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Treatment For Unilateral Closed Locked with Jog Manipulation Technique And Simplified Myofunctional Technique And Anterior Splint Reposition

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Abstract

Disc displacement without reduction (DDWoR) with limiting mouth opening is a condition that occurs in the inability to reduce the disc to its normal position also known as a closed lock. In general, there are 3 therapies used for this condition: non-surgical treatment/ conservative, minimally invasive (arthrocentesis), and surgical. Mandibular manipulation is the initial, conservative, and effective treatment in cases of acute. This paper aim to explain the treatment for closed lock patient using mandibular manipulation technique using jog manipulation and simplified myo-fuctional technique accompanied using anterior splint reposition. A 20-year-old male patient came to the Prosthodontics Clinic at RSGM USU with complaints of being unable to open his mouth wide and feeling pain in the right joint if he opened his mouth too wide.The patient had a complaint 1 week ago. Clinical examination of the patient showed a limited mouth opening which was 13 mm, left and right lateral movement was 1,2 mm and 5,6 mm. deflection with mouth opening. In this patient underwent the jog manipulation technique as mandibular manual therapy, combined with the use of an anterior repositioning splint, and the patient was instructed to self-treated at home with the Simplified- Myofunctional Technique (S-MFT). An effective jog manipulation technique can be successfully performed in acute closed lock conditions but must be accompanied by the use of an anterior splint that is immediately attached to the patient to restore disc morphology that was previously distorted. Home therapy exercises are an effective combination to prevent the displacement of the disc.

Keywords: Disc displacement without reduction; closed lock; *jog manipulation technique*; S-MFT, anterior splint reposition

1. Introduction

Temporomandibular disorder is a musculoskeletal disorder involving the TMJ and muscles of mastication. According to DC/TMD, the diagnosis of TMD is based on one of the following conditions: (1) TMJ abnormalities, (2) Muscle abnormalities, (3) headaches associated with TMD, (4) structures associated with TMD, which, according to Okeson TMJ abnormalities can be subdivided into 3 large categories, namely (1) derangement of the disc-condyle complexity (internal derangement) (2) structural incompatibility of the articular surface, (3) inflammatory disorders of the joint. Disorders of the disc-condyle complex (internal TMJ derangement) constitute the majority of disorders that occur in the general population. (Okeson 2019; Wright and Klasser, n.d.; Ohrbach, n.d.; Nagata et al. 2019a).

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There are 3 types of internal TMJ derangement, namely disc displacement with reduction, disc displacement with intermittent locking, and disc displacement without reduction with or without limited mouth opening. Disc displacement without reduction (DDWoR) with limited mouth opening is a condition that occurs in a patient who is unable to return the disc to its normal position relative to the condyle, thus disrupting condyle translation, which causes an increase in load on the anterior surface, of the condyle, in this situation rotation occurs but no translation occurs in joints. This condition is usually called a closed lock. This restricted opening condition can be acute or chronic, depending on the locking duration.(Okeson 2019; Nagata et al. 2019b; Wright and Klasser, n.d.; Ohrbach, n.d.; al-Baghdadi et al. 2014; Uchida et al. 2021).

Limitations in mouth opening in patients with intracapsular disorders must be differentiated from those caused by extracapsular disorders. Patients with limited mandibular mouth opening caused by intracapsular disorders such as disc displacement without reduction have a mouth opening less than 30 mm. When opening the mouth wide, the midline of the mandible is deflected towards the side of the joint involved and can make eccentric movements on the involved side (ipsilateral) normally. Patients can feel pain when opening their mouths or making eccentric movements, but this pain is not always felt. Usually, suppose the limitation of opening the mouth is caused by muscle disorders (extracapsular), where the muscles for opening the mouth are the elevator muscles (temporalis, masseter, and medial pterygoid). In that case, there is no limitation of eccentric movement to the right and left. (Nagata et al. 2019b; 株式会社杏林舎, n.d.; n.d.; Ohrbach, n.d.; Wright and Klasser, n.d.; Yoshida et al. 2005; Nagata et al. 2019a; Mlernik and Więckiewicz 2015a; Uchida et al. 2021; Kui et al. 2020).

A closed lock can be a debilitating condition for the patient and harm the patient's quality of life due to mandibular dysfunction and TMJ pain. Research reports that patients with closed locks show a 4-fold increased risk of degenerative changes in the joint compared to joints with normal disc positions. Joints in closed-lock sufferers do not always lead to degenerative joint disease (DJD); however, this condition can become chronic and persistent. For this reason, handling a closed lock, especially in the acute phase, is necessary to produce an unlock condition. In general, are 3 therapies used in this condition: non-surgical treatment/conservative (drugs, therapy using tools, physiotherapy, and mandibular manipulation), minimally invasive (arthrocentesis), and surgery (Okeson 2019). In patients with acute closed lock conditions, conservative or minimally invasive treatment such as mandibular manipulation is the main and effective choice, where treatment for closed lock sufferers aims to increase joint mobility, reduce the disc to its normal position, and maintain the normal morphology of the disc. (thin in the intermediate part and thicker in the anterior and posterior parts) and eliminates pain in the TMJ before surgery. In patients with a long history of intermittent locking, the disc and ligaments have undergone morphological changes, and it is difficult to reduce the disc again and keep it in place. (Lei et al. 2020; Md Anisuzzaman et al. 2019; Bhargava 2021; Mlernik and Więckiewicz 2015b) This article aims to explain the treatment of closed lock patients using mandibular manipulation techniques, namely jog manipulation and simplified myo-functional techniques, accompanied by anterior repositioning splints.

