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CASE REPORT

Periodontal Splinting Choises For Patient With Edentulous

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ABSTRACT

Background: *Mobile tooth is a problem that often occurs and result in tooth loss. It caused by disease or periodontal tissue's injury. Splint is a device that is made to stabilize or tighten mobile tooth due to a trauma or disease. It works by distribute the occlusion pressure to reduce tooth mobility. Removable partial denture frame is one treatment for missing teeth and permanent splints.* ***Objective:*** *The aim of this treatment is to explained effect of periodontal splints for edentulous patient.* ***Case:*** *First case: A woman complained mobile teeth on the incisors. Intraoral examination showed remaining teeth couldn't be abutment. Second case: A woman complained mobile teeth on the incisors. Intraoral examination showed remaining teeth could be abutment.* ***Case management:*** *First case: Patient was given initial therapy and continued with rehabilitative therapy by removable partial denture metal frame. Second case: Patient was given initial therapy splinting using fiber reinforced composite. A week post treatment patient felt comfortable.* ***Conclusion:*** *It can be concluded periodontal splinting reduced teeth mobility and prevent further damage to the periodontal tissue og Edentulous patient.*

Keywords: *Removable partial denture, splinting, frame*

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INTRODUCTION

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Periodontitis is inflammation of periodontal tissues characterized by the formation of pockets and resorption of alveolar bone. Periodontitis can cause teeth to loosen and fall out of their socket. The initial teeth treatment for periodontitis with mobility is splinting. Splinting is a treatment that aims to stabilize or reduce the degree of tooth mobility, while a splint is a tool or material that serves to stabilize and tighten loose teeth[1]. Splinting is indicated for mobile teeth and caused discomfort to the patient[2]. Periodontal splint works by dividing the occlusal pressure across the teeth's surfaces to prevent further damage of the mobile teeth. Periodontal splint is used when the adaptive capacity of the periodontium has been exceeded and the degree of mobile teeth is incompatible with masticatory function[3].

The important thing to do for splinting is selecting an abutment tooth. While selecting an abutment tooth for splinting one should always considet the pericemental area of an abutment tooth. Ante postulated that "The total periodontal membrane area of the abutment teeth must equal or exceed that of the teeth to be replaced." Patient with edentulous area should give special attention when determinint the type of periodontal splint. When ante postulated law is not fulfilled, it can cause an increase in periodontal tissue damage[4].

Type of periodontal splints are classified according to time and shape. The type of splint according to time is a temporary splint and permanent splint, while based on its shape it can be a removable splint or a fixed splint[5]. Temporary splint can used with composite. The use of composite as base materials began to be developed to increase splinting strength which is currently widely known as Fiber Reinforced Composite (FRC), a fiber that is easy to manipulate, aesthetically pleasing and can be embedded in a resin structure[6]. One type of permanent splint is a removable partial denture metal frame[4].

Removable partial dentures are denture that aim to replace part of the missing natural teeth and can be removed and installed by the wearer themselves[3]. The purpose of denture is to restore stomatognathic functions, masticatory, phonetic, aesthetic functions and maintain the condition of the remaining tissues. Denture helps to regulate functional forces to be evenly distributed so as minimize stresses that could potentially damage the periodontal tissues on other teeth[5].

Removable partial denture can function as periodontal splint when the condition of the periodontal tissues in the remaining teeth is not good[2]. Removable denture partial metal rame is ideal periodontal splint compared to acrylic denture. Removable partial denture metal frame can be made narrower, thinner and stronger, and stiffer to achieve the ideal design[4]. The objective of this treatment is to explained effect of periodontal splints for edentulous patient.

CASES

Case 1:

A 46-years-old female patient came to dental hospital loose front teeth and only a few remaining teeth. The patient complained of difficulty speaking and eating. The patient wanted treatment for the loose teeth. The patient's tooth was extracted 6 months ago. The medical history of the patient revealed that the patient was in good health with no history of any systemic disease and or condition. She had no known drug allergy and was not taking any medication. The results of the general condition of the patient, BP: 127/68 mmHg, pulse: 69x/minutes, RR: 18x/minutes. Extraoral examination: face is symmetric, there is no swelly of lymph nodes and palpation (-). Intraoral examination: edentulous area 16, 15, 14, 13, 23, 24, 25, 26, 37, 36, 34, 44, 45, 46.

