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REVIEW ARTICLE

Molar intrusion in open bite: effects on vertical dimension and temporomandibular joint

Elizabeth Estrella Paucar Toribio[1]✉, Rocío del Pilar Sandoval Gálvez[2], Lucas Bastian Quiroz Matamoros[3], Montserrat Casals Soderlund[4]

[1]Universidad San Sebastián, Santiago de Chile, Chile.
[2]Universidad Mayor, Santiago de Chile, Chile.
[3]Universidad del Desarrollo, Santiago de Chile, Chile.
[4]Universidad de los Andes, Santiago de Chile, Chile.

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ABSTRACT

Introduction: molar intrusion, used to correct anterior open bites, reduces vertical dimension and causes mandibular rotation, but it may alter condylar position and affect the temporomandibular joint.
Objective: to analyze the effects of molar intrusion on the temporomandibular joint and vertical dimension, evaluating joint alterations and skeletal stability after treatment.
Methods: a systematic review of the scientific literature was conducted in different databases, using a search algorithm to identify relevant sources. The selected studies, after applying rigorous inclusion and exclusion criteria, were critically appraised in terms of currency, methodological quality, and thematic relevance, and coherently integrated into the final synthesis of the review.
Development: molar intrusion decreases vertical dimension, with a greater effect in growing patients and those with skeletal anchorage. In the temporomandibular joint, no worsening of previous dysfunctions was observed; in healthy or stabilized joints, clinical improvements were even described. The stability of the vertical correction and mandibular rotation is maintained in medium-term follow-up with minimal relapse. However, variability in diagnostic methods and the short duration of the studies limit the generalizability of these findings.
Conclusions: molar intrusion offers aesthetic and functional benefits, reducing the vertical dimension and promoting mandibular rotation without apparent adverse effects on the temporomandibular joint. Long-term studies and standardized diagnostic methodologies are required to fully confirm these current findings.

Keywords: Open Bite; Tooth Movement Techniques; Temporomandibular Joint Disorders.

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INTRODUCTION

Open bite is defined as the malocclusion in which one or more teeth do not reach the occlusal plane and do not establish contact with their antagonists. This definition, although widely accepted, is not unique and varies according to different authors.(1) Its etiology is multifactorial, involving genetic, anatomical, and environmental factors.(2,3,4) At the genetic level, craniofacial syndromes such as Crouzon or Treacher-Collins are included, as well as polymorphisms in genes such as MMP9 and TNF-α, which alter the skeletal growth pattern.(3) Anatomically, it has been associated with macroglossia, elongation of the lower facial third, increased posterior dentoalveolar height, and clockwise mandibular rotation.(1,2)

In the environmental plane, factors such as bad oral habits stand out, including digital sucking, prolonged pacifier use, and tongue thrusting. Chronic respiratory obstruction caused by conditions such as adenoid or tonsillar hypertrophy, and orofacial muscle dysfunctions, such as hypotonia, are also included, all having a direct impact on the function of the stomatognathic system.(1,2,4)

Treatment should ideally begin during mixed dentition, a stage in which more favorable responses are obtained at the skeletal and functional levels.(2,4) Therapeutic options include lingual re-educator appliances, functional devices, fixed appliances, extraoral forces, and posterior resin blocks,(1) as well as habit control and myotherapy.

In adolescents and adults, planning must consider the functional and aesthetic complexity of the malocclusion.(5) Therapies with resin blocks and temporary anchorage devices (TADs) have been described in the literature to allow controlled molar intrusion, being effective in moderate cases.(3,5) In severe cases, orthodontic treatment can be complemented with orthognathic surgery according to the cephalometric analysis and the skeletal objectives of the case.

Any orthodontic treatment must begin with a comprehensive evaluation of joint and muscular health, since any alteration in these components can compromise therapeutic stability and prognosis. Molar intrusion, as a technique used in the correction of anterior open bite, has been associated with possible modifications in vertical dimension and in the condylar relationship of the temporomandibular joint within the glenoid cavity. This situation raises questions about the possible impact of molar intrusion on the temporomandibular joint (TMJ). Therefore, this review focused on analyzing the effects of molar intrusion on the TMJ and vertical dimension, evaluating both possible joint alterations and post-treatment skeletal stability.

METHODS

A systematic review of scientific literature was carried out using the following databases: PUBMED, Epistemonikos, and EBSCO.

Inclusion criteria:

- Studies published between 2014 and 2024 in English and Spanish.
- Studies focusing on the molar intrusion technique in patients with open bite, studies evaluating the decrease in vertical dimension (VD) and its effects on the TMJ.
- Studies whose methodological design included randomized controlled clinical trials (RCTs), prospective and retrospective studies.

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Exclusion criteria:
• Studies that used a technique other than molar intrusion.
• Letters to the editor, review articles, animal studies, and case reports were excluded.