2. Case Report

A 20-year-old man came to the USU RSGM Prosthodontics Clinic complaining of not being able to open his mouth wide and feeling pain in the right joint when he opened his mouth. The patient has had this complaint since 1 week ago. Initially, the patient felt a clicking sound in his right jaw joint, but there was no limitation in opening and closing his mouth wide. The patient has received treatment, and the pain has disappeared. Still, in the last week, there have been limitations in opening the mouth and pain when the patient is forced to open his mouth wide, so the patient has difficulty carrying out simple activities such as talking, laughing, eating and drinking.

A thorough anamnesis, intraoral and clinical examination, and supporting panoramic radiography and TMJ examinations are carried out at the first visit. Examination of TMJ pain using DC/TMD and anatomical impressions was also performed at this visit. The clinical examination results found that the patient's mouth opening was limited, the patient's mouth opening was 13 mm, and the maximum forced mouth opening accompanied by pain in the right

extra-auricular area was 13.5 mm. The patient did not experience a midline shift, but there were limitations in lateral and protrusive movements to the left. On left lateral examination, a displacement value of 1.2 mm was found, and a protrusive movement of 2 mm. The patient can achieve Right lateral movement with a measurement value of 5.6 mm. There is a deflection to the right when opening and closing the mouth.

Figure 1. Initial, right lateral and left lateral movement

On examining the patient's joints using a stethoscope, no clicking sounds were heard when opening and closing the mouth. During the AXIS I pain screening examination using DC/TMD, it was found that the patient felt stiff in the jaw when he woke up in the morning, accompanied by pain when chewing food, especially hard/tough foods such as chewing gum. Pain is also felt when opening the mouth and moving it forward or to the other side, as well as when talking and shouting. From the conclusion of the examination using Axis 1 DC/TMD, the results of the diagnostic decision tree were intra-articular joint disorder with a diagnosis of disc displacement without reduction (DDWoR) accompanied by headache attributed to TMD. In the Axis II examination using DC/TMD, the average score for pain in the face was 8. The highest score for limited jaw function was 10, namely, opening the mouth to bite an apple, which means opening the mouth cannot be done due to limitations. The Axis II examination also found that the patient often carried out activities supporting the right chin.

The results of panoramic x-ray and TMJ analysis revealed flattening in the anterior area of the right condyle process, which indicates a disturbance in the TMJ due to changes in the condyle bone. In the radiological image of the TMJ, it can be seen that there is no translation when opening the mouth at the right condyle, but translation occurs at the left condyle. So, a definite diagnosis was obtained in this case, namely right unilateral disc displacement without reduction with limited mouth opening according to the joint involved based on the patient's anamnesis examination accompanied by supporting examinations.

At the first visit, an immediate splint (figure 6) was also placed on the patient because the patient complained of extreme pain in his jaw joint due to continuously trying to open his mouth at home. Pain is also felt in the facial muscles. (Chairunnisa and Kurnikasari 2013).

At the next visit, the patient's complaint of pain had disappeared, but he could still not open his mouth wide. Manual mandibular manipulation was performed at this visit using the jog manipulation technique. Before manipulation of the mandible, the patient's mouth opening is closed again.

The jog manipulation technique is designed to treat patients with limited mouth opening, which combines closed, lateral and open mouth manipulation techniques to be applied to various patient conditions. This technique uses a pivot made of gauze. In this case, the jog manipulation technique used an open (figure 7) and lateral (figure 8) type of movement on the patient's right joint. The gauze is inserted into the patient's rear molars in the open movement type. The operator's thumb is placed on the gauze, and the patient's jaw is pulled down with a slow but controlled force; simultaneously, an upward force is applied to the other fingers on the inferior mandible. When the joint is distracted, the mandible is pulled forward and to the left to allow the condyle to move to the displaced disc area several times to match the patient's opening. In lateral-type movement, the pivot is inserted into the patient's right

molar (the affected joint) and the patient is forced to move the jaw to the left. And at the same time, place your hand on your right chin to shift your jaw to the left. All manipulation movements are carried out twice with a manipulation time of 30 seconds when the patient is relaxed.

