

Non Invasive Treatment of Bilateral Temporomandibular Joint Osteoarthritis and Myofascial Pain in Young Adult (Case Report)

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Abstract

Introduction: Temporomandibular osteoarthritis (TMJ OA) is a degenerative disease that is characterized by progressive cartilage degradation, subchondral bone remodeling, synovitis, and chronic pain. Non invasive treatment of TMJ OA are physiotherapy, medication and splint therapy. Among these, splint therapy has been clinically confirmed to effectively protect the TMJ against overloading and to relieve excessive muscular tension. The aim of this article is to describe non invasive treatment in TMJ OA patient by using stabilization splint.

Case report: A 23 years old female patient with the chief complaint of open bite in the front teeth that she had recently. She also suffers from morning stiffness and facial pain on the right side for almost 9 years. Clinical examination found that the overbite was -2 mm, overjet was 3 mm and fine crepitus sound was detectable in both side. On palpation, patient reported pain on the right masseter, temporalis and submandible muscles. Maximum mouth opening with and without pain was 47 mm and 38 mm respectively. Based on RDC/TMD diagnostic criteria algorithm axis I and also confirmed with radiograph, we diagnosed the patient as bilateral osteoarthritis and myofascial pain with limited opening. A hard stabilization splint with 2 mm thickness in posterior was fabricated for the patient. Two months after initiating splint therapy, facial pain was completely disappeared. This condition will be maintained for 6 months before initiating orthodontic treatment for occlusal reconstruction.

Discussion: Management of TMJ OA may be divided into non invasive, minimally invasive and invasive or surgical modality. Non invasive treatment by stabilization splint was used to decrease the load on the joint, restricting the effects of traumatizing factors and leading to a decrease in inflammation, thereby limiting pain. Once the pain has been resolved and this condition is stable over a reasonable amount of time, initiation of orthodontic therapy may be considered.

Conclusion: The first treatment option for TMJ OA should be non invasive treatment as this management has proven effective with the least morbidity to the patient.

Key Words: temporomandibular joint, osteoarthritis, non invasive treatment, stabilization splint

Date of Submission: 02-06-2020

Date of Acceptance: 17-06-2020

I. Introduction

Osteoarthritis is a chronic non-inflammatory degenerative diseases of joints also named as degenerative joint disease, degenerative arthritis or osteoarthrosis that represents both the non-inflammatory and inflammatory alterations that may involve temporomandibular joint (TMJ)¹. The temporomandibular joint osteoarthritis (TMJ OA) is a degenerative disease which is characterized by progressive cartilage degradation, subchondral bone remodeling, synovitis, and chronic pain².

Osteoarthritis occurs in approximately 15% of the world's population. Although there is no certain age group, osteoarthritis occurs with greater frequency as age advances. At the age of 40, about 20 % of population may suffer from osteoarthritis. The peak prevalence develop in 5th and 6th decade and there is a reduction in the progression after 75 years. In the age group of 73–75 years about 70 % of the population exhibit osteoarthritis changes in radiograph examination, but only 9.6% of men and 18 % of women at the age more than 60 years suffer the osteoarthritis symptoms. Epidemiologic study of TMJ OA are similar to generalized osteoarthritis. The clinical evidence of TMJ OA occurs in 8–16 % of population. TMJ OA may happen at unilateral or bilateral of the jaw. TMJ OA more happens in women than men. This may be caused by Estrogen Receptor alpha polymorphism and pain susceptibility³.

Osteoarthritis has complex and multifactorial etiology. Risk factors of TMJ OA include age, genetics, trauma (previous history of fracture, prolonged micro trauma), disturbances of joint or muscle (internal derangements, inadequate muscle strength/endurance, joint instability, dissection, ligament laxity), systemic

conditions (generalized osteoarthritis, infection and idiopathic degenerative process, congenital and developmental abnormality)⁴. The common etiology factor of TMJ OA is mechanical overloading of the articular structures of the joint. When the precise cause of osteoarthritis can be identified, the condition is called as secondary osteoarthritis. When the cause of the arthritic condition cannot be identified, it is called as primary osteoarthritis⁵.

