INTERNATIONAL SEVEN JOURNAL
OF MULTIDISCIPLINARY
ISSN: 2764-9547

THERAPEUTIC MANAGEMENT OF CLASS II MALOCCLUSIONS

MANEJO TERAPÊUTICO DAS MALOCLUSÕES DE CLASSE II

MANEJO TERAPÉUTICO DE LAS MALOCLUSIONES DE CLASE II

https://doi.org/10.56238/isevmjv5n2-020

Receipt of originals: 02/21/2026 **Acceptance for publication:** 03/21/2026

Maria Gabrielly Soares Evangelista[1], Giovanna Caroline Sartor[2], João Pedro Mapurunga da Frota Araújo[3], Roque Luis Mendes Neto[4], Hellen Karina Silva de Mendonça[5], Suzeline Pinheiro Barros[6], Nathalia Costa Rosa[7], Priscila Daniela Fonseca Guimarães[8], Daniel Péricles Santos de Menezes Nogueira[9]

ABSTRACT

Objective: To analyze recent scientific evidence related to the therapeutic management of skeletal Class II malocclusions, with emphasis on the effects of functional appliances, the ideal timing of intervention during growth, and aesthetic therapeutic approaches that favor patient adherence.

Methodology: A narrative literature review was conducted using the PubMed database, employing the descriptors “Class II correction” and “Retrognathism,” combined with the Boolean operator AND. Articles published in the last five years, available in full text in Portuguese or English, and directly related to the topic were included. Selection was carried out through the analysis of titles, abstracts, and full-text reading of the studies.

Results: The literature shows that functional appliances, especially the Twin Block, are effective in correcting skeletal Class II malocclusions, promoting an increase in mandibular length and reduction of overjet. Treatment success is directly related to therapeutic timing, with the pubertal growth peak being the most favorable period for significant skeletal changes. In addition, aesthetic approaches, such as clear aligners with mandibular advancement, demonstrate promising results and greater patient adherence to treatment.

Conclusion: The management of Class II malocclusions should be based on accurate diagnosis, identification of the growth stage, and individualized planning. Functional appliances remain an effective strategy, while new technologies expand therapeutic possibilities by combining clinical efficiency with improved aesthetic acceptance.

[1] Master’s student in Clinical Dentistry. Faculdade Paulo Picanço (FACPP).
[2] Undergraduate Student in Dentistry. Atitus Educação Campus Passo Fundo (ATITUS).
[3] Master’s student in Clinical Dentistry. Faculdade Paulo Picanço (FACPP).
[4] Graduated in Dentistry. Universidade Maurício de Nassau (UNINASSAU).
[5] Master’s student in Clinical Dentistry. Faculdade Paulo Picanço (FACPP).
[6] Graduated in Dentistry. Universidade Federal do Ceará (UFC).
[7] Undergraduate Student in Dentistry. Universidade Positivo (UP).
[8] Graduated in Dentistry. Universidade Estadual de Montes Claros (UNIMONTES).
[9] Graduated in Dentistry. Soberana Faculdade de Saúde de Petrolina (SOBERANA).

Keywords: Class II Malocclusion. Mandibular Retrognathism. Functional Appliances. Craniofacial Growth. Orthodontics.

RESUMO

Objetivo: Analisar as evidências científicas recentes relacionadas ao manejo terapêutico das maloclusões de Classe II esquelética, com ênfase nos efeitos dos aparelhos funcionais, no momento ideal de intervenção durante o crescimento e nas abordagens terapêuticas estéticas que favorecem a adesão do paciente.

Metodologia: Revisão bibliográfica narrativa realizada na base de dados PubMed, utilizando os descritores “Class II correction” e “Retrognathism”, combinados pelo operador booleano AND. Foram incluídos artigos publicados nos últimos cinco anos, disponíveis na íntegra em português ou inglês e relacionados diretamente ao tema. A seleção ocorreu por meio da análise de títulos, resumos e leitura completa dos estudos.

