GRADUATION PROJECT

Degree in Dentistry

EFFECT OF THE USE OF A MOUTHGUARD AND ITS IMPACT ON PATIENTS' ORAL AND GENERAL HEALTH

Madrid, academic year 2025/2026

Identification number: 176

RESUMEN

Introducción: La sobrecarga oclusal puede causar trauma agudo en el deporte o microtrauma crónico en los trastornos temporomandibulares (TTM). Esto supone riesgos significativos para la salud oral y general. Los dispositivos intraorales se prescriben comúnmente para manejar estas fuerzas. Sin embargo, sus implicaciones clínicas y mecanismos requieren una evaluación exhaustiva; **Objetivos:** El objetivo de este estudio es describir sistemáticamente la efectividad clínica de las férulas oclusales y los protectores bucales. Queremos evaluar sus mecanismos de acción, el impacto en los síntomas y la función mandibular. También nos interesa conocer los criterios de selección y el papel fundamental de la adherencia del paciente; **Metodología** : Se realizó una revisión documental sistemática siguiendo las directrices PRISMA. Se buscaron artículos en bases de datos electrónicas como PubMed, Scopus y Web of Science. Finalmente, se seleccionaron 25 artículos científicos relevantes para la síntesis cualitativa; **Resultados:** Los dispositivos hechos a medida tienen una superioridad biomecánica para prevenir traumatismos. Sin embargo, su uso por parte de los pacientes es bajo debido a su alto costo. En el manejo de los TTM, las férulas reducen eficazmente el dolor a corto plazo. No obstante, la eficacia a largo plazo es similar a la de un placebo o la fisioterapia. Esto destaca la presencia de mecanismos biopsicosociales inespecíficos. La adherencia se ve afectada por las molestias iniciales. Además, una mala higiene del aparato presenta graves riesgos de infección sistémica; **Conclusiones :** Los aparatos intraorales hechos a medida son el estándar de oro clínico para la protección dental. Sin embargo, el tratamiento de los trastornos oclusales crónicos requiere un enfoque interdisciplinar. Esto implica combinar férulas con fisioterapia en lugar de utilizar monoterapia con férulas. El éxito del tratamiento depende en gran medida de la educación de los pacientes sobre la adaptación y la adherencia psicológica. También es crucial seguir estrictos protocolos de higiene.

PALABRAS CLAVE

Odontología, Férulas Oclusales, Protectores Bucales, Trastornos Temporomandibulares, Sobrecarga Oclusal, Cumplimiento del Paciente.

ABSTRACT

Introduction: Occlusal overload can cause acute trauma in sports or chronic microtrauma in temporomandibular disorders (TMD). This poses significant risks to oral and general health. Intraoral devices are commonly prescribed to manage these forces. However, their clinical implications and mechanisms require a thorough evaluation; **Objectives:** The aim of this study is to systematically describe the clinical effectiveness of occlusal splints and mouthguards. We wish to evaluate their mechanisms of action, their impact on symptoms and mandibular function. We are also interested in understanding the selection criteria and the crucial role of patient compliance; **Methodology:** A systematic literature review was conducted in accordance with the PRISMA guidelines. Articles were searched for in electronic databases such as PubMed, Scopus and Web of Science. Ultimately, 25 scientific articles relevant to the qualitative synthesis were selected; **Results:** Custom-made devices offer biomechanical advantages in preventing injury. However, patient uptake is low due to their high cost. In the management of TTM, splints effectively reduce pain in the short term. However, long-term efficacy is similar to that of a placebo or physiotherapy. This highlights the presence of non-specific biopsychosocial mechanisms. Adherence is affected by initial discomfort. Furthermore, poor hygiene of the device poses serious risks of systemic infection; **Conclusions:** Custom-made intraoral appliances are the clinical gold standard for dental protection. However, the treatment of chronic occlusal disorders requires an interdisciplinary approach. This involves combining splints with physiotherapy rather than using splints alone. The success of treatment depends largely on educating patients about adaptation and psychological compliance. It is also crucial to follow strict hygiene protocols.

KEYWORDS

Dentistry, Occlusal splints, Mouthguards, Temporomandibular disorders, Occlusal overload, Patient compliance.

ÍNDICE

1. INTRODUCTION 1

1.1 DEFINITION OF OCCLUSAL OVERLOAD (or OCCLUSAL STRESS) 1

1.2 DENTAL PROBLEMS CAUSED BY OCCLUSAL OVERLOAD 1
- 1.2.1 DENTAL INJURIES PROBLEMS 2
- 1.2.2 TEMPOROMANDIBULAR SYNDROME 2
- 1.2.3 ORTHODONTIC PROBLEMS 3
- 1.2.4 PROBLEMS RELATED TO SPORTS ACTIVITY 3

1.3 CLINICAL SYMPTOMS RELATED TO OCCLUSAL OVERLOAD 4

1.4 TYPES OF SPLINTS AND MATERIALS 4

1.5 QUALITY OF LIFE IN OCCLUSAL OVERLOAD PROCESSES 5

1.6 PATIENT PERCEPTION AFTER USING OCCLUSAL DISCHARGE SPLINTS 5

2. OBJECTIVE 7

3. MATERIAL AND METHODS 8

3.1 PICO QUESTION 8

3.2 ELIGIBILITY CRITERIA 9

3.3 INFORMATION SOURCES AND RESEARCH STRATEGY 10

3.4 STUDY SELECTION 10

3.5 DATA EXTRACTION 11

4. RESULTS 12

4.1 DATA EXTRACTION AND STUDY CHARASTERISTICS 12

4.2 SYNTHESIS OF RESULTS 14
- 4.2.1 SCIENTIFIC EVIDENCE ON TYPES OF OCCLUSAL SPLINTS AND MECHANISMS OF ACTION 14
- 4.2.2 CLINICAL CHARACTERISTICS OF OCCLUSAL DISORDERS AMENABLE TO SPLINT THERAPY 15
- 4.2.3 EFFECTIVENESS IN REDUCING PAIN AND IMPROVING MANDIBULAR MOBILITY 15
- 4.2.4 CLINICAL CRITERIA FOR SELECTING THE MOST APPROPRIATE SPLINT 16
- 4.2.5 PATIENTS PERCEPTIONS: COMFORT, ADHERENCE AND QUALITY OF LIFE 16

5. DISCUSSION 17

6. CONCLUSIONS 20

7. SUSTAINABILITY 21

8. REFERENCES 22

- **ANNEXES** 25

Definition and Background 25

1. INTRODUCTION

1.1 DEFINITION OF OCCLUSAL OVERLOAD (or OCCLUSAL STRESS)

Occlusal overload, often referred to as occlusal stress, is defined as the application of excessive mechanical forces to the stomatognathic system that surpass the physiological adaptive capacity of the dental structures, periodontal tissues and the temporomandibular joint (TMJ). In the context of physical activity and sports, this phenomenon manifests through two primary distinct mechanisms, acute high-impact forces and repetitive functional loading. Acute occlusal stress is characteristically observed in contact and collision sports, where kinetic energy from an external blow is transmitted through the mandible. This transmission can drive the dentition together with substantial force or cause direct structural fractures due to the sheer magnitude of the impact (1,2). Conversely, repetitive occlusal stress is frequently self-inflicted and is increasingly recognized in the form of Awake Bruxism (AB). AB is when people clench or grind their teeth when they are not eating. This happens a lot in sports that need a lot of strength like powerlifting and CrossFit (3). Some people think that clenching teeth helps make muscles stronger and improves performance. This is because it affects the way the brain talks to the muscles (4). It is bad, for the teeth and the jaw because it puts a lot of pressure on them. AB is a problem because it can hurt the teeth and the jaw (3). Consequently, the management of occlusal overload requires a dual approach, protection against sudden trauma and the mitigation of chronic, performance-associated clenching forces (3, 4). The clinical importance of these problems is demonstrated by current epidemiological statistics. Depending on what people do and their age studies find that 10 to 39 percent of all tooth injuries happen during sports (2, 5). This happens a lot. Also it is thought that 5 to 12 percent of people have jaw problems. These jaw problems are called Temporomandibular Disorders or TMD (7, 8). However athletes have jaw problems, this is because they often clench their teeth and grind them when they are stressed or competing that can cause a lot of jaw pain (3, 4).

