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RCMOS - Multidisciplinary Scientific Journal The Knowledge.
ISSN: 2675-9128. São Paulo-SP.

Year VII, v.1 2026 | Submission: 08/09/2026 | Accepted: 11/09/2026 | Publication: 14/09/2026

Diagnosis and treatment of occlusal alterations: orthodontic approaches and post-treatment stability.

Diagnosis and treatment of occlusal changes: orthodontic approaches and post-treatment stability

Diagnosis and treatment of occlusal changes: orthodontic approaches and stability after treatment

Eduardo Barbosa

SUMMARY

Contemporary orthodontics offers various diagnostic and therapeutic resources for correcting occlusal and dentoskeletal alterations, the choice of which depends on the clinical, skeletal, and functional characteristics of each patient. This study aimed to analyze aspects related to orthodontic diagnosis and treatment, with emphasis on occlusal alterations, maxillary expansion, the biomechanics of fixed appliances, and the stability of results after the active phase of treatment. Methodologically, a literature review was conducted, selecting and analyzing studies available in full and related to the proposed theme. The analyzed literature highlights the importance of evaluating dental and skeletal relationships for therapeutic planning, as well as identifying the functional components associated with different malocclusions. Maxillary expansion is an important resource for correcting transverse discrepancies, and may involve orthodontic, orthopedic, or surgically assisted approaches, according to skeletal maturity and individual needs. Regarding fixed orthodontic appliances, different bracket systems present biomechanical and clinical particularities, and therapeutic efficiency depends not only on the device used, but also on the mechanics employed, the biological response of the tissues, the quality of the adhesive bond, and the maintenance of oral health. Post-treatment stability is another relevant aspect, considering the multifactorial nature of relapse and the importance of retention protocols.

In conclusion, the effectiveness of orthodontic treatment is related to the integration of diagnosis, individualized planning, biomechanics, clinical follow-up, and strategies for maintaining results, which contributes to greater predictability, functionality, and therapeutic stability.

Keywords: Orthodontics. Malocclusion. Maxillary expansion. Orthodontic biomechanics.
Orthodontic relapse.

ABSTRACT

Contemporary orthodontics provides various diagnostic and therapeutic resources to correct occlusal and dentoskeletal alterations, with indications that depend on each patient's clinical, skeletal, and functional characteristics. This study aimed to analyze aspects of orthodontics
diagnosis and treatment, with an emphasis on occlusal alterations, maxillary expansion, the biomechanics of fixed appliances, and the stability of outcomes after the active phase of treatment. Methodologically, we conducted a literature review by selecting and analyzing full-text studies related to the proposed topic. The literature analyzed highlights the importance of assessing dental and skeletal relationships for treatment planning, as well as identifying functional components associated with different malocclusions. Maxillary expansion represents an important therapeutic approach for correcting transverse discrepancies and may involve orthodontic, orthopedic, or surgically assisted procedures according to skeletal maturity and individual patient needs. Regarding fixed appliances, different bracket systems have specific biomechanical and clinical characteristics, and therapeutic efficiency depends not only on the device used but also on the mechanics applied, the biological response of the tissues, the quality

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of the adhesive interface, and oral health maintenance. Post-treatment stability is another relevant aspect, considering the multifactorial nature of orthodontic relapse and the importance of retention protocols. The effectiveness of orthodontic treatment depends on integrating diagnosis, individualized treatment planning, biomechanics, clinical follow-up, and strategies to maintain results, contributing to greater predictability, function, and therapeutic stability.
Keywords: Orthodontics. Malocclusion. Maxillary expansion. Orthodontic biomechanics. Orthodontic relapse.