Resultados: A literatura evidencia que aparelhos funcionais, especialmente o Twin Block, são eficazes na correção da Classe II esquelética, promovendo aumento do comprimento mandibular e redução do overjet. O sucesso do tratamento está diretamente relacionado ao timing terapêutico, sendo o pico de crescimento puberal o período mais favorável para alterações esqueléticas significativas. Além disso, abordagens estéticas, como alinhadores transparentes com avanço mandibular, demonstram resultados promissores e maior adesão dos pacientes ao tratamento.

Conclusão: O manejo das maloclusões de Classe II deve basear-se em diagnóstico preciso, identificação do estágio de crescimento e planejamento individualizado. Aparelhos funcionais permanecem como estratégia eficaz, enquanto novas tecnologias ampliam as possibilidades terapêuticas ao associar eficiência clínica e melhor aceitação estética.

Palavras-chave: Má Oclusão de Classe II. Retrognatismo Mandibular. Aparelhos Funcionais. Crescimento Craniofacial. Ortodontia.

RESUMEN

Objetivo: Analizar la evidencia científica reciente relacionada con el manejo terapéutico de las maloclusiones de Clase II esquelética, con énfasis en los efectos de los aparatos funcionales, el momento ideal de intervención durante el crecimiento y los enfoques terapéuticos estéticos que favorecen la adherencia del paciente.

Metodología: Se realizó una revisión bibliográfica narrativa en la base de datos PubMed, utilizando los descriptores “Class II correction” y “Retrognathism”, combinados mediante el operador booleano AND. Se incluyeron artículos publicados en los últimos cinco años, disponibles en texto completo en portugués o inglés y relacionados directamente con el tema. La selección se llevó a cabo mediante el análisis de títulos, resúmenes y la lectura completa de los estudios.

Resultados: La literatura evidencia que los aparatos funcionales, especialmente el Twin Block, son eficaces en la corrección de las maloclusiones de Clase II esquelética, promoviendo el aumento de la longitud mandibular y la reducción del overjet. El éxito del tratamiento está directamente relacionado con el momento terapéutico, siendo el pico de crecimiento puberal el período más favorable para cambios esqueléticos significativos.

INTERNATIONAL SEVEN JOURNAL
OF MULTIDISCIPLINARY
ISSN: 2764-9547

Además, los enfoques estéticos, como los alineadores transparentes con avance mandibular, muestran resultados prometedores y una mayor adherencia de los pacientes al tratamiento.

Conclusión: El manejo de las maloclusiones de Clase II debe basarse en un diagnóstico preciso, la identificación del estadio de crecimiento y una planificación individualizada. Los aparatos funcionales siguen siendo una estrategia eficaz, mientras que las nuevas tecnologías amplían las posibilidades terapéuticas al combinar la eficiencia clínica con una mejor aceptación estética.

Palabras clave: Maloclusión de Clase II. Retrognatismo Mandibular. Aparatos Funcionales. Crecimiento Craneofacial. Ortodoncia.

1 INTRODUCTION

Skeletal Class II malocclusion is one of the most prevalent conditions in orthodontic routine, clinically characterized by maxillary protrusion, mandibular retrognathism, or a combination of both (Huo et al., 2023). Mandibular retrognathism, in particular, is identified as the predominant etiological component in most cases, exerting a significant negative impact on facial aesthetics, masticatory function, and often respiratory health of patients (Guo et al., 2024; Huo et al., 2023). The treatment of this condition during the growth period aims to optimize the development potential of the mandible, seeking harmony between the bone bases (Huo et al., 2023; Bimalrag et al., 2021).

Historically, therapeutic management has been based on the use of functional appliances, such as the *Twin Block*, which works by repositioning the anterior jaw to stimulate temporomandibular joint remodeling and bone growth (Khan et al., 2024; Bimalrag et al., 2021). However, the effectiveness of these interventions is intrinsically linked to the biological *timing* of the patient, with the peak of pubertal growth being the optimal time to achieve maximum skeletal outcomes (Huo et al., 2023; Sawant et al., 2024). In addition to conventional approaches, the advent of aesthetic technologies, such as clear aligners and invisible modifications of functional appliances, has sought to overcome the challenge of patient adherence, especially in adolescence (Eshky, 2022; Sawant et al., 2024).

