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MANDIBULAR REPOSITIONING SPLINT: A FUNCTIONAL AND ESTHETIC CONSIDERATION FOR DISC DISPLACEMENT WITH REDUCTION AND MYOFASCIAL PAIN MANAGEMENT

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Abstract

Disc displacement with reduction represent the early stage of disc derangement disorders. Disc derangement disorders result from elongation of capsular and discal ligaments coupled with thinning of the articular disc. These changes commonly result from either macro or micro trauma. Mandibular repositioning splint can be used to treat disc displacement with reduction. This clinical report aims to explain management of disc displacement with reduction and myofascial pain with mandibular repositioning splint. 23-years-old female patient was complaining in mouth limited opening and pain around cheeks, ears, neck and shoulders since six months ago, especially after wake up in the morning but returned to normal a few hours later. On clinical examinations there was a clicking sound while mouth opening and closing, also pain during palpation on facial muscles, neck and shoulders. Patient was suggested to use mandibular repositioning splint 24 hours a day for three to six months. Mandibular repositioning splint is effective if the patient uses it continuously. Functional and esthetic concerns are important if the mandibular repositioning splint is to be used during the day. The advantages of the mandibular repositioning splint are least affected of speech function, more esthetic and the patient easier to move the mandible to posterior. Mandibular repositioning splint is the best choice for disc displacement and myofascial pain treatment because it may be more acceptable from a functional and esthetic standpoint.

Keywords : *Disc displacement with reduction, Myofascial pain, Mandibular repositioning splint*

INTRODUCTION

TMD consists of a number of clinical conditions of the temporomandibular joint (TMJ), the masticatory muscles, and related structures.^{1,3} The etiology of TMD is said to be multifactorial, typically presenting with symptoms such as pain and/or tenderness of the muscles of mastication, clicking of the TMJ, limited jaw movements, orofacial pain, and other symptomatology.^{1,2,3} TMDs also is commonly associated with other symptoms affecting the head

and neck region such as headache, ear-related symptoms, and cervical spine disorders.⁴ There is no agreement on the precise cause(s) of TMDs among clinicians and researchers in this area, although trauma, psychological stress, malocclusion (due to anterior open bites or missing molar teeth), and oral habits (due to bruxism leading to occlusal wear) have universally been cited as predisposing factors to initiating and perpetuating TMDs.³

The American Academy of Orofacial Pain (AAOP) classification divides temporomandibular disorders broadly into muscle-related TMDs (myogenous), and joint-related TMDs (arthrogenous).⁴ TMJ Disorders are a broad category of temporomandibular disorder (TMDs) that arise from capsular and intracapsular structures. This category is divided into three subcategories: derangement of the condyle-disc complex, structural incompatibility of the articular surfaces, and inflammatory disorders. Derangement of condylar-disc complex can be divided into two subcategories for the purpose of treatment : disc displacement with reduction and disc displacement without reduction.⁵

Disc displacement with reduction represent the early stages of disc derangement disorders. Disc derangement disorders results from elongation of the capsular and discal ligament coupled with thinning of the articular disc. These changes commonly result from either macro or micro trauma. Macro trauma can occur due to a motorcycle accident or a blow to the face and common sources of microtrauma are hypoxia-reperfusion injuries, bruxism and orthopedic instability.⁵

In disc displacement with reduction, the articular disc has displaced anterior to the condylar head. It may also be displaced medially or laterally. The posterior most border of the disc is anterior to the 11:30 position of the condylar head. The disc remains in this position as long as the mouth is closed. When the mouth is opened, the disc is re-situated on the condylar head. The movement of the disc onto and off the condylar head may result in a clicking, snapping, and/or popping sound. This sound does not occur with every mandibular movement. Rather, it should be heard by the patient at least once in the last 30 days and by the examining dentist during at least a third of the mandibular movements. Because the disc reduces during condylar translation, range of

motion is not limited. However, movements may not be as smooth as a normal TMJ because of the momentary sliding of the condyle on and off of the disc.⁶

