Case Report

Importance of occlusal equilibration for partial edentulous prothesis with fixed gnatoprotetic devices

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ABSTRACT In the general economy of the functionality of the stomatognat system, an important role is held by the oclusal function, namely, both the dentodentary intra-arcades reports and also the dynamics of the inter-arcades reports which, when they are correct, contribute to the maintaining of the homeostasis of the system and when they are affected have traumatic consequences, of oversolicitation that can be polymorphly manifested at the level of the system's components. A pathological modification which affects a component of the stomatognat system produces also the deregulation of the others' functionality, entering a vicious circle of self destruction, installing thus the pathological state to the other components, producing the dysfunction of the stomatognat system. The prosthesation of the partial edentation through fix gantoprosthetic apparatus contribute to the recovering of function of the dentomaxillary apparatus, and the step of oclusal equilibration hinders the apparition of the oclusal trauma phenomenon. In this paper is presented a method of determination of premature contacts and oclusal interferences in a clinical case of conjunct prosthesation of a reduced partial edentation, having a prosthetic field showing deficits from the dento-parodontal point of view.

KEY WORDS *premature contact, oclusal trauma, oclusal equilibration*

Introduction

The modern concept of prosthetic treatment suggests the prosthetic need for an occlusal morphology to ensure both the transmission of the occlusal pressure in the long axis of the tooth and the occlusal reports in accordance with the criteria of functional occlusion, avoiding thus premature contacts and occlusal interferences which are the main generators of occlusal trauma. In this context, morphofunctional restoration of partially edentulous dental arch with the creation of a biological balance between conjunct prosthesis and prosthetic field depend on the dentoperiodontal tissue tolerance with whom the prothesis comes into contact whether direct or indirectly represents and represent an actual problem of dental prosthetics.

Material and method

Patient D.I. aged 25 presents himself to the Dental Prosthetic clinic for rehabilitation. He presents a lateral edentulous at the mandible which has not prothesis. At the same time he has painful symptoms at heat stimuli at the level of 47, showing a moderate occlusal cavity. After performing a clinical and radiological examination we observed the existence of 48 included partially in the submucous, it also showed an impairment of the apical periodontium of traumatic origin. After performing odontectomy on 48, we made vital extirpation of 47. The failure of permeability of the mesial canals leads me to choose the correct treatment of distal canal and preserve the distal root together with his coronary portion through the technique of coronary-root amputation (premolarization)[1,3,4].

Before hemisection I created an inoclusional space of about 2-4 mm at the level of 47, thus avoiding overloading it during the functioning of the dentomaxilar device [2].

In approximately 4 weeks the practitioner achieves the temporary prothetics of the edentulous part, prosthesis which is designed both to follow the bone remineralization process and the distal root immobilization. After 10 weeks I realized the final prosthesis for two partial edentulous due to two conjunct prostheses made of metal-ceramics. It is followed by the occlusal equilibration stage using the graphic intraoral registration technique. For this purpose it is used a partially programmed articulator and the Gerber set. This technique is used to fingerprint the dental arches in order to obtain working models to show exactly how occlusal surface is. The models are made of hard gypsum and are equipped with a removable base and a magnet which serve to highlight the discrepancy between the centric relation occlusion and maximum of intercuspidary [11].

Fig 1. Status of 48 during a retroalveolar radiography

A silicone is applied on the arch fork. The facial arch is applied on the occlusal surface of the mandibular arch and the mine is applied at the level of temporous-mandibular joint in contact with existing graph paper panel. The tip of the mine should be placed on the line that binds the tragus with the external angle of the eye, at 13 mm above the tragus[7]. Other authors recommend that the determination should be separate for right and left[7]. The recording of the jaw position in relation to the skull involves using facial arch transfer.

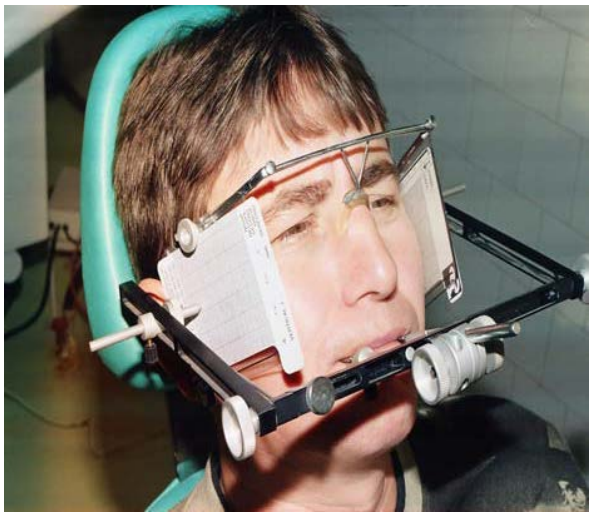

Fig. 2 Application of facial arch - overview

The practitioner leads the mandible in centric relation position after the patient performs several movements of opening and closing the mouth on the maximum distance of 20 mm[7].

The position of the marker mine changes until a single point is obtained corresponding terminal hinge axis. Next step is to determine the position of the jaw in relation to the skull, using the same face arch. For this silicone is further applied to record the occlusion at the level of the facial fork arch, this being applied on the occlusal surface of the maxillary arch.