2 METHODOLOGY

The present study is characterized as a narrative literature review, developed with the objective of synthesizing and analyzing the most recent scientific evidence related to the Therapeutic Management of Class II Malocclusions. The search was carried out in the PubMed database, using the descriptors "Class II correction" and "Retrognathism", combined using the Boolean operator AND, according to the terminology of Medical Subject Headings (MeSH). Articles published in the last five years, available in full and written in Portuguese or English, that directly addressed the topic, were included. Studies that did not have a direct relationship with the central theme, duplicate publications, narrative reviews with low methodological rigor, and articles not indexed in the database used were excluded. The selection of studies was conducted in two stages: screening of titles and abstracts, followed by the evaluation of full texts to confirm relevance. The information extracted was organized in a descriptive way.

3 RESULTS AND DISCUSSION

3.1 MULTIFACTORIAL ETIOLOGY OF CLASS II

The etiology of Class II malocclusion is multifactorial and involves complex interactions between genetic, environmental, and functional factors. Changes in the craniofacial growth pattern, deleterious oral habits, mouth breathing, and muscle dysfunctions can contribute significantly to the development of mandibular retrognathia. In addition, the presence of upper airway obstructions, such as adenotonsillar hypertrophy, can favor oral breathing patterns and promote posterior mandibular rotations, aggravating the sagittal discrepancy between maxilla and mandible (GUO et al., 2024).

In this context, recent studies highlight that respiratory changes associated with obstructive sleep apnea in children can negatively influence craniofacial growth, leading to the development of characteristics such as long face, narrow palate, and mandibular retrognathism. Early identification of these conditions is critical for multidisciplinary therapeutic planning involving orthodontics and otolaryngology (GUO et al., 2024).

3.2 COMPARISON OF FUNCTIONAL APPLIANCES IN THE TREATMENT OF CLASS II

Several functional appliances have been proposed for the correction of skeletal Class II malocclusion, including the Herbst, Bionator, Frankel (FR-2) and Twin Block. These devices act by promoting mandibular advancement and stimulating neuromuscular and skeletal adaptations that favor the harmonization of bone bases (BIMALRAG et al., 2021).

Among these devices, the Twin Block stands out for its high clinical efficiency and greater acceptance by patients, due to its design consisting of separate upper and lower plates, allowing greater functional freedom during chewing and speaking. This device promotes mandibular advancement through occlusal inclined planes positioned approximately between 65° and 70°, stimulating the anterior posture of the mandible and favoring condylar and dentoalveolar adaptations (BIMALRAG et al., 2021).

However, the therapeutic success of these devices depends directly on the patient's cooperation, especially in the case of removable devices. Adherence to continuous use is one of the main determining factors for obtaining satisfactory clinical results.

3.3 MANDIBULAR GROWTH AND BIOLOGICAL BASES OF THERAPY

Mandibular growth occurs mainly by bone remodeling and endochondral condylar activity, being influenced by biomechanical and functional factors. During craniofacial development, mandibular length increases primarily by bone deposition at the posterior border of the mandibular ramus and by continuous remodeling of bone surfaces (HUO et al., 2023).

In children, hypertrophy of the tonsils and adenoids (AAH) is the main risk factor for sleep apnea. Respiratory obstruction leads to habitual mouth breathing, which can cause "long face syndrome" and aggravate the recessed positioning of the jaw (GUO et al., 2024).

Understanding these biological mechanisms is essential for functional jaw orthopedics, since the mandibular advancement promoted by functional appliances can stimulate adaptive changes in the condylar complex, increasing the proliferative activity of the condylar cartilage and contributing to mandibular growth (HUO et al., 2023).