1 INTRODUCTION

Orthodontics plays a fundamental role in the diagnosis, prevention, and treatment of...
Dental, occlusal, and craniofacial alterations, encompassing different therapeutic possibilities.
according to the patient's clinical, functional, and skeletal characteristics.
The development of new diagnostic resources, materials, and techniques has contributed to...
expanding treatment possibilities, allowing for increasingly sophisticated approaches.
Individualized and tailored to the specific characteristics of each malocclusion.
Proper orthodontic diagnosis is an essential step in defining the
therapeutic planning, especially in the face of alterations involving discrepancies.
dentoskeletal disorders, crossbites, maxillary atresia, open bite, and alterations in the relationships
between the bony bases. In these cases, the evaluation should not be limited to the positioning of the
dental elements, but also consider aspects related to growth.
craniofacial, skeletal characteristics, muscle balance and functions performed
through the stomatognathic system.
Among the resources available for correcting transverse discrepancies, the following stands out:
Maxillary expansion, which can be performed using different orthodontic and orthopedic protocols.
or surgically assisted. Rapid maxillary expansion, in particular, aims to produce
predominantly skeletal alterations through action on the palatine suture
The procedure is moderate, and may result in dental, periodontal, and structural changes. The indication
The choice of therapeutic approach depends, however, on factors such as age and maturity.
skeletal, the magnitude of the transverse disability, and the individual characteristics of the patient.
Alongside achieving orthodontic correction, the stability of the results is an issue.
Relevant in long-term follow-up. Relapse has a multifactorial character and may
to be related to the reorganization of periodontal and muscular tissues, to growth
craniofacial, to the characteristics of the malocclusion initially presented and to the protocol of
containment adopted. In this way, the containment phase should be understood as part
integral to the treatment, contributing to the maintenance of dental positions and relationships.

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occlusal movements established during the active phase.

The evolution of orthodontic appliances has also provided different alternatives for the management of treatment mechanics. Among them are bracket systems. Conventional and self-ligating brackets, whose biomechanical, adhesive, and clinical characteristics may... to influence certain procedures. In addition to the efficiency of tooth movement, they must Aspects related to the strength of the bond between the bracket and the enamel should be considered, integrity of materials, biofilm control, and maintenance of dental health and periodontal function during treatment.

Given the diversity of occlusal alterations and the different possible approaches, It becomes relevant to understand, in an integrated way, the diagnostic fundamentals. biomechanical and clinical aspects involved in orthodontic treatment. Thus, this study aimed to The objective is to analyze, through a literature review, aspects related to the diagnosis and... Treatment of occlusal and dentoskeletal alterations, with emphasis on expansion approaches. maxillary, in stability and post-treatment relapse and in biomechanical characteristics, adhesive and clinical aspects of orthodontic bracket systems.

2. THEORETICAL FRAMEWORK

2.1 Diagnosis and Therapeutic Approaches to Occlusal and Craniofacial Disorders

Farheen et al. (2016) highlight that the proper diagnosis of skeletal and dental relationships This constitutes a fundamental step in planning and defining the therapeutic approach. in orthodontics. Among the parameters used for this purpose, the *Overbite* stands out. *Depth Indicator* (ODI), used in the evaluation of vertical relationships, and the *Anteroposterior Dysplasia Indicator* (APDI), related to the assessment of skeletal discrepancies in the sense anteroposterior. In their study, the authors analyzed dental records and cephalograms. pre-treatment lateral variations in 90 individuals were analyzed to verify possible variations in these variations. Indicators related to characteristics such as sex and age. The results demonstrated absence of statistically significant differences in the values of the ODI and APDI angles in function of these variables. Particularly with regard to the vertical component, the findings They indicated the applicability of ODI in differentiating between deep bite patterns. overbite considered within normal parameters and open bite, reinforcing its usefulness as a complementary tool to cephalometric evaluation and diagnosis.

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Orthodontic.

Souki (2016) describes the orthodontic-surgical treatment of an 18-year-old and 1-month-old patient.
diagnosed with Class III skeletal malocclusion associated with mandibular prognathism
and significant dentoalveolar compensations. Clinical evaluation revealed a tendency towards
Crossbite and open bite in the anterior region, in addition to crowding in the lower arch.
Given the complexity of the situation, the patient was referred to an oral and maxillofacial surgeon.
for evaluation and planning of surgical intervention, including analysis of the need for
approach to upper and lower third molars. Subsequently, it was instituted
Orthodontic treatment with fixed appliances on the upper and lower arches, using
Roth prescription brackets with a 0.022 x 0.028 inch *slot ,* bands on the first molars,
associated with convertible double tubes, and single tubes in the second molars of both teeth.
arches.