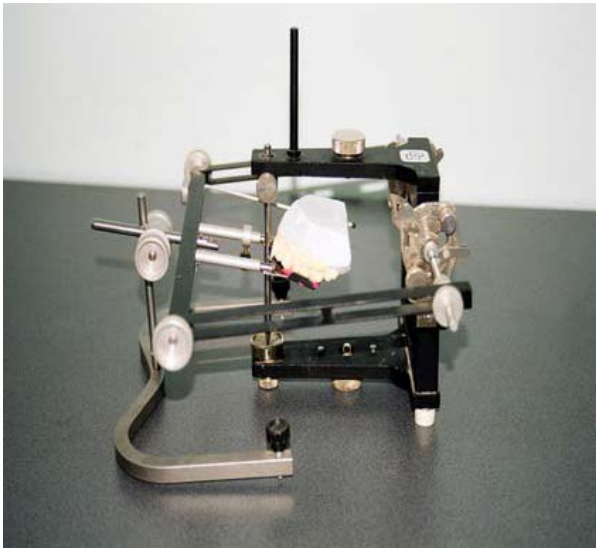

Fig. 3 Fixation of the jaw model at the level of the articulatory upper arm

Then by handling the screws that allow the movement of the metal parts with a sharp point, they are placed on the tegument of the terminal hinge axis, position in which the rods are fixed by tightening the screws, the occlusal part of the facial arch is fixed parallel to the Camper[7]. Depending on the marks determined by the facial arch, thus the attachment of the maxillary model is made at the level of the articulatory upper arm.

An important step is represented by the determination and recording of the centric relation position with the help of Gerber dental kit, consisting of a pin and a metal plate.

Both the needle and metal plate are placed in a prefabricated system adapted to the morphology of the two fields, maxillary and mandible[11].

In order to support the two components, one uses crochet wires that are applied interdentary. The metal plate is coloured with a special marker, it helps to highlight the gothic angle. The patient is instructed to close his/her jaws until the needle exert a slight pressure on the pad. Repetitive movement of the mandible are made whether to the right or left and forward on the plate highlighting the gothic angle. Then any movement stops, the registration plate of the prosthetic field is removed and on it a wax plastic disc provided with a hole is afterwards fixed.

Fig. 4 The fixation system of the Gerber set

This hole is placed strictly in the gothic angle[11]. The prosthetic plate is reintroduced in the prosthetic field, the patient brings the needle in contact with the plastic disk so that the disk enters the orifice. The movement stops and it is followed by the process of fixing the two arches in position using a silicone impression material of lutty consistency. With the help of occlusion keys that were previously established, the practitioner proceeds to mount the mandibular model on the lower arm of the articulator.

Fig. 5 Fixation of the mandibular model to the lower arm of the articulator

In the next phase, the occlusal surfaces are stained with a marker and to highlight the premature contacts and occlusal interferences, all are outlined with the help of the articulatory paper.

Results and discussion

Selective grinding used as means of treatment to reduce pain and suffering at the facial level is well viewed. Thus, a classical investigation to whom many practitioners refer to, evaluated a total of 32 patients with pain in the temporo-mandibular joint and facial muscles treated by using adjustment oclusal therapy[12].

Fig. 6 Highlighting premature contacts and occlusal interferences

Thus, 27 patients still had pain in their joint and facial muscles of different intensities while only 5 patients had muscle pain. Electromyographic recordings were made for each patient before and after conducting occlusal adjustment therapy for a period of one month. Patients were spread over a period of three years. The most consistent and significant occlusal interference which caused muscle spasms, pain, bruxism and dysfunction was the discrepancy between centric relation position and maximum intercuspidary[5].

Another study of 34 patients with occlusal dysfunction treated with occlusal adjustment therapy two and half years ago, showed that premature contacts in centric relation position especially the unilateral ones are very hard to eliminate[9]. Thus, 74% of these patients still had occlusal interferences, 41% had mild or no symptoms and 24% had no interference but had significant signs of dysfunction. The conclusion was that the dysfunction etiology is complex and multifactorial. Occlusal adjustment was also used to treat miofacial dysfunction syndrome caused by the existence of a lateral slide from centric position to maximal intercuspidary position[13]. A complete success was recorded in eliminating pain as a result of occlusal adjustment therapy. For three years a total of 56 patients with miofacial dysfunction syndrome were treated, the study showed that at 79% of them the symptoms didn't reoccur after oclusal adjustment therapy[15]. Total reduction of pain was reported in 64% of 154 patients with dysfunction syndrome whose symptoms limit the temporo-mandibular joint

movements, and for 34% of them a partial reduction in symptoms was reported.

It should be noted that in order to achieve optimum occlusal relation obtained by selective grinding, a careful health evaluation of the periodontium should be made, Recent studies showed that there is an interrelation between occlusion and periodontal diseases[8]. Thus, the installation of the occlusal trauma depends largely on the ability to withstand and distribute periodontium occlusal forces. To exceed this capacity means to produce various degrees of tooth mobility.

Occlusal adjustment was proposed as a method to control occlusal trauma. Thus, Muhleman showed that mobility value is 30% higher in teeth with hypofunction than in those with hyperfunction[10]. After establishing a bilateral balanced occlusion due to occlusal adjustment the mobility decreased by 18.1% to teeth with hypofunction and 8.7% in those with hyperfunction. Vollmer and Rateitschak confirmed that occlusal adjustment can reduce tooth mobility with percentages between 18% and 28% after a period of between 7 to 30 days[14].

In the clinical case presented, the selective grinding step is important as distal pole tooth has undergone coronary-root amputations, the selective grinding offsetting deficit of dental periodontal support, thus preventing the occurrence of reduced morphological abnormalities of occlusal balance with great potential trigger for occlusal dysfunction.

Conclusions

Partial edentulism and its consequences is a trigger of occlusal trauma.

Selective grinding stage avoids paraxial transmission of masticatory forces. Selective grinding must be done in advance on models mounted in articulator and then performed in the oral cavity.

Selective grinding is also applied on the artificial faces of the occlusal dental bridges, aiming to integrate their occlusal morphology in functionality of the stomatological system.

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