Case 2:

A 42-years-old female patient came with loose front teeth since 2 years ago and felt uncomfortable. Intraoral examination revealed reddish-colored gingiva on teeth 13, 12, 11, 22, 23, 25, 27, 28, 34, 33, 32, 31, 41, 42, 44, 45, 47. Unstippling gingival texture on teeth 17, 14, 12,

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25, 27, 33, 32, 31, 41, 42, 43. Consistency: firm. Gingival recession was found in teeth 14 (3 mm), 13 (4 mm), 11 (2 mm), 23 (4 mm), 25 (4 mm), 35 (3 mm), 34 (3 mm), 33 (3 mm). mm), 32 (3 mm), 31 (3 mm), 41 (3 mm), 42 (3 mm), 43 (3 mm), 44 (3 mm), 45 (3 mm). Mobility of teeth 31 and 32 degrees 1), teeth 41 and 42 (degrees 2). Edentulous area on 36 and 46. The results of the examination showed that the patient's diagnosis was chronic periodontitis of teeth 31, 32, 41, 42. The posterior teeth were still sufficient and adequate to be used as abutments, so the treatment plan for the patient was a periodontal splint using fiber.

Figure 1. Intraoral examination

CASES MANAGEMENT

Case 1:

Initial treatment, patient was given scaling, root planing, moulding maxilla and mandibula (figure 1).

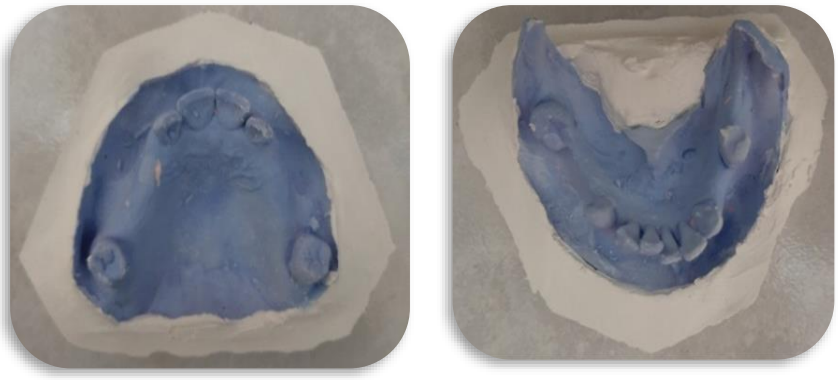

Figure 2. Moulding with mucostatic technique

On the next visit, tried in individual tray and made Border Molding. The patient was instructed to come and then tried in border molding, preparationed of occlusal rest and

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changed of amalgam filling to composite. Patient treatment was continued with mucocompression molding to imprint the muscles and areas that would support removable denture retention and stability (Figure 2).

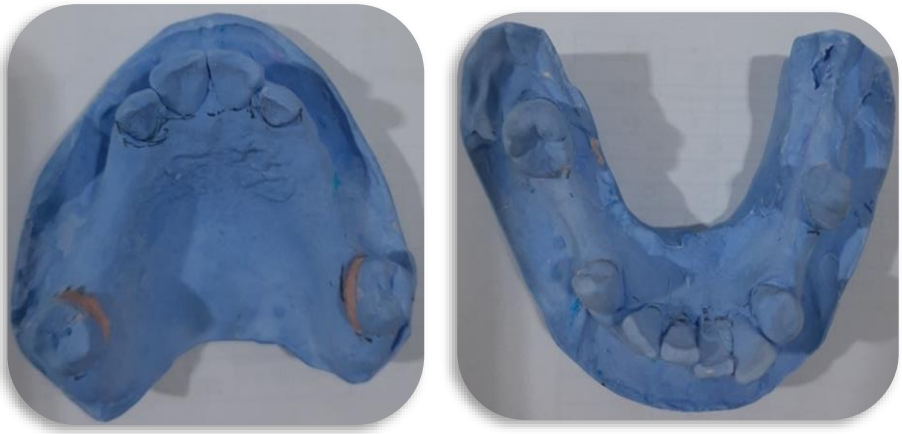

Figure 3. Mucocmpression molding

On the fifth visit (Figure 3) the patient came for try in the metal frame which was tested on the patient directly by evaluating the retention, stabilization and distribution of occlusal forces on the loose teeth. The patient was instructed to come the following week (Figure 4) for try in the baseplate and biterim and doing Maxillomandibulo Relationship (MMR). The patient's next visit was carried out try-in dental elements (Figure 5). After the results of the try-in match the working model, it can be entered into the dental laboratory for processing

Figure 4. Try in frame

Figure 5. Try in base plate and bite rim

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Figure 6. Try in dental elements

The last visit took the finished denture and inserted it into the patient (Figure 6) and was given instructions regarding the use and care of the denture. The patient was instructed one week later to be evaluated on removable partial denture. The results of the evaluation, the patient feel more comfortable when eating and talking because the teeth do not feel loose anymore.