After the orthodontic preparation phase, the patient underwent orthognathic surgery, followed by...
from the final phase of treatment, during which the need for use of
intermaxillary elastics and adjustments in orthodontic arches. According to Souki (2016), the
The results obtained were consistent with the established therapeutic objectives, showing improvement.
of the profile and facial aesthetics, in addition to establishing functionally correct occlusal relationships.
appropriate and more harmonious. The case therefore highlights the importance of integration between the
Orthodontic diagnosis, tooth preparation, and surgical planning in the treatment of
pronounced skeletal discrepancies.

In addition to interventions aimed at correcting dental and skeletal alterations, the
Preventive dental care is a relevant component of...
Maintaining oral health throughout treatment. Souza et al. (2020) highlight the importance
of periodic follow-up consultations, professional prophylaxis, topical application of
Fluoride treatment and radiographic examinations when clinically indicated. Measures
Additional preventative measures may include applying sealants to teeth with pits and fissures.
deep lesions or developmental alterations that favor biofilm accumulation, as well
such as the continuous reinforcement of guidelines on oral hygiene and dietary habits. These
These strategies contribute to the prevention of oral changes and to the maintenance of healthy conditions.
necessary for the proper development of dental treatment.

Saldanha et al. (2024) characterize anterior crossbite associated with displacement.
functional malocclusion, such as malocclusion, occurs when the incisal edges of one or more upper incisors are misaligned.
They establish an inadequate relationship with the lower incisors during closure.

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mandibular. In this condition, occlusal interferences can promote displacement.
anterior functional movement of the mandible to the position of maximum intercuspation, resulting in
Establishment of an anterior crossbite. Identification of this functional component.
This is particularly relevant for differential diagnosis and treatment planning, a
since maintaining the occlusal alteration can interfere with the balance of dental relationships and
in the development of the stomatognathic system.
The choice of orthodontic approach for correcting anterior crossbite should
to consider not only clinical efficacy and long-term stability of results, but also
also aspects related to cost-effectiveness, collaboration, and acceptance of the treatment.
by the patient, including the occurrence of pain and discomfort. During mixed dentition, cases of
Anterior crossbite involving one or more incisors can be treated with braces.
fixed or removable orthodontic appliances. According to De Paula and Da Silva (2023), both
These modalities can present satisfactory results and a favorable prognosis when
correctly indicated, highlighting the importance of individualized diagnosis for the
choosing the most appropriate therapeutic strategy.
Changes in oral conditions can have repercussions that extend beyond the limits of
dental and periodontal structures. Gonçalves et al. (2026) highlight aspects such as the reduction
of bite force, decreased tongue pressure and xerostomia, in addition to factors
related to swallowing, nutritional status, and respiratory health. In this context, the
Dental involvement is not limited to the isolated diagnosis and treatment of diseases.
oral health, also encompassing the assessment of conditions that can interfere with chewing, in
preparation and organization of the food bolus, oral comfort, and functional performance.
of the structures involved in the stomatognathic system.
Regarding transverse changes in occlusion, Brandão (2018) describes the bite.
Posterior crossbite as a malocclusion characterized by the inversion of occlusal relationships.
expected changes between the upper and lower teeth, which may be associated with alterations in
Dental positioning and the relationships between the maxillary bases. In a clinical report involving
A male patient whose main complaint was dental aesthetics, the evaluation
Extraoral examination revealed slight facial asymmetry, accompanied by mandibular deviation to
left. The intraoral examination revealed a unilateral posterior crossbite.
functional on the same side, demonstrating the importance of the association between facial findings,
Functional and occlusal factors for establishing a diagnosis.
As a therapeutic approach, Brandão (2018) employed a removable orthopedic device.