For the present search, a combination of keywords and MeSH title terms was used: "molar intrusion" AND ("open bite" OR "anterior open bite") AND ("vertical dimension" OR "occlusal vertical dimension") AND ("temporomandibular joint disorders" OR "TMJ dysfunction").

Data Analysis and Processing
The report of this systematic research followed the set of Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) Guidelines. The search yielded 372 articles in total, resulting in 104 articles after removing duplicate articles and reading titles. Of these, 85 articles were excluded for not meeting the inclusion criteria; the reasons for exclusion are found in Figure 1. Finally, a total of 19 articles were selected for the review.

Data extraction included bibliometric information and specific patient characteristics such as age, number of patients, as well as outcomes of changes observed in vertical dimension and in the temporomandibular joint, evaluated through lateral cephalometry, TMJ CBCT, and TMJ MRI, as detailed below.

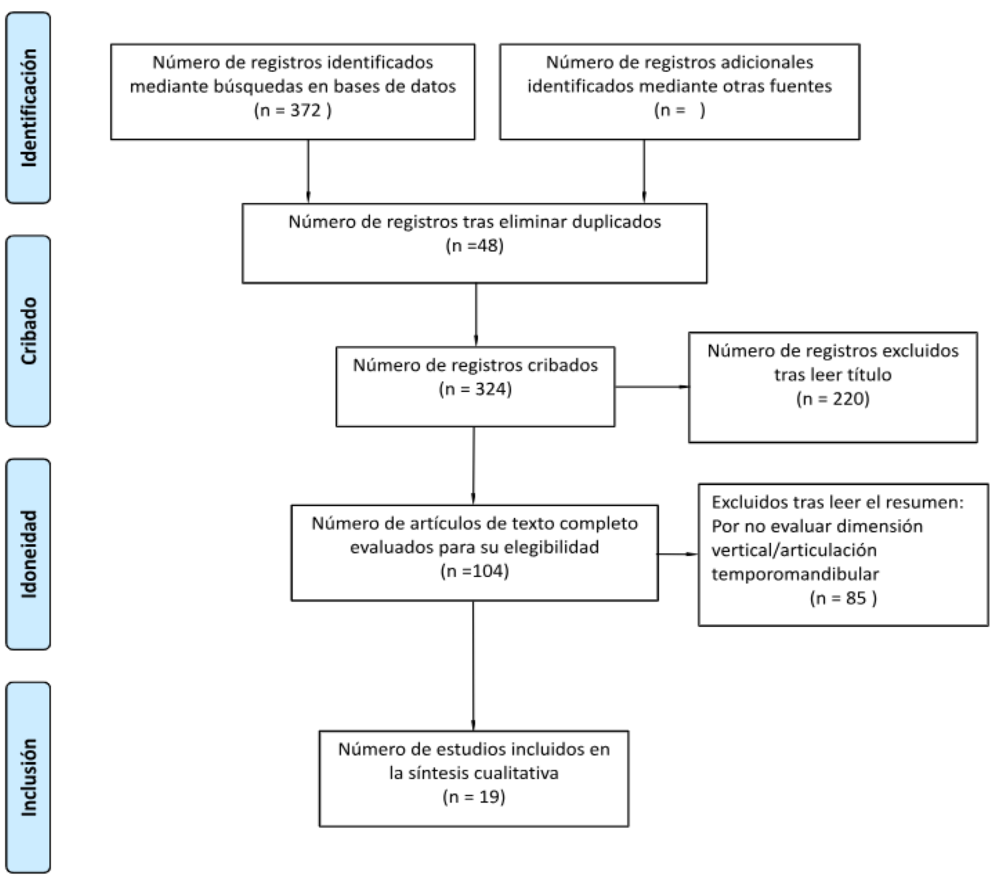

Fig. 1 PRISMA flow diagram.

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Lateral Cephalometry (2D):
Angles: Sella/Nasion (S/N)-Mandibular Plane (MP), SN-Gonion/Gnation (Go/Gn), Frankfort Plane (FH)/MP, ANB, SNB.

Linear Measurements: Anterior Lower Facial Height (LAFH), molar height (U6-PP), Vertical distance from chin to palatal plane (Me/PP).

Mandibular Relationship:
Location and rotation of Gonion (Go), Pogonion (Pog), and Menton (Me). Angle between the palatal plane (ANS–PNS) and the mandibular plane (Go–Me).

CBCT (Cone Beam Computed Tomography) and MRI (Magnetic Resonance Imaging) (3D): Condylar Position: Observation of the condyle position in the articular fossa.

Joint Space: Analysis of articular distances and volume of the retrodiscal space. Morphological Changes: Evaluation of signs of bone remodeling in the condyle and changes in joint volume.

Angles: SN-MP, SN-GoGn, FH-MP, ANB, SNB.

Linear Measurements: LAFH, TFH, molar height (U6-PP).

