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Case Report

Treatment of temporomandibular disorder using occlusal splint

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ABSTRACT

Background*: Patient suffering from occlusal abnormality is usually detected months or even years when the acute patient visits a dentist, and generally the patient does not receive direct treatment upon his complaints since minimum information is available on this type of treatment. In general, the dentist provides medication only or conducts incorrect selective grinding where in fact, the patient does not feel better from the previous conditions.* ***Purpose****: The objective of this study is to discuss the treatment on the dysfunctional temporomandibular joint followed by orofacial pain caused by occlusal disorder using occlusal splint.* ***Case****: In this case, a forty three years old male having trouble with the joint on the left jaw followed by orofacial pain caused by occlusal disorder.* ***Case Management****: Initial treatment with occlusal splint makes the patient comfortable and recovers from his complaints since the patient could restructure the chewing muscles. This treatment will be more successful if the dentist has the knowledge to use and choose occlusal splint method properly. Occlusal Splint could be used as a supporting therapy and consideration as one of the therapies to avoid the unwanted side effects. The use of occlusal splint is meant as an alternative of the main therapy in overcoming the problem of occlusal splint.* ***Conclusion****: Finally, therapy with occlusal splint is very effective as an alternative treatment to handle the dysfunction of temporomandibular joint caused by occlusion.*

Key words*: occlusal disorder, temporomandibular joint, occlusal splint*

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INTRODUCTION

Disorder on temporo mandibular joint often creates symptoms which has become the main complaint for a patient to visit a dentist. Symptoms suffered by a patient is usually as follows: Stiff neck, headache, facial pain, earache, clicking when a patient opens and close his or her mouth, or even when the symptom has been suffered for too long, it can cause arthritis on the joints. One of the factors that cause this disorder is Occlusal Splint.[1,2]

The treatment of occlusal splint which will be conducted on a patient who still has a complete set of teeth or even a patient who has lost some, may be sufficient by adjusting occlusion from the tooth which has been the cause of the occlusion so that the occlusion could be back in line with the chewing system of the patient. If the disorder has been suffered for too long, however, that kind of treatment would not be sufficient since the acute occlusal disorder will cause a joint temporomandibular disorder followed by orofacial pain.[2,3]

Oftenly, a dentist does not take into consideration on the disorder of the jaw joint in doing his treatment since there are limited information on how to deal with the temporomandibular joint disorder. The disorder could be triggered by related multi factors which have reciprocal influence one to another. There are three other supporting factors on the disorder of temporomandibular joint, such as: Neuromuscular, skeletal and dental, as well as the existence of stress which is enough to create muscle strain.[1,4]

The disorder on temporomandibular followed by orofacial pain due to the occlusal disorder has been the disorder often found in the clinic. The occlusal disorder itself could caused by several factors, for example, the acute abrasive teeth caused by bruxism,[4,5] the chewing

habit with only one side which is often called unilateral chewing, lost of teeth, tooth caries, the imperfect shape and position of teeth, or even the incorrect adjustment of teeth, the occlusal disorder, however, could provide various adaptation to each patient.[5]

The treatment of the joint temporomandibular disorder caused by occlusal disorder, is less effective if the patient is only given medicine to cure the infection or pain killer without handling the main problem, which is the occlusal disorder itself.[6]

As an alternative to this treatment, it is needed to conduct preliminary treatment with a temporary tool on occlusal and tooth incision which is called occlusal splint.[3,7] Occlusal splint is a tool made of acrylic and installed on the top or bottom jaw, the position has to be in contact with the whole teeth surface and fixed on its place since the acrylic is placed deep inside to the undercuts within the teeth proximate. The main objective of the occlusal splint is to eliminate the occlusal disorder by changing the connection between the top and the bottom jaw determined by the intercuspation (Figure 1).[7]

The other use of occlusal splint is to control the pain of the dysfunction temporomandibular joint muscle which is related to the teeth touching disorder.[8] Occlusion has been of of the most important factors in the dentistry since the success or failure of a dentist depends on the ability to treat physiological occlusion on a patient even if it is only a simple tooth patching which will change the way of a patient to bite which can be uncomfortable to the patient.[9]

The occlusal disorder can be defined as the deviation from the normal occlusion (both from the shape and function) or an unstable condition which creates pressure at the time of chewing and bruxism pattern as well as pressure on the tongue and lips. The occlusal disorder has also been the deviation from normal occlusion and hypermobility and the result of the occlusal trauma.[10,11] The occlusal disorder can cause temporomandibular joint dysfunction.