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with a superior expansion mechanism. In order to facilitate the correction of the ratio.
Transversely, a unilateral component was incorporated into the device on the affected side, intended to help eliminate functional interferences associated with the condition. After nine months During treatment, correction of the unilateral posterior crossbite reported in the case was observed. clinical. The result reinforces the importance of early diagnosis and identification of functional components involved in occlusal changes, especially during the periods of craniofacial growth and development.

From a broader perspective, dental practice also includes assessment. of the conditions of the teeth, occlusion and prostheses, as well as factors such as xerostomia, pain, oral hygiene and masticatory efficiency. Gonçalves et al. (2026) also highlight the relevance of the control of oral conditions related to the microbial load present in the contents Potentially aspirated oropharyngeal airway. In this way, the dental evaluation can integrate- if to the analysis of oral functions and systemic conditions related to chewing and swallowing and to respiratory health, broadening the understanding of the functional repercussions associated with alterations of the stomatognathic system.

2.2 Maxillary Expansion in the Treatment of Transverse Deficiencies

Procedures aimed at maxillary expansion, whether orthodontic, orthopedic or... surgically assisted, their main purpose is to correct transverse deficiencies of the The maxilla is augmented by increasing its transverse dimensions. In addition to the effects... In dentoskeletal procedures, these interventions can produce modifications in the anatomy of the oral cavity. nasal and adjacent structures, with possible repercussions on nasal airflow resistance. and in the function of the upper airways. De Araújo et al. (2022) highlight that the changes Structural changes resulting from maxillary expansion can promote functional conditions. related to nasal permeability and respiratory dynamics, although the observed effects They should be evaluated individually, according to the anatomical and clinical characteristics of each patient.

The identification of the main areas of resistance in the craniofacial skeleton contributed to The development and improvement of different surgical techniques for maxillary expansion. In this context, different maxillary osteotomies have been associated with the use of devices. expanders, with the aim of reducing the resistance imposed by bone structures and facilitating Transverse displacement of the maxillary segments. According to Campoverde et al. (2024), the

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Surgically assisted expansion techniques aim to promote a more complete separation.
controlled hemimaxillary expansion, favoring the achievement of transverse expansion in patients with
What factors limit the effectiveness of conventional orthopedic approaches due to skeletal resistance?
The selection of the technique should consider factors such as skeletal maturity, the magnitude of the
Transverse deficiency, anatomical characteristics, and therapeutic goals.
Correction of transverse maxillary discrepancies can also promote development.
of the subsequent stages of orthodontic treatment. According to Costa (2023), certain
alterations considered too complex to treat exclusively through medical devices.
Conventional orthodontics may offer a greater chance of correction after intervention.
appropriate for maxillary deficiency. In this sense, orthodontic treatment seeks to establish
more balanced relationships between the dental arches and their respective bony bases,
providing more favorable conditions for the positioning of the teeth.
Achieving a more suitable relationship between the maxillary bases can reduce the need
excessive dental compensations at certain stages of orthodontic treatment and
to contribute to greater stability of the results achieved. In this way, maxillary expansion,
When correctly indicated and integrated into orthodontic treatment planning, it constitutes a resource.
relevant for correcting transverse discrepancies, and its indication should take into account,
taken together, the dental, skeletal, and functional components involved in each case.
(Costa, 2023).
Rapid maxillary expansion (RME) is a therapeutic approach aimed at correcting...
Transverse deficiencies of the maxillary arch, especially in cases of maxillary atresia.
The procedure is performed using active expanding devices capable of exerting forces.
of great magnitude on dental and skeletal structures. Unlike the expansion
In contrast to conventional dentoalveolar therapy, ERM primarily seeks to promote a response.
Skeletal, characterized by the separation of the maxillary structures in the region of the palatine suture.
median and by the consequent increase in the transverse dimensions of the maxilla. The magnitude and the
The distribution of the effects obtained may vary according to factors such as age and maturity.
skeletal, anatomical characteristics and the activation protocol employed (Defiltro;
Nogueira, 2024).
Historically, rapid maxillary expansion has experienced distinct periods of acceptance and use.
in orthodontic practice. During the first decades of the 20th century, important orthodontists
Americans, including Angle, Case, Ketcham, and Dewey, did not widely incorporate the
ERM to its therapeutic approaches. The prevailing conception at that time was that...

