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FUNCTIONAL AND PSYCHOREHABILITATION OF THE OF THE STOMATOGNATIC SISTEM 'S DISORDERS- A NON INVASIVE TREATMENT APPROACH

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ABSTRACT

The congruence of the temporomandibular joint is influenced by the absence of odontoperiodontal units, which leads to oromaxillofacial disharmony, causing dysfunctions of the stomatognathic system concomitant with a biological imbalance. The appearance of the dysfunctional syndrome of the stomatognathic system can be avoided by a transitional medical device called a transitional morphological guard to relax the mandibular muscles, establishing the basic functions in achieving the phonetic and aesthetic objectives with the effective maintenance of the mandibulocranial relationship. Considerations regarding subsequent prosthetic treatment include either implantology as an optional option or removable prosthesis.

Different interarches ratios are established by the mandible to the maxilla and define the notion of relationship or varied intermaxillary relationships which lead to the proper functioning of the functions of the stomatognathic system, the most important being mastication, thus establishing dental-dental contacts, or in other words occlusal relationships. The risk factors that negatively influence a harmonious occlusion can appear as a result of occlusal changes such as: orthodontic displacements; wear of occlusal surfaces and incisal edges; loss of a lateral tooth; the loss of posterior support (when several teeth are lost) and the vicious habits of the patients. As a result of these changes, occlusal trauma, joint, periodontal and musculo-ligamentary pain, occlusal stress, injuries, etc. may occur. Taking into account the fact that occlusion is a defined static term that describes the relationship between the antagonistic teeth in contact, as well as the movement of the antagonistic teeth (upper teeth compared to the lower ones and vice versa) during mastication, it means that normal stable occlusion together with mastication, phonation and physiognomy are acceptable if it turns out that there are no signs of dental, periodontal, muscular or joint suffering, all of which are attributed to occlusal demands in particular.

In conclusion, the examination and monitoring of the intermaxillary relations are essential for a successful treatment as well as for an exceptional occlusal harmony.

Keywords: mandibulocranial reports, occlusal imbalance, morphostatic occlusal transition guard

INTRODUCTION

The absence of teeth classified according to Kennedy Aplegate in classes and the lack of correct dental treatments from a prosthetic point of view form an imbalance of the dento-maxillary system. Overloading has the effect that the appearance of blind occlusal disharmony leads to a change in the direction of distribution of occlusal forces(1,2). Therefore, in the previously mentioned conditions, it generates overloading of the remaining teeth, sometimes even leading to their fracture, and reflexively negatively influences the functionality of the dental arches, the muscular system, the temporomandibular joint and the central nervous system. Syndrome of the stomatognathic system (SST) occurring in the group of remaining teeth, the involved muscles (elevators and descenders) of the mandible, in the temporo-mandibular joint can change the posture of the individual. Changes to the dento-periodontal structures due to malpositions or malrotations must be

resolved through appropriate treatment and must not be allowed to generate local and general complications. Fixed or removable dentures cannot always be replaced with implantology, so any possibility of restoring the missing teeth must be taken into account. The lack of inter-arcade reports in the three reference planes represented by the sagittal or antero-posterior plane, the vertical plane and the transverse plane can be easily identified for their restoration through prosthetic treatment methods(3,4). The elementary movements of the mandible are combined in compound movements, so as to allow the realization of the fundamental movements and they are associated during the functional movements. In all the Keneddy Aplegate classes, the fundamental movements of the mandible are unstable and unreproducible, being modified by the pathological conditions arising as a result of biologically active decline at the level of the entire stomatognathic system. As a result, the occlusion plane and Spee's curve can be pathologically modified in situations resulting from extraction, long-term missing teeth or rotation of some teeth(5,6).