Mandibular Relationship: Location and rotation of Gonion (Go), Pogonion (Pog), and Menton (Me).

Risk of Bias

To assess the risk of bias in the randomized study (RCT), the RoB 2 tool was used, which considers five key domains: randomization process, deviations from assigned interventions, missing outcome data, measurement of the outcome, and selection of the reported result. On the other hand, for non-randomized studies, the ROBINS-I tool was used, which covers six domains: confounding, selection of participants, classification of interventions, deviations from interventions, missing outcome data, and measurement and selection of results.

DEVELOPMENT

Table 1 shows the synthesis of the identified studies that responded to the addressed topic. In it, works are organized according to their main methodological characteristics, which allows visualizing trends and gaps existing in the analyzed field clearly.

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Table 1. Summary of selected studies.

Source	Study Type	Participants (Gender)	Age of Participants	Study Location/Country
Hasan AA et al.,[6]	Randomized prospective clinical trial	20 (10 men / 10 women)	9.7±0.66 years	University of Al-Baath, Syria
Hsu LF et al.,[7]	Retrospective	32 (29 women / 3 men)	26.0±6.0 years	National Taiwan University Hospital, Taiwan
Oliveira TF et al.,[8]	Prospective	9 (3 men / 6 women)	18.7±5.1 years	University Estadual Paulista, Brazil
Elshal MG,[9]	Prospective	10 (4 men / 6 women)	22.4±3.20 years (18–29)	Minia University, Egypt
Kang DO et al.,[10]	Retrospective	30 (6 men / 24 women)	Mean 23.1 years (range 14–44)	Yonsei University, South Korea
Kassem HE et al.,[11]	Retrospective	28 (not reported)	19–28 years	Alexandria University, Egypt
Kim K et al.,[12]	Retrospective	21 (3 men / 18 women)	Mean 23.9 years (range 18.5–36.4)	Yonsei University, South Korea
Marzouk ES et al.,[13]	Prospective	13 (4 men / 9 women)	16 to 22.75 years	Alexandria University, Egypt
Marzouk ES et al.,[14]	Prospective	26 (15 women / 11 men)	22.4±2.3 years (range 19.3 to 26.9)	Alexandria University, Egypt
Nemes B et al.,[15]	Retrospective	18 (2 men / 16 women)	Mean 28.7 years	Private Practice, Hungary
Ogura H et al.,[16]	Retrospective	10 (1 man / 9 women)	Mean 25.7 years (range 14.3–52.8)	Tohoku University, Japan
Scheffler NR et al.,[17]	Retrospective	30 (11 men / 19 women)	Mean 24.1±10.7 years (12.7–48.1)	University of North Carolina, USA
Turkkahraman H et al.,[18]	Prospective	20 (14 women / 6 men)	16.68±2.80 years	University of Suleyman Demirel, Turkey
Vela-Hernández A et al.,[19]	Descriptive retrospective	31 (17 men / 14 women)	Mean 26.6±4.9 years (22.1–32.6)	University of Valencia, Spain
Chen YJ et al.,[20]	Prospective	12 (not reported)	22.83±8.19 years (19–44)	National Taiwan University Hospital, Taiwan
Abdulnabi Y et al.,[21]	Prospective	15 (7 men / 8 women)	20.6±4 years	Damascus University, Syria
Akan B et al.,[22]	Retrospective	19 (5 men / 14 women)	Mean 16.5 years	Katip Celebi University, İzmir, Turkey
Akbaydogan LC et al.,[23]	Prospective	20 (6 men / 14 women)	14.71±1.77 years	Alanya Alaaddin Keykubat University, Turkey
Hart TR et al.,[24]	Retrospective	31 (21 women / 10 men)	11.6 – 55.5 years (mean 20.7)	University of Rochester Eastman Institute for Oral Health, USA

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Risk of Bias Analysis
Using the RoB 2 Tool, the study by Hasan AA et al.,[6] had a low risk, while the rest of the studies were analyzed by the ROBINS-I Tool, in which they had a moderate risk.

Reduction of Vertical Dimension
All studies reported a decrease in vertical dimension after molar intrusion. The techniques used were TADs such as mini-implants and zygomatic miniplates, resin build-ups, and the Rapid Molar Intruder device. The reduction in vertical dimension varied between less than 1 mm and more than 4 mm, and in three studies a reduction was explicitly declared without specifying the numerical value. Measurement was performed mainly via cephalometry using ANS and Me points, although some studies used other references such as Me–HRL, Go–Me, or Me/PP. Applied forces ranged between 100 and 450 grams, and treatment duration was from 6 months to 3,3 years (Table 2).

Table 2. Results associated with the decrease in vertical dimension.