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Expansion of the arches could be achieved physiologically through the use of devices.
orthodontic procedures and the gradual movement of teeth, aiming to promote alignment and
to establish appropriate functional relationships. In contrast, ERM continued to be used in
European centers. According to Araújo and de Lima (2026), its resumption in the North American context.
It gained momentum from 1956 onwards, when Korkhaus, during a visit to the Department of
Orthodontics at the University of Illinois contributed to renewing interest in the technique in
United States.

Among the clinical manifestations observed during maxillary expansion, the following stand out:
The transient appearance of a diastema between the upper central incisors, considered a
characteristic sign of the response to transverse separation of the maxilla. Jeronimo, Araki and Rocha
(2024) describe that, during the activation of the expander device, changes may occur in
positioning of the crowns and roots of the upper central incisors, following the
Modifications in the maxillary structures. The dental behavior observed during this period.
This results from the interaction between the orthopedic effects of expansion and the tissue response.
periodontal tissues are subjected to applied forces.

After the activation of the expander device is interrupted, a reorganization process begins.
Dental and periodontal development. During this period, spontaneous approximation of the crowns of the teeth may occur.
upper central incisors, followed progressively by root repositioning and
due to the recovery of their slopes. This phenomenon has been associated with, among other factors,
due to the action of the periodontal transseptal fibers, which are subjected to stretching during opening.
of the diastema and, subsequently, tend to reorganize themselves. In this way, the changes
The changes observed in the incisors during and after ERM are part of the biomechanical and biological response.
resulting from the transverse expansion of the maxilla (Jerónimo; Araki; Rocha, 2024).

2.3 Post-Treatment Stability, Retention, and Orthodontic Relapse

In recent decades, there has been an increase in demand for orthodontic treatment among
adult patients, a phenomenon related to various social, clinical, and technological factors.
Among them, the most notable are the increased emphasis on oral health and preventive measures in
Dentistry, the increase in expectations related to dentofacial aesthetics, the expansion of
population access to information about therapeutic possibilities and advances in
Orthodontic systems. The evolution of materials and techniques has also made possible...
development of devices with more favorable aesthetic and functional characteristics,

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contributing to greater comfort and acceptance of treatment among adults (Jourdan, 2025).

Dental and craniofacial relationships are subject to a dynamic equilibrium resulting from Interaction between dental, periodontal, muscular, and skeletal components. Treatment Orthodontics temporarily modifies this balance through the controlled application of forces, promoting tooth movement and remodeling of supporting tissues. According to According to Da Silva Pinto and Berbert (2026), these interventions seek to establish dental relationships and The most suitable occlusal techniques, especially in growing individuals, may be... planned taking into account craniofacial development and skeletal characteristics of patient. Therefore, orthodontic tooth movement should be understood as a process. biologically mediated, in which applied forces induce adaptive responses in tissues. periodontal and related structures.

Although orthodontic treatment can provide aesthetic, functional, and occlusal results Even when teeth are in satisfactory condition, maintaining the achieved dental positions is a fundamental step. for long-term therapeutic stability. After removal of the active devices, the tissues Periodontal, muscular, and dentoalveolar structures undergo a period of reorganization and adaptation, during which unwanted tooth movement may occur. In this context, Orthodontic relapse refers to the tendency for partial relapse of teeth or structures. Conditions prior to treatment may affect the results, potentially compromising some outcomes. obtained (Paulino, 2024).

In treatments involving maxillary expansion, for example, partial reduction may occur. of the transverse gain achieved, while changes in dental alignment may manifesting itself through the reappearance or development of crowding, particularly in the anterior regions of the dental arches. The occurrence and magnitude of these changes They depend on multiple factors, including individual characteristics, growth, and craniofacial aging, periodontal conditions, muscle balance, extent of movements carried out and the containment protocol adopted. In this way, the Post-treatment follow-up and proper use of restraint devices They play a relevant role in preserving orthodontic results and reducing the risk of complications. risk of relapse (Paulino, 2024).

