child's oral hygiene habits. In some cases, as the patient adapts, anxiety levels decrease, cooperation improves, and an adequate level of oral hygiene is maintained, allowing treatment to continue until optimal clinical outcomes are achieved.

In patients with intellectual disabilities, a desensitization phase is usually required prior to the initiation of orthodontic treatment, as they may have difficulty processing new information and following multistep instructions [20]. In most clinical situations, treatment goals can be achieved through an individualized approach, the use of behavior management techniques, and the application of positive and negative reinforcement. Subsequently, the need for additional therapeutic interventions should be determined, particularly in patients with low tolerance to procedures.

In more complex cases, patients may require conscious sedation — a controlled pharmacological state of relaxation while maintaining consciousness. Commonly used agents include propofol and midazolam due to their short half-lives and mild sedative effects. The most common side effect is drowsiness. It should also be taken into account that patients in this category often take multiple medications, the side effects of which may further negatively impact oral health.

The most complex orthodontic procedures are performed under general anesthesia. Such interventions require a specialized operating room setting due to potential intraoperative and postoperative complications involving the respiratory and cardiovascular systems, which increases both patient risk and treatment costs. Therefore, intravenous deep sedation is often considered a preferable alternative to general anesthesia and has demonstrated high effectiveness even in patients with severe impairments. Simple and minimally invasive orthodontic procedures are generally better tolerated under sedation. With appropriate preparation of the dental office, sedation can be administered on an outpatient basis by an anesthesiologist. General anesthesia should be regarded as a last resort and used only after all other behavior management methods have been exhausted [21].

Special attention is given to patients with Down syndrome, in whom occlusal instability may be associated with early atypical involuntary contractions of facial and masticatory muscles. Correction of such conditions is possible through myofunctional therapy and orthodontic methods [22]. In addition, the rational use of orthodontic appliances can help prevent self-injurious behavior in this patient group.

Considering the communication challenges associated with patients with intellectual disabilities, dental practitioners should pay particular attention to both nonverbal cues and verbal instructions, ensuring that communication is simple, clear, and repeated when necessary.

During orthodontic treatment, such patients are recommended to undergo regular follow-ups with a dental hygienist. In cases of gingival hyperplasia, a gingivectomy may be required; however, this procedure can be challenging in patients with special healthcare needs. Therefore, parents should be informed in advance about possible interventions. The use of fixed orthodontic appliances allows for optimal occlusal outcomes to be achieved within a relatively short period of time [23]. At the same time, the main limiting factors remain insufficient professional training and a lack of interdisciplinary collaboration within dental teams. Key conditions for successful treatment include

active parental involvement, adequate assessment of the patient's functional capabilities, and the creation of a comfortable, adapted clinical environment.

Modern technologies significantly expand the possibilities for providing orthodontic care to this patient population. These include minimally invasive surgical procedures, clear removable aligners, dental implants, self-ligating bracket systems, advanced oral hygiene tools, and temporary anchorage devices for controlled tooth movement. Improvement in smile aesthetics contributes to increased self-esteem and better social adaptation, which is of comparable importance to treatment outcomes in the general population [24].

The limited number of studies included in this systematic review makes it difficult to draw generalized conclusions. Most of the analyzed studies were descriptive in nature and based on small sample sizes, with a predominance of subjective assessments and a lack of rigorous statistical analysis.

Conclusion

Orthodontic treatment of patients with intellectual disabilities requires an individualized and comprehensive approach, taking into account a wide range of additional therapeutic options. Key determinants of successful outcomes include collaboration with parents, patient motivation, appropriate selection of orthodontic mechanotherapy, and the use of behavior management techniques in combination with interdisciplinary cooperation among specialists.

To improve the quality of training for future orthodontists, it is advisable to include in residency and clinical education programs topics related to behavioral and pharmacological patient management, as well as the principles of a team-based, interdisciplinary approach to the treatment of this patient population.

Conflict of interest

The authors declare no conflict of interest.

Consent to publication

The authors have given their consent to the publication of the manuscript.

Use of Artificial Intelligence

The authors state that no artificial intelligence was used in the writing of the article.

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Ортодонтичне лікування пацієнтів з ментальними та інтелектуальними порушеннями: систематичний огляд

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Резюме. Пацієнти з ментальними та інтелектуальними порушеннями демонструють вищий рівень тривожності під час очікування ортодонтичного лікування порівняно із загальною популяцією. Незважаючи на це, у літературі бракує систематичних оглядів, присвячених методам поведінкової корекції та особливостям ортодонтичної терапії для цієї категорії пацієнтів.

Метою цього огляду було виявлення основних ортодонтичних проблем і бар'єрів у лікуванні осіб із ментальними порушеннями з акцентом на розробку рекомендацій для оптимізації ортодонтичної допомоги.

Матеріали та методи. Проведено огляд літератури, що включав дослідження, в яких розглядалися стратегії поведінкової корекції та/або методи фізичного обмеження, що застосовуються під час ортодонтичного лікування пацієнтів з інтелектуальними порушеннями. Для пошуку використовувалися бази даних PubMed, Scopus, Embase, Cochrane Oral Health Group та Dentistry & Oral Sciences Source за період з 2002 по 2022 роки. Було відібрано статті англійською мовою, що відповідали критеріям включення, а якість обраних досліджень оцінювалася за допомогою інструментів критичної оцінки Інституту Джоанни Бріггс (Joanna Briggs Institute).

Результати. Огляд показав, що більшість досліджень мали описовий характер і включали окремі клінічні випадки, тоді як систематичні дослідження та рандомізовані контрольовані випробування практично відсутні. Основні проблеми під час лікування включали низьку мотивацію пацієнтів, труднощі з підтриманням гігієни порожнини рота, необхідність адаптації методів управління поведінкою та використання фармакологічних або фізичних засобів для забезпечення ефективного й безпечного лікування.

Висновки. Успіх ортодонтичної терапії у пацієнтів із ментальними порушеннями визначається поєднанням адекватної механотерапії, методів поведінкової корекції та мультидисциплінарного підходу. Важливими факторами

є мотивація пацієнта та співпраця батьків або опікунів. Необхідні подальші систематичні дослідження для розробки чітких рекомендацій щодо надання ортодонтичної допомоги особам із ментальними та інтелектуальними порушеннями.

Ключові слова: *ортодонтія; ментальні порушення; інтелектуальні порушення; поведінкова корекція; спеціальні медичні потреби; фізичні обмеження; ортодонтичне лікування.*

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