Osteoarthritis' symptoms is usually painful and accentuated by jaw movement. The common complaint of TMJ OA is crepitation (grating joint sounds). Osteoarthritis is generally associated with disc dislocation without reduction or perforation which occur anytime the joint is overloaded. When the disc is dislocated and the retrodiscal tissues rupture, the condyle will articulate directly with the fossa therefore accelerating the destructive process. When the dense fibrous articular surfaces are destroyed, the bony changes will occur⁶. One of TMJ OA characteristic is limited mandibular opening because of the joint pain. Palpation of the lateral and posterior condyle will increase the pain.⁵

The diagnosis is usually confirmed by TMJ radiographs⁵. Radiographic examination generally show that the articular surfaces seem to be eroded and flattened. The common radiograph finding involve erosion and flattening of the articular surface of the condyle and articular eminence, osteophytes, articular cysts, and loss of the joint space position and articular cartilage alterations⁷. Jaw function usually becomes very restricted because of any movement of these eroded articular surfaces will increase pain. Although osteoarthritis is in the category of inflammatory disorders, it is not a true inflammatory condition. In most cases when the loading is decreased, the arthritic condition can become adaptive but the bony morphology remains altered⁶.

The treatment of TMJ OA can be classified into 3 categories: noninvasive, minimally invasive, and invasive management. The Purpose of TMJ OA treatment are: 1. Decreasing joint pain, 2. Increasing joint function and mouth opening, 3. Preventing further joint damage 4. Improving patient's quality of life and reducing disease-related morbidities⁸. The decision for surgical management of TMJ OA must be based on evaluation of the patient's response to non invasive management, the patient's mandibular form and function, and the influence of the condition against patient's quality of life⁹.

Non invasive treatment include occlusal splint, medication and physical therapy. Among these treatment, splint therapy has been clinically proven effective to protect the TMJ against overloading and to reduce excessive muscular tension in the case of bruxism. Because of mechanical overloading is the causative factor, the treatment should be focus on attempt to reduce the overloading. Occlusal appliances such as anterior positioning or stabilization is indicated to reduce the loading force. In a few case after the symptoms have disappeared, the sequela of the disorder may need to be treated. If a significant portion of the bony structure lost, the posterior teeth will begin to contact heavily. These posterior teeth will act as fulcrums by which the mandible rotates, collapsing posteriorly and opening anteriorly. The result is an anterior open bite⁵.

The aim of this article is to describe non invasive treatment of TMJ OA in young adult by using stabilization splint.

II. Case Report

A 23 years old female patient was referred to Prosthodontics Department, Faculty of Dentistry, Universitas Sumatera Utara with the chief complaint of open bite in the front teeth that she had recently. She reported morning stiffness and complained about right facial pain near the ear and left shoulder pain that has lasted for approximately 9 years. She also had difficulty in chewing and opening her mouth because of the pain. There was no history of injury to the head, neck and jaw. Patient's general health overall was good.

She was clinically evaluated by using research diagnostic criteria for temporomandibular disorders (RDC/TMD). Clinical examination found that the overbite was -2 mm, overjet was 3 mm and fine crepitus sound was detectable in both side of TMJ. On palpation, patient reported pain on superior masseter, middle masseter, middle temporalis and submandible region muscles of the right side. Maximum mouth opening with and without pain was 47 mm and 38 mm respectively. There was a slightly midline deviation to the left when mouth opening. Right lateral excursion was 6 mm and pain was noted. Left lateral excursion was 7 mm without pain. Protrusive movement was 4 mm.



Figure 1. Intraoral photograph

The clinical examination and diagnostic blood test did not indicated rheumatoid arthritis. The criteria such as arthritis involvement of three or more joint area, hand joint involvement and rheumatoid nodules was not present in this patient. Serum rheumatoid factor was negative. Erythrocyte sedimentation rate and C reactive protein were in normal range.