Thus, orthopedic intervention performed during the active growth period enhances the body's biological responses and increases the predictability of therapeutic results.

3.4 EFFICACY OF THE TWIN BLOCK BRACES AND DENTOSKELETAL CHANGES

The *Twin Block* device remains one of the most widely used functional devices due to its effectiveness in promoting favorable cephalometric changes. Studies have shown that its use results in a significant increase in effective jaw length and lower anterior facial height, in addition to promoting the inclination of the upper incisors to the palatine and the vestibularization of the lower ones (Khan et al., 2024; Bimalrag et al., 2021).

These changes result in a drastic reduction of *overjet* and the correction of the molar ratio from Class II to Class I (Bimalrag et al., 2021). However, it is observed that part of the correction is due to dentoalveolar components, which requires careful planning to avoid unwanted effects on tooth inclination (Khan et al., 2024).

3.5 TREATMENT TIMING AND SKELETAL MATURATION

The prevalence of Class II malocclusion is common and the incidence of this condition can reach about 20%. In addition to aesthetic impairment and self-esteem,

severe mandibular retrognathia can be associated with health problems such as sleep apnea syndrome and hypertension (Huo et al., 2023).

Determining the optimal time to initiate mandibular retrognathiar correction is a critical factor for clinical success. The use of cervical vertebrae maturation indicators (MVC) helps the orthodontist to identify the pubertal growth spurt (Huo et al., 2023; Sawant et al., 2024). Evidence suggests that treatment initiated during vertebral maturation phases 3 and 4 (CVMI) tends to produce more robust and stable skeletal changes compared to early or late interventions (Huo et al., 2023). Early correction is mainly reserved for cases with risk of trauma to the incisors or strong psychosocial impact (Huo et al., 2023).

3.6 THERAPEUTIC INNOVATIONS: ALIGNERS AND AESTHETICS

To deal with the low adhesion associated with bulky metal braces, new aesthetic strategies have been implemented. The use of clear aligners (e.g., Invisalign) with mandibular advancement features has been shown to be effective in correcting skeletal Class II in adolescent patients, allowing simultaneous control of deep overbite and tooth alignment (Eshky, 2022). Similarly, the adaptation of the *Twin Block* to an aesthetic version, eliminating visible metallic threads, proved to be a promising alternative to increase the daily time of use of the device by patients, a determining factor for the effectiveness of the treatment (Sawant et al., 2024).

The use of aligners brings advantages to the patient, as well as offering less pain and facilitating oral hygiene compared to fixed braces, reducing the risk of periodontal disease. Aligners, along with appropriate attachments and engagers, is an effective method to treat orthodontic difficulties, such as Class II complicated with deep overbite, in a reasonable time (ESHKY, 2022). In addition, with the use of digital software, it was possible to predict the final positions of the teeth and jaw before starting treatment.

3.7 STABILITY AND VERTICAL GROWTH

Mandibular growth is a dynamic process of translation (growth in width, length and height) and remodeling. Clinical use in Class II correction requires precise synchronization with the pubertal growth spurt; Treatment at its optimal time, when needed, optimizes skeletal response and long-term occlusal stability.

The therapeutic planning of Class II must respect the chronology of growth of facial dimensions. Transverse growth is the first to complete its cycle, which requires early interventions. Unlike transverse growth, sagittal growth has its apex during the pubertal outbreak, when orthodontic treatment is crucial for Class II therapy, in addition to reaching its maximum efficacy. Finally, vertical growth is the last process to stabilize, which requires monitoring to ensure occlusal stability and the patient's aesthetics, avoiding the elongated face (Huo et al., 2023).

The stability of Class II correction in patients with a dolichofacial growth pattern (long face) poses an additional challenge. The use of the Austro repositioner associated with fixed appliances demonstrated the ability to control the vertical dimension while correcting the sagittal relationship, maintaining stable results one year after the end of treatment (Austro-Martinez et al., 2024). In addition, the relationship between mandibular retrognathism and pediatric obstructive sleep apnea (OSA) reinforces the importance of functional orthopedics, since mandibular advancement can expand the upper airway, although adenotonsillectomy remains the primary treatment for OSA (Guo et al., 2024).