Several treatment methods for TMDs have been used, including occlusal splints, physiotherapy, relaxation therapy, pharmacological interventions as well as educational and behavioural counseling. Splint therapy has been a preferred modality for the management of TMDs since the 1960s, and many practitioners use splints as a primary care technique for patients with TMDs.⁴ According to the Glossary of Prosthodontic Terms [8th ed.], “occlusal splint is defined as any removable artificial occlusal surface used for diagnosis or therapy affecting the relationship of the mandible to the maxilla. It may be used for occlusal stabilization, for treatment of temporomandibular disorders, or to prevent wear of the dentition.”^{2,7,8} A common goal of occlusal splint treatment is to protect the TMJ discs from dysfunctional forces, that may lead to perforations or permanent displacements. Other goals of treatment are to improve jaw-muscle function and to relieve associated pain by creating a stable balanced occlusion..^{2,8} There are many types of occlusal splints which are recommended for treatment of TMDs, but there are two types of occlusal splints are most commonly used, such as stabilization splint and repositioning splint.⁴

Anterior positioning appliance also called mandibular orthopedic repositioning appliance (MORA) or mandibular repositioning splint aims to change the maxillomandibular relationship so that the mandible is assumed more to the anterior position. Mandibular repositioning splint is recommended for treating patients with internal derangement (anterior disc displacement with reduction).² The use of the splint provides an occlusal relationship requiring a slight protrusion of the mandibular motion to restore the condylar relationship of the disc to normalcy. The use of splints to reposition the disc on this condyle should be used 24 hours a day for 3 to 6 months.

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The first use of this splint can immediately help relieve pain symptoms.⁵

This paper aims to explain the treatment of disc displacement with reduction and myofascial pain by using mandibular repositioning splint.

CASE REPORT

23-years-old female patient was complaining in mouth limited opening and pain around cheeks, ears, neck and shoulders since six months ago, especially after wake up in the morning but returned to normal a few hours later. On clinical examinations there was a clicking sound while mouth opening and closing, also pain during palpation on facial muscles, neck and shoulders. The discomfort of even the pain that patients feel on the face, neck, shoulders to the head is sometimes felt when the patient is in an emotional stress situation. Patients often chew on the left because they feel uncomfortable biting on the right. Patients do not take drugs to overcome the pain.

Patient was asked some few questions that are based on the Research Diagnostic Criteria for Temporo- Mandibular Disorders (RDC/TMD).⁹ It was aimed to know the medical history of TMJ in order to help classify the types of TMDs during examinations of muscles around the face and neck, also TMJ. Extra-oral examination showed symmetrical face shape (Fig. 1). Extra-oral examination on muscles, i.e. masseter muscle, temporal muscle, temporal tendon, sternocleidomastoid muscle, splenius capitis muscle, and trapezius muscle which are associated with TMDs, are recorded with scores based on the criteria of DC /TMD:

- 0: no pain
- 1: mild pain
- 2: moderate pain
- 3: severe pain



Fig. 1. Profile of the frontal face

Examination of functional manipulation was also conducted, i.e. a maximum mouth opening with and without pain, lateral movements, protrusive movement; midline shifting when maximum mouth opening. Afterwards, examination of TMJ was conducted, such as intra-auricular palpation, extra-auricular palpation; examination of joint sounds, and as the result are shown in Table 1.

On intra oral examination (Figure.2a) and panoramic radiograph analysis (Figure .2b) there was missing on 47; imbedded on 18, 28, 38; composite filling on 36 and 46; extrusion on 17; labioversion 21; palatoversion 25; mesiolinguotorsion 32 and 45; mesial tilting on 48. The periodontal condition is good. The size of the condyle in the left region is as large as the right region. Based on the classification of angle occlusion next to Right Class II ½ P; left class 1; overbite and overjet 4 mm. Deviation to the right occurs while mouth opening.