1.2 DENTAL PROBLEMS CAUSED BY OCCLUSAL OVERLOAD

The pathological consequences of unmitigated occlusal overload are extensive, ranging from immediate failure of hard tissues to the gradual development of chronic functional disorders affecting the entire craniofacial complex.

1.2.1 DENTAL INJURIES PROBLEMS

Dental injuries from accidents are a problem for people all around the world. When we look at the numbers we can see that sports and other fun activities cause about 25 to 34 percent of all mouth and face injuries (2). The kinds of injuries that happen are very different they can be cracks in the tooth or more serious problems like when the tooth gets knocked out of its socket (2). One thing that is very important and is changing all the time is making sure that teeth with restorations are protected. More and more athletes are getting dental work done to make their teeth look better so now we need to think about how to keep these restorations safe. Studies have shown that when teeth get hit hard the special coverings on the teeth can break or come off. This is because the force of the hit is not spread out it all goes to one spot (6). If athletes do not wear mouthguards to help spread out the force of a hit their special dental work can get damaged easily. This can be very bad. Cost a lot of money to fix. Dental restorations like veneers are, at risk of getting broken or coming off when teeth get hit hard. Mouthguards can help protect these restorations by absorbing some of the force of the hit (6).

1.2.2 TEMPOROMANDIBULAR SYNDROME

Temporomandibular Disorders or TMD are a group of problems that affect the muscles used for chewing the temporomandibular joint and surrounding tissues (7, 8). Occlusal overload is a cause of TMD. This can happen through a one-time blow to the chin or repeated strain from clenching or grinding teeth (1, 3). In sports a hit to the chin can push the jawbone into the socket. This can cause injury inside the joint leading to swelling, bleeding or a displaced disc (1). Repeatedly clenching during sports can also lead to muscles, pain and long-term joint problems (3, 4). The main way to manage TMD is by using splints or mouthguards as a conservative treatment. These help to protect the joint and muscles from strain (8, 9). TMD can be an issue for athletes and using a mouthguard can help prevent some of these problems (1). The temporomandibular joint and muscles are essential for activities, like eating and speaking. TMD can affect a persons quality of life making it difficult to enjoy things like eating or talking (18). Mouthguards are often used to prevent TMD in sports. They help to absorb shocks and reduce strain on the joint. By protecting the joint and muscles mouthguards can help prevent TMD. Using a mouthguard can be an effective way to manage TMD (1). By increasing the vertical dimension and providing a stable occlusal platform, these devices promote neuromuscular equilibrium, reduce abnormal muscle activity and decompress the articular structures (9,10).

1.2.3 ORTHODONTIC PROBLEMS

Athletes getting treatment are at high risk when it comes to occlusal stress. The fixed appliances like brackets and arch wires add hard surfaces. These can cause cuts on the lips and cheeks if hit (11). Directly biting down hard can also damage the orthodontic equipment. This can cause brackets to come off or wires to get bent. As a result treatment takes longer. Is harder to manage (11). Regular mouthguards may not fit well over these appliances. They might even stop the teeth from moving like they should. This is a problem, for athletes undergoing treatment. They need a solution that protects their teeth and the orthodontic hardware. Therefore, specialized fabrication techniques are required, such as using polyolefin materials formed directly over the appliances with appropriate blocking-out of undercuts, to ensure adequate protection without compromising the orthodontic therapy (11).

1.2.4 PROBLEMS RELATED TO SPORTS ACTIVITY

The incidence and severity of injuries vary significantly depending on the nature of the sport. High-confrontation sports such as Rugby, Boxing and Basketball pose the highest risk of maxillofacial trauma (5,12). Basketball, for instance, is frequently cited as having one of the highest rates of dental injury, yet paradoxically, players often exhibit low compliance with protective gear compared to contact sports like football (5).Beyond hard tissue damage, sports activities are a frequent cause of soft tissue injuries. In vitro studies utilizing porcine skin models as a proxy for human mucosa have confirmed that mouthguards play a critical role in preventing lacerations. By covering the sharp incisal edges of the teeth, mouthguards significantly reduce the severity of skin damage during impact (2). Additionally, aquatic sports introduce a non-traumatic, chemical form of occlusal stress, dental erosion. Competitive swimmers exposed to low-pH chlorinated water for prolonged periods exhibit a softening of enamel microhardness, rendering teeth more susceptible to attrition and sensitivity (12). Mouthguards in this context serve as a physical barrier against the erosive medium.

1.3 CLINICAL SYMPTOMS RELATED TO OCCLUSAL OVERLOAD

The clinical manifestation of occlusal overload is characterized by a constellation of symptomatic pain and functional limitations. Common presentations include:

- **Myofascial Pain:** This is the common problem that people with TMD and athletes who clenches their teeth a lot have. They feel an aching pain in the muscles they use to chew, like the masseter and temporalis muscles. This pain can also be felt in the head and neck (10,13).
- **Joint Sounds and Limitation:** When people have TMD they might hear clicking or popping sounds when they open their mouth. Their jaw might also move in a way when they open it. These things can happen because the joint is not working right because of an injury or because they have been using their jaw too much (7,14).
- **Tooth Sensitivity and Wear:** When people grind their teeth a lot it can damage their teeth. They might get worn down teeth or their teeth might become sensitive. This is especially true for people who grind their teeth at night (3).
- **Spinal Posture Correlations:** Some research suggests that the way the jaw is aligned can affect the spine in the neck. It is thought that if the jaw is not aligned right it can cause problems, with the spine and lead to muscle and joint problems. Myofascial Pain and Tooth Sensitivity and Wear can also be related to Spinal Posture Correlations and Joint Sounds and Limitation (15).

1.4 TYPES OF SPLINTS AND MATERIALS

The efficacy of protection and therapy is heavily dependent on the specific type of device and the materials employed in its fabrication.

- **Types:** The scientific literature categorizes these devices into three main types: Stock (prefabricated), Boil-and-Bite (B&B) (mouth-formed) and Custom-Made (CM) devices (2). Custom-made splints and mouthguards are universally considered the "gold standard." These mouthguards are made from a stone cast of the patients teeth. They fit well and do a great job of spreading out the force of a blow. This is better than what other mouthguards can do (3,16).