Source	Intrusion Technique Used	Average Amount of Initial Open Bite (mm)	Amount of Molar Intrusion (mm)	Vertical Dimension Measurement Technique (Decrease)	Applied Force (g)	Treatment Duration (months)
Hasan AA et al.,[6]	Rapid molar intruder (RMI)	−4.56±1.21 mm	2.9±0.7 mm	Cephalometry using ANS and Me points (1.94±0.66 mm)	150–200 g	10 months
Hsu LF et al.,[7]	TADs	-3.14 mm±1.86 mm	1.84±0.66 mm	Cephalometry using ANS and Me points (2.50±1.33 mm)	Not reported	3.3 years±1.2 years
Oliveira TF et al.,[8]	Zygomatic miniplates	Not reported	2.03±0.87 mm	Cephalometry using N–Me points (Measures not reported)	450 g	6 months
Elshal MG,[9]	Zygomatic miniplates + Hyrax acrylic expander with bite blocks	−6.0 mm	3.85±0.82 mm	Cephalometry using ANS and Me points (4.20±1.13 mm)	250 g	9.7 months
Kang DO et al.,[10]	TADs	-3.14 mm±1.86 mm	2.30±1.29 mm	Cephalometry using ANS and Me points (2.70±1.37 mm)	100–150 g	34.6±9.3 months
Kassem HE et al.,[11]	Zygomatic miniplates	- 3 to 8-mm	2.0 to 4.0 mm	Cephalometry: Lower facial height measured indirectly using Me–HRL and Me′–HRL distance (Measures not reported)	450 g	Not reported
Kim K et al.,[12]	Mini-implants	Less than 2 mm	2.2±0.8 mm	Cephalometry using ANS and Me points (3.0±1.2 mm)	250g	9.7±3.2 months
Marzouk ES et al.,[13]	Zygomatic miniplates	-3 mm to -8 mm	3.1±0.74 mm	Cephalometry using ANS and Me points (3.0±1.25 mm)	450 g	9±2.5 months
Marzouk ES et al.,[14]	Zygomatic miniplates	-3 mm to -8 mm	3.04±0.79 mm	Cephalometry using ANS and Me points (3.12±0.58 mm)	450 g	Not reported

Nemes B et al.,[15]	Occlusal splint + Zygomatic miniplates	3.14±1.65 mm	1.95±0.58 mm	Cephalometry: Lower facial height measured indirectly using ANS–PNS and Go–Me distance (Measures not reported)	Not reported	22±2.5 months
Ogura H et al.,[16]	Mini-implants	−2.4±1.4 mm	1.6 mm	Cephalometry using Me/PP points (1.2±1.0 mm)	200 g	7.1±2.5 months
Scheffler NR et al.,[17]	TADs	−1.2±1.7 mm	2.3 mm	Cephalometric radiograph with ANS–Me measurement (1.6±2.2 mm)	150 g	6 months
Turkkahraman H et al.,[18]	Zygomatic miniplates	−4.34±1.71 mm	3.59±1.34 mm	Cephalometric radiograph with ANS–Me measurement (3.30±1.68 mm)	200 g	12 months
Vela-Hernández A et al.,[19]	Resin build-ups on upper molars + Tip-Edge Plus appliance	−2.48±1.57 mm	1.15±0.45 mm	Cephalometric radiograph with ANS–Me measurement (0.70±0.56 mm)	Not reported	17.2 months
Chen YJ et al.,[20]	TADs + Maxillary occlusal splint	−3.91±1.99 mm	1.55±0.88 mm	Cephalometry using ANS and Me points (1.67±1.21 mm)	250 g	8 months
Abdulnabi Y et al.,[21]	Mini-implants	−3.7±1.9 mm	2.9±1.2 mm	Cephalometry using ANS (Superior Nasal Aperture) and Me (Menton) points (3.1±1.4 mm)	250 g	6.3 months
Akan B et al.,[22]	Zygomatic miniplates	−3.20±1.75 mm	2.32±2.13 mm	Cephalometry using ANS and Me points (1.81±3.50 mm)	400 g	9.4 months
Akbaydogan LC et al.,[23]	Mini-implants	−9.03±1.74 mm	4.00±1.01 mm	Cephalometry using ANS and Me points (4.86±1.67 mm)	250 g	8 months
Hart TR et al.,[24]	Mini-implants	≥2 mm	3 mm	Cephalometry using ANS and Me points (1.5 mm)	100 g	15.7 months

The decrease in vertical dimension after molar intrusion was consistent in all analyzed studies, with values ranging between 0,70 mm and 4,86 mm. These findings are comparable with those of Acar YB et al.,[25] where a molar intrusion of 3,1 mm was reported, a value that falls within the interval observed in our analysis.

In the study by Akbaydogan et al.,[23] conducted in a population of children and adolescents, a significant decrease in anterior vertical dimension was demonstrated after molar intrusion. This decline is one of the most substantial among all analyzed studies and is explained by the severity of the anterior open bite condition that patients presented at the start of treatment. For its part, Hart et al.,[24] performed a subgroup analysis, differentiating adolescents (≤18 years) from adults.

