

## A 36-YEAR-OLD FEMALE PATIENT TREATED WITH AN OCCLUSAL SPLINT: A CASE REPORT

Frosina Volcheski<sup>1</sup>, Jasna Petrovska<sup>1</sup>, Elena Aleksova Noveska<sup>2</sup>,  
Valdeta Osmani<sup>2</sup>

This article describes a case of a 36-year-old female patient who sought help due to long-lasting pain in the temporomandibular joint (TMJ) region. Clinical examination revealed pain on the left side in the region of TMJ, and pain on opening, chewing, and palpation. Also, deviation to the right, and clicking on opening were present. A painful sensation on the left masseter muscle was detected on palpation. The diagnosis was established according to the functional analysis, clinical examination, and obtained anamnestic data. The decision was stabilizing occlusal splint to be administered in combination with exercises, physiotherapy, and symptoms-relieving analgesic treatment if needed.

This protocol aimed to alleviate the painful symptomatology and enable relaxation of the muscles of mastication to some degree, before orthodontic treatment. This would obtain a solid basis for stable orthodontic treatment outcomes.

Based on the case of the presented patient, it can be concluded that temporomandibular joint disorders (TMJD) can be treated with occlusal splint therapy in combination with exercises and physiotherapy. *Acta Medica Medianae 2023;62(3):81-87.*

**Key words:** temporomandibular joint (TMJ), temporomandibular disorders (TMD), stabilization splint therapy, orthodontics

---

<sup>1</sup>University Dental Clinic "St. Pantelejmon", Skopje, Republic of North Macedonia

<sup>2</sup>University "St. Cyril and Methodius", Faculty of Dentistry, Skopje, Republic of North Macedonia

Contact: Frosina Volcheski  
79 3/15 Hristo Tatarchev St., Skopje, Republic of North Macedonia  
E-mail: f.volcheski@yahoo.com  
Phone: 0038972257710

### Introduction

Temporomandibular disorders (TMD) are relatively present in everyday practice. Patients are used to living with that kind of pain, which usually is accepted as common and normal. TMJD (temporomandibular joint disorders) are often misdiagnosed and patients are experiencing similar mild symptoms for long period, to the point when those symptoms are not tolerable. Chronic pain might cause a decrease in quality of life, triggering many health concerns for patients and a great social burden. Nociceptive and emotional

behaviors are reliant and share overlapping neural mechanisms. Consequently, TMD (temporomandibular disorder) pain due to inflammation might correspondingly induce emotional disturbance (1). Of immense importance for our practice is accurate diagnosis and treatment planning of our patient's condition (2, 3, 4, 5).

As orthodontic practitioners or future orthodontic practitioners, we should consider that orthodontic treatment is neither the cause nor cure for TMD, relying on reports of the current systematic reviews (6, 7).

The proper management will include using reversible and conservative modalities such as medications, physical therapy, oral appliances, and self-care (8, 9).

A thorough clinical interview and physical examination to detect TMD signs and symptoms before the establishment of orthodontic therapy is mandatory (5).

Unilateral pain present in the TMJ region and sensations in the soft tissues around the joint, that increases during mandibular movements may often be symptoms of TMD (2, 3, 5).

As muscles are holding the body in a given position, this location awareness is primarily relayed to the cortex in order of proprioception. According to TMJ, there has been an overall consensus that the symptoms of TMJ are not

usually in the joint itself, but also in the body's neuromuscular system, primary the masseter and temporalis, medial and lateral pterygoid (10).

Internal derangements of the temporomandibular joint are defined as a change in normal anatomic relationships so that the articular disc is displaced from its position between the head of the condyle and the glenoid fossa. The internal derangement can be functional or anatomic disturbance between the condyle, the disc, and the glenoid fossa. A more common derangement is the joint's functional (neuromuscular) derangement that often results from trauma. Those trauma-initiated displacements of the articular disc, especially the anterior displacement of the disc due to the spasm of the superior head of the lateral pterygoid muscle, will generally result in symptoms like clicking, popping, pain, and other functional problems in the masticatory system (11).