- **Materials:** The material that is used the most for making mouthguards and soft splints is Ethylene Vinyl Acetate. This material is very flexible. It can absorb shocks really well. It is also safe for people to use (16).
- **Advanced Designs:** New technology has led to the creation of mouthguards, with layers of Ethylene Vinyl Acetate. Some mouthguards also have parts that help spread out the force of a blow. Researchers have been looking into using resins that can be cured with light and reinforced with glass fibers. Mouthguards made with these materials can absorb shocks without being too thick and uncomfortable for the user to wear (17).

1.5 QUALITY OF LIFE IN OCCLUSAL OVERLOAD PROCESSES

Occlusal overload and associated TMDs have a profound negative impact on Oral health-related quality of life. Chronic pain, the inability to chew efficiently and limitations in mouth opening contribute to significant psychological distress, sleep disturbances and reduced daily functioning (14,18). Therapeutic interventions using occlusal splints have been demonstrated to significantly improve quality of life outcomes. Longitudinal studies comparing splint therapy to placebo indicate that the reduction of pain intensity (measured via Visual Analog Scale) and the restoration of mandibular function lead to measurable improvements in patient well-being (14,18). In the context of sports, the psychological assurance of protection allows athletes to perform with greater confidence and security ("peace of mind"), indirectly supporting their psychological well-being and social interaction within their team environment (3).

1.6 PATIENT PERCEPTION AFTER USING OCCLUSAL DISCHARGE SPLINTS

Adherence to therapy or protective protocols is ultimately dictated by patient perception, specifically regarding wearability and functional interference.

- **Comfort and Stability:** Comparative studies between B&B and CM mouthguards reveal that patients consistently perceive Custom-Made devices as significantly more comfortable and stable (5,16). B&B mouthguards often score poorly on stability and fit parameters, leading to frequent dislodgement and user frustration (5).
- **Speech and Breathing:** Immediate interference with speech (phonetics, specifically lisping) and sensations of bulkiness or nausea are common initial complaints upon insertion of any intraoral device (19). However, when we look at the results of long-term studies that use sound measurements like Voice Onset Time we see that patients get used to it over time. People usually notice that their speech gets clearer and they feel less sick to their stomach

between one week and six months of using it. This means that the problems they have, at first should not make them stop using it away according to a study that was done (19).

- **Design Preference**: It is interesting that making changes to the design like making the front part thicker does not always mean patients will not like it. Studies on rugby players showed that patients did not really care if their custom mouthguards were thicker or not. What mattered most was how well the mouthguard fit, not how thick it was.
- **Adherence Factors**: How patients feel about things is very important. If patients are. Have a good mindset and if they get support, from their coaches or doctors they will be more likely to keep using their mouthguards and stick to their treatment.

2. OBJECTIVE

General Objective:

- To describe through systematic bibliographic review the clinical effectiveness of occlusal splints as a therapeutic tool in the management of occlusal disorders, considering their impact on symptoms, mandibular function and patients' quality of life.

Specific Objectives:

- To describe the clinical characteristics of the main occlusal disorders that are amenable to treatment with occlusal splints.
- To evaluate the effectiveness of occlusal splints in reducing pain, improving mandibular mobility and decreasing clinical signs associated with temporomandibular dysfunction.
- To identify clinical criteria for selecting the most appropriate type of splint according to the patient's specific diagnosis.
- To analyze through scientific evidence patients' perceptions regarding the use of occlusal splints in terms of comfort, adherence to treatment and improvement in quality of life.

3. MATERIAL AND METHODS

This study was designed as a systematic documentary review. The protocol adheres to the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines to ensure a transparent and reproducible synthesis of the available scientific evidence.

3.1 PICO QUESTION

The research question is formulated using the PICO framework to define the search strategy boundaries:

PICO	TERMS
PATIENT Which group of patients are going to be studied ?	Patients subjected to occlusal overload, including athletes, patients with Temporomandibular Disorders, or individuals exhibiting Bruxism.
INTERVENTION What intervention is going to be investigated?	Use of intraoral protective or therapeutic devices: Mouthguards (Custom-made, Boil-and-Bite, Stock) or Occlusal Splints.
COMPARAISON What is the alternative or control group in the research?	Comparison between different device types or comparison with adjunctive therapies and no use.
OUTCOME What results are expected from the intervention?	**Dental/TMJ Health:** Prevention of trauma/erosion, reduction of TMD pain/dysfunction. **Function:** Functional adaptation (speech, comfort). **Adherence:** Patient adherence and compliance.

Our PICO question during the thesis will be :

In patients subjected to occlusal overload, what is the impact of using occlusal splints or mouthguards compared to non-use or alternative therapies on the management of dental/TMJ health, functional adaptation and patient adherence ?

3.2 ELIGIBILITY CRITERIA

To make sure the review is accurate we used rules to decide what to include and what to leave out.

- **What we included :**

The types of studies we looked at were: original research articles, including studies where people were split into groups to see what works other types of studies like controlled trials studies that followed people over time and surveys that asked people questions about how often they do something. We also looked at studies that tested the properties of materials in a lab. We looked for studies that talked about how mouthguards or occlusal splints work how they are designed what they are made of how they affect the way people function and how often people use them. We only looked at articles that were written in English, Spanish or French and that we could read in full. We only looked at studies that were published from 2010 to the time so we could be sure the information was relevant, to the materials and techniques used today.

- **What we left out:**

We did not include articles that just gave an overview of a topic or articles where the author was just giving their opinion. We did not include studies that only looked at how to move teeth or devices for sleep apnea that were not related to protecting the mouth. We did not include studies that did not have information or did not clearly say what they found out.

3.3 INFORMATION SOURCES AND RESEARCH STRATEGY

The search for information was done in an organized way. We looked at a lot of studies using databases like PubMed, Scopus, Web of Science and the Cochrane Library.
We searched for studies from January 2015 to October 2025.

Some studies were really interesting so we used them even though they were not within our time frame. To find the studies we made a special plan. We picked words that were related to what we were looking for. We used words that are used in these databases like MeSH terms and also regular words. We combined these words using operators like "OR" and "AND". For example we used "Mouthguard" or "Mouth protector" to find studies about mouthguards. We also used ". To narrow down our search like "Patient AND Intervention AND Outcome". However when we looked at how patients did over time using measurements like Voice Onset Time we saw that they got used to things. Patients usually got better at speaking and felt less sick between one week and six months of using something. This means that if patients are not comfortable at first they should not stop using it away.

3.4 STUDY SELECTION

We picked the articles in three steps.

First we got all the records, from the databases. Took out the duplicates so we do not have the same thing twice.

Second we looked at the title. The summary of the records that were left and removed the ones that did not fit what we were looking for. We did this by checking if the articles met the rules we made in section 3.2. If they did not fit we did not use them.

Finally we got the articles that seemed like they might be useful and we looked at them very carefully. In this step we made sure to follow the rules for what we would use and what we would not use. We wrote down why we did not use some of the articles like if they did not have the information or if they were not done in the right way. We did this so everyone can see what we did with the articles.