Fig. 2a. Intra-oral condition on maxilla and Mandibula

Table 1: Results on examinations of muscles and functional manipulation which are related on TMDs, as well as the examination on TMJ

Examination	Region	
	Right	Left
Masseter	Superior :2 Middle : 2 Inferior : 2	Superior :1 Middle :1 Inferior :1
Temporal	Ant : 0 Med : 0 Post : 0	Ant : 0 Med : 0 Post : 0
Temporal Tendon	2	0
Posterior region of cervical neck	0	1
Sternocleido-mastoideus	Post : 2 Ant : 2 Clavicula: 2	Post : 2 Ant : 2 Clavicula : 2
Trapezius	2	2
Maximum mouth opening without pain (mm)	mm	
Maximum mouth opening with pain(mm)	mm	
Lateral movement	9 mm	6 mm
Pain on TMJ	2 (lateral pole)	2 (lateral pole)
TMJ sounds	Open :clicking Close :cliking	Open : cliking
Headache	+	+
Tinnitus	-	-
occlusion	Right : Angle class II ½ P Left : Angle class I Overbite & overjet : 4 mm	
Mid –Line shifting of mandible whi le maximum mouth opening	Right deviation when mouth opening	



Fig. 2b. Panoramic radiograph

On examination of TMJ radiograph (Fig.2b), it can be seen that:

1. While mouth closing the left and right mandibular condyles position is in the glenoidalis fossa and there is a close contact between the articular surface of the condyle and the glenoidalis fossa (Fig. 3a)
2. while mouth opening the left and right mandibular condyle position is anterior to the articular tubercle (Fig. 3b)



Fig. 3a: TMJ Radiography while mouth closing

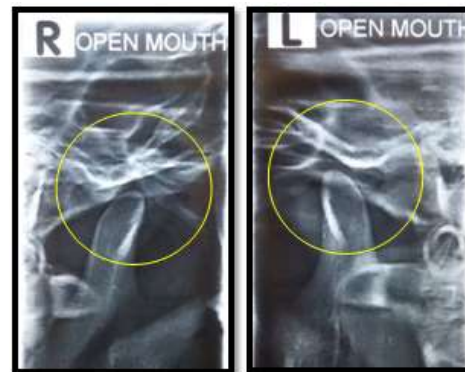


Fig. 3b. TMJ Radiography while mouth opening

Anatomic impressions were done by using alginate and casted twice to get a study casts and working casts.

Based on the above examinations results and associated them with RDC/ TMD, diagnosis of TMDs was obtained as: *Myofascial Pain* dan *Disc Displacement with reduction* et causa mikrotrauma teeth on 17 and 48 after extraction on 47. On palpation examinations of the extraoral muscles (muscle masseter, temporalis muscle, temporal tendon,) there is pain until level 2 at the right region. The palpation of lateral pole (extra auricular) there is a pain in TMJ while opening the

mouth. There is joint sound “clicking” while mouth opening and closing at right side of the TMJ, and also at the left while mouth opening. There is consistent deviation while mouth opening and closing. Limited of mouth opening that is felt every morning after awaking and gradually returning to normal after a few hours.

Preliminary treatment which was known as the first phase of treatment was given to the patient, such as:

1. **Communication:** Explanation to patient about having a reversible TMD that may be associated with bad habits, such as often chewing on right side and the patient is suggested to change this habit, also a tooth extrusion.

2. **Physical therapy:** The treatment was done alone at home by compressing the area of TMJ with a warm towel around 10-15 minutes continuously and at least up to 3 weeks; massage around the facial muscles which was previously applied with cream containing methyl-salicylate; exercise in mouth opening and closing slowly without any deviation / deflection in front of the mirror.

3. **Occlusal splin therapy:** Mandibular repositioning splint or MORA (Mandible Orthopedic Repositioning Appliance) becomes optional due to deviation while mouth opening, associated by the clicking sound of the joints indicating the inclusion of the condyle discs. The procedure of making mandibular repositioning splint which was also the first phase of treatment, as follows:

1. Taking bite wax registration by increasing the occlusal bite wax according to patient's free way space (2-4 mm), then the patient was instructed to bite in edge to edge position
2. Survey on the working casts in order to get the height contour of teeth that will be waxed up also areas that need to be blocking out.(Fig.4)
3. Mouting the working casts along with bite wax registration into articulator semi-adjustable. (Fig.5)
4. Wax up was done on the mandible until it covered the height contour of teeth according to survey results so it would be more aesthetic and

retentive and did not exceed the gingival margin which would cause irritation.(Fig.6)



Fig. 4 . Surveying the teeth countour

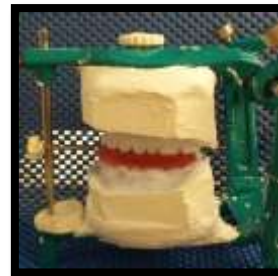


Fig.5. Mounting the working casts into semi-adjustable articulator.