On panoramic examination (Fig 2) found that both side condyle head had toadstool appearance characteristic which marked by flattening and apparent elongation of the articulating condylar surface and dorsal (posterior) inclination of the condyle and neck. Condylar neck in the right side was shorter compared to the left side. Articular eminence in both side was flattening. Antegonial notch was deepened in both side. Based on RDC/TMD diagnostic criteria alogaritm Axis I and also confirmed with radiograph, we diagnosed the patient as bilateral osteoarthritis and myofascial pain with limited opening.



Figure 2. Panoramic Imaging

Treatment plan for this patient divided into two phase. The first phase is non invasive treatment that consist of behavioral counseling, physical therapy, home exercise and stabilization splint. After all the symptoms dissappear, the treatment will be continued to the second phase that will using the fix orthodontics appliance for occlusal reconstruction as she refused to undergone any surgical treatment.

Fabrication of Stabilization splint

Impression of Maxillary and mandibular arch was taken using irreversible hydrocolloid and quickly poured to ensure accurate reproduction of surface detail. Bite record of the patient was taken using wax in centric position with 2 mm thickness in posterior. Then, the cast and bite record was mounted in the articulator. Before modeling the splint, survey the maxillary cast to determine the biggest contour of the teeth and the outline of the splint drawn on the maxillary cast by using the pencil. The splint will acquire the retention by using proximal, buccal and lingual undercuts that are not blocked out. Wax are softened and adapted over the cast and then trimmed to the pencil outline. Then, the occlusion adjusted to establish the desired occlusion. Contacts are established between the flat surface of the splint and all the antagonist teeth. After this, the maxillary cast is removed from the articulator and invested in a flask, dewaxing, and then the mould packed with clear acrylic resin which is then processed. The splint is trimmed and polished¹⁰.

Fitting the stabilization splint

Firstly, check the retention of the splint. Excessive acrylic resin is removed with a laboratory carbide bur from the undercut areas around the teeth until the splint fully seated and adequately retentive. For occlusal adjustment, the splint is adjusted until all mandibular teeth contact evenly on the flat splint surface in the centric position. In lateral movements, the guidance is achieved by only mandibular canines contact with the splint surface whereas all the remaining teeth is not contact¹⁰.



Figure 3. Fitting the Stabilization splint intraorally

Follow up

Patient was follow up 2 weeks after delivery of the splint. At the first follow up, the patient reported that the pain was reduced, but she still experienced morning stiffness. After two months follow up, the pain and morning stiffness completely disappeared. There was no pain on palpation. Follow up was done for almost nine months, all the symptoms was dissapeared and there is no pain on palpation. Then, she was refered to Orthodontics Department for the second phase of the treatment for occlual reconstruction using fix orthodontics appliance.

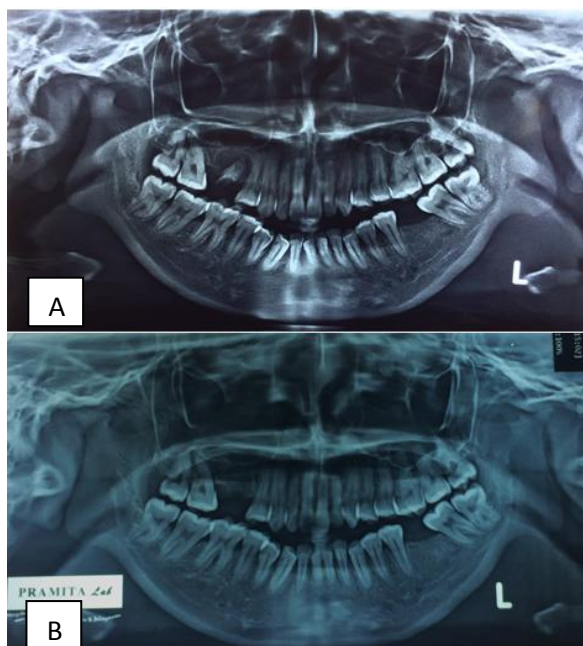


Figure 4. Panoramic Imaging (A) Before Treatment (B) After treatment first phase treatment