3.5 DATA EXTRACTION

For the articles included in the final review, a systematized data extraction was performed. The following variables were recorded for each study to answer the research question :

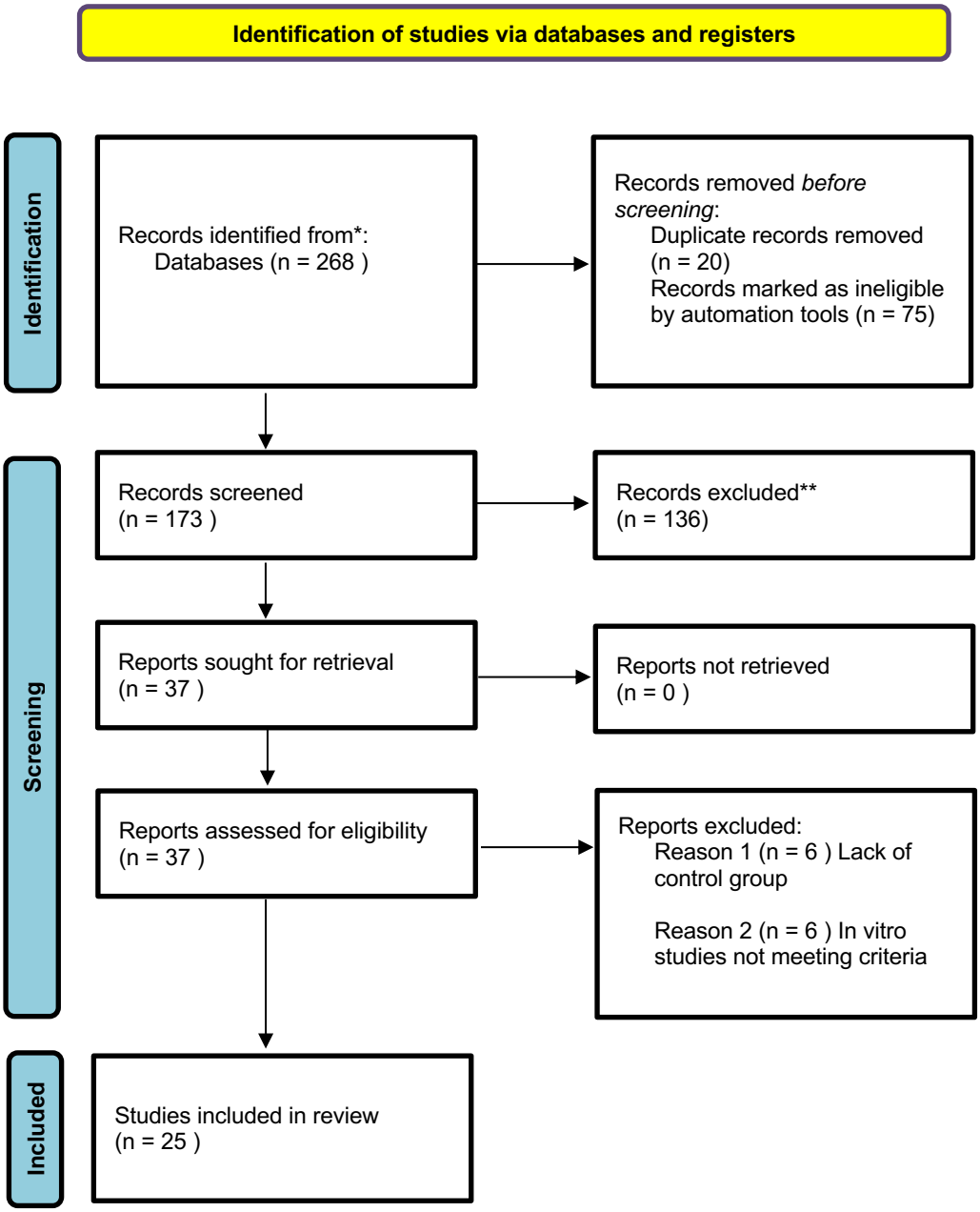
- **General Information :** Author, year of publication and country of origin.
- **Methodological Data :** Type of study, sample size and follow-up period.
- **Intervention Details :** Type of device used (e.g., Custom-made vs. Boil-and-Bite mouthguard) and material characteristics.
- **Outcome Variables :** Frequency of dental injuries, reduction in myofascial pain, speech adaptation levels and patient adherence rates.

Data was extracted using a standardized form collecting Author/Year, Study Design, Sample Size, Type of Appliance, Main Outcomes (e.g., VAS pain scores, injury rates, speech VOT, adherence rates) and Conclusions.

4. RESULTS

4.1 DATA EXTRACTION AND STUDY CHARASTERISTICS

The selection process of the articles included in this systematic review was carried out following the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines. A total of 248 records were identified through database searching in PubMed, Medline and Sciencewebsite. After removing 75 duplicates, 173 records were screened based on title and abstract. Of these, 136 were excluded as they did not meet the basic eligibility criteria. Subsequently, 37 full-text articles were assessed for eligibility. A total of 12 articles were excluded at this stage (e.g., lack of control group, in vitro studies not meeting criteria). Finally, 25 scientific articles were selected for qualitative synthesis.



Detailed synthesis of these findings for each included study are included in table 1 with the study design / sample size and type of appliance used during the study.

The second table details regroup general health and function outcome ; adherence and confort of the patient ; finally the main conclusions of each study.

4.2 SYNTHESIS OF RESULTS

The data extracted from the 25 included studies has been systematically categorized according to the five specific objectives of this review to provide a structured and purely factual synthesis of the current scientific evidence.

4.2.1 SCIENTIFIC EVIDENCE ON TYPES OF OCCLUSAL SPLINTS AND MECHANISMS OF ACTION

The literature categorizes intraoral devices into prefabricated (stock), boil-and-bite and custom-made appliances. According to the clinical guidelines published by the International Association of Dental Traumatology (IADT) and reported by Abbott et al. (2), custom-made mouthguards are recognized as the primary protective measure. Fiamengui et al. (3) and Voinescu et al. (16) evaluated the physical mechanisms of action, demonstrating that custom-fitted devices fabricated on stone casts provide precise anatomical fit, which eliminates the gag reflex, ensures better oxygenation and offers significantly higher retention compared to stock guards. In an in vitro 3D finite element analysis, Dal Piva et al. (6) investigated the distribution of occlusal forces. Their study demonstrated that high-impact stress concentration is significantly elevated on ceramic veneers and their antagonist teeth without protection, proving that custom mouthguards are biomechanically necessary to absorb impact energy and prevent catastrophic fractures of these aesthetic rehabilitations (6). Furthermore, regarding material advancements, an in vitro study by Sakaue et al. (17) explored the use of light-cured intermediate resins. They found that incorporating glass-fiber reinforcement into the resin improves the shock absorption and durability of the appliance without necessitating an increase in palatal thickness (17).

4.2.2 CLINICAL CHARACTERISTICS OF OCCLUSAL DISORDERS AMENABLE TO SPLINT THERAPY

The selected studies identify a broad spectrum of occlusal disorders treated with intraoral appliances, which are clinically characterized by either acute macro-trauma or chronic micro-trauma. In a prospective clinical study involving 86 athletes, Singarapu et al. (1) identified the clinical characteristics of acute sports-related occlusal overload. Their data showed that impacts forcefully drive the mandibular condyle upward and backward into the glenoid fossa, leading to specific TMJ injuries, including intracapsular trauma and condylar impacts (1). Conversely, chronic disorders like Temporomandibular Disorders (TMD) present different clinical signs. Systematic reviews by Orzeszek et al. (10) and Freire-Nieto et al. (8) (which included 24 and 21 studies, respectively) described the primary clinical characteristics of these chronic disorders as severe orofacial muscle pain intensity, tension-type headaches and severely restricted maximum mouth opening (MMO) (8, 10). Additionally, in a quasi-experimental study of 60 patients, Esteve et al. (18) noted that in patients with systemic conditions such as fibromyalgia, localized occlusal symptoms are accompanied by widespread chronic pain and severely disrupted sleep architecture (18).

