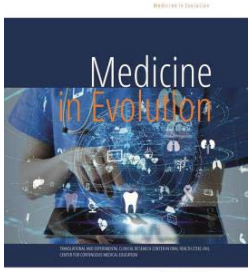
Registration of intermaxillary relations using anterior Jig compared to the classical method



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Abstract

The purpose of this study was to record the intermaxillary relationships as accurately as possible by using the anterior Jig method as compared to the classical occlusion recording. The patients were divided into two groups. In the study group, the anterior Jig was used to record as accurately as possible the situation in the oral cavity in terms of intermaxillary relations, and in the control group, the classical method was used. With the help of indirect provisional restorations, the differences that appeared after recording the occlusion with the 2 methods were highlighted. In conclusion, the method of recording the intermaxillary relationships using the anterior Jig and the material of recording the bilateral occlusion proved to be the most accurate fitting of the models in the articulator, the difference being made by the anterior support.

Keywords: Anterior jig, intermaxillary registration, CO, bimanual manipulation CR technique

INTRODUCTION

In case of dental patients who require extensive fixed prosthodontic and oral rehabilitation, recording an accurate centric relation is often a difficult procedure (1,2). Due to the preparation of the hard dental tissues, the occlusal stops are affected and the occlusion is no longer stable. As for the centric relation, there are many definitions that it has, at the moment none of them is considered to be official (3,4,5,6,7). Due to the multitude of definitions, its understanding that can be confusing because besides the fact that this definition can be changed it will also evolve constantly in the future (8). Some disagreements may be explained due to the different training areas, but a consensus was not found even in the situations where the clinicians were from the same country (9,10) which means that there will still be a controversial problem in prosthodontics (11). Even though there are some considerations about a range of normal positions of the condyle in the glenoid fossa (12,13) of all the patient's jaw relationships, the one that must be registered is the centric relation because is the only clinically comfortable, repeatable and logical jaw relationship and so the most important and critical (14,15,16). To include as many definitions in our study, we consider the centric relation (CR) as a classic reference position of the relationship between the maxillary and mandibular arches at the closure of the oral cavity where the condyles occupy the highest position in the glenoid cavity for occlusal, temporomandibular joint (TMJ) examination and prosthetic treatment. The purpose of this study was to record the intermaxillary relation as accurately as possible by using the anterior Jig method as compared to the classical occlusion recording. Regarding the methods of recording the centric relation described in the literature (17,18,19,20,21) there is no consensus on which one is the best (22). When clinicians perform full mouth rehabilitation, one very important thing is that they must be sure that they have correctly recorded their patient's centric relation. Regarding this, a technique is described for registering centric relation in dentate patients using an anterior deprogrammer Jig (23,24,25,26,). This technique is simplifying the setting up of models and the programming of articulators (26,27), thus visual verification is possible when the assembling is made with the correct orientation of the casts (28) by confirming the precise position of the anterior Jig with the help of impressions of maxillary and mandibular incisors left on it. Properly executed, the patient is able to close into an unassisted centric relation, eliminating the adaptive mandibular closure patterns (29) and the possibility of operator-induced error associated with commonly accepted manipulative techniques. There are several techniques described for registration of centric relation in dentate patients that use a anterior deprogrammer, and all these techniques have in common the muscular deprogramming. In order to obtain this muscular deprogramming (30,31,32) and to record the correct centric relation in the dentate patients the anterior Jig will have to be performed properly. Introduction presentation of general aspects, in the context of the approached theme.

Aim and objectives

In this study, the differences in registration of the intermaxillary relations were evaluated in a number of 49 patients. The differences that appeared from the records of intermaxillary relations both within the study group and within the control group were marked by the use of a new technique proposed in this study. This refers to the registration of intermaxillary relations by using the anterior Jig.

MATERIAL AND METHODS

In the study group, the first phase was to perform the anterior Jig. The clinician used a composite material (Gaenial A Chord) which he placed at the level of the lower central incisors. The amount of composite material can be adapted for each patient without influencing the study from the point of view of the contact space between the two dental arches.

Figure 1. Positioning the composite material at the level of the lower central incisors

Figure 2. Guiding the patient in the central relationship position using bimanual guidance

Figure 3. Photopolymerization of the anterior Jig

After obtaining the anterior Jig, the impression material will be injected. (Oclufast Rock Zhermack)

Figure 4. The actual injection of the recording material of the occlusion

Figure 5. The Guidance in centric relation

After the registration of the occlusion performed using the anterior Jig method, the registration with the facebow will take place next. Then the impressions will be made and the entire clinical situation will be transferred to the dental laboratory. With the help of these elements, the models will be mounted in the articulator.

Figure 6. Mounting the models in the articulator within the study group

In the control group, the occlusion was recorded differently compared to the occlusion recorded in the study group. The anterior Jig in this situation was no longer created. Through the method used in the control group, we tried through this study to highlight the fact that this method is one of the most used in current practice, and this greatly influences the prosthetic results. Since this is one of the most used methods of recording intermaxillary relations a comparison of it with another method which has been proven to be much more effective would change the perspective of intermaxillary relation records. The procedures and techniques used by the technicians in the dental laboratory were identical. The exception in this situation is the steps that could not be executed due to the absence of the anterior Jig.