MATERIAL AND METHOD

In order to identify the causes with effects in major occlusal disharmonies due to the absence of multiple occlusal contacts at the level of the teeth in the lateral area, we developed the concept of functional and physiological optimization of the functions of the stomatognathic system. For class I Kennedy Apllegate related to joint- muscle and neuromuscular imbalance, we designed a medical device called a morphological occlusion splint (GMO) between the two dental arches intended to temporarily restore the functions of the stomatognathic system and maintain within normal limits the fundamental movements of the mandible until completion prosthetic treatment. In this way, on the remaining teeth of the two maxillary arches (teeth with long-term treatments) and in the edentulous spaces in the jaw that correspond to the biterminal edentulous (artificial teeth were fitted according to the absent teeth), the previously mentioned type of mouthguard was morphologically imprinted. Thus, we recorded a stable morpho functional balance with the help of this guided transparency device given the position of the mandible relative to the terminal hinge axis. The Occlusal Morphological Guard (GMO) was designed using the product range of the Eclipse system, a preformed composite resin. The mouthpiece with specific GMO diagnosis is used in the transitional temporary periprosthetic work with the aim of establishing the occlusal interception relationship as the optimal solution, being the best distance between the jaws for results that guarantee bimaxillary compatibility and comfort without neuro-musco-articular traumatological conditions(7,8).

The materials used to make dental braces are generally made of calibrated plastic foils, individually adapted to each patient with specific problems. In this particular case, the dental splint is not made of PMMA acrylate (normally this is used especially in more complicated treatments), otherwise, we used a new generation acrylic resin system called the Eclipse System, an inert material from the point from a chemical point of view, well tolerated and biocompatible with nonallergic properties. In order to determine the type of occlusal contacts before the study models were mounted in the articulator to observe possible interocclusal dissociations. After analysing the models in the articulator, we found that at the level of the dental arches there is an occlusal articulation interference

due to the lack of posterior support teeth. This was rectified by the two models in the position of maximum intercuspation during the artificial mounting of the teeth on both hemiarches. After the contact points between the remaining teeth were marked by the covering plane (overjet and overbite), we removed the maximum contact points using the joint paper and identified each dento-dental contact by classifying it into functional or non-functional occlusal contact classes.

The purpose of the study has a therapeutic significance, realized by identifying the type of occlusal contacts on the surface present in the morpho static and tactic position in patients with Kennedy Aplegate Class I dento-maxillary changes (validated for the other classes as well) and starting the treatment after its completion using the morphological transitory occlusion splint(9,10) .

Clinical case

The 53-year-old patient presented himself for the improvement of the fundamental functions of occlusion, being diagnosed according to the Kennedy Apllegate class I classification of the jaw.

In order to clinically identify the problems of deficient occlusion following the loss of the odontoperiodontal units and the lack of occlusal interferences from propulsion and lateral movements to the right and to the left, it was found that for the articulation and maintenance of the fundamental mandibulocranial functions, it is necessary to create an element of continuity called the morphological gutter of occlusion.

After the radiological examination, I considered the treatment plan efficient if the endodontic treatment of the remaining teeth in the maxillary and mandibular frontal area is taken into account. By accepting the treatment plan, the patient together with the medical team involved in the prosthetic rehabilitation treatment considered it necessary to apply a device to maintain the fundamental functions of the occlusion. After the preliminary impression followed by the application of the individual impression trays for the registration of the functional impression as well as the registration of the centric relationship with the help of the occlusion models, the models together with the anthropometric landmarks were transferred to the laboratory for the execution of the medical device called the morphological transitory occlusion splint. After mounting the models in the articulator and transferring the anthropometric landmarks, the limit of the prosthetic field was drawn on the working model with a pencil and the drawing of the medical device was configured. At the level of the upper hemiarch on the left side and on the right side, on the external and internal cortex of the slopes of the prosthetic field in the lateral areas, with the help of flat bases from the Eclipse system, we created by pressing and applying then polymerizing the 2 mm thick prosthetic saddles , then we recorded the position of maximum intercuspation with the opposing teeth by fitting the artificial teeth using the set-up resin and the outline material from the Eclipse system. Therefore, after the polymerization of the model with a prosthetic profile, both hemiarches were enabled for prosthetic purposes and the deficient occlusion eliminated to be able to be spatially integrated over the remaining teeth and neighbouring teeth included on both ending edentulous spaces with the help of the previously mentioned system, the morphological transition tray (GMT).