4.2.3 EFFECTIVENESS IN REDUCING PAIN AND IMPROVING MANDIBULAR MOBILITY

The evaluation of therapeutic efficacy in the extracted literature presents distinct short-term and long-term findings. In the short term, multiple systematic reviews and meta-analyses, including those by Freire-Nieto et al. (8), Kuzmanovic Pficer et al. (9) (analyzing 33 studies) and Zhang SH et al. (7) (analyzing 20 studies), consistently reported that occlusal stabilization splints successfully provide significant pain relief (measured via Visual Analog Scale) and restore normal jaw kinematics and mouth opening range compared to no treatment control groups (7, 8, 9). However, long-term data presents different outcomes. In a Randomized Controlled Trial (RCT) involving 24 patients, Vrbanović & Alajbeg (14) found that over extended follow-up periods (six months), the reduction in pain and improvement in the Oral Health Impact Profile (OHIP-14) achieved with active stabilization splints were not statistically superior to those achieved with non-occluding placebo splints. Similarly, a meta-analysis of 12 studies by Zhang L et al. (25) demonstrated that active exercise therapy is equally effective as, or superior to, occlusal splint therapy for restoring functional mobility in painful TMD (25).

4.2.4 CLINICAL CRITERIA FOR SELECTING THE MOST APPROPRIATE SPLINT

The extracted data establishes specific criteria for appliance selection based on patient diagnosis. For athletes with fixed orthodontic appliances, a prospective study by Westerman et al. (11) on 52 patients established that polyolefin mouthguards can be effectively fabricated over brackets, setting a material selection criterion for this demographic (11). For TMD management, recent evidence dictates selection criteria based on multimodal therapy. A scoping review of 14 studies by Brighenti et al. (22), alongside a prospective CBCT study on 24 patients by Tăut et al. (23), demonstrated that selecting a combined approach occlusal splints alongside cranio-temporomandibular kinesiotherapy reduces muscle spasms significantly faster than splint monotherapy (22, 23). Regarding physical design criteria, an RCT by Deregibus et al. (13) involving 40 patients found no significant difference in efficacy between maxillary and mandibular splints (13). Finally, a systematic review of 11 studies by Ferrillo et al. (15) found no scientific evidence to support the selection of occlusal splints for the correction of spinal postural disorders, such as scoliosis or lordosis (15).

4.2.5 PATIENTS PERCEPTIONS: COMFORT, ADHERENCE AND QUALITY OF LIFE

Data on patient perception reveals significant barriers to treatment. In a large cross-sectional study of 200 patients, Beck et al. (20) identified that a "foreign body sensation," tightness and physical discomfort are the primary reasons for treatment dropout (20). In a quasi-experimental study of 30 patients, Mat Zainal et al. (19) objectively measured speech using Voice Onset Time, finding transient speech distortion (sibilants); however, patients functionally adapted within 7 to 21 days (19). Despite the protective benefits of custom devices, a cross-sectional study of 532 subjects by Soğukpınar Önsüren et al. (5) revealed that the vast majority of athletes still choose boil-and-bite guards due to high costs and lack of knowledge (5). Adherence is also dictated by psychological profiles; a cross-sectional study of 80 patients by Pihut et al. (21) demonstrated that high levels of anxiety and depression significantly lower patient compliance (21). Finally, a cross-sectional study of 266 athletes by Özkal Eminoğlu et al. (12) found that hygiene practices are overwhelmingly poor, with mouthguards frequently contaminated with *Staphylococcus aureus* and *Candida*, posing a risk of systemic infection (12).

5. DISCUSSION

The present systematic review analyzed 25 scientific articles to evaluate the clinical effectiveness of intraoral appliances in the management of occlusal disorders. By synthesizing the current literature, a profound disconnect between protective science and clinical reality becomes immediately evident. When examining the mechanisms of action, the data reported by Abbott et al. (2) and the finite element analysis by Dal Piva et al. (6) unequivocally establish the custom-made mouthguard as the absolute gold standard for force distribution and protection of complex ceramic restorations. However, while these authors prove the biomechanical superiority of custom appliances, the sociological findings presented by Soğukpınar Önsüren et al. (5) reveal a concerning paradox, a massive majority of athletes continue to purchase inferior stock or boil-and-bite guards. This juxtaposition highlights a critical clinical reality, the mechanism of action of an appliance is entirely useless if the device is not utilized by the patient. Therefore, it is my critical view that the primary barrier to occlusal protection is no longer a lack of advanced material science especially considering the development of thin, glass-fiber reinforced resins proposed by Sakaue et al. (17) but rather a profound deficit in patient education. The dentist's role must urgently evolve from a passive fabricator of splints to an active educator, bridging the gap between scientifically proven mechanisms and patient consumer habits, particularly for athletes heavily invested in aesthetic dentistry.

This protective scope directly intersects with the clinical characteristics of the occlusal disorders being treated. The literature differentiates between the acute macrotrauma of sports impacts and the chronic microtrauma of conditions like Temporomandibular Disorders (TMD) and awake bruxism. Interestingly, the prospective evidence provided by Singarapu et al. (1) expands our understanding of these clinical characteristics by directly linking the use of mouthguards to the prevention of deep TMJ injuries and condylar impacts. This is a crucial correlation because it suggests that the clinical characteristics of occlusal trauma are not merely localized to the dentoalveolar complex, as often traditionally viewed, but extend to the entire craniofacial skeleton. Consequently, appliances must be viewed holistically as craniofacial shock absorbers rather than simple tooth protectors, a perspective that should shift how general dentists assess trauma risk in active patients.

When evaluating the effectiveness of these devices in reducing pain and improving mandibular mobility, the comparison of different authors reveals a highly debated therapeutic reality that actively challenges the traditional "gnathological" paradigm. On one hand, systematic reviews by Freire-Nieto et al. (8) and Kuzmanovic Pficer et al. (9) demonstrate an undisputed short-term efficacy, where stabilization splints rapidly decrease myofascial pain and restore maximum mouth opening. On the other hand, long-term data introduces a critical "placebo paradox." The randomized controlled trial by Vrbanović & Alajbeg (14) directly contradicts the premise of permanent mechanical correction, showing that active stabilization splints are not statistically superior to non-occluding placebo splints over extended periods. Similarly, Zhang L et al. (25) prove that physical exercise can achieve the same results. In analyzing these opposing viewpoints, it becomes clear that the biopsychosocial model of pain management is far more accurate than a strictly biomedical one. It can be deduced that the clinical relief provided by the splint likely stems from cognitive awareness (biofeedback), physiological muscular rest induced by an increased vertical dimension and the placebo effect itself, rather than the precise, microscopic correction of occlusal interferences. Based on this synthesis, it is evident that irreversible occlusal adjustments (like selective grinding) should be avoided as a primary treatment for TMD, positioning the splint instead as a reversible, non-invasive tool for temporary symptom management.