In the control group, the unimanual technique of guiding the patient in centric relation was used, because this is the most used by the majority of clinicians who record the intermaxillary relations in this way. For the injection of the occlusion recording material, the exact same device and material (Oclufast Rock Zhermack) was used as in the case of the study group in order not to influence from this point of view the results of the recordings made in both groups.

RESULTS

In order to be able to compare the results as accurately as possible, we chose to use both methods of recording the intermaxillary relations in the following way. Each patient was recorded both by the anterior Jig method and by the classical method. The first comparison made was in the realization of indirect provisional prosthetic restorations after recording the occlusion by the classical method, and then using the anterior Jig method. After recording the occlusions, the models were mounted in a randomized articulator.

Figure 7. The difference between the classic method and the anterior Jig method highlighted by indirect provisional restorations

Figure 8. In the left side, the classic method was used and in the right side the anterior Jig method

Regarding the results within the study group the registration provided 100% success. On the other hand, in the control group, in the case of 6 patients, the provisional restorations fit to the same extent as in the study group after the occlusal adjustments were made. The indirect restorations of the patients in the control group, i.e. a percentage of 87.75%, could not be considered acceptable after the occlusal adaptation was performed at their level.

DISCUSSIONS

In the moment of positioning the anterior Jig by placing the composite at the level of the lower central incisors, the patient is asked to open and close the oral cavity multiple times, at the same time adding the composite to perform the Jig. At the moment of the gradual application of the composite, the patient is asked to close and open the oral cavity, and at that moment the anterior Jig performs a muscle deprogramming. This muscle deprogramming is determined by the muscle relaxation that allows centric relation to be recorded by whatever method use (27). Muscle deprogramming leads to the elimination of the engram and allows lateral pterygoids to relax (33) so that at the neuromuscular level (34) both the interference

made in the dynamic occlusion and the premature contacts made in the static occlusion that the patient had since then will disappear. Thus the recorded centric relation will be correct both from the point of view of the temporal-mandibular articulation as well as regarding the new restorations. By performing this muscle deprogramming the anterior Jig, even in situations where manipulating the mandible to obtain the centric relation may be more difficult (35), will allow the clinician to determine as accurately as possible the centric relation so that he can be sure that was recorded correctly. Although in some situations to guide the patient correctly the methods commonly used are chin point guidance or bimanual manipulation (36,37) in some clinical situations the manipulation with anterior Jig guidance has been shown to be very efficient and accurate (38,39). In order to be sure of a correct recording in this study besides these guides (bimanual manipulation, the chin point guidance, anterior Jig guidance) the verification was also performed by positioning the tongue tip to soft palates which were performed by the patient to observe the accuracy of the method used. The correct mounting of casts on articulators is a fundamental step in obtaining good clinical results and reducing the time spent in adjusting the prosthetic restorations. (40). The proper recording of the centric relation leads to the correct fitting of the opposing casts in the articulator, minimizing orientation errors that can cause malocclusions. The correct fitting already made will decrease the degree of intraoral adjustment from the new restorations (41), after fixing them, but also will generate a smaller surface amount removed of the restorations. A careful analysis of occlusal contacts should be performed, in order to avoid the creation of iatrogenic interferences that can produce the signs and symptoms of temporomandibular and postural disorders (42,43) because of the disharmony between the occlusion of the teeth and the centric relation position of the temporomandibular joints (44). Although some aspects have been highlighted such as the sensitivity, reliability, and efficiency of occlusal indicators, there is no data regarding whether the presence of occlusal indicators affects muscle function during occlusion (45). Even when adjusting restorations, there are some aspects that need to be considered in order for the prosthetic treatment to be functionally correct. The indicators of occlusion can affect the functional occlusal contacts if a very thick articulating paper is used because its thickness can significantly influence neuromuscular function during occlusion by not providing a valid tooth contact information and affecting the validity of the measurements they provide (45). Therefore the method of the anterior Jig by its ability to provide a very good, accurate and precision recording of the centric relation aims to perform extensive prosthetic interference-free occlusion type restoration (46). But this will greatly depend on the clinician's ability to perform the restorative procedures correctly from start to finish because if they are performed incorrectly they will cause interference and disharmonic relation between the arches (47,48,49,50,51). With a correct recording of the intermaxillary relationships, a functional anterior guidance is provided that can reduce the parafunctional activity and this anterior guidance can determine a harmonious functionality of the temporomandibular complex (52). In order to perform functional prosthetic restorations, the clinician must start from the beginning with a correct treatment plan that respects the concept of mutually protected occlusion (53) and tends to achieve both occlusal and articular stability in order to achieve orthopedic stability (54).

CONCLUSIONS

Mounting the models in the articulator using the method of registration of intermaxillary relations using the anterior Jig provides superior fidelity in terms of the final results from a prosthetic point of view. In situations where we have to perform extensive prosthetic restorations, the anterior Jig registration method can be considered the choice due to the most accurate reproducibility of the intermaxillary relationships. Compared to the

conventional method, this method avoids a lot of errors such as: mounting models tipped to the front, vertical inocclusions and sagittal inocclusions.

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