CASE

A male patient, 43 years of age, an entrepreneur, shows up with the pain on the left jaw joint. It has been checked by a dentist and an adjustment has been conducted on the left bottom left region jaw, the jaw radiation and the pain killer has also been given to the patient. The pain, however, remains. The patient has been using portable false teeth for 13 years with the broken false teeth wire. The last extraction was done 5 years ago on the bottom right region. The patient is asking for the jaw joint treatment for the better. On the extra oral examination, on the left temporomandibular, it is found that the clicking occurs when the mouth is opened, the firm palpation and the intermittent pain.

The intraoral examination suggests the following lost teeth: 17, 18, 23, 24, 25, 27, 28, 36, 37, 38, 46, 48 teeth with patch up: 14, 16, 26, 35, 44, 45, 47, teeth with attrition: 11, 12, 13, 21, 22, 31, 32, 41, 42, and tooth with rotation: 15 and the panoramic as well (Figure 2).

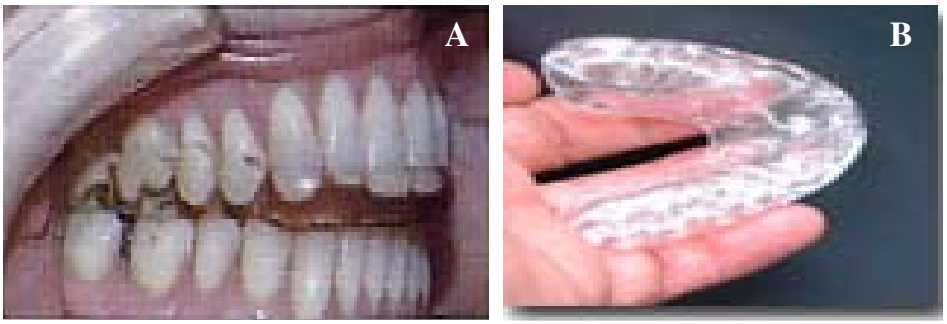

Figure 1. A) Occlusal splint in use (intra oral). B) The occlusal splint.

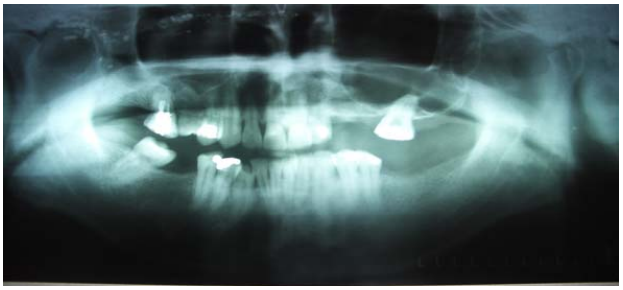

Figure 2. Panoramic rontgenographic of the patient.

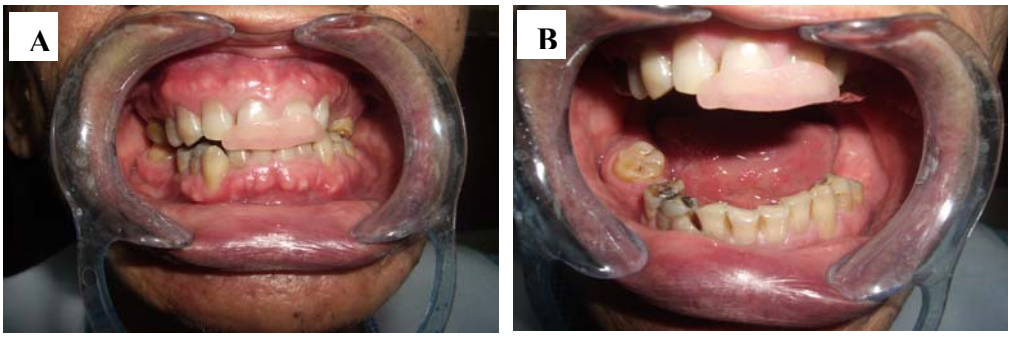

Figure 3. Jig in use (intra oral). A) In centric occlusion; B) In open mouth condition.