Based on this modern understanding of therapeutic mechanisms, the clinical criteria for selecting the most appropriate splint must be completely redefined away from splint monotherapy. The evidence provided by Brighenti et al. (22) and Tăut et al. (23) proves that selecting a splint in isolation is a suboptimal clinical criterion. The authors consistently agree that the new "Gold Standard" mandates an interdisciplinary approach, combining the acrylic appliance with physiotherapy (kinesiotherapy) to accelerate muscular recovery. Therefore, the decision-making process for appliance selection should prioritize patient comfortsuch as choosing between an upper or lower splint based on individual tolerance, as supported by Deregibus et al (13) while simultaneously integrating referrals to physical therapists. Furthermore, it is imperative that dentists base their selection criteria strictly on evidence-based medicine; as definitively demonstrated by Ferrillo et al. (15), there is absolutely no scientific justification for prescribing occlusal splints in an attempt to correct systemic spinal posture disorders such as scoliosis, a myth that still persists in some clinical circles.

Finally, analyzing patient perceptions regarding comfort, adherence and quality of life exposes the severe practical limitations of these therapies. Discomfort and the sensation of a "foreign body" identified by Beck et al. (20) are not merely minor complaints; they are the primary clinical reasons for treatment failure and dropout. While clinicians can reassure patients based on the findings of Mat Zainal et al. (19) that speech distortions will naturally and objectively resolve within three weeks, they must also deeply address the psychological barriers to adherence, such as underlying anxiety and depression identified by Pihut et al (21). Perhaps the most critical finding regarding long-term use and quality of life is the often-overlooked systemic health implication of poor appliance hygiene. The identification of mouthguards as reservoirs for dangerous pathogens like Staphylococcus aureus and Candida by Özkal Eminoğlu et al. (12) is alarming. It transforms a theoretically protective device into a potential vector for oral stomatitis and systemic bacteremia. This finding dictates that a splint cannot truly improve a patient's quality of life if it introduces new infectious pathologies. Therefore, to maximize adherence and ensure true clinical success, the practitioner's responsibility extends far beyond delivering a perfectly fitted custom device; it requires the strict, ongoing enforcement of hygiene and maintenance protocols.

6. CONCLUSIONS

1. Occlusal splints are clinically effective therapeutic tools for the management of occlusal disorders. They successfully mitigate traumatic forces, alleviate painful symptoms, and restore mandibular function. Ultimately, their positive impact on a patient's quality of life relies entirely on correct diagnosis, appropriate device selection, and strict patient compliance.

2. The clinical characteristics of occlusal disorders dictate the required therapeutic approach, dividing primarily into two categories. Acute macrotrauma presents as sudden structural dental damage and forceful temporomandibular joint impactions. Conversely, chronic microtrauma (such as TMD and bruxism) manifests progressively with persistent myofascial pain, masticatory fatigue, headaches, and restricted jaw mobility.

3. Splint therapy is highly effective for short-term symptom management, rapidly reducing myofascial pain and restoring normal mandibular mobility. Over the long term, however, they must be strictly utilized as reversible, symptom-relieving tools rather than definitive mechanical corrections of the temporomandibular joint.

4. The primary clinical criterion for appliance selection is the absolute necessity for a custom-made fit to ensure proper anatomical adaptation. Furthermore, the selection process must be specific to the diagnosis, requiring an interdisciplinary approach—such as combining splint therapy with physical therapy—rather than relying on splint monotherapy.

5. Long-term clinical success is frequently compromised by patient perceptions of physical discomfort, speech alterations, and underlying psychological barriers. To truly ensure adherence and improve the patient's quality of life, clinicians must proactively manage these comfort issues and strictly enforce mandatory appliance hygiene protocols to prevent systemic infections.

7. SUSTAINABILITY

The study looks at the three parts of being sustainable: economic, social and environmental. When it comes to money custom-made mouthguards are a way to save money because they can help prevent big dental problems that cost a lot to fix, like implants or broken ceramic veneers.

Stopping injuries to the face and mouth is good for athletes because it helps them feel better and they do not have to miss school or work because of pain or surgery.

Environmentally mouthguards are made from plastic. They last a long time and can protect teeth so people do not need to get a lot of dental work that makes a lot of waste and hurts the environment.

So telling people to use mouthguards is a way to make healthcare more sustainable by focusing on preventing problems instead of just fixing them. The use of made mouthguards is a good example of sustainable healthcare because it is good, for the environment it helps people socially and it saves money economically.

8. REFERENCES

1. Singarapu R, Panneerselvam E, Balasubramaniam S, Nakkeeran KP, Ramanathan M, Raja Vb K. The Role of Mouthguards in Preventing Temporomandibular Joint Injuries During Contact Sports: A Prospective Study. Front Dent [Internet]. 8 de mayo de 2023 [citado 27 de enero de 2026]; Disponible en: https://publish.kne-publishing.com/index.php/fid/article/view/12661

2. Abbott PV, Tewari N, O'Connell AC, Mills SC, Stasiuk H, Roettger M, et al. The International Association of Dental Traumatology (IADT) and the Academy for Sports Dentistry (ASD) guidelines for prevention of traumatic dental injuries: Part 3: Mouthguards for the prevention of dental and oral trauma. Dent Traumatol. febrero de 2024;40(S1):7-9.

3. Fiamengui LMSP, Fontoura LPG, De Oliveira JFB, Lieuthier KM, De Oliveira VRF, Mesquita MLM, et al. Custom-Made Mouthguard: Personalized Solution for Injury Prevention Secondary to Bruxism During Physical Activity. Dent Traumatol. octubre de 2025;41(5):595-600.

4. Popovici C, Bordea IR, Inchingolo AD, Inchingolo F, Inchingolo AM, Dipalma G, et al. Dental Splints and Sport Performance: A Review of the Current Literature. Dent J. 18 de abril de 2025;13(4):170.

5. Soğukpınar Önsüren A, Eroğlu H, Aksoy C. Faculty of sports science students, physical education teachers and athletes' level of knowledge and attitude about mouthguards. BMC Oral Health. 9 de enero de 2024;24(1):57.

6. Dal Piva AMO, Tribst JPM, Borges ALS, Kleverlaan CJ, Feilzer AJ. The ability of mouthguards to protect veneered teeth: A 3D finite element analysis. Dent Traumatol. junio de 2023;39(3):191-9.

7. Zhang SH, He KX, Lin CJ, Liu XD, Wu L, Chen J, et al. Efficacy of occlusal splints in the treatment of temporomandibular disorders: a systematic review of randomized controlled trials. Acta Odontol Scand. 16 de noviembre de 2020;78(8):580-9.

8. Freire-Nieto P, Felipe-Spada N, Giner-Sopena Á, Villarroel-Montaño G, Tomàs-Aliberas J. Efectividad de Férulas de Descarga Oclusivas como Tratamiento para la Disfunción Temporomandibular. Revisión Sistemática. Int J Odontostomatol. diciembre de 2022;16(4):572-7.

9. Kuzmanovic Pficer J, Dodic S, Lazic V, Trajkovic G, Milic N, Milicic B. Occlusal stabilization splint for patients with temporomandibular disorders: Meta-analysis of short and long term effects. Milgrom PM, editor. PLOS ONE. 6 de febrero de 2017;12(2):e0171296.