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In adolescents, more pronounced vertical changes were documented. This finding reinforces that the skeletal response to molar intrusion is more predictable and efficient in growing subjects. Finally, the study by Hasan et al.,[6] focused on patients in mixed dentition using a rapid intrusion device (rapid molar intruder, RMI). This early approach showed favorable changes in both vertical dimension and soft tissues, confirming the effectiveness of early treatment in correcting anterior open bite.

Vertical dimension was evaluated in all studies through cephalometric analysis, but with differences in the reference points used. Most studies employed the ANS–Me distance. This measurement is widely used because it represents the height of the lower facial third and is sensitive to changes produced by posterior intrusion and mandibular rotation. Some studies applied alternative methods. Kassem et al.,[11] used the Me–HRL distance; Nemes et al.,[15] combined ANS–PNS and Go–Me; Ogura et al.,[16] used Me/PP; and Oliveira et al.,[8] used the N–Me distance. This variability in reference points introduces a methodological limitation, since each measure reflects distinct components of the vertical change. Even so, all studies that reported this variable documented a reduction in vertical dimension after intrusion.

Effects on the TMJ

Of the analyzed studies, only 3 included evaluation of the temporomandibular joint before, during, or after treatment. In this context, the study by Chen et al.,[20] worked with patients without a diagnosis of temporomandibular dysfunction, while the remaining studies by Nemes et al.,[15] and Hsu et al.,[7] included exclusively patients with stabilized TMD prior to orthodontic treatment.

Diagnoses reported in these cases included muscular pain in masseter, temporal, medial pterygoid, and suboccipital muscles, in addition to joint diagnoses such as disc displacement with and without reduction, and signs of degenerative bone pathology such as flattening and erosion. Clinical stabilization was achieved through rigid full-coverage splints, physiotherapy, and pharmacological treatment. In all cases, the start of orthodontic treatment was carried out after confirming absence of pain, functional mouth opening, and imaging findings compatible with stable joints.

During treatment, follow-up protocols were applied that included regular clinical controls and techniques such as electromyography, magnetic resonance imaging, or CBCT. As pointed out by Hsu et al.,[7] upon the appearance of muscular or joint discomfort, specific interventions were performed such as splint adjustment, manual therapy, dry needling, medication, or temporary pause of treatment.

At the end of treatments, absence of joint and muscular pain was reported in all evaluated cases. In the study by Nemes et al.,[15] changes in condylar morphology and in the position of the condyle within the glenoid cavity were recorded, as well as the reduction of flattening, erosion, and joint irregularities (Table 3).

Table 3. Results associated with effects on the TMJ.

Source	Joint Symptoms	Treatment Duration (months)	Follow-up Duration (months)	Effects	Conclusion
Hsu LF et al.,[7]	Only muscular pain	3.3 years±1.2 years	3.7±2.6 years	Pain was transient, managed by manual therapy, dry needling, NSAIDs, and clinical evaluation at each session	All patients were asymptomatic at the end of treatment. Safe treatment for the TMJ
Nemes B et al.,[15]	Presented pain before treatment start. No reappearance of symptoms reported during treatment	22±2.5 months	No long-term follow-up reported	Improvement of condylar morphology in CBCT; Right condylar flattening decreased from 61.11% to 27.78%, Left condylar flattening decreased from 72.22% to 38.89%. Right condylar cortical erosion/irregularity decreased from 72.22% to 22.22%, Left condylar cortical erosion/irregularity decreased from 55.56% to 22.22%. Irregular joint space / anomalous position right decreased from 66.67% to 16.67%, Irregular joint space / anomalous position left decreased from 61.11% to 16.67%. No signs or symptoms of TMD (muscular sensitivity, pain, clicks, joint locking)	Effective treatment to restore stability and improve condylar morphology
Chen YJ et al.,[20]	Asymptomatic	14.9±4.3 months	No long-term follow-up reported	No new symptoms reported	Safe treatment for the TMJ

When analyzing the available literature on molar intrusion in patients with open bite, few have stopped to consider the effects of this treatment approach on the TMJ. Among reference works, only 3 of them have analyzed the TMJ report before, during, or after orthodontic treatment.[7,15,20] In them, it is evident that all treatments began after clinical stabilization in the TMJ. That is, patients had no pain, could open functionally, and images also revealed that the joints were stable. As Okeson JP points out,[26] starting orthodontic treatment in a symptomatic or unstable joint can create more problems than solutions, leading to greater possibilities of pain or dysfunction along the way.