Figure 4. Patient position in centric relation.

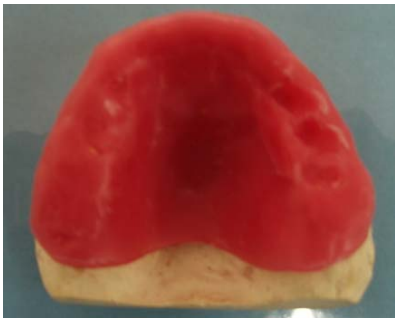

Figure 5. Wax impression.

CASE MANAGEMENT

To handle the emergency or the acute pain, the installation of the occlusal pemogram (Jig) with cold curing acrylic was conducted on 11, 21. Jig was made by the following steps: brushing part of the teeth 11, 21 with sterile vaseline separator. Next, dough was made using cold curing acrylic which was then applied directly to the teeth surface in accordance to the jig design. The patient wass then instructed in the protrusive movement to achieve the jig thickness to 2 mm. After the material set, the retruded cusp position was checked in the palatal part, which was adjusted to the movement limit of mandibula and the result was a recorded spot on the functional movement. Jig was ready to use, figure 3.

Then, the wax molding was implemented for the centrically connection and the occlusal molding position The result of the wax molding was actually the biting records along the protrusive and lateral movement needed to be installed on the semi adjustable articulator (Dentatus).

Method of molding: The patient was sitting straight up with the chin pointing up and the jaw in centric relation (Figure 4). Two plates of red wax is softened and put on the occlusal top jaw (on the working model) which fits with the shape of the palatum of the patient. Finally, the wax plate was inserted into the patient's mouth.

The patient was guided to close the jaw so that the top and bottom occlusal teeth could be recorded. The molding of the occlusal wax was then taken out from the mouth. The excessive wax was the cut off with scissors as in figure 5. Protrusive molding: The bottom jaw was upright 5 mm, this condition will make angle with approximately 2° of accuracy. Lateral molding: The bottom jaw was shifted to the lateral for 5 mm. The non working side also makes angle with approximately 2° of accuracy.

To check the relation of the working occlusal model in the articulator starting from the cusp initial occlusion to the protrusive and lateral for 5 mm. Putting up the 5 mm red wax in the molding part pacing up to the bottom jaw to mould the protrusive and lateral position on both sides of each part of the non working part. Repeating the softened wax molding and inserted to the teeth in the patient's mouth, to guide the bottom jaw to move protrusive and laterally for each molding process so that condillus shifting exists for 5 mm. The molding is taken out from the mouth and put in the working model of the bottom jaw, and its steadiness was examined.

The making of the molding pattern on functional occlusion is based on the occlusion pattern on the patient by marking it with color. The occlusal pattern covers the contact of the teeth on retruded contact position = RCP, on Intercuspal contact position = ICP, on working side contact position = WSCP, on non working side contact position = NWSP and on Protrusive contact position = A-PCP or P-PCP (Figure 6). This is to differentiate the position of the functional occlusion pattern and can be used

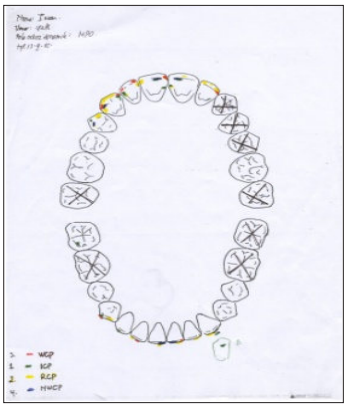

Figure 6. Result of the pattern of functional occlusion.

