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Case Report

The management of over closured anterior teeth due to attrition

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ABSTRACT

Background*: Tooth is the hardest tissue in human body, that can be injured because of attrition process. For old people, denture attrition process is caused by psysiological process relating with the mastication function which also supported by some bad habits such an bruxism, premature contact, and consuming habit of abrasive food. Attrition or abrasion can also be happened with patien't dentition who does not have teeth subtutition for long time due the lost of their maxillary as well as mandibulary. The pasient will loose their vertical dimension of occlusion, injure, and the lower jaw becomes over closed which is called over closure.* ***Purpose****: This article reported the management of over closured anterior teeth due to attrition.* ***Case****: a seventy six year old woman patient came to Prosthodontic Clinic in Faculty of Dentistry, Airlangga University, to rehabilitate her upper and lower severe attrited anterior teeth and her posterior teeth. The patient has experienced of wearing acrylic removable mandibular partial denture ten years ago. Unfortunaly, the denture was uncomfortable, and she did not wear it anymore since five years ago.* ***Case management****: The severe attrition of anterior teeth with the lost of occlusal vertical dimension can be treated by improving the occlusal vertical dimension gradually. The treatment is then followed by the increasing of the height of the anterior teeth by lengthening the crown teeth of upper jaw with 12 units of span bridge and the acrylic removable partial denture of lower jaw.* ***Conclusion****: The severe attrition of anterior teeth with the lost of occlusal vertical dimension can be treated by improving the occlusal vertical dimension gradually, using long span bridge and acrylic removable partial denture.*

Key words: *attrition, over closure*

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INTRODUCTION

Tooth is the hardest tissue in human body; however, this tissue can be injured because of attrition process. For old people, the dental attrition process is caused by physiological dan pathological processes. Physiologically, it is related with the mastication function which supported by any bad habits like bruxism, premature contact, and consuming abrasive food, while pathologically is caused by endogenous or exogenous factors as well as by para function. The causes of attrition itself can be mechanically and chemically classified, mechanically in the form of attrition and abrasion, while chemically in the form of erosion.[1,2]

Attrition or abrasion can also be happened with patien't dentition who does not have teeth subtutition for long time due the lost of their maxillary as well as mandibulary. The pasient will loose their vertical dimension of occlusion, injure, and the lower jaw becomes over closed which is called over closure. Under this condition, the patients tend to move the mandible forward and used their anterior teeth for mastication resulting attrition and abrasion on the anterior teeth.[2]

Over closure is an occluding vertical dimension that results in excessive inter occlusal distance when the mandible is in the rest position. It results in reduced interidge distance when the teeth are in contact.[2] Over closure is signed by a deep fold at the corner of the mouth. In this condition the patients normally get easily tired while masticating food, having problem with clicking of the temporomandibular joint, and having their lower faces on third shorter.[1]

There are two kinds of vertical relation, first is when the teeth contact in centric occlusion. The second one

is when during rest position. The rest position is neutral position of mandible when the muscles of the mouth are opening and closing in balance (minimal muscle tonus). The difference between the two vertical dimensions is called free way space which usually about 2–4 mm. If the free way space is more than 2–4 mm, it will indicate that over closure occurs.[4,5]

Several methods could be applied to determine the occlusal vertical dimension. The first method is Niswonger, the occlusal vertical dimension is obtained from jaw vertical dimension during the rest position subtracted by free way space (2–4 mm).[5] Second method is Willis, the distance between nasal base to the point below the chin when the teeth or bite wall contacts.[4] Third method is Silverman using phonetic method, in which the patient is asked to say such as "yesss" (words containing 's' letter), and then the distance between it is noted from incisal edge to the most maximum line of occlusal contact when 's' sound is produced.[6] In this case, incisal gap is about 2–4 mm similar to free way space.

