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CASE REPORT

Management of temporomandibular disorders on violinists

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ABSTRACT

Temporomandibular Joint Disorders (TMD) is musculoskeletal group syndrome involving temporomandibular joint, masticatory muscles, and related tissues. Symptoms that often appear are pain in the joint area, limited mouth opening, and jaw that locks easily. TMD is generally experienced by many violinists. The tilt of the head to one side when playing violin for a long period cause muscle tension and pain in the face and neck region. This case report aims to describe the treatment of TMD on violinist using occlusal splint. A 26 year old female violinist came to prosthodontic clinic with the main complaint of pain in the jaw when opening the mouth too wide and frequent pain in the facial muscles. The patient has a bruxism habit and anxiety for a long time, and had unbearable pain when opening her mouth. Dental impressions are preformed and an immediate splint was made at the first visit, then at the second visit the immediate splint was replaced with a stabilization splint which was used for 3 months and is given physical self-regulation instructions until the pain finally disappears. Occlusal splint therapy accompanied with physical self regulation can overcame TMD in violinist patient. (IJP 2025;7(1):37-42)

Introduction

The temporomandibular joint (TMJ) is a hinge joint that connects the upper and lower jaw bones between the temporal bone and the head of the mandibular condyle. The TMJ is a complex joint because it can move in all directions such as opening and closing like a hinge, shifting back and forth from one side to another during mastication, swallowing and speaking, also the TMJ provides stability to the position of the mandible and prevents dislocation due to excessive force.[1-3] The components of the TMJ are hard tissue (condylar bone, mandibular fossa, articular eminence) and soft tissue (articular disc; ligaments namely collaterals, capsular, temporomandibular, sphenomandibular, stylomandibular; masticatory muscles namely temporalis, masseter, medial pterygoid, lateral pterygoid and neck muscles (digastric)).[4,5]

Temporomandibular disorders (TMD) are a heterogeneous group of musculoskeletal and neuromuscular conditions involving the temporomandibular joint complex, and the surrounding muscles and skeletal components. TMD affects up to 15% of adults, with peak incidence at ages 20 to 40 years. TMDs are classified as intra-articular or extra-articular. Common symptoms include jaw pain or dysfunction, earache, headaches, and facial pain. The etiology of TMD is multifactorial and includes biological, environmental, social, emotional, and cognitive triggers.[1,2,6,7]

Diagnosis is most often based on history and physical examination. Diagnostic imaging may be useful when malocclusion or intra-articular abnormalities are suspected. Most patients improve with a combination of non-invasive therapies, including patient education, self-care, cognitive behavioral therapy, pharmacotherapy, physical therapy, and occlusal devices. Nonsteroidal anti-inflammatory drugs and muscle relaxants are recommended initially, and benzodiazepines or antidepressants may be added for chronic cases.[8-13]

There are three major classes of TMD disorders: (1) disorders of the joint, including disorders of the disc; (2) disorders of the muscles used for chewing (masticatory muscles); and (3) headaches associated with TMD disorders.13 TMD are the second most common cause (after dental pain) of orofacial pain, characterized by pain in the region of the temporomandibular joint and in the facial muscles. In addition to pain, patients may experience other signs and symptoms, such as clicking in the joints and limited mouth opening.14–16 The prevalence of TMD is close to 29.5% globally, and women have a higher prevalence rate than men (36.7% vs. 26.7%).[13]

In a study conducted by Bitinine et al.17 found a direct correlation between temporomandibular disorders and lower quality of life.17 This study confirms clinical studies conducted previously that chronic medical conditions have a strong negative effect on the patient's quality of life. In other studies, it was found that more women experience TMD and this also affects their quality of life.[18-21] Many instrumental music players experience TMD. The most frequently reported symptoms are clicking or popping sounds, followed by temporomandibular joint pain, muscle pain, crepitus, and limited

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Figure 1. **A midline shift of 2 mm to the left.**

Figure 2. **Study Model.**

Figure 3. **Immediate splint on the patient.**

Figure 4. **Stabilization splint .**

mouth opening. Playing musical instruments related to the masticatory system, such as wind instruments and violin, is thought to be part of the group of etiological factors for TMD.[22-24] This case report aims to show the management of TMD, especially in violinists. We will explain the stages of treatment that need to be carried out for a violinist with TMD.

Case Report

A 26 years old female patient came to the Prosthodontics Polyclinic at Oral and Dental Hospital Universitas Padjadjaran with complaints of pain in her jaw when she opened her mouth too wide and frequent aches in her facial muscles. The patient had the right upper back molar and lower 2nd premolar extracted for orthodontic purposes. The patient often feels anxious and the patient is a violinist. The patient also has a habit of bruxism. 14 days after the first visit, the patient came in with complaints of unbearable pain when opening his mouth and chewing on the left side of his jaw, his weight had dropped drastically due to his inability to chew. The patient has recently had problems that have caused increased anxiety. The patient wants to open and close the mouth without pain. The patient also felt pain in the head.