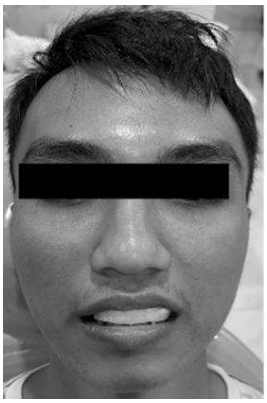

Figure 2. Insertion Immediate Splint

In this case, the mandibular manipulation was successfully carried out, as indicated by the increase in the patient's mouth opening from 13 mm to 36 mm before manipulation, and the patient could make lateral movements to the left freely (figure 9).

Figure 3. Left open mouth movement manipulation and right lateral movement manipulation

Figure 4. Left mouth opening measurement after manipulation and right Insertion Anterior Splint Reposition

After manipulating the patient's mandible, an anterior repositioning splint is immediately placed to prevent disc redisplacement. This repositioning splint is placed by advancing the mandible to achieve a more anterior position than centric occlusion. Patients are instructed to carry out muscle therapy themselves at home and are advised not to eat too hard foods. In this case, the simplified myofunctional technique is used as a self-exercise that the patient will do at home.

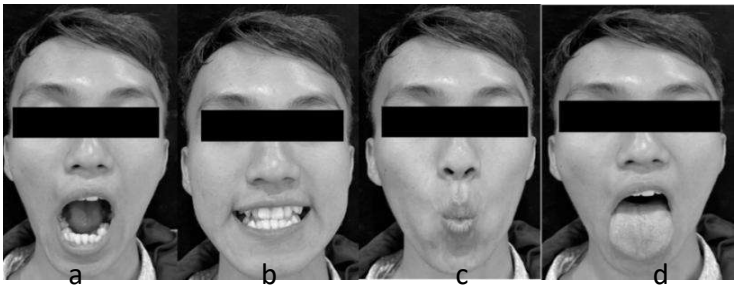

Figure 5. Simplified myo-functional therapy (S-MFT) (a) Maximum mouth opening (b) *Clenching (*c) Lips protrusion (d) Maximum mouth opening with maximum tongue protrusion

3. Discussion

Disorders, and central nervous system disorders. However, disc displacement without reduction is the most common cause of limited mouth-opening cases.

In this case, the patient suffered from acute right unilateral closed lock because the patient had a previous history of clicking and a bad habit of supporting the chin. From clinical examination, he experienced a deflection to the right and limited external movement to the left, which strengthened the patient's diagnosis.

Farar and Mc Carty introduced a manipulation technique to restore the disc in cases of closed lock and consider that this technique can be effective if the disc has been displaced for less than 3 weeks, namely in cases of acute closed lock, so it must be done as soon as possible. This technique is a non-invasive procedure and does not require special equipment to carry out. (株式会社杏林舎, n.d.; n.d.; Nagata et al. 2019b).

In this case, manipulation of the mandible uses the Jog manipulation technique adapted from the manipulation technique introduced by Fararr and Mc Carty. It is called jog manipulation because this technique applies movement to the joint, which is assumed in closed lockjaw, there is fixation or adhesive that occurs in the joint cavity, thereby limiting mouth movement, with movement in the form of vertical force applied to the joint it will create a gap and shift it to the place of adhesion so that the disc can be reduced back above the condyle. This technique uses a pivot made of gauze as a pivot to pull the joint firmly in a vertical direction and lateral manipulation that applies a shear force using the patient's lateral force.

This technique was effective for the patient, with a significant increase in the patient's mouth opening of around 18 mm. Still, research shows that this mandibular manipulation only had an effect at the initial visit when treating the patient, not for long- term care. A simplified-myofunctional Technique (S-MFT) procedure was also carried out in this case. S-MFT is a functional therapeutic technique that patients can use at home to help optimally long-term treatment of closed lock cases. The movement involves maximal opening of the mouth accompanied by protrusion of the tongue which can facilitate the gliding movement of the condyle and allow stretching of the digastric or suprahyoid muscles, which is difficult to achieve with other exercises. Another advantage of this therapy is that it does not use the patient's hands or fingers as support, making it easy for the patient to apply even when working or carrying out activities.

The use of anterior repositioning splints is also used in this case, which function to keep the disc in place after successful manipulation and must be installed immediately after manipulation to prevent clenching of the posterior teeth, which causes disc redisplacement. Anterior splints used for several days can restore the disc's normal morphological shape so that it is easier to maintain its position because the disc that has moved has become distorted, so it is easily dislocated again. Research also states that approximately 90% of uses of splints are effective in TMD cases. (Muhtarogullari, Avci, and Yuzugullu 2014; Okeson 2019; Wright and Klasser, n.d.; Pihut and Kulesa- Mrowiecka 2023; Yoshida et al. 2005; LDodeja, singh, and mistry 2019; 株式会社杏林舎, n.d.; n.d.)

4. Conclusion

Mandibular manipulation using the jog manipulation technique is effective in patients with cases of acute closed lock with a history of closed lock <3 weeks. However, it must be accompanied by therapeutic exercises at home and an anterior repositioning splint.

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