The stability of the results obtained after orthodontic treatment is one of the main... Challenges in maintaining dental and occlusal corrections in the long term. Sangalli and Macedo (2025) highlight that relapse has a multifactorial etiology and may be related to various conditions, including premature or inappropriate interruption of the containment protocol,

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the changes resulting from craniofacial growth and development after treatment
and the reorganization of periodontal and muscular tissues. Therefore, some degree of alteration
Changes in dental position can be observed after different therapeutic modalities, which makes
Individualized planning for the containment phase and monitoring are fundamental.
Patient's periodic review.
Post-treatment stability can also vary depending on the initial characteristics of the disease.
occlusion and the therapeutic modality employed. Santana et al. (2023) observed differences in
stability between orthodontic protocols performed with and without tooth extractions, with
more favorable results for certain treatments involving extractions in
population analyzed. However, the indication for extractions must be based on
diagnostic and therapeutic needs of each patient should not be taken into consideration.
In isolation, it is a resource aimed at preventing relapse. The authors also point out
Differences in the stability of orthodontic-surgical treatments indicate that procedures
Patients undergoing isolated maxillary surgery may present with postoperative behavior distinct from those
observed in surgical interventions combined with different bone bases.
In this context, Guilhen and Machado (2022) characterize orthodontic relapse as a
a multifactorial phenomenon, the understanding of which requires recognition of the factors associated with it.
dental instability and the biological and biomechanical mechanisms involved in
Repositioning of the teeth after the active phase of treatment. These factors may include...
involving periodontal, muscular, occlusal, skeletal and related aspects
craniofacial growth. Thus, the restraint phase constitutes an essential stage of
Orthodontic treatment, as it allows for the stabilization of structures during the period of
Reorganization of tissues contributes to maintaining the achieved dental positions.
Among the occlusal alterations associated with therapeutic and stability challenges, the following stand out:
anterior open bite. Bueno and Nogueira (2025) present different possibilities for
their therapeutic approach, initially demonstrated in models and subsequently,
clinically applied. Anterior open bite has a complex etiology and may involve
dentoalveolar, skeletal, and functional components, which is why its diagnosis should
Consider the specific characteristics of each patient before defining the treatment.
In cases where there is a significant skeletal component, treatment planning may involve
strategies aimed at vertical control and intrusion of the posterior segments, including
devices such as bite blocks and temporary anchorage mechanisms, as well as others
Orthodontic and orthopedic approaches, selected according to age and speech pattern.

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growth and severity of the discrepancy. In patients with skeletal abnormalities.
Given the pronounced and specific indications, orthognathic surgery may be part of the treatment plan.
therapeutic. When alterations in muscle patterns or orofacial functions are identified.
associated with malocclusion, orofacial myofunctional therapy can also be considered as
A complementary approach, aiming to promote functional balance and assist in maintenance.
from the results obtained (Bueno; Nogueira, 2025).

2.4 Orthodontic Brackets: Biomechanical, Adhesive, and Clinical Aspects

Self-ligating brackets are one of the available alternatives for performing the procedure.
Orthodontic treatment with fixed appliances has been associated with operational characteristics.
which may favor certain stages of clinical practice. According to Feliciano et al. (2026),
These systems have attracted interest due to their proposed simplification of some...
clinical procedures, particularly due to the absence of conventional ligatures for the
The orthodontic archwire is maintained inside the bracket *slot* . This feature may
to provide greater convenience in certain procedures and reduce the time required.
for certain interventions during follow-up appointments.
Dos Santos (2022) describes different advantages attributed to self-ligating systems, including
greater practicality in clinical management and the possibility of reducing the time spent on
specific maintenance procedures. The author also reports results related to
duration of treatment and the interval between appointments, although these parameters should be
interpreted considering the particularities of each case, since the total time of
Orthodontic treatment depends on factors such as the type and severity of the malocclusion, the
The need for extractions, the magnitude of tooth movement, the biological response.
Individual and patient collaboration. Furthermore, self-ligating systems can be...
Made with materials that have greater aesthetic appeal, including bracket options.
ceramic or translucent, which constitutes an alternative for patients seeking less
visual impact during treatment.
One of the main biomechanical characteristics of self-ligating braces is the use of a
Proprietary slot closure mechanism , eliminating the need for routine use of elastic bandages.
or metallic for fixing the archwire. According to Feliciano et al. (2026), this configuration can
to reduce friction between certain components of the bracket-archwire system under certain conditions.
specific, allowing the use of orthodontic forces of lower magnitude in some phases of