Figure 7. Metal frame removable partial denture insertion

Case 2:

On the first-time round, a full-mouth scaling and root planning were performed a week later as well as polishing of all the rough dental surfaces and was followed by occlusal adjustment. The splint installation procedure was started by measuring the fiber length as needed in the dental model from teeth 34 to 44 using dental floss, then prophylaxis was carried out. All labial and lingual surfaces were cleaned with a pumice and a low speed hand-piece. Fiber is taken using tweezers and then the fiber is cut according to the required amount. Fiber should be kept out of light by placing it under a cover during preparation. Fiber is placed on a glass plate. The lingual part of teeth to be splinted was applied with 37% etching for 10 seconds, then rinsed dry and then isolated with a cotton roll. Bonding was applied with a microbrush, gently air-dried and curing for 20 seconds. Fiber in a closed container is applied composite with the help of a plastic filling instrument. Flowable composite resin is applied in a thin layer on the lingual of the tooth to be treated. A tooth-adjusted FRC is applied and gently pressed against each tooth. Make sure the fiber is not in

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the occlusion area. The fibers were pressed into the interproximal space, then curing for 5 seconds on each tooth. Then the entire fiber splint was covered with a thin layer of composite (0.5 mm). Then curing for 40 seconds. Fiber should not be cut when finishing/polishing the splint. Excess resin is removed with a composite finishing bur. Polishing was carried out using a hand-piece at a speed of 3000 rpm. Fiber should not be exposed. Check for occlusion by instructing the patient to do biting and chewing movements. The patient is asked whether there is a lump or discomfort. Then the patient was given education not to eat hard food first, not to play with fiber splints with the tongue, always maintain dental and oral hygiene by brushing teeth 2 times a day in the morning and at night before going to bed, brushing between teeth with an interdental brush, using a toothbrush with soft bristles, and came back for control after 7 days.

Figure 12. Extracoronal periodontal splinting using FRC

DISCUSSION

Loose teeth are a common problem in the oral cavity and can cause teeth to fall out of their sockets or avulsion. This condition can occur due to injury or disease of the periodontal tissues. Loose teeth can be physiological or pathological problems. Increased mobility of teeth can be caused by many factors, the most common factor causing loose teeth is inflammation caused by plaque accumulation and trauma from occlusion. Loose teeth is one of the clinical signs of periodontitis that occurs due to damage to the bone that supports the teeth, the expansion of inflammation from the gingiva to the deeper supporting tissues and the pathological process of the jaw that often occurs in chronic periodontitis patients accompanied by occlusion trauma, so that the reduction in the degree of tooth mobility is one of the causes of tooth loss, one of the main goals of periodontal therapy[6,7]. The degree of tooth mobility according to Miller is divided into 3, namely 1) Grade I: Slightly more than usual; 2) Grade II: loose teeth <1 mm; 3) Grade III: Loose teeth >1 mm horizontally with movement in a vertical direction.

The occurrence of loose teeth is divided into two stages, the initial stage is the intra-socket stage, namely the socket where the tooth is moving within the boundaries of the periodontal ligament. In the early stages of tooth movement about 0.05 to 0.10 mm due to a force of about 100 lb. The second stage is gradual and is associated with the elastic deformity of the alveolar bone in response to increased horizontal pressure. Treatment of loose teeth due to periodontitis is carried out in stages. These stages are the initial, surgical, rehabilitative, and maintenance stage. Splinting is an initial stage, in addition to splinting at this stage, occlusion adjustments are also made to eliminate any occlusive trauma that can interfere with treatment. Splinting plays a role in fixation

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of teeth so that the degree of tooth mobility is reduced and will gradually be followed by periodontal tissue repair.