Figure 7. Model in semi-adjustable articulator.

Figure 8. Permissive occlusal splint.

Figure 9. Directive occlusal splint.

as a guide in the arrangement on occlusion pattern in the articulator, as in figure 7.

To conduct facebow transfer, it was needed to make an imaginary line from other canthus ketragus and to determine condilli point which is about 12 mm from the tragus. Continue with the installation of bite fork on the top jaw with the help of the red wax and putting the orbital pin pointer at the base of the orbital bone. After the facebow molding was gained, the immediately the facebow transfer is released from the patient.

The making of permissive and directive occlusal splint was started with the making of the occlusal splint with the waxing process using the blue wax on the working model in the articulator which was in accordance with the occlusal splint design. Then, the planting was conducted in a cuvet, after that the wax was dismissed and the acrylic filling using the transparent heat curing acrylic before the brushing. In inserting occlusal splint, the occlusal has to be stable within the teeth and the patient should not feel any pain since the teeth are not pressed by the occlusion.

Control I was conducted one day after the insertion with the permissive occlusion. The patient does not longer feel any pain on the joint area, move the jaw for approximately two finger wide, temporomandibular joint shall slide smoothly.

Entering control II (One week after the use of the permissive occlusion, the patient should feel calm, there are no worries present, the examination of intra oral and the reading of the panoramic photo on the left joint. No disorder present, and then the replacement of the permissive occlusion with the directive occlusion (Figure 8).

Control III (One day after the use of the directive occlusion). No complaint and no disorder. The patient should feel that the position of the occlusion was more stable using directive occlusion, movement of the mouth was about three fingers wide.

Control IV (two weeks after the use of the directive occlusion). No complaint and no disorder. The occlusion position was more stable with the directive occlusal splint and the next step was to provide the definitive proteases in accordance with the guide to directive occlusion (Figure 9).

DISCUSSION

Based on the complaints, history and treatment that has been conducted to the patient who has been complaining about headache and the jaw joint and at the same time the pain from the teeth which has been adjusted, the patient also complains about the sound which initiated from the joint when the lower jaw is moved, the pain that often exists, sometimes it diminishes, the most common symptoms which make patient seeks for treatment. Clinically, in this

case, the patient has been suffering from temporomandibular joint disorder, the patient sometimes has difficult times in differentiating the source of pain from the adjusted teeth or from other source.

Each and every person has different pain limit and different pain acceptance, and this condition is caused by psychological factors.[11] The edge of the sensitive tooth could initiate a headache and jaw joint, which also might be followed by clicking to the patient. This has to do with the disharmonized occlusion which results in disorder on temporomandibular joint. The complain of the pain is the most often complaint. This condition could occur in the morning, in the middle of the day or during the night when the mouth is opened. The clicking sound also occurs when the mouth is closed and this condition is called reciprocal clicking.[5,12]

It is found that during the clinical and radiological examination, the patch up is in poor condition on teeth 35, 44, 45. Especially, on teeth 44 and 45 the overhanging patch up is found, whereas on tooth 35, the adjustment of the occlusion is detected. This condition does not show the occlusal harmonization.

The lost of posterior 17, 18, 24, 25, 27, 28, 36, 37, 38, 46, 48 have caused the excessive closing of the upper jaw. In turn, condilli is pressed to the posterior part. As a result, pain occurs around the joint, and sometimes followed by headache.