The lost occlusal vertical dimension in long term can influence the appearance of the face, so it will look older, and in severe condition it may cause angular cheilitis.[7] When the occlusal vertical dimension is lost, a therapy should be carried out to improve the vertical dimension. Some kinds of therapies can be conducted, for example by lengthening the crown, doing the orthodontical tooth movement, repositioning teeth by surgical procedure, or making substitute of removable dentures.[8] Maryono[3] did the over closure therapy by heightening the occlusal vertical dimension gradually. The result of her therapy was the disappearing of the over closure symptoms in two weeks until one month. The patient are also satisfied since they can get mastication comfort and aesthetical face again.[3]

The purpose of this case report is showing the treatment of a patient who had severe anterior teeth attrition with over closure and temporo mandibular joint problems.

CASE

A seventy six year old woman patient came to Prosthodontic Clinic in Faculty of Dentistry, University of Airlangga, to rehabilitate her upper and lower severe attrited anterior teeth and her posterior teeth. The patient has experienced of wearing acrylic removable partial denture of lower jaw ten years ago. Unfortunaly, the denture was uncomfortable, and she did not wear it anymore since five years ago.

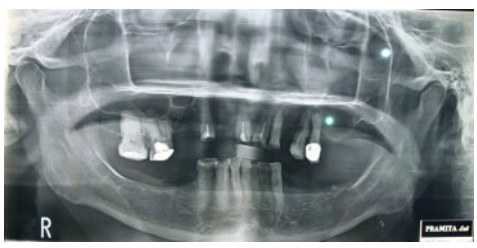

Figure 1. Panoramic photo of the patient showed severe teeth attrition and several posterior teeth lost.

CASE MANAGEMENT

During the clinical examination of temporomandibular joint, it was found a clicking in the left and right temporomandibular joint, that made the patient felt uncomfortable. The intra oral examination, found the lost of 12, 14, 15, 23, 26, 27,34, 35, 36, 37,46, 47, and affected by attrition 11, 13,21, 22, 31, 32, 33, 41,42, 43, 44, and deep bite in anterior relation (over closure). Morover after taking panoramic photo of the patient's dentition (Figure 1), it was showed that there were lost teeth and post endodontic treatment on 11, 21, and 22.

Anatomic duplicate of her upper and lower jaws impression was conducted by using stock tray with irreversible hydrocolloid materials and was casted with type II of hard gyps in order to make diagnostic model or study model (Figure 2).

Figure 2. Diagnostic model of upper and lower jaws.

The examination of occlusal vertical dimension with Niswonger's and Willis's ways were conducted by concerning with the appearance of the patient. The measuring result of vertical dimension of occlusion was 61 mm, and the rest position was 69 mm. It means that the occlusal vertical dimension is lost or reduced. In conclusion, the rest position was subtracted by the occlusion position, 69 mm – 61 mm = 8 mm, and then was subtracted by free way space. The result of the lost vertical dimension of occlusion was 8 mm – 4 mm = 4 mm. Then, the diagnostic wax up for upper jaw model was taken by heightening the bite, about 2 mm (Figure 3).

Figure 3. Diagnostic wax up of maxillary model.

Figure 4. The lengthening of anterior teeth and lower jaws with composite.

Diagnostic wax up were a long span maxillary bridge and heightening crown of mandibular anterior teeth which was for her lower jaw. Both diagnostic waxed up were made by using wax material. The improving process of the lost occlusal vertical dimension was taken gradually conducted. The first stage, the restoration of the 33, 32, 31, 41, 42, and 43 were conducted by lengthening incisal, 2 mm, with of composite restoration A3 and A1 to improve the aesthetics and heighten the occlusal vertical dimension (Figure 4). Then the patient was evaluated for two weeks. The patient had no problems with her temporomandibular joint. The second stage was the preparation process of these teeth mention 11, 13, 21, and 22 (Figure 5).

Figure 5. Upper jaw teeth preparation.

Figure 6. The temporary bridge of upper anterior teeth.