Practically, after defining the centric and between two arches relationship through the articulation of the occlusal gear, the upper dental arch was completely covered in this specific case. The average of the covered plane occlusal contact type was exclusively on the entire surface of the teeth in the frontal and lateral areas, being configured by removing the excess of the preformed plate by vacuum up to the parcel area, bypassing the interdental papillae in order not to damage the marginal periodontium for prophylactic purposes. The GMT brace facilitates the modular conversion of artificial teeth into natural teeth with the role of protecting the mandibular joint and dental arches and maintaining the teeth in their new position. The GMT mouthpiece for the correct repositioning of functions lost with the absence of teeth on the arch is a special mouthpiece, with a double active/passive role and is generally used to reposition one, two teeth or even three missing teeth on a hemiarch both sides or just one, which has undergone occlusal, muscular and joint changes, as a result of some trauma or early dental extractions. These braces are recommended to be worn 20-24 hours/day, with the result that, after the specific prosthetic treatments have been carried out, they should be replaced with permanent teeth either by implantation or prosthetic restoration with the recommendation to apply a permanent retention brace or temporary for a limited period of time even after the completion of the entire therapeutic process of occlusal rebalancing(11,12). The dental GMT mouthguard has a number of benefits, due to the purpose for which it was designed. It can also be used at night (like those for bruxism, restraint or implants) with several advantages:

• They prevent tooth loss by aggressively demanding the remaining teeth on the arch and their modification from the implantation axis;

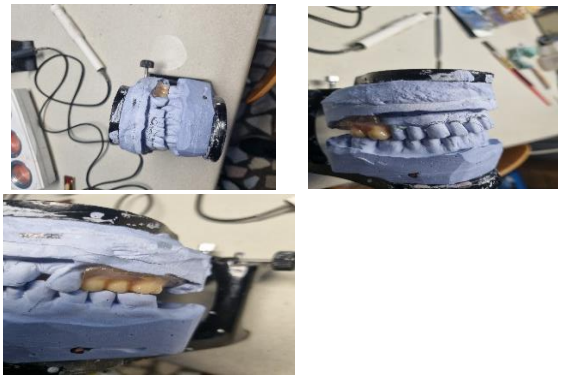
• They prevent the occurrence of the intensity of occlusion forces, the direction of movement and instability;

• Reduce mandibular tension, relax facial muscles and prevent their pain, including in the case of conditions such as temporomandibular joint dysfunction (this occurs when the mandibular joint is not aligned correctly);

• Prevents occlusal instability;

• Prevents the occurrence of cervical pain by supplementing the support and maintenance of the arches in symmetry with the TMJ (muscle fatigue, mandibular, ear or neck pain);

• Contributes to the development of healthy rest habits as it reduces discomfort and relaxes muscles(13,14).



a b c

Fig. 1a. Mounting the teeth in the articulator, b. Inter-arcade recording of the occlusion by mounting the diatoric artificial teeth, c. Lateral view of the model profile made with the help of the Eclipse system

In making the GMT device, I preferred the Eclipse system due to the reduction of working time, eliminating the empirical

method for making prostheses, braces, orthodontic appliances, etc. being recommended as a material to replace the classic PMMA resins. Being a new generation of superior acrylic resins, a revolutionary method is used to make prostheses that does not involve packaging in patterns like conventional prostheses and the use of wax is absent as a working technique, so the prostheses are obtained by directly applying the 3 layers of Eclipse resin, base plate, resin set-up and outline. All 3 Eclipse resin components are easy to work with and do not contain MMA.

For good functionality guided by DGMO, we will detail the aspects and particularities of clinical education of the patient during the use of this device. After the introduction of the DGMO, initially in the position of maximum intercuspation, the propulsion movement was achieved with tooth-tooth contacts until the end-to-end position maintained by the incisal edges of the group of teeth in the frontal area. On the remaining frontal teeth and on the upper hemiarches, the anterior guidance paths were reprinted, respectively the posterior guidance being rehabilitated for the remaining group of maxillary teeth and mandibular teeth; joint and muscle movements. In static occlusion, we identified masticatory units in the frontal area (as sufficient working part) and in the posterior area (as insufficient working part) and noted the existing occlusal interferences. The patient performed the lateral movement to the right, starting from the position of maximum intercuspation to the head-to-head position in laterality with the preformed GMTO tray between the two dental arches. In the final stage, we examined the lateral movement to the left by noting the occlusal interferences that appear on the left side (working side) and those on the right side (working side).