The five most common etiologic factors that have been the topic of research are the occlusal condition, trauma, emotional stress, deep pain input, and parafunctional activity such as bruxism and clenching (2). Functional conditions resulting from occlusal interferences are found in clinical practice usually and regularly. In orthodontic practice, unilateral crossbite conditions may cause a functional one-sided shift, which if not treated on time might be, but not necessarily cause a TMJ problem (12).

### Case Presentation

A 36-year-old female patient came to the University Dental Clinique "St. Pantelejmon", Skopje at the Department of Orthodontics, complaining of pain in her left side around the TMJ joint region. The pain was increasing on the mouth opening. Also, the patient reported that she had already consulted several doctors before coming to our department and got an explanation that the condition was not curable and was suggested medication treatment only, which reportedly did not help. Medical history revealed prior orthodontic treatment, and the same was performed 2-years before for unilateral crossbite treatment. Also, she reported existing bad habits like holding the phone with her shoulder while speaking and chewing gum frequently.

### Clinical diagnostics

On palpation, a painful sensation was present in the left masseter muscle region approximately near the TMJ, and a painful sensation while palpating the left TMJ region. A painful sensation on the mouth opening was present, also the pain was present during mastication. Protrusive and lateral movements were painful as well. A click was present on the left side on opening. The questionnaire given to the patient gave a result of 3 points which indicated a problem with TMJ (2, 4). On clinical

examination, the mouth opening was 30 mm (Figure 2 A), which also referred to a problem with TMJ. The maximum mouth opening was 35 mm on assisted opening, and opening with mild pressure on the mandible was 40 mm and was painful. It is essential to emphasize that a slight deviation to the right was present during mouth opening. Lateral excursions noted a symmetrical pattern on both sides and were normal, 10 mm, on both sides (Figure 2 D, E). The amount of protrusion was 6 mm (Figure 2 C).

### Dental status

Clinical examination and anamnesis of the patient revealed that the patient had undergone orthodontic treatment two years before. The upper alveolar arch (Figure 1 A, B, C) presented sufficient alignment on both sides. She reported that before starting with the orthodontic treatment she had a unilateral crossbite. Even though the crossbite was solved back then, it was obvious that the result was obtained only by dental inclination and the palatal vault remained high and narrow. The patient also reported the same painful sensations 2 years before starting with the orthodontic treatment but was given an explanation that after the treatment the pain would diminish. Clinical examination and panoramic radiographs did not reveal any pathology of the teeth, nor prosthodontic restoration was present. The overjet was 3 mm, and the overbite was measured at 2 mm. Panoramic radiography (Figure 1 D) did not reveal any serious joint pathology and since we were not able to make diagnostic conclusions only by panoramic radiography, we suggested a cone beam computed tomography (CBCT) of TMJ, which unfortunately, due to technical issues, was not performed. According to the overall functional, clinical examination, and available radiographic data, the preliminary diagnosis indicated intracapsular TMJ disorder which included disk displacement with reduction, TMJ arthralgia, and masseter myalgia. Regarding the patient's report of unsuccessful pain management in her previous medical history and diagnostic findings, a decision was made to administer stabilization occlusal splint therapy in combination with counseling and avoiding parafunctional activities, physiotherapy which would include wet moist wraps and self-massage of the masseter muscle, as well as exercises for joint distraction.

### Treatment plan

The primary goal, of crucial and utmost importance, was the resolution of the pain problem. Treatment included stabilization splint fabrication under the guidance of Aqualizer™. The Aqualizer™ is a therapeutic and diagnostic tool for TMJ disorders. The Aqualizer™ was placed in the patient's mouth for 30 minutes while sitting on the dental chair. As a diagnostic tool, this phase also

exhibited problems with TMJ because while wearing it for a short amount of time, the patient reported mild pain relief (13, 14, 15).