The making process of temporary bridge of upper jaw for 11, 12, 13, 21, and 22 was conducted followed by the heightening process of occlusion about 2 mm of the temporary bridge in order not only to maintain the aesthetics and to improve the vertical dimention of occlusion, but also to treat the over closure condition of the patient. Temporary bridge was by self curing acrylic (Figure 6).

The teeth should get anesthetic treatment 16, 24, and 25 as the preparation for making the long span bridge with 12 units made of porcelain materials fuced to metal materials. Therefore, the final formation after the preparation of gingival margin area was in ridge form, meanwhile pontic form facing the gingival for anterior teeth was ridge lap, and for posterior teeth was sanitary. During the important preparation, the parallel position of axial areas of all supporting teeth must be concerned by using an aid tool, paralelometer, in order to make the insertion process of the long span bridge more easier. After the preparation process, the duplicating process with irreversible hydrocolloid materials and cast with the type III of hard gyps was conducted. The next step was having correction of the parallel position among the prepared teeth with paralelometer tool that has parallel axis must be conducted on the model.

The making of the long span bridge for 11, 12, 13, 14, 15, 16, 21, 22, 23, 24, 25, and 26, and the cantilever design for 26 with porcelain fuced to metal materials were conducted in order to find out the occlusal area of upper jaw appropriated with curve of Spee (Figure 7-A). After the making of the long span bridge is finished,it was inserted into the patient.

The next stage was the making of acrylic removable partial denture for lower jaw. The 34 was given two finger-wrought wire with rest mesial, meanwhile 43 was given Gilet clamer (Figure 7-B).

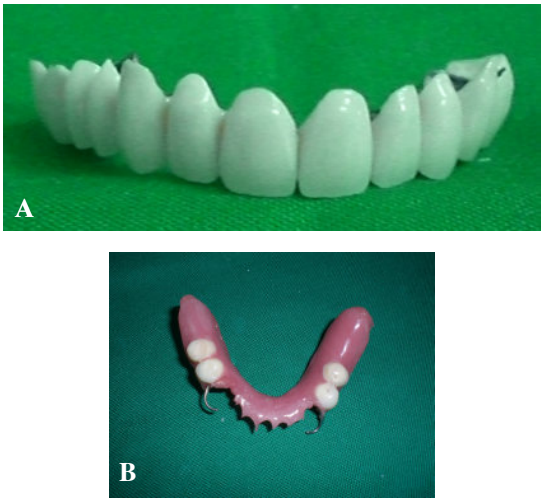

Figure 7. A) The long span bridge of upper jaw; B) The lower jaw acrylic removable partial denture.

Figure 8. The upper jaw long span bridge and the lower removable partial denture inside the mouth.

During insertion the acrylic removable partial denture of lower jaw, the correction of occlusion must be conducted by articulating paper in order to obtain stable occlusion. After being polished, the acrylic removable partial denture was inserted into the mouth of the patient (Figure 8). Controls are conducted of the first and the seventh day after the insertion. There is no problem during the usage of acrylic removable partial denture.

DISCUSSION

The most common problem occurred is concerning with the severe problems of dental and periodontal damage treated by tooth extraction. Therefore, in order not to reduce further problems of mastication process caused by the tooth extraction, the use of the removable partial denture or the fixed bridge should be done.

The substituting of the lost teeth in upper and lower jaws by using the fixed bridge and the removable partial denture is not only to improve the function of mastication, talking, and aesthetics, but also to maintain the health of tissue in the mouth. The abnormality of the occlusion contact will occur when there is failure in the mastication system. It can disturb the movement that is supposed to be smooth among the teeth of upper and lower jaws. The failure of the mastication system then can cause the irregular movement pattern of lower jaw compared to what usually occurs in the normal condition since everyone will always tend to try to find a new movement pattern considered to be more comfort.[9]

During preparation of teeth, the spring line must be concerned in order not to obtain difficulties during the insertion process of the long span bridge. Moreover the colar of long span bridge must also be appropriated with the color of the original color of the patient's teeth in lower jaw.