The results of the patient's examination showed that the movement to open the mouth without pain was 32 mm, the maximum mouth opening without assistance was 45 mm, the maximum mouth opening with assistance was 50 mm, pain during the movement to open the mouth in the masseter, temporal and TMJ. When the patient makes right lateral movement, it is 7 mm (without pain), left lateral movement is 7 mm (without pain), protrusion is 4 mm (without pain). There is a clicking sound accompanied by pain in the left TMJ when opening and closing the mouth. There is no clicking sound and pain in the TMJ during lateral movement, pain when palpating the right temporalis and masseter (origin, body and insertion). There is pain when palpating the left masseter (body and insertion). There is pain on palpation of the lateral pterygoid, posterior mandible, temporalis, and submandibular.

The patient experienced disc displacement with reduction with intermittent locking. The treatment plan for this patient is to eliminate bad habits by reducing violin playing activities during the treatment period and referring to a psychologist if necessary to deal with the patient's anxiety. A stabilization splint was made on the lower jaw, OHI, Home care (supportive therapy), physical self regulation (PSR), clinical evaluation of the final results of TMJ splint treatment.

At the first visit, the patient underwent an intra-oral and extra-oral examination figure 1., filling out the DC/TMD form. The patient also underwent impression of the upper and lower jaw figure 2, and was then referred for an X-ray.

On the second visit, the patient came in feeling unbearable pain in the left jaw when opening his

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mouth and biting, so his weight dropped drastically. On intraoral examination, the patient was only able to open his mouth 2 fingers (19 mm) and felt pain. The patient underwent immediate splinting figure 3.

At the third visit, the patient's pain had subsided 1 day after using the immediate splint. The next step is that the patient undergoes impressions again to make a stabilization splint. At the fourth visit, a stabilization splint was installed.

On the fifth visit, the patient came for the first control which was carried out 1 week after the previous visit. The patient feels the clicking decreases. Stabilization spline reduction was carried out.

On the sixth visit, the patient came to undergo a second control carried out 1 week after the previous visit. The patient's TMJ condition is not yet stable, the pain in the muscles has begun to decrease. Stabilization spline reduction was carried out.

On the seventh visit, the patient came to undergo a third control carried out 1 week after the previous visit. The patient feels that the pain in the muscles is decreasing. Stabilization spline reduction was carried out.

On the eighth visit, the patient came to undergo a fourth control carried out 1 week from the previous visit. The patient no longer has any complaints, the patient's clicking is no longer there, the mouth opens up to 4 fingers (4 mm), the right masseter muscle no longer feels tense.

On the ninth visit, the patient came to undergo the fifth control carried out 1 week from the previous visit. The patient has no subjective complaints, mouth opening is 39 mm. At the tenth visit, the patient came to undergo the sixth control carried out 1 week from the previous visit. The patient had no subjective or objective complaints.

Discussion

Musical instruments can be divided into two groups, which are wind instruments and string instruments. The viola, violin, cello, lyre, and double bass are classified as string instruments.[22] The violin is a four-stringed wooden plucked musical instrument that can be played using a bow. In general, violins are right-handed instruments and have been designed for use only by right-handed people. However, a left-handed person can play a specially made violin that allows them to hold the bow using the left hand. Based on research conducted by Mizuho and Sugiura,[25] the violin is one of the most popular string instruments in the world.25,26 Professional violinists have been linked to a predisposition to developing TMD. There are a number of risk factors, including physical trauma due to playing posture and the presence of parafunctional habits. Musical performance anxiety (MPA) and emotional stress may also be a factor, as it is associated with playing-related musculoskeletal disorders (PRMD).[23,24,27]

Playing musical instruments regularly can trigger or aggravate TMD, as it is an activity that, in most cases, requires improper use of the orofacial muscles and joints.[22,24] Violins are predominantly designed for right-handed players; therefore, standard playing technique requires the instrument to be supported on the left clavicle. During performance, the violin is positioned horizontally between the left shoulder and the lower jaw and maintained with sustained pressure. To stabilize the instrument, violinists commonly adopt a posture involving lateral neck inclination and increased mandibular force against the violin. This playing posture results in continuous physical contact and repetitive mechanical loading on the craniofacial and cervical regions. Prolonged exposure to such mechanical forces, combined with sustained flexion of the neck and shoulder during extended playing periods, may generate excessive stress in these areas and contribute to the development of TMD.[28-31]

The playing position and posture adopted by violinists may contribute to the initiation of temporomandibular joint disorders, particularly joint pain and dysfunction of the masticatory muscles, such as the masseter and temporalis, due to sustained clenching required to stabilize the instrument. Furthermore, prolonged shoulder and cervical flexion during violin performance can lead to fatigue of the trapezius and sternocleidomastoid muscles, potentially resulting in muscle spasms and discomfort in the shoulder and neck regions.[28,31] The American Academy of Orofacial Pain defines TMD as a group of disorders involving masticatory muscles, the temporomandibular joint, and related structures. It is characterized by pain in the masticatory muscles and/or TMJ, articular sounds, and limited mandibular movement. However, there is no unique etiological factor that can explain the emergence of this disease from TMD.[32-24]