The Aqualizer™ is primarily used as a prefabricated splint, for relieving acute TMD symptoms (16, 17). However, the always preferable solution is an individually fabricated splint of hard acrylic material. The splint was finished and placed on the lower arch, with mild impressions on the occlusal surface of the upper teeth. In addition to occlusal splint, the treatment protocol included self-administered exercises and passive muscle stretching which included exercises to open on a straight opening pathway while standing in front of the mirror. Also, exercises to open and close the mouth while keeping the tongue up on the palate. The stabilization splint was worn during the night.

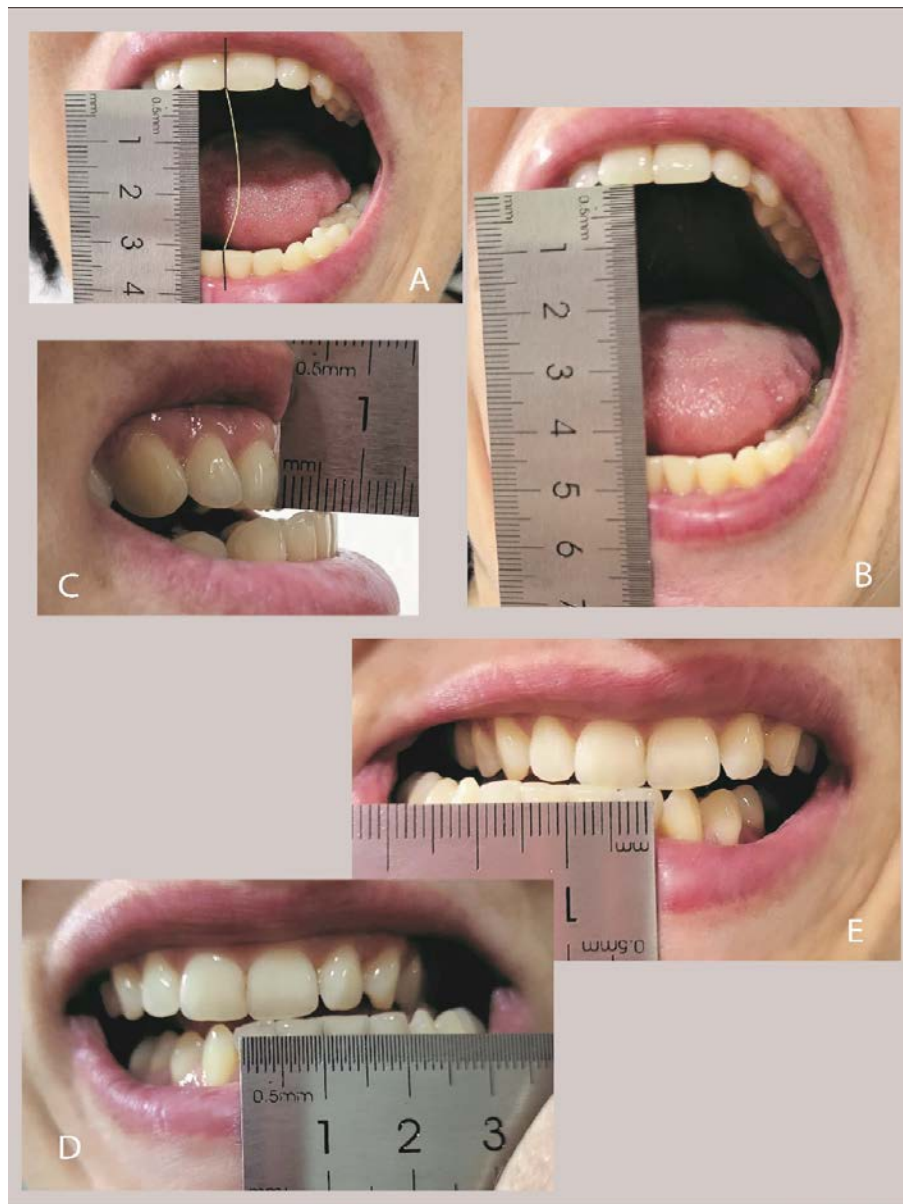
As already noted, the patient mentioned bad habits like holding the phone on her shoulder while talking, and frequent chewing gums during the day, so we suggested immediate habit elimination. Also, we suggested very careful opening movements, especially to avoid sudden and excessive opening of the mouth.