Fig.2 Assembly view of the medical device, GMTO occlusal transition morphological guard

The type of non-functional occlusal contacts varies during the development of the pre-prosthetic treatment plan and during the actual prosthetic treatment there are several functional occlusal contacts. As the occlusal relationships between the teeth of the two jaws are finalized, the majority of occlusal contacts are the functional ones, being present in a maximum number of occlusal contacts in patients with class I KA, which only causes occlusal dysfunctions and does not affect the temporomandibular joint. The application of GMTO braces with posterior support, imitating the natural anteroposterior support of maintaining the two jaws in an relationship only results in a pathological condition marked by the absence of one or more dento-periodontal units, on one or both arches, from the post-extractive period of the teeth. Unresolved by prosthetic or implantology treatments, this clinical entity of edental registered in all Kennedy Apllegate classes causes a severe temporomandibular dysfunction affecting all the components of the dento-maxillary apparatus, even in the case of a single tooth gap. Otherwise, changes occur such as horizontal migrations and rotations of the

remaining teeth, egressions, extrusions, loss of interdental contact points, changes in the structure of the marginal periodontium, various pathological abrasions, loss of occlusal reliefs and occlusal disharmonies, pathological deviations of mandibular movements.

RESULTS AND DISCUSSION

The results, in order to be processed statistically, were discussed by the doctor with the patients and together they confirmed the existence of clearly superior advantages by wearing this medical device with specific non-traumatizing characteristics, but on the contrary with benefits of improving the entire stomatognathic system by activating the fundamental basic functions in especially mentioning neuromuscular comfort thus avoiding dysfunction at this level. In principle, the occlusal balancing in this case was achieved through the flatness of the occlusal surface areas of the teeth in the maxillary process, distinctive surface contact compared to the multiple ideal contacts according to the prosthetic restorations of choice. The implicit occlusal balancing treatment by GMTO successfully reduces the dental mobility of the remaining teeth on the arch by limiting the pushing or dislocation forces by reducing the occlusal interferences(15). Thus, the treatment is effective by taking over the requests from the remaining teeth to artificial teeth planted artificially in the bimaxillary prosthetic socket. In the case of incorrect and inadequate execution of GMTO and if there is space between the two surfaces of the occlusal plane due to the lack of contact on the surface, the occlusal balancing treatment through GMTO is ineffective and at the same time only if the patient complains of loss of function or discomfort at this level.

The considerations regarding the optimal restoration through GMTO therapy of occlusal rebalancing aims to achieve an occlusal relief as functional as possible for the performance of SST functions, which ensures a correct position of the mandible in relation to the skull, dental contacts evenly distributed on the dental arches, the transmission of normal occlusal forces in terms of intensity and direction both in statics but not in dynamics.

CONCLUSIONS

In the light of what has been presented, it is essential to know the factors that define functional dental occlusion and to carefully analyse the static and dynamic dental occlusion in patients with different types of Kennedy Apllegate classes as maxillary dysfunctions, so that at the end of the treatment there are functional occlusal contacts to provide masticatory efficiency and stability to the mandible. The model with a therapeutic profile made and made with the help of the Eclipse system, introduced under the name of the occlusal transition morphological guard (GMTO), plots both hemiarches in the Kennedy Apllegate class I dentition, but does not exclude from the options of proprosthetic treatment and other classes familiar to the previously mentioned one. For optimal non-traumatizing results in terms of exerting forces through pressure on the mucous tissue, the wearing of the brace is conditioned by the optimization as well as the dosage of the muscular and joint forces to ensure the minimum occlusal comfort.

According to research in specialized literature, in general dental practice, a complete and effective prosthetic treatment is determined by the clinician's ability to

statistically configure through complementary clinical investigations; three-dimensional results of the appearance of the patient's soft tissue, following that depending on the complete clinical picture, a therapeutic strategy can be established later on the hard dental and skeletal tissues. We can say with certainty that the new three-dimensional technologies that have appeared in recent years, dentists can interpret and discuss the images obtained with their patients, thus establishing new standards for oromaxilofacial aesthetic examination, diagnosis and treatment planning in dentistry.

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