3.8 LIMITATIONS OF THE LITERATURE

Despite advances in the understanding of the treatment of Class II malocclusions, the literature still has important limitations. Many studies have small sample sizes, limited follow-up periods, or large methodological variability, making direct comparisons between different therapeutic approaches difficult.

In addition, there is still debate in the literature about the real magnitude of the skeletal effects obtained with functional appliances, since part of the correction may be associated with dentoalveolar alterations.

Another relevant limitation refers to the dependence on patient collaboration in therapies with removable appliances, a factor that can compromise the predictability and stability of clinical results.

3.9 FUTURE PERSPECTIVES

Recent technological advances, such as digital planning, intraoral scanners, and CAD/CAM systems, have expanded the therapeutic possibilities in contemporary orthodontics. In this context, the development of clear aligners with integrated mandibular

advancement mechanisms represents a promising trend in the treatment of skeletal Class II, especially in patients seeking aesthetic solutions (ESHKY, 2022).

However, longitudinal studies with larger samples are still needed to evaluate the long-term stability of these approaches and their efficacy when compared to conventional functional appliances.

4 CONCLUSION

The therapeutic management of skeletal Class II malocclusions, with a predominance of mandibular retrognathism, should be based on an **accurate diagnosis** and **individualized planning**. Timing is critical for success, and assessment of **bone maturation**—especially through cervical vertebrae (CVM) radiographs—is indispensable. Evidence indicates that treatment initiated at stage CS3 of cervical vertebrae (peak pubertal growth) produces **more robust and stable skeletal responses**, highlighting the need for a personalized approach that considers the patient's gender.

Functional **appliances**, notably the *Twin Block*, continue to be an **effective strategy** in the correction of Class II, promoting mandibular advancement. However, the literature points to **important limitations**, such as the debate about the real magnitude of skeletal effects versus dentoalveolar alterations. In addition, dependence on patient **collaboration and adherence** is a factor that can compromise the predictability and stability of clinical outcomes.

In response to these challenges, **technological evolution** has expanded the **therapeutic possibilities**. Clear **aligners with mandibular advancement features** represent a **promising alternative** that associates **clinical efficiency** with greater **aesthetic acceptance** and **comfort** for patients. However, to confirm the long-term stability and efficacy of these new approaches compared with conventional functional appliances, **longitudinal studies** with larger sample sizes and greater methodological rigor are needed.

REFERENCES

Austro-Martinez, M. D., et al. (2024). Stability of class II correction with the Austro repositioner associated with multi-brackets fixed appliances in dolichofacial patients. BMC Oral Health, 24(44), 1–10.

Bimalrag, B. R., et al. (2021). Cephalometric evaluation of the pre- and posttreatment changes after the correction of class II division 1 malocclusion with twin block appliance in mixed dentition. Journal of Contemporary Dental Practice, 22(1), 88–92.

Eshky, R. T. (2022). Orthodontic correction of class II skeletal malocclusion complicated by deep bite using clear aligners: A case report. Journal of Taibah University Medical Sciences, 17(6), 962–968.

Guo, F., et al. (2024). Functional therapy and adenotonsillectomy clinical trial for class II malocclusion (FACT-II): Protocol for a randomised controlled trial. BMJ Open, 14, e079571.

Huo, B., et al. (2023). Timing of early correction of mandibular hypoplasia in skeletal class II malocclusion: A review. Journal of Clinical Pediatric Dentistry, 47(6), 1–11.

Khan, M. I., et al. (2024). Dentoskeletal effects of twin block appliance in patients with class II malocclusion. Dento-Skeletal Medicine, 1–7.

Sawant, H. R., et al. (2024). Esthetic twin block approach for correction of developing class II division 1 malocclusion of an 11-year-old female patient: A case report. International Journal of Clinical Pediatric Dentistry, 17(3), 363–366.