Follow-up appointments were on the 1st, 2nd, and 3rd month, and after six months of wearing the splint. On the first appointment, the patient reported pain diminishing, but the opening was still not favorable. On the 2nd visit improvement in the symptoms was noted and after 6 months of wearing the splint, the amount of opening improved, from 30 mm to 45 mm, (Figure 2 B), and also correction of the deviation was noted.



**Figure 1**

- A. The intraoral photography shows a matching of the upper and lower interincisive line
- B. Class I canine relation and molar relation - left side
- C. Class I canine and molar relation - right side
- D. OPG did not reveal any severe pathology of the joints



**Figure 2**

- A. Opening pattern with a slight deviation to the right before splint therapy measured 30mm,  
 B. Opening pattern after 6 months of treatment with the splint measured 45 mm,  
 C. Protrusive movement before the treatment and after the treatment remained the same at 6mm,  
 D. Lateral movement to the left before treatment was 10 mm and remained the same after treatment,  
 E. Lateral movement to the right was 10mm and remained the same after treatment

### Discussion

Functional irregularities of the temporomandibular joints are undoubtedly the chief patient problem detected during examination for masticatory dysfunction. The cause for this is due to the high incidence of signs, and not necessarily symptoms (2, 3, 10). The focus of such an evaluation is to determine whether the patient has a TMD or not. Many of the signs such as joint sounds or deviated opening are not painful, and therefore the patient may not pursue treatment. These TMJ disorders generally fall into two broad

categories: Internal derangements and inflammatory joint disorders (2, 10, 11).

The mandibular condyle displays a different morphological variation in different groups and individuals due to developmental variations and constant condylar remodeling. The articular eminence inclination also varies in individuals, which determines the movement and degree of rotation of condyles in the glenoid fossa. The radiographic joint space is a radiolucent area between the mandibular condyle and the temporal bone (18). The condylar position is determined by this relative dimension of the radiographic joint

spaces between the glenoid fossa and the mandibular condyle (8, 18).

Clinicians should be vigilant in diagnosing TMD in patients who present with pain located in the TMJ area. A multidisciplinary approach is successful for the management of TMD. Initial treatment goals should focus on resolving pain and dysfunction. Occlusal splints are used to alleviate or prevent degenerative forces placed on the TMJ, articular disk, and dentition (5, 8, 9).

We presented an adult patient with severe pain in her left TMJ region. The patient did not report trauma in the TMJ region. She reported a unilateral crossbite problem which had been orthodontically treated 2 years before. The reason this woman had TMD problems was pretty much related to the unstable occlusion in this case. She also reported pain in the TMJ region before orthodontic treatment but was told that after the treatment she would feel pain relief. Unilateral crossbite might, but not necessarily be the reason for TMD. Usually, the problem that arises in unilateral crossbite cases is with the muscles that

need to be rehabilitated first for the prevention of condylar asymmetry (19).