In order to obtain the treatment result of the fixed denture that meet the aesthetic aspects and the health requirements, it must be concerned with some factors like the relation between the teeth and the curve of the jaw, the health of the periodontium tissue, gingival retraction, the formation of dental anatomy, the pontic form like ridge lap, and the color of the facing fixed denture that must be appropriated with the original color of the teeth. The restoration of the dentures in this case involves regio anterior and regio posterior of upper jaw. This condition is also followed by the decreasing of occlusal vertical dimension.

The treatment for this case is the long span bridge. The reason is because of its rigid characters that can avoid the fracture during the restoration, and therefore the apportionment of load can have the occlusion balanced for all the jaw curves.[10]

In other words, the restoration of the long span bridge that has rigid character can distribute the load more balance on the teeth of the antagonist jaw. Besides, the long span bridge that exceeds the median line connecting the right and left sides of the upper jaw can hopefully have the balanced occlusion. In order to obtain the balance occlusion and stable denture, furthermore, there must be occlusal contact on working side. The contact must occur contemporaneously in working side of the fixed denture of upper jaw and the acrylic removable partial denture of lower jaw in order to spread the accepted load. It was conducted by doing occlusal adjustment to the patient's denture.[11]

Moreover, 31, 32, 33, 41, 42, 43, 44 of lower jaw must be treated by the heightening of the bite with the increment of initial part of those teeth in order to improve the occlusal vertical dimension and over closure. The heightening of the occlusal vertical dimension must be done gradually in order to let the muscles of the mastication adapt to the new occlusal vertical dimension.

The long span bridge with cantilever design for 26 of upper jaw was chosen. The design was possibly chosen since the antagonist tooth using the acrylic removable partial denture which has smaller mastication ability than the original one. To find out the occlusal area of the long span bridge of upper jaw, it must be appropriated with the curve of Spee of upper jaw, meanwhile the curve of the teeth must be appropriated with the curve of the jaw.

According to Hickey *et al*.,[5] over closure is a problem of tempororo mandibular joint with the symptoms like sharp pain in temporo mandibular joint, discomfort, clicking, dizzy and neuralgia. The problem of ear function is caused by the decreasing distance between upper jaw and lower jaw, so the tongue will move to the backside caused the near tissue pushed and therefore closed the Eustachian hole caused the problem of ear function. The occlusal vertical dimension that is too much low can cause condili move forward and push the front part of fossa articularis. The continual pressure can cause sharp pain around jaw joint that sometimes can cause dizzy. By improving the occlusal vertical dimension gradually the condili must gradually be repositioned into the original position in articularist fossa. Because of the movement of condili gradually to the original position, then the pressure on fossa wall can be elimanated.[5]

Problems with temporo mandibular joint can also cause headache and tinnitus. Over closure caused by the lost of teeth can also cause Costen's Syndrome with initial symptoms like tinitus, vertigo and dull pain around the ears.[11]

Actually, all of the over closure therapy taken for any cases are followed by the improving of occlusal vertical dimension. Though the improving of occlusal vertical dimension can change the position of lower jaw that then causes the elongation of the muscles of mastication, it still can not cause any symptoms in patients as long as it is not more than the appropriate vertical dimension of occlusion.[12] Meanwhile, much increasing of occlusion vertical dimension can cause the lost of free way space, inflammation on the tissues under the removable denture, pain in muscles, reabsorb of residual alveolar bone, horse

sound producing, sounds p,b, and m becomes unclear since the mouth can not close completely in which symptom of temporo mandibular joint syndrome then becomes increasing due to the load relating with joint.[13]

The improvement of occlusal vertical dimension is generally to reduce occlusal trauma of all chewing system, headache, by increasing functional comfort, improving aesthetics and stability, reducing temporo mandibular joint syndrome, and improving the occlusal damage because of the use of dentures.[12]

In conclusion, the severe attrition of anterior teeth with the lost of occlusal vertical dimension can be treated by improving the occlusal vertical dimension gradually, using long span bridge and acrylic removable partial denture.

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