The excessive muscle contraction could be initiated by the lost of bilateral posterior teeth. Spasm could cause pain and limited movement, other than that, the jaw position shall shift so that the teeth do not experience the right occlusion. If this condition keeps occurring, the teeth shall adjust themselves and occupy the new position so that the condyle shall not be in centric relation.[6,13]

The occlusal disorder could initiate mastikasi muscles along with their nervous system which will result in stomagtognatic dysfunctional system. The chewing system dysfunction could stimulate neuralgia trigeminal.[11] Predisposition factor is the excessive factor from the chewing muscle which is connected to bruxism for the whole night and followed by jaw stiffness when the patient wakes up and trismus. Low intensity pain is suffered during the day due to the activities which sometimes need more attention. Muscle contraction has been the manifestation of spasm in the long run. On the above case, other than the mastikasi muscles as the source of pain, other factors such as emotional stress could also be considered as the etiology factor, that is problems on the patient working condition. So, there are several factors related to the joint disorder which are related to each other.

Based on the anamnesis, clinical examination and radiology, it has been found that the diagnose on the patient with "Temporomandibular Joint disorder" is caused by occlusion disorder. The initial treatment on this case is focused to overcome the existing pain, which is conducting a biting test using *cotton roll* for approximately five minutes, until the patient should feel much better from the initial condition. Afterwards, 'jig" is installed on the top anterior jaw using cold cure acrylic.

After the pain fade away, immediately replaced by occlusal splint. The tool chosen for the first time is permissive occlusion in which the occlusal surface and incision are slippery so that the friction is smooth, sliding without any obstacle. This tool is to free the intercuspation from the touching teeth, which will make neuromuscular reflex disappear, and muscle shall function according to the regular interaction which could make the cause and the effects of the functional irregularity.[7,14] The use of the occlusal splint shall add the vertical dimension to the patient. This shall place condili to the stable support to the fossa glenoid (centrically related), so in turn, it will decrease the pressure on the joint structure and the possibility of decreasing the muscle activities due to the muscle relaxation.[1, 17] The position of occlusion is changed, so the accuracy and the certainty of the proper position of condili joint shall be achieved. The occlusal splint changes the position of the lower jaw as opposed to the upper jaw which experiences the intercuspation, that is, rearranging the relation within the teeth by erasing the command to the muscle (muscle de-programmer) which causes the inaccuracy of the relation among the teeth.[7,16] The occlusion is used in a relatively short period of time, that is between 5–7 days or should not be more than 6-8 weeks. This is due to the effective time limit of neuromuscular in adapting in the relaxation period.[3,15]

Moreover, the permissive occlusal splint was replaced by directive occlusal splint since the above mentioned occlusal disorder has already been solved and the correct position of the occlusion has also been achieved, and the use of directive occlusion is still needed. The occlusion surface and the incision of this last tool are not slippery. It is, however, in a form of occlusal molding and the opposite tooth incision was given the occlusion so that the occlusal pattern becomes stable and is in line with the chewing system of the patient who is free of occlusal disorder. This directive occlusion is used in a relatively longer period of time than the permissive occlusion to give the chance to the occlusal pattern to adapt to the new occlusal position.[3]

The patient's evaluation is conducted regularly. Control is carried on until the patient does not have any complaints and disorder around the joint area. When the jaw is opened and close, the temporomandibular is sliding smoothly. This reflects the condyle position is adapting to the new position on fossa glenoid.

The professional and consistent treatments are truly the key to success in managing the patient in curing the temporomandibular joint disorder. With the series of comprehensive treatment enable doctors to give opportunity in each and every step of comprehensive treatment to evaluate the next status for every chewing system and to provide time and accurate intervention when needed.

Based on the above explanation, it can be summarized that the use of occlusal splint could overcome the temporomandibular joint disorder followed by orofacial

pain since the use of occlusal splint would add vertical dimension to the patient. This shall place condyle to the stable position to fossa glenoid (centric relation). This shall also decrease the pressure on the joint structure and opens up the possibility to decrease the muscle activities due to muscle relaxation.

The position of occlusion is indirectly changed, so that the accuracy and the certainly of the true condyle joint position are achieved. The objective of the initial treatment with permissive occlusion, followed by occlusal treatment and occlusal adjustment with directive occlusion is to stabilize the occlusion position and to continue diminishing the uncomfortability from the previous treatment, so that the treatment progress is achieved. In addition, definitive prosthetic could be provided by using directive occlusal splint guide if the occlusal disorder has been overcome.

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