### **Conclusion**

We reported a 36-year-old female patient with TMJ problems with a 6-month follow-up. Based on the case of the presented patient, it can be concluded that TMJ disorders can be treated with conservative and occlusal splint therapy. The clinician aims to identify the symptoms, relieve the pain to help the patient have a normal life, and cease the progression of the TMJ problems. According to the case progression, it was concluded that conservative treatment in combination with counseling, exercises in combination with occlusal splint therapy, should be the first-choice therapy for TMD, due to their low risk of side effects. Regarding using occlusal splint therapy as a treatment modality, it should be highlighted that we can use it but not abuse it. However, further research should be exhibited for more accurate conclusions to be established

## References

1. Yi Y, Zhou X, Xiong X, Wang J. Neuroimmune interactions in painful TMD: Mechanisms and treatment implications. *J Leukoc Biol.* 2021; 110(3): 553-563. [[CrossRef](#)] [[PubMed](#)]
2. Kandasamy S, Greene CS, Rinchuse DJ, Stockstill JW, editors. *TMD and Orthodontics. A Clinical Guide for the Orthodontists.* Switzerland: Springer; 2015
3. Conti AC, Oltramari PV, Navarro Rde L, de Almeida MR. Examination of temporomandibular disorders in the orthodontic patient: a clinical guide. *J Appl Oral Sci.* 2007; 15(1): 77-82. [[CrossRef](#)] [[PubMed](#)]
4. Gonzalez YM, Schiffman E, Gordon SM, Seago B, Truelove EL, Slade G, Ohrbach R. Development of a brief and effective temporomandibular disorder pain screening questionnaire: reliability and validity. *J Am Dent Assoc.* 2011; 142(10): 1183-91. [[CrossRef](#)] [[PubMed](#)]
5. Gauer RL, Semidey MJ. Diagnosis and treatment of temporomandibular disorders. *Am Fam Physician.* 2015; 91(6): 378-86. [[PubMed](#)]
6. Mohlin B, Axelsson S, Paulin G, Pietilä T, Bondemark L, Brattström V, Hansen K, Holm AK. TMD in relation to malocclusion and orthodontic treatment. *Angle Orthod.* 2007; 77(3): 542-8. [[CrossRef](#)] [[PubMed](#)]
7. Fernández-González FJ, Cañigral A, López-Caballo JL, Brizuela A, Moreno-Hay I, Del Rio-Highsmith J, Vega JA. Influence of orthodontic treatment on temporomandibular disorders. A systematic review. *J Clin Exp Dent.* 2015; 7(2): e320-7. [[CrossRef](#)] [[PubMed](#)]
8. Ramachandran A, Jose R, Tunkiwala A, Varma R B, M. Shanmugham A, Nair PK, et al. Effect of deprogramming splint and occlusal equilibration on condylar position of TMD patients – A CBCT assessment. *CRANIO®.* 2019; 39(4): 294–302. [[CrossRef](#)] [[PubMed](#)]
9. Torii K, Chiwata I. A case report of the symptom-relieving action of an anterior flat plane bite plate for temporomandibular disorder. *Open Dent J.* 2010; 4: 218-22. [[CrossRef](#)] [[PubMed](#)]
10. Jankelson R. Anatomy and Physiology of the Neuromuscular System. In: *Neuromuscular dental diagnosis and treatment.* 2 nd ed. St. Louis, Mo: Ishiyaku EuroAmerica; 2005. p. 10–16.
11. Jankelson R. *Neuromuscular dental diagnosis and treatment.* 2 nd ed. St. Louis, Mo: Ishiyaku Euro America; 2005. p. 285.
12. Rakosi T, Graber T, Alexander W. *Orthodontic and dentofacial orthopedic treatment.* Stuttgart [etc.]: Thieme; 2010. p. 4-69.
13. Lerman MD. A complete hydrostatically derived treatment procedure for the TMJ pain-dysfunction syndrome. *J Am Dent Assoc.* 1974; 89(6): 1351-7. [[CrossRef](#)] [[PubMed](#)]
14. Oral Health Group. 2021. Aqualizer Muscle Directed Bite Registration - A Perfect Bite the First Try - Oral Health Group. [online] Available at: URL: <https://www.oralhealthgroup.com/features/aqualizer-muscle-directed-bite-registration-a-perfect-bite-the-first-try/> [Accessed 24 July 2021].
15. Aqualizer. 2021. Aqualizer for Dentists and Orthodontists. [online] Available at: URL: <https://aqualizer.com/where-to-buy/dentists-and-orthodontists/> [Accessed 24 July 2021].
16. Buchbender M, Keplinger L, Kesting MR, Adler W, Schmitt CM. A clinical trial: Aqualizer™ therapy and its effects on myopathies or temporomandibular dysfunctions. Part I: Objective parameters. *Cranio* 2021; 16: 1-9. [[CrossRef](#)] [[PubMed](#)]
17. Buchbender M, Keplinger L, Kesting MR, Adler W, Schmitt CM. A clinical trial: Aqualizer™ therapy and its effects on myopathies or temporomandibular dysfunctions. Part II: Subjective parameters. *Cranio* 2021; 13: 1-7. [[CrossRef](#)] [[PubMed](#)]
18. Paknahad M, Shahidi S. Association between mandibular condylar position and clinical dysfunction index. *J Craniomaxillofac Surg* 2015; 43(4): 432-6. [[CrossRef](#)] [[PubMed](#)]
19. Thilander B, Bjerklín K. Posterior crossbite and temporomandibular disorders (TMDs): need for orthodontic treatment? *Eur J Orthod.* 2012; 34(6): 667-73. [[CrossRef](#)] [[PubMed](#)]