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Stabilization was obtained through various techniques, such as rigid full-coverage stabilization splints, physiotherapy, or pharmacological treatment. This seems to have played a crucial role in ensuring that orthodontic treatment was safe regarding joint sequelae. It is here where it is important to highlight that all cases,[7,15,20] incorporate periodic clinical follow-up protocols and, when necessary, specific interventions, whether splint adaptations, interruption of treatment, or even physiotherapy techniques such as dry needling. This capacity for modification and adaptation to the patient's status seems to have been crucial for the favorable clinical course.

At the end of treatments, none of the patients manifested signs of joint and muscular discomfort.[7,15,20] There were even studies that demonstrated an improvement in joint structures, with a decrease in condylar flattening and erosion, presenting a better position of the condyle in the glenoid cavity. For its part, Ceviadanes LH et al.,[27] had already warned about the possibility of morphological changes in the TMJ without apparent symptoms.

However, this evidence must be interpreted with caution due to the very scarce number of studies that specifically address effects on the TMJ. This limited database prevents generalizing the results to the entire population with TMD receiving orthodontic treatment with molar intrusion.

Treatment Stability.
A total of six studies included post-treatment follow-up with the objective of evaluating the clinical stability of the obtained results. The reported follow-up time varied between one and four years. In all cases with follow-up, acceptable clinical stability was reported at the time of evaluation (Table 4).

Table 4. Long-term post-follow-up stability results.

Source	Post-treatment Follow-up	Clinical Stability
Hsu LF et al.,[7]	Yes (3.7±2.6 years)	Acceptable clinical stability
Kang DO et al.,[10]	Yes (3.9±2.7 years)	Acceptable clinical stability
Marzouk ES et al.,[14]	Yes (4 years)	Acceptable clinical stability
Ogura H et al.,[16]	Yes (1 year)	Acceptable clinical stability
Scheffler NR et al.,[17]	Yes (2 years)	Acceptable clinical stability
Vela-Hernández A et al.,[19]	Yes (2.7±1.8 years)	Acceptable clinical stability

Another problem was that none of the studies were controlled and the number of participants was small. Understanding that long-term follow-ups were not published, it cannot be assured with certainty if the positive effects truly continue until now or if perhaps there were some negative effects that occurred later, as shown by the study of González Espinosa D et al.,[28] on the stability of molar intrusion, which found an average relapse of 1,23 mm in overbite correction after only 2,5 years of follow-up. In this sense, and given the lack of data on the TMJ condition in these follow-ups, we are certainly not in a position to affirm that molar intrusion is a totally safe procedure for the TMJ in all patients.

Therefore, what is evident is that orthodontic treatment with large vertical movement must always consider the patient's joint health, and it is important that the functional evaluation of the TMJ be a routine part of the diagnosis and plan.[15] As De Leeuw R et al. mention,[29] associating with other experts in orofacial pain could significantly alter both the outcomes and the patient's experience during treatment.

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CONCLUSION

The reviewed clinical studies support that controlled molar intrusion allows a reduction of vertical dimension and mandibular rotation, with functional and aesthetic benefits. No negative effects on the temporomandibular joint were observed, even in patients with pre-existing dysfunction, but with joint stability; available data suggest post-treatment stability. However, the scarce number of studies that performed follow-up and the variability in diagnostic methods limit the robustness of these conclusions. Longitudinal studies with clinical and imaging follow-up are required to validate skeletal and joint stability in the long term.

BIBLIOGRAPHIC REFERENCES

1. Benedi García MM, Díaz Castro A. Mordida Abierta Anterior: Definición, Manifestaciones Clínicas, Clasificación, Etiología y Terapéuticas (Revisión bibliográfica). Rev Latinoam Ortodoncia Odontopediatr[Internet]. 2021[citado 14/07/2025]; 2021(1): Disponible en: https://www.ortodoncia.ws/publicaciones/2021/art-5/

2. Carulla Martínez D, Curbelo Mesa R, Benedit García MM. Mordida Abierta Anterior: Denticiones, Categorías y Terapéuticas – Revisión bibliográfica. Rev Latinoam Ortodoncia Odontopediatr[Internet]. 2020[citado 14/07/2025]; 20(1): 123–130. Disponible en: https://www.ortodoncia.ws/publicaciones/2020/art-7/

3. Hsu JY, Cheng JH, Feng SW, Lai PC, Yoshida N, Chiang PC. Strategic treatment planning for anterior open bite: A comprehensive approach. J Dent Sci[Internet]. 2024 Jul[citado 14/07/2025]; 19(3): 1328-1337. Disponible en: https://doi.org/10.1016/j.jds.2024.04.001

4. Salame Ortiz VA, Amancha Salguero KB, Almendariz Ormaza DN, Quiroz Molina JJ. Tratamiento de la mordida abierta anterior por hábitos y su estabilidad a largo plazo. Rev Inf Cient [Internet]. 2024 [citado 14/07/2025]; 103(1Sup): e4525. Disponible en: https://revinfcientifica.sld.cu/index.php/ric/article/view/4525