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treatment. However, the effectiveness of tooth movement does not depend exclusively on the the type of bracket used, but also the characteristics of the orthodontic wire, the system of The forces applied, the mechanics used, and the biological response of the periodontal tissues all influence this. From a clinical standpoint, self-ligating systems can also facilitate insertion and... Replacement of orthodontic archwires, helping to reduce the time required for certain procedures during consultations. Feliciano et al. (2026) also describe potential benefits related to comfort and clinical practicality. However, the choice between Self-ligating and conventional brackets should consider not only these aspects, but also the characteristics of the malocclusion, the therapeutic objectives, the professional's experience, the Patient preferences and the costs associated with the system. Therefore, the brackets Self-ligating brackets should be understood as a therapeutic alternative among the different... resources available in contemporary orthodontics, and not as a universally accepted modality. superior to conventional systems.

In addition to the biomechanical characteristics of the different devices, the installation of devices Fixed orthodontic appliances can modify the conditions of the oral environment. Da Silva et al. (2024) They point out that the presence of metal brackets and other components of the appliance may These changes promote biofilm retention and hinder oral hygiene procedures. These may be associated with increased bacterial plaque buildup and changes in parameters of the oral environment, including pH variations. In this sense, monitoring Regular dental checkups and the adoption of proper oral hygiene measures are essential. during orthodontic treatment, with the aim of reducing the risk of periodontal changes. and injuries resulting from biofilm accumulation.

Direct bonding of metal brackets to tooth enamel is a widely used procedure. Used in fixed orthodontics, allowing the installation of accessories without the need for... more invasive procedures on the dental structure. According to Mendes et al. (2021), although this The technique offers clinical advantages related to the practicality and maintenance of the devices. In orthodontics, it is necessary to consider possible changes resulting from the interaction between the Metallic materials, the adhesive system, and the oral environment. Among these changes, the following stand out: possibility of corrosive processes and release of oxidation products, which can to compromise the superficial and aesthetic characteristics of the region involved. In this context, early identification of signs of corrosion or oxidation in components is crucial. Metallic products assume clinical relevance. Mendes et al. (2021) highlight that the resulting products These processes can come into contact with the tooth surface, promoting changes in

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coloration. When these changes are not identified and properly managed, it can
This can cause aesthetic damage to the enamel surface. Therefore, monitoring is necessary.
Periodic monitoring of orthodontic components and the condition of the enamel adjacent to the brackets is
important for the early detection of possible changes and for the adoption of clinical measures
necessary.

Another relevant aspect during treatment with fixed orthodontic appliances concerns...
Failures in the union between the bracket and the tooth surface. Linhares et al. (2021) emphasize that the
Bracket detachment can interfere with the progress of treatment, as it frequently
It requires a temporary interruption of orthodontic mechanics for the replacement of the appliance.
Depending on the frequency and timing of these failures, there may be an increase.
of the number of clinical procedures and compromise of the planned sequence for the
tooth movement.

The bond strength between bracket and enamel is multifactorial and can be...
influenced by the properties of the adhesive system, the material, and the characteristics of the substrate.
of the bracket, by the conditioning and bonding protocol, by the surgical technique and by
Mechanical forces to which the device is subjected during treatment. In addition, forces
Masticatory and orthodontic processes can lead to adhesive failures when they exceed the strength of the bond.
interface for joining. Thus, the proper selection of materials and the careful fulfillment of the
Bonding protocols are essential to ensure sufficient retention during treatment.
without causing unnecessary damage to the enamel structure (Linhares et al., 2021).