10. Orzeszek S, Waliszewska-Prosol M, Ettlin D, Seweryn P, Straburzynski M, Martelletti P, et al. Efficiency of occlusal splint therapy on orofacial muscle pain reduction: a systematic review. BMC Oral Health. 28 de marzo de 2023;23(1):180.

11. Westerman B, Kerr M, Tod M. The clinical fabrication of polyolefin mouthguards formed over fixed orthodontic appliances. Australas Orthod J. 1 de julio de 2021;37(2):362-6.

12. Özkal Eminoğlu D, Kaşali K, Gençoğlu C, Ulupinar S, Özbay S, Şeran B, et al. Mouthguard use, hygiene and maintenance practices among combat and team sports athletes: A comparative study. Sozen H, editor. PLOS ONE. 29 de enero de 2025;20(1):e0317952.

13. Deregibus A. Are occlusal splints effective in reducing myofascial pain in patients with muscle-related temporomandibular disorders? A randomized-controlled trial. Turk J Phys Med Rehabil. 4 de marzo de 2021;67(1):32-40.

14. Vrbanović E, Alajbeg IZ. Long-term Effectiveness of Occlusal Splint Therapy Compared to Placebo in Patients with Chronic Temporomandibular Disorders. Acta Stomatol Croat. 15 de septiembre de 2019;53(3):195-206.

15. Ferrillo M, Marotta N, Giudice A, Calafiore D, Curci C, Fortunato L, et al. Effects of Occlusal Splints on Spinal Posture in Patients with Temporomandibular Disorders: A Systematic Review. Healthcare. 15 de abril de 2022;10(4):739.

16. Voinescu I, Dorobanţu CG, Costea RC, Perieanu VŞ, Pîrvu D, Popescu M, et al. Technological aspects in the manufacturing of custom-fitted mouthguard (Part II). ORL.ro. 2024;1(62):38.

17. Sakaue T, Togo S, Tsutsui A, Matsuda Y, Nakajima K, Takeda T, et al. Improving light-cured intermediate resin for hard and space mouthguard using a glass fiber. Dent Traumatol. abril de 2023;39(2):119-31.

18. Esteve M, Rosales Leal JI. Effects of Occlusal Splints on Temporomandibular Disorders and Well-Being Among Fibromyalgia and Bruxism Patients: A Quasi-Experimental Study. Appl Sci. 18 de abril de 2025;15(8):4465.

19. Mat Zainal MK, Liew AKC, Abdullah D, Soo E, Abdul Hamid B, Ramlee RAM. Changes in oral functions and speech when using custom-fitted mouthguards: An uncontrolled before-and-after study. Dent Traumatol. agosto de 2024;40(4):460-9.

20. Beck CC, Reissmann DR, Brinkmann L, Schierz O. Factors Influencing Adherence to Therapy With Occlusal Splints : A Multicentre Questionnaire Based Study. J Oral Rehabil. diciembre de 2025;52(12):2209-18.

21. Pihut M, Maga W, Gala A. Assessing the Reliability of Compliance with the General Treatment Recommendations by Patients Treated for Temporomandibular Disorders. J Clin Med. 22 de septiembre de 2025;14(18):6674.

22. Brighenti N, Battaglino A, Sinatti P, Abuín-Porras V, Sánchez Romero EA, Pedersini P, et al. Effects of an Interdisciplinary Approach in the Management of Temporomandibular Disorders: A Scoping Review. Int J Environ Res Public Health. 4 de febrero de 2023;20(4):2777.

23. Tăut M, Buduru SD, Tălmăceanu D, Ban A, Roman R, Leucuța D, et al. Occlusal Splint Therapy Combined with Cranio-Temporomandibular Kinesiotherapy in Patients with Temporomandibular Disorders : A CBCT Study. Life. 19 de diciembre de 2022;12(12):2143.

24. Chahrour M, Reda B. Assessment of Using Occlusal Splints Without Other Adjunctive Treatment Modules in the Management of Temporomandibular Disorders: A Systematic Review of Literature. Cureus [Internet]. 13 de agosto de 2025 [citado 27 de enero de

2026]; Disponible en: https://www.cureus.com/articles/378879-assessment-of-using-occlusal-splints-without-other-adjunctive-treatment-modules-in-the-management-of-temporomandibular-disorders-a-systematic-review-of-literature

25. Zhang L, Xu L, Wu D, Yu C, Fan S, Cai B. Effectiveness of exercise therapy versus occlusal splint therapy for the treatment of painful temporomandibular disorders: a systematic review and meta-analysis. Ann Palliat Med. junio de 2021;10(6):6122-32.

- **ANNEXES**

Definition and Background

Author	Study Design	Sample Size	Type of Appliance	Oral Health Outcome	General Health/Function Outcome	Adherence/Comfort	Main Conclusion
Freire-Nieto P, Felipe-Spada N, Giner-Sopena Á, et al.	Systematic Review	21 studies	Occlusal Stabilization Splint	Significant reduction in TMD pain intensity (VAS) and improvement in function.	Improvement in oral-related quality of life due to pain relief.	High adherence reported when patients perceive immediate pain relief.	Occlusal splints provide significant pain relief for TMD patients but evidence on "cure" is limited.
Fiamengui LMSP, Fontoura LPG, de Oliveira JFB, et al.	Narrative Review	N/A	Custom-Made Mouthguard	Prevention of dental attrition and trauma caused by awake bruxism during sports.	Safe participation in resistance training (weightlifting) without dental damage.	Custom-made guards rated significantly more comfortable than boil-and-bite.	Custom mouthguards are essential for protecting teeth and preventing awake bruxism damage during heavy lifting.
Brighenti N, Battaglino A, Sinatti P, et al.	Scoping Review	14 studies	Occlusal Splint	Superior outcomes when combined with physical therapy compared to splint monotherapy.	Holistic improvement in cranio-cervical function via interdisciplinary care.	Interdisciplinary support increases patient engagement and treatment reliability.	An interdisciplinary approach (Splint + Physical Therapy) is superior to splint monotherapy for TMD.
Beck CC, Reissmann DR, Brinkmann L, Schierz O.	Cross-sectional Study	200	Occlusal Stabilization Splint	Discomfort and foreign body sensation leading to treatment discontinuation.	Device discomfort significantly impacts daily life and sleep quality.	"Foreign body sensation" and tightness are the #1 reasons for dropout.	Discomfort and "foreign body sensation" are the strongest predictors of treatment abandonment.
Mat Zainal MK, Liew AKC, Abdullah D, et al.	Quasi-experimental Study	30	Custom-Made Mouthguard	Temporary alteration of speech and salivation; adaptation occurs within 21 days.	Transient speech distortion (sibilants); requires 7–21 days for adaptation.	Initial discomfort (speech/salivation) resolves after 3 weeks of wear.	Speech distortion is temporary; athletes fully adapt to custom mouthguards within 21 days.
Vrbanović E, Alajbeg IZ.	Randomized Controlled Trial (RCT)	24	Stabilization Splint vs. Placebo Splint	No statistically significant difference in pain relief compared to	Reduction in Perceived Stress (PSS) and Quality of Life (OHIP-14) similar to placebo.	High adherence observed in controlled trial settings (supervised).	Long-term pain reduction with stabilization splints is not statistically