5. Nieto-Pillco M, Lima-Illescas M. Tratamiento ortodóntico de la mordida abierta anterior en adolescentes y adultos: revisión de literatura. 593 Digital Publisher CEIT[Internet]. 2023 May[citado 14/07/2025]; 8(3): 528–43. Disponible en: https://doi.org/10.33386/593dp.2023.3.1780

6. Hasan AA, Zeidan HM, Hajeer MY, Al-Jundi A, Al-Sabbagh R, Khattab TZ, Al-Munajed MK. Evaluation of Soft and Hard Tissue Changes Following the Use of Rapid Molar Intruder for the Management of Skeletal Anterior Open Bite in Mixed Dentition: A Randomized Controlled Trial. Cureus[Internet]. 2022 Dec[citado 14/07/2025]; 14(12): e32826. Disponible en: https://doi.org/10.7759/cureus.32826

7. Hsu LF, Liu YJ, Wang SH, Chen YJ, Chen YJ, Yao CJ. Orthodontic correction of acquired open bite with TMJ degeneration: A retrospective study of outcomes and stability. J Formos Med Assoc[Internet]. 2024 Apr[citado 14/07/2025]; 123(4): 452-460. Disponible en: https://doi.org/10.1016/j.jfma.2023.10.006

8. Oliveira TF, Nakao CY, Gonçalves JR, Santos-Pinto A. Maxillary molar intrusion with zygomatic anchorage in open bite treatment: lateral and oblique cephalometric evaluation. Oral Maxillofac Surg[Internet]. 2015 Mar[citado 14/07/2025]; 19(1): 71-77. Disponible en: https://doi.org/10.1007/s10006-014-0457-2

9. Elshal MG. Dentoskeletal changes of anterior openbite cases treated by intrusion of maxillary posterior segments via zygomatic miniplates. Med Sci[Internet]. 2021 Feb[citado 14/07/2025]; 25(108): A1. Disponible en: https://mail.discoveryjournals.org/medicalscience/current_issue/v25/n108/A1.htm

10. Kang DO, Yu HS, Choi SH, Kim ST, Jung HD, Lee KJ. Stability of vertical dimension following total arch intrusion. BMC Oral Health[Internet]. 2023 Mar 22[citado 14/07/2025]; 23(1):164. Disponible en: https://doi.org/10.1186/s12903-023-02842-1

11. Kassem HE, Marzouk ES. Prediction of changes due to mandibular autorotation following miniplate-anchored intrusion of maxillary posterior teeth in open bite cases. Prog Orthod[Internet]. 2018 May 14[citado 14/07/2025]; 19(1):13. Disponible en: https://doi.org/10.1186/s40510-018-0213-5

12. Kim K, Choy K, Park YC, Han SY, Jung H, Choi YJ. Prediction of mandibular movement and its center of rotation for nonsurgical correction of anterior open bite via maxillary molar intrusion. Angle Orthod[Internet]. 2018 Sep[citado 14/07/2025]; 88(5): 538-544. Disponible en: https://doi.org/10.2319/102317-714.1

13. Marzouk ES, Abdallah EM, El-Kenany WA. Molar Intrusion in Open-bite Adults Using Zygomatic Miniplates. Int J Orthod Milwaukee[Internet]. 2015 Summer[citado 14/07/2025]; 26(2): 47-54. Disponible en: https://pubmed.ncbi.nlm.nih.gov/26349291/

14. Marzouk ES, Kassem HE. Long-term stability of soft tissue changes in anterior open bite adults treated with zygomatic miniplate-anchored maxillary posterior intrusion. Angle Orthod[Internet]. 2018 Mar[citado 14/07/2025]; 88(2): 163-170. Disponible en: https://doi.org/10.2319/072317-490.1

15. Nemes B, Frank D, Puigdollers A, Martín D. Occlusal Splint Therapy Followed by Orthodontic Molar Intrusion as an Effective Treatment Method to Treat Patients with Temporomandibular Disorder: A Retrospective Study. Appl Sci[Internet]. 2021[citado 14/07/2025]; 11(16): 7249. Disponible en: https://doi.org/10.3390/app11167249

16. Ogura H, Numazaki K, Oyanagi T, Seiryu M, Ito A, Noguchi T, Ohori F, Yoshida M, Fukunaga T, Kitaura H, Mizoguchi I. Three-Dimensional Evaluation of Treatment Effects and Post-Treatment Stability of Maxillary Molar Intrusion Using Temporary Anchorage Devices in Open Bite Malocclusion. J Clin Med[Internet]. 2024 May[citado 14/07/2025]; 13(10): 2753. Disponible en: https://doi.org/10.3390/jcm13102753