III. Discussion

Although our patient’s chief complaint was anterior open bite but also suffered TMD symptoms, it is very important to delayed the orthodontic treatment. When the TMD symptoms were presented, it must be properly treated before the initiation of orthodontic therapy. As many study has described that many manifestations of TMD can effectthe occlusal relationship, thereforebecome unstable and will interferethe correct treatment planning. Anterior open bite is a routine finding in TMJ OA patient. TMJ O that is associated with functional overloading can lead to joint tissues collapse. If the joint collapse at both of the TMJ, condylar resorption will cause morphologic breakdown of the TMJs and a subsequent decrease in ramus height, which results in progressive mandibular retrusion with anterior open bite. This malocclusion is called “acquired open bite associated with TMJ osteoarthritis”. In these patients, anterior teeth show wear facets and loss of the mamelons on the incisal edges. This characteristic means that non-contacting teeth of these patients used to be in contact before⁷.

As the patient presented severe deformation of the mandibular condyle and myofascial pain, TMJ OA therapy primarily aims to relieve symptoms, intercept the disease progress, and rehabilitate TMJ function.² The

treatment of TMJ OA can be classified into non invasive, minimally invasive and invasive/surgical. As our patient refused all the surgical procedures, either minimally invasive or invasive, we planned non invasive treatment for this patient. TMJ OA conservative management modalities such as medication, physical therapy and Stabilization Splint therapy. Ok et al study showed improvement of TMJ OA signs and symptoms regardless of the application or non use of a splint. However, Stabilization Splint therapy will relieved excessive loading on the TMJ in TMJ OA patients which is showed on the Stabilization Splint group by using CBCT superimposition, there was less bone resorption in the glenoid fossa than the non stabilization splint group. Therefore, Stabilization Splint therapy could be an effective treatment option for reduction of bone resorption in the glenoid fossa in TMJ OA patients¹¹.

Non invasive treatment of TMJ OA by using stabilization splint will decreases the load on the joint, reducing the effects of traumatizing factors that will lead in decreasing the inflammation, thereby limiting pain. The purpose of stabilization appliance as outlined by the American Academy of Orofacial Pain guidelines is to “provide joint stabilization, protect the teeth, redistribute the occlusal forces, relax the elevator muscles, and decrease bruxism.” Additionally, it is stated that “wearing the appliance increases the patient’s awareness of jaw habits and helps alter the rest position of the mandible to a more relaxed, open position¹². Machon et al showed that the success of using stabilization splin was noted 3 months after initiating therapy in 60% of the cases. A conservative and analgesic therapy alone did not lead to any significant progress which is noted after 3 months in only 30% of the cases. Majersjo and Wenneberg (2008) described that the onset of the effects of analgesics is felt much sooner than the effects of occlusal splints. A number of authors (Gaudot et al., 2000; Bumann and Lotzman, 2002; Van Put, 2003) recommend the initial use of conservative treatments and the application of surgical (minimally invasive)therapy only when these treatment failed¹³.

Once the pain has been resolved and the condition is stable over a reasonable amount of time, initiation of orthodontic therapy may be considered. TMD symptoms must always be controlled to reestablish a normal occlusion that will allow proper treatment planning⁷.

IV. Conclusion

Current TMJ OA treatments focus on relieving pain, preventing disease progress and restoring TMJ function. Mechanical overloading can cause TMJ OA and in severe cases, it can affect facial structural.¹¹The first treatment option for TMJ OA should be non invasive treatment as this management has proven effective with the least morbidity to the patient.

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Ivana, et. al. “Non Invasive Treatment of Bilateral Temporomandibular Joint Osteoarthritis and Myofascial Pain in Young Adult (Case Report).” *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*, 19(6), 2020, pp. 25-29.