There are various kinds of splints based on purpose, duration of use, and location. Ferencz classified splints into short-term splints, temporary splints, and long-term splints according to the necessity. Short-term splints are splints used for less than 6 months during periodontal treatment and may change for other types of splints[2]. A temporary splint is a splint that may be used from several months to years for diagnostic purposes, and usually leads to a more permanent type of stabilization. Permanent splints are worn indefinitely and can be repaired or removed. Splints are intended to increase functional stability and improve aesthetics in a long-term. This splint is usually placed only after completion of periodontal therapy and achievement of occlusal stability. Examples include Pin ledge type of abutment, clasped supported partial denture or better-known metal frame partial denture as in case[8].

In the first case, the treatment option taken to address the patient's main complaint was to make a removable partial denture with a metal frame. Making metal frame splinting aims to reduce lateral forces, masticatory force distribution throughout the teeth evenly. Adjustment of the occlusion prior to splint placement aims to eliminate premature contact and occlusal trauma, both primary and secondary, and to improve the condition of the temporomandibular joint. If the periodontal tissue is unable to withstand functional stresses, the teeth will be loose, this can interfere with function, especially in cases such as the patient above who has lost a lot of teeth[4].

For conventional splinting periodontal, joining teeth together in a splint system is an important method used to decrease mobility in cases of reduced periodontal support. Several biomechanical studies investigated the influence of bone levels and splinting on teeth with reduced periodontal support height. The reduced bone support and unfavorable crown to root ratio of an abutment will reduce the area of the periodontal ligament and also increase the leverage when a non axial load is applied. Removable metal frame partial denture showed an improvement in stress distribution to the supporting structures[10]. A review of removable partial denture as periodontal therapy pointed out that a tooth that has lost more than 50% of its bone support is indicates for removable partial denture for periodontal splinting[11].

In the second case, splinting treatment with FRC material was carried out because the patient's teeth were crowded so that the FRC could be attached to the tooth surface, besides that there were still teeth that could be used as abutments. The various FRC thicknesses can be adjusted according to the length of the tooth to be treated. FRC is a new invention, modern, effective, high aesthetic value, provides comfort for patients and is easy to clean. Fiber with FRC material can be used for palatal or lingual splinting, labial splinting or occlusal splinting[12]. The advantages of this material are that it is very easy to maintain, metal free, transparent, aesthetically pleasing, and looks natural. Fiber Reinforced Composite splint is a splinting material that combines the adhesive properties of a composite with the strength of a fiber. The combination of fiber and composite materials allows the splint to have a minimal thickness but remain strong. These two materials are chemically bonded thereby increasing the bond strength between the two materials and extending the splint's life span[13,14].

Fiber Reinforced Composites (FRC) also have several weaknesses, including the possibility of fracture and attrition of the occlusal part if there is excessive pressure. Delamination and secondary caries can also occur if the application of FRC to the tooth surface is carried out in an inappropriate manner. The mechanical properties of FRC can also decrease after hydrolytic aging[15,16]. After the splint was carried out, the patient was given some information for education related to the treatment that had been given, including not eating hard food first, not playing with the fiber splint with the tongue, always maintaining oral hygiene by brushing

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teeth 2 times a day in the morning and the night before going to bed, brushed between the teeth with an interdental brush, used a toothbrush with soft bristles, and came back for control 7 days later.

The important thing to note regarding loose tooth therapy is the patient's oral hygiene. Therefore, determining the design of dentures is very important so that patients can maintain oral hygiene independently at home and do not easily cause food impaction. Denture design is also important because it relates to periodontal health and its role in maintaining the stability of the remaining teeth. Determining the number of teeth that are guards is also something that must be considered so that the purpose of using dentures is achieved. Determination of the abutment teeth used is based on the ante law, i.e. the abutment teeth are at least as large as the missing teeth or loose teeth. Increasing the number of abutments can help increase the support for the periodontal tissues. In addition, it will reduce torsion and lateral pressure which has the potential to damage the periodontal tissue of the abutment teeth. In the condition that the abutment teeth have disturbances in the periodontal tissue, the use of more than one tooth can be an option as additional support[6].

CONCLUSSION

In the condition of loose teeth and many missing teeth, to restore stomatognathic function and reduce tooth mobility, periodontal splinting can be used. The choice of splinting with metal frame removable dentures can be an option when the patient has lost so many teeth that no abutment can be used. The use of periodontal splinting using FRC can be used on loose teeth with sufficient abutments.

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