17. Scheffler NR, Proffit WR, Phillips C. Outcomes and stability in patients with anterior open bite and long anterior face height treated with temporary anchorage devices and a maxillary intrusion splint. Am J Orthod Dentofacial Orthop[Internet]. 2014 Nov[citado 14/07/2025];146(5): 594-602. Disponible en: https://doi.org/10.1016/j.ajodo.2014.07.020

ISSN: 1561-3194 **RNPS:** 1877
Rev Ciencias Médicas. 2026; 30(2026): e6835

18. Turkkahraman H, Sarioglu M. Are temporary anchorage devices truly effective in the treatment of skeletal open bites? Eur J Dent[Internet]. 2016 Oct-Dec[citado 14/07/2025]; 10(4): 447-453. Disponible en: https://doi.org/10.4103/1305-7456.195169

19. Vela-Hernández A, López-García R, García-Sanz V, Paredes-Gallardo V, Lasagabaster-Latorre F. Nonsurgical treatment of skeletal anterior open bite in adult patients: Posterior build-ups. Angle Orthod[Internet]. 2017 Jan[citado 14/07/2025]; 87(1): 33-40. Disponible en: https://doi.org/10.2319/030316-188.1

20. Chen YJ, Chen HH, Hsu LF, Wang SH, Chen YJ, Lai EH, Chang JZ, Yao CJ. Airway increase after open bite closure with temporary anchorage devices for intrusion of the upper posteriors: Evidence from 2D cephalometric measurements and 3D magnetic resonance imaging. J Oral Rehabil[Internet]. 2018 Dec[citado 14/07/2025]; 45(12): 939-947. Disponible en: https://doi.org/10.1111/joor.12712

21. Abdulnabi Y, Albogha MH, Abuhamed H, Kaddah A. Non-surgical treatment of anterior open bite using miniscrew implants with posterior bite plate. Orthod Waves[Internet]. 2017[citado 14/07/2025]; 76(1): 40–45. Disponible en: https://doi.org/10.1016/j.odw.2016.11.006

22. Akan B, Ünal BK, Şahan AO, Kızıltekin R. Evaluation of anterior open bite correction in patients treated with maxillary posterior segment intrusion using zygomatic anchorage. Am J Orthod Dentofacial Orthop[Internet]. 2020 Oct[citado 14/07/2025]; 158(4): 547-554. Disponible en: https://doi.org/10.1016/j.ajodo.2019.09.018

23. Akbaydogan LC, Akin M. Cephalometric evaluation of intrusion of maxillary posterior teeth by miniscrews in the treatment of open bite. Am J Orthod Dentofacial Orthop[Internet]. 2022 May[citado 14/07/2025]; 161(5): 621-627. Disponible en: https://doi.org/10.1016/j.ajodo.2020.11.033

24. Hart TR, Cousley RR, Fishman LS, Tallents RH. Dentoskeletal changes following mini-implant molar intrusion in anterior open bite patients. Angle Orthod[Internet]. 2015 Nov[citado 14/07/2025]; 85(6): 941-8. Disponible en: https://doi.org/10.2319/090514-625.1

25. Acar YB, Özbilen EÖ, Yıldırım G, Kahraman D, Tozlu M, Erverdi AN. Dentoalveolar and Skeletal Effects of an Anterior Open Bite Treatment Protocol Using Zygomatic Anchorage. Orthod Craniofac Res[Internet]. 2025 Jun[citado 14/07/2025]; 28(3): 507-514. Disponible en: https://doi.org/10.1111/ocr.12901

26. Okeson JP. Management of temporomandibular disorders and occlusion. 7th ed. St. Louis: Elsevier[Internet]; 2012 april[citado 14/07/2025]. Disponible en: https://shop.elsevier.com/books/management-of-temporomandibular-disorders-and-occlusion/okeson/978-0-323-08220-4

27. Cevidanes LH, Hajati AK, Paniagua B, Lim PF, Walker DG, Palconet G, Nackley AG, Styner M, Ludlow JB, Zhu H, Phillips C. Quantification of condylar resorption in temporomandibular joint osteoarthritis. Oral Surg Oral Med Oral Pathol Oral Radiol Endod[Internet]. 2010 Jul[citado 14/07/2025]; 110(1): 110-7. Disponible en: https://doi.org/10.1016/j.tripleo.2010.01.008

ISSN: 1561-3194 **RNPS:** 1877
Rev Ciencias Médicas. 2026; 30(2026): e6835

28. González Espinosa D, de Oliveira Moreira PE, da Sousa AS, Flores-Mir C, Normando D. Stability of anterior open bite treatment with molar intrusion using skeletal anchorage: a systematic review and meta-analysis. Prog Orthod[Internet]. 2020 Sep[citado 14/07/2025]; 21(1): 35. Disponible en: https://doi.org/10.1186/s40510-020-00328-2

29. De Leeuw R, Klasser GD. Orofacial pain: guidelines for assessment, diagnosis, and management. 6th ed. Chicago: Quintessence Publishing; 2018.