				placebo splint (6 months).			superior to placebo splints.
Voinescu I, Dorobanțu CG, Costea RC, et al.	Narrative Review	N/A	Custom-Made Mouthguard	Superior fit, retention and tissue protection compared to stock mouthguards.	Custom fit allows for better breathing and oxygenation than stock guards.	Precise anatomical fit of custom guards eliminates gagging and pressure.	Custom-fitted mouthguards offer superior retention and tissue protection compared to stock or boil-and-bite types.
Kuzmanovic Pficer J, Dodic S, Lazic V, et al.	Systematic Review and Meta-analysis	33 studies	Occlusal Stabilization Splint	Significant short-term improvement in mouth opening (MMO) and pain reduction.	Restoration of normal jaw kinematics and mouth opening range.	Adherence is essential for efficacy; varies based on splint thickness.	Splints are significantly effective for short-term pain relief and increasing mouth opening compared to no treatment.
Singarapu R, Panneerselvam E, Balasubramaniam S, et al.	Prospective Clinical Study	86	Mouthguard	Reduction in TMJ injuries (condylar impact) and joint pain in contact sports.	Prevention of TMJ trauma which can be linked to concussion risks.	Athletes report better compliance with custom guards due to easier breathing.	Mouthguards significantly reduce the incidence of TMJ injuries and condylar impacts during sports
Esteve M, Rosales Leal JI.	Quasi-experimental Study	60	Occlusal Splint	Reduction in muscle tenderness and TMD symptoms in fibromyalgia patients.	Significant improvement in Sleep Quality and Well-being (Fibromyalgia patients).	Improved sleep and well-being motivate continued nightly use.	Splint therapy improves subjective well-being and sleep quality in patients with Fibromyalgia.
Dal Piva AMO, Tribst JPM, Borges ALS, et al.	In Vitro Study	N/A	Custom-Made Mouthguard	Prevention of ceramic veneer fractures via stress dissipation during impact	Preservation of complex aesthetic rehabilitations (social/psychological benefit).	N/A (In Vitro study on material stress).	Mouthguards are mandatory to prevent catastrophic fracture of ceramic veneers during impact.
Pihut M, Maga W, Gala A.	Cross-sectional Study	80	Occlusal Splint	Poor adherence correlates with persistence of TMD symptoms	Psychological factors (stress/anxiety) heavily influence treatment reliability.	High anxiety and depression levels significantly lower patient compliance.	Psychological factors (anxiety/depression) are the main cause of poor compliance with TMD treatment.
Abbott PV, Tewari N, O'Connell AC, et al.	Clinical Guidelines / Expert Consensus	N/A	Mouthguard	Prevention of tooth avulsion, luxation and alveolar bone fractures.	Prevention of psychological trauma associated with permanent tooth loss.	Stock guards (Type 1) cause breathing difficulties and low compliance.	Custom-made mouthguards are the gold standard recommendation for preventing dental trauma.

Özkal Eminoğlu D, Kaşali K, Gençoğlu C, et al.	Cross-sectional Study	266	Mouthguard	High risk of oral infection (stomatitis) due to bacterial/fungal contamination.	Risk of systemic disease/bacteremia due to Staphylococcus/Candida colonization.	Poor hygiene (odor/taste) negatively impacts long-term wear.	Hygiene practices are poor; mouthguards are often contaminated with Staphylococcus and Candida.
Sakaue T, Togo S, Tsutsui A, et al.	In Vitro Study	N/A	Custom-Made Mouthguard	Enhanced shock absorption and tooth protection using glass-fiber reinforcement.	Maintenance of comfort/bulkiness balance to ensure athlete compliance.	Reinforced thin design improves comfort without compromising safety.	Glass-fiber reinforcement improves shock absorption and durability without increasing palatal bulk.
Westerman B, Kerr M, Tod M.	Prospective Clinical Study	52	Custom-Made Mouthguard	Effective retention and protection for patients wearing fixed orthodontic appliances.	Enables athletes with fixed orthodontics to play contact sports safely.	High acceptance reported by orthodontic patients (fits over braces).	Polyolefin mouthguards can be effectively fabricated over fixed orthodontic appliances (braces).
Tăut M, Buduru SD, Tălmăceanu D, et al.	Prospective Clinical Study	24	Occlusal Splint	Faster reduction of muscle spasm and pain when combined with kinesiotherapy.	Reduction in associated cervical (neck) muscle tension and pain.	Good adherence to combined protocol (Splint + PT) in clinical setting.	Combining splints with Kinesiotherapy reduces muscle spasm faster than splints alone.
Zhang SH, He KX, Lin CJ, et al.	Systematic Review	20 studies	Occlusal Splint	Effective for alleviating TMD pain and increasing jaw mobility.	Functional improvement in mastication and jaw mobility.	Comfort varies by design; critical for long-term TMD management.	Occlusal splints are effective for symptom management in both myogenic and arthrogenic TMD.
Ferrillo M, Marotta N, Giudice A, et al.	Systematic Review	11 studies	Occlusal Splint	No evidence of correction for spinal posture or alignment via occlusal splints.	No scientific evidence that splints correct Spinal Posture (Scoliosis/Lordosis).	N/A (Review focused on postural metrics).	There is no scientific evidence to support using dental splints to correct spinal posture (scoliosis).
Popovici C, Bordea IR, Inchingolo AD, et al.	Narrative Review	N/A	Dental Splint / Mouthguard	Potential for increased bite force and neuromuscular efficiency (CAP effect).	Inconsistent evidence regarding enhancement of athletic strength/power (CAP effect).	Bulkiness can hinder performance, leading athletes to discard the device.	Evidence supporting splints for enhancing athletic performance (strength/power) is inconsistent.

Soğukpınar Önsüren A, Eroğlu H, Aksoy C.	Cross-sectional Study	532	Mouthguard	Increased risk of dental injury due to widespread use of non-custom guards.	Lack of safety awareness increases risk of general orofacial injury.	Custom guards rated highest for retention; Cost is the main barrier.	Lack of knowledge and cost lead most athletes to choose inferior boil-and-bite guards.
Chahrour M, Reda B.	Systematic Review	12	Occlusal Splint	Splint monotherapy is beneficial but less effective than multimodal treatment.	Limited functional recovery when used without adjunctive physical therapies.	Simplifying treatment (Splint only) improves short-term compliance.	Splint monotherapy is beneficial but multimodal treatment is recommended for optimal results.
Deregibus A, Ferrillo M, Piancino MG, et al.	Randomized Controlled Trial (RCT)	40	Occlusal Splint	Maxillary and mandibular splints are equally effective for myofascial pain relief.	Significant improvement in Mandibular Range of Motion (ROM).	No significant difference in comfort between Upper vs. Lower splints.	No difference in efficacy between upper and lower splints; choice should be based on patient comfort.
Orzeszek S, Waliszewska-Prosol D, Ettlin D, et al.	Systematic Review	24 studies	Occlusal Splint	Reduction of orofacial muscle pain intensity compared to no treatment.	Reduction in tension-type headaches and associated muscle pain.	Consistent wear is required to maintain muscle relaxation effects.	Occlusal splints successfully reduce orofacial muscle pain intensity compared to controls.

Figure 1. Results table