In the context of self-ligating systems, Feliciano et al. (2026) highlight characteristics such as
The absence of conventional ligatures, the slot's own closing mechanism, and the
possibility of reducing friction between the archwire and the bracket under certain conditions.
Mechanical. These features can facilitate procedures such as insertion and engagement.
and the removal of orthodontic wires, providing greater convenience in certain steps.
Clinical applications. However, these properties do not eliminate the need for an adhesive interface.
Proper contact between the bracket and the enamel is maintained, ensuring the stability of the appliance.
fundamental for the transmission of orthodontic forces.

In this way, the clinical effectiveness of fixed appliances depends on the interaction between the
characteristics of the bracket system, the strength and stability of the adhesive bond, and the
Proper oral hygiene maintenance. The presence of an adhesive interface capable of resisting.
to masticatory and orthodontic forces, associated with the correct positioning of accessories and to
Controlling biofilm around brackets contributes to the continuity of the mechanics.

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Machine Translated by Google
RCMOS – Multidisciplinary Scientific Journal The Knowledge.
ISSN: 2675-9128. São Paulo-SP.

Year VII, v.1 2026 | Submission: 08/09/2026 | Accepted: 11/09/2026 | Publication: 14/09/2026

planned for the preservation of dental and periodontal tissues. Thus, both aspects
Biomechanical aspects, as well as adhesives and preventatives, should be considered in the planning and execution.
monitoring of orthodontic treatment (Feliciano et al., 2026).

CONCLUSION

Analysis of the literature shows that orthodontic treatment involves a complex interaction.
among dental, skeletal, periodontal, muscular and functional factors, making
Essential for conducting a thorough diagnosis and developing an individualized treatment plan.
Proper identification of occlusal and craniofacial discrepancies allows for selection.
therapeutic approaches compatible with the clinical and biological characteristics of each
patient, reducing inappropriate interventions and promoting the achievement of results.
functional and aesthetically satisfactory.

In transverse maxillary deformities, expansion procedures are of important importance.
therapeutic resources, which may involve orthodontic, orthopedic or other approaches.
surgically assisted. The choice of technique should consider factors such as age,
Skeletal maturity, the magnitude of the discrepancy, and the strength of the craniofacial structures.
In addition to dentoskeletal effects, the modifications resulting from expansion may present
functional repercussions, although their results should be interpreted according to the
Individual characteristics and the goals set for each treatment.

The stability of the results is another fundamental aspect of orthodontic therapy.
Relapse is multifactorial and may be related to the initial characteristics of the disease.
occlusion, tissue reorganization, craniofacial growth, and containment conditions
after the active phase. In this sense, post-treatment follow-up and proper planning are essential.
Containment measures are essential steps to promote the maintenance of corrections.
achieved.

Regarding fixed orthodontic appliance systems, conventional and self-ligating brackets offer...
specific biomechanical and operational characteristics that should be considered in
clinical planning. Although self-ligating systems may offer advantages in clinical planning.
certain procedures, their use should not be considered, in isolation, as
guarantee of greater therapeutic efficiency, since the success of orthodontic movement
It depends on multiple factors. Similarly, the quality of the bond between the bracket and the
In enamel, proper material selection and biofilm control are relevant for the

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Machine Translated by Google

Year VII, v.1 2026 | Submission: 08/09/2026 | Accepted: 11/09/2026 | Publication: 14/09/2026

continuity of orthodontic mechanics and for the preservation of oral health.

It can be concluded, therefore, that the effectiveness of orthodontic treatment is not associated

It's not just about choosing a technique or a system of devices, but about the integration between them.

diagnosis, planning, biomechanics, clinical follow-up and maintenance strategies

of the results. The individualization of therapeutic conduct, based on the characteristics

Based on the patient's dentoskeletal and functional characteristics and the available evidence, this constitutes an element

central to achieving more predictable, functional, and stable orthodontic results.

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Machine Translated by Google

Year VII, v.1 2026 | Submission: 08/09/2026 | Accepted: 11/09/2026 | Publication: 14/09/2026

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