**Prikaz slučaja**

UDC: 616.724-009.7:616.314-089.5

DOI: 10.5633/amm.2023.0312

**TRIDESETŠESTOGODIŠNJA BOLESNICA TRETIRANA  
OKLUZALNIM SPLINTOM: PRIKAZ SLUČAJA***Frosina Volčeski<sup>1</sup>, Jasna Petrovska<sup>1</sup>, Elena Aleksova Noveska<sup>2</sup>,  
Valdeta Osmani<sup>2</sup>*<sup>1</sup>Univerzitetska stomatološka klinika „Sv. Pantelejmon“, Skoplje, Republika Severna Makedonija<sup>2</sup>Univerzitet „Sv. Kiril i Metodij“, Stomatološki fakultet, Skoplje, Republika Severna Makedonija

Kontakt: Frosina Volčeski  
Ulica Hristo Tatarčev 79 3/15 Skoplje,  
Republika Severna Makedonija  
E-mail: f.volcheski@yahoo.com  
Telefon: 0038972257710

Ovaj članak opisuje slučaj tridesetšestogodišnje bolesnice koja je zatražila pomoć zbog dugotrajnog bola u predelu temporomandibularnog zgloba (TMZ). Kliničkim pregledom otkriven je bol na levoj strani u predelu TMZ i bol pri otvaranju, žvakanju i palpaciji; primećena je devijacija udesno, kao i klikćući zvuk pri otvaranju.

Palpacijom je otkriven bolni osećaj na levom mastikatornom mišiću. Dijagnoza je bila utvrđena na osnovu funkcionalne analize, kliničkog pregleda i anamnestičkih podataka. Doneta je odluka da se tretman započne ordiniranjem stabilizacionog okluzalnog splinta u kombinaciji sa vežbama, fizioterapijom i analgetičkim tretmanom za ublažavanje simptoma, po potrebi.

Ovaj protokol imao je za cilj da ublaži bolnu simptomatologiju i omogući opuštanje mastikatornih mišića u određenoj meri, pre ortodontskog lečenja, kako bi se dobila solidna osnova za stabilni ishod ortodontskog lečenja.

Na osnovu slučaja prikazanog bolesnika može se zaključiti da se poremećaji temporomandibularnog zgloba (TMZ) mogu lečiti terapijom okluzalnim splintom u kombinaciji sa vežbama i fizioterapijom. *Acta Medica Medianae 2023;62(3):81-87.*

**Ključne reči:** temporomandibularni zglob, temporomandibularni poremećaji, stabilizacioni splint, ortodoncija

*"This work is licensed under a Creative Commons Attribution 4.0 International (CC BY 4.0) Licence".*