Headache is a frequently reported complaint among patients with TMD. Headache disorders are recognized as one of the most prevalent pain conditions worldwide, with epidemiological evidence indicating that the majority of individuals experience at least one episode of headache during their lifetime. It is estimated that a significant proportion of the general population, close to 90%, experiences at least one episode of headache within a one-year period, highlighting the widespread nature of this symptom.[34-36] Migraine and tension-type headache (TTH) represent the headache disorders most frequently associated with TMD, often presenting in their chronic forms. Migraine is commonly observed in patients with painful myogenous TMD. In fact, most individuals diagnosed with primary headache disorders also exhibit symptoms or signs of TMD, although the prevalence of specific TMD subtypes in the headache population remains unclear. Overall, migraine and TTH appear to be the headache

conditions most closely associated with TMD.[33,37]

In this case, the patient experienced a headache. This pain increases when the stress experienced by the patient increases. This finding is consistent with the results reported by Gadd et al.[38] who demonstrated a high prevalence of psychiatric comorbidities in a tertiary referral clinic for TMDs. The study highlighted that patients with chronic pain have a higher prevalence of mood disorders with depression and anxiety contributing to higher pain intensity, emotional allodynia, and neuro-anatomical changes. Psychological distress also plays a significant role in the modulation and amplification of TMD-related pain, including headache complaints. Stress is known to increase parafunctional activities and sustained muscle tension, which may exacerbate myogenous pain and contribute to headache intensity in TMD patients. Therefore, the stress-related worsening of headache observed in the present case supports the concept that psychosocial factors are important contributors to symptom severity in TMD.[38] Resende et al.[39] also concluded that there is a relationship between sociodemographic aspects, anxiety, quality of life, and TMD. Patients with TMD have higher levels of anxiety and lower quality of life, and this can interfere with the treatment process, thereby reinforcing the need for therapy that considers various factors related to the disorder.[39]

Occlusal splint therapy has been shown to reduce muscular load in the masseter, temporalis, trapezius, and sternocleidomastoid muscles during musical performance. A similar reduction in muscle activity has also been observed in asymptomatic violinists, indicating that occlusal splints may serve not only as a therapeutic intervention but also as a preventive strategy against overuse-related symptoms, particularly in individuals with preexisting craniomandibular disorders.[40-43] In addition, when physical selfregulation techniques are performed with appropriate movements and sufficient duration, excessive muscle tension in patients with temporomandibular disorders can be alleviated. Muscle relaxation achieved through PSR is associated with a reduction in pain intensity, thereby improving overall patient comfort and functional well-being.[44]

Patient can finally experience reduced clicking, headaches and muscle pain when opening and closing the mouth after undergoing treatment in the form of installing an occlusal splint and performing PSR. Recent clinical evidence supports the use of occlusal splints in conjunction with physical therapy or exercise modalities as an effective approach for managing TMD symptoms. In a 2025 pilot randomized controlled trial by Ferrillo et al.[45] patients receiving occlusal splints in addition to physical therapy demonstrated significantly greater pain reduction, improved neck disability scores, and enhanced quality of life compared with physical therapy alone.[45]

Furthermore, research conducted by Romeo et al.[46] shows that a combination of occlusal splint therapy and musculoskeletal physiotherapy produces better results in reducing pain and improving lower jaw range of motion compared to occlusal splint therapy alone. This further reinforces the synergistic benefits of self-regulated physical exercise combined with occlusal stabilization.[46] Cahyani et al.[47] also found that both occlusal splints and exercise therapy were effective in reducing symptoms and improving functional outcomes in TMD patients, thus supporting their use as the primary conservative intervention. The implications of these combined therapy results can produce better outcomes, allowing patients to perform exercises at home under professional guidance, while receiving medical interventions adapted based on thorough clinical examination and diagnosis.[47]

Conclusion

Treatment of patients with disc displacement with reduction accompanied by intermittent locking using occlusal splints and physical self-regulation (PSR) demonstrated favorable clinical outcomes, with a gradual reduction in pain until complete symptom resolution was achieved. Based on this case, several clinical considerations can be suggested. First, occlusal splint therapy combined with PSR may be considered as an effective conservative treatment option for violinists presenting with temporomandibular disorders, particularly in cases associated with repetitive functional loading. Second, ergonomic modifications, including optimization of head, neck, and mandibular positioning during violin performance, should be emphasized to minimize excessive mechanical stress on the temporomandibular joint and associated musculature. Third, stress management strategies should be incorporated into the treatment plan, as psychological stress may exacerbate parafunctional activities and contribute to symptom recurrence. Finally, a multidisciplinary approach is recommended to optimize long-term symptom control and minimize the risk of relapse.

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