Fig 6. Wax up was done on the mandible

5. Processing Mandibular repositioning splint with heat polymerized translucent acrylic resin.
6. Insertion of Mandibular repositioning splint, by checking the adaptation and retention; splint thickness must be in accordance with free way space; occlusal contact in an edge to edge position; clicking sound is lost when mandibular repositioning splint is insertion; Patient was suggested to use mandibular repositioning splint 24 hours a day for three to six months.(Fig.7)



Fig. 7. Insertion of Mandibular repositioning splint.

The patient was instructed to come for the first control (a week after the insertion of Mandibular repositioning splint), then was examined about complaints during splints wear, such as:

1. Examination of complaints of mandibular repositioning splint, there is a traumatic occlusion on the repositioning splin using articulating paper.
2. Examination of muscles that include Masseter, pterigoid medialis and lateralis, temporalis, temporalis tendon, sternocleidomastoideus, splenius capitis. Results showed that the spasms and pain still not reduced.
3. Examination of clicking sounds. The results showed that the sound present.
4. Examination on deviation of the mandible while mouth opening and closing were still not consistent.

The patient was re-educated on the importance of physical therapy at home. At the secondary control :

1. Patient complaints about limited opening a weeks ago and pain around preauricular region and while eating some food in hard consistency.
2. Examination of muscles that include masseter, pterygoid medialis and lateralis, temporalis, temporalis tendon, splenius capitis. Results showed that there is no pain and spasms. But there was a pain on preauricular region at left side when palpation on lateral pole and spasms on trapezeus and sternocleidomastoideus muscles.

3. Examination of TMJ sound, the results showed that the sound of "cliking" was lost.
4. Examination on deviation of the mandible while mouth opening and closing were still not consistent.
5. The height contour of mandibular repositioning splint was checked and reduced the occlusal surface until patient feel comfortable.
6. Patient suggested to use medications to reduce the pain and physical therapy at home.

The next control will be done continuously at least once every two weeks until the complaint is resolved and splint is used for 3-6 months, 24 hours a day, except while eating.

DISCUSSION

Presumably it is possible to obtain the same results regardless of the situation of the occlusal splint but the choice of the individual situation depends on a few basic principles.⁸

The recommended occlusal therapy appliance in case of disc displacement with reduction is mandibular repositioning splint which can immediately help to relieve joint pain symptoms. The purpose of treatment by using mandibular repositioning splint is not permanently change the position of the mandible, but only to change into temporary position to provide opportunities of retrodiskal tissue to make improvements.^{2,5,8}

In case of a deep curve of Spee, mandibular splint is preferred. Mandibular occlusal splint also offers the advantage of encouraging a better rest place for tongue (which is anterior palate). Extensions on the facial surfaces of the incisors should be avoided. Besides not being aesthetic, it may prevent adequate lip seal.⁸

In treating a TMDs, functional considerations is very important, though aesthetic considerations are also a major concern. When planning an occlusal treatment aesthetic considerations can not be ruled out. Patients should be asked regarding aesthetic problems because treatment is sometimes unacceptable for such aesthetic reasons. For example patients do not want to wear occlusal splint because aesthetically unpleasant.⁵

Mandibular repositioning splint will be effective if used by the patient constantly. Aesthetic and functional considerations are important if mandibular repositioning splints are used throughout the day. The advantages of the mandibular repositioning splint are least affected of speech function, more esthetic and the patient easier to move the mandible to posterior. Mandibular repositioning splint is the best choice for disc displacement and myofascial pain treatment because it may be more acceptable from a functional and esthetic standpoint.

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