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# *Reliability of the physiologic method for registering the centric relation position*

**(A clinical study in 100 edentulous patients)**

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Although each step in construction of a complete denture is important, the determination of the centric relation position is the most important among them. Because this position and this is alone, can be reproduced for the purpose of establishing or guiding other registrations. Centric relation is a starting point.

There are different opinions on the determination of centric relation position. Because each investigator takes the matter from his own point of view which considers important, and bases his technique according to his thoughts. Another reason for that is the fact that a definite agreement has not yet been reached about functional mandibular movements.

Sicher (1) has defined the centric relation as an ideal position which coincides with the median occlusal position. Moyers (2) has defined it as a condition determined by the neuromuscular reflexes. It is a type of reflex learned by the child upon completion of decidous teeth and assumption of the occlusal position by the jaws. But Lucia (3) states that, the mandible is in the centric relation when the rotational centers for the lateral and vertical movements are in the terminal hinge position. Sheppard (4) believes that the relation-

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ship of the mandible to the maxilla when the mandible is braced during swallowing is the centric relation.

According to the Glossary of Prosthetic Terms (5), the definitions of centric relation and centric occlusion are as follows :

Centric jaw relation : 1) The jaw relation when the condyles in the most posterior unstrained position in the glenoid fossae from which lateral movement can be made at any given degree of jaw separation.
2) The most posterior relation of the mandible to the maxillae at the established vertical dimension.
3) The relation of the mandible to the maxillae when the condyles are in their most posterior position in the glenoid fossa from which unstrained lateral movements can be made at the occluding vertical dimension normal for the individual.

Centric occlusion : 1) The relation of opposing occlusal surfaces which provides the maximum planned contact and/or intercuspation.
2) The occlusion of the teeth when the mandible is in centric relation to the maxillae.

According to these definitions, the centric relation is the postural position of the mandible to the maxillae. The centric relation is also the terminal skull-to-the-mandible relation whereas the centric occlusion is the cusp-to-fossa or tooth-to-tooth relation.

There are various methods for determining the centric relation. In practice, we generally used the physiologic (swallowing) or graphic methods. The graphic methods are divided into two categories as intraoral and extraoral techniques.

The purpose of this study is to increase the materials in the investigation that I undertook in 1969 and so try to determine more accurately whether the physiologic method is reliable in establishing the centric relation successfully as far as undergraduate students are concerned.

Materials and method :

The materials for this study consist of one hundred patients to

seek complete upper and lower denture treatment at the Faculty of Dentistry in Istanbul. All the patients were presented themselves with the class I type of jaw relationship. The residual alveolar ridges were ranged from highly resorbed ridges to the well marked and U-shaped ridges. 67 % of the patients were not denture wearers and the remaining have worn complete dentures during the period of varying 1 month to 25 years.

The complete dentures are constructed by the students according to the technique applied in the Department of Removable Denture Prosthodontics at the Faculty of Dentistry.

This technique begins with preliminary impression in conventional tray with the irreversible hydrocolloid material. Upon preparing individual impression tray, the peripheries of the tray are molded according to the functional muscle movements in green stick modeling compound and the final impression is made with the zinc oxide and eugenol paste. The vertical dimension of occlusion is determined by the techniques proposed by Silverman (6) and Niswonger (7), and the centric relation is registered with the swallowing method. Try-in, processing and polishing the dentures are then proceeded.

The evaluations of the centric relation records were made upon inserting the dentures, but before proceeding with the selective grinding. For this, the patient's head was slightly positioned backward with his back in complete contact with the back of the chair and he was told to relax. The index finger was placed on the gnathion of the patient to guide his mandible without any excessive pressure. Patient was also requested to touch the tip of his tongue to palate while swallowing. This procedure was repeated several times, so that the patients became accustomed to close their jaw normally. The patient was then asked to occlude his jaw in normal position and to bring his teeth into contact. They were also asked not to open their jaw after being felt that they had brought their teeth into normal occlusion and were tried to feel the maximum contraction of the temporal and masseter muscles with the finger tips. As it is known, this theory is based upon isometric contraction of the muscles. In other words, this is the clinical examination of the Boos Bimeter technique (8) in which the muscles of mastication exert maximal force when the mandible is in centric relation to the maxilla providing the vertical dimension of occlusion is correct. In this case, the determination of the centric relation is decided to be correct.

After that, the cusps and fossa relationships are controlled by visual examination. Any deviation from centric is recorded accordingly.

Findings :

In 73 % of the total amount of patients, both the centric relation (skull-to-the-mandible relationship) and the centric occlusion (cusps-to-fossa relationship) were correct. In 3 % of the cases where the centric relation was correct, the dentures showed an openbite anteriorly about 2-3 mm. and the vertical dimension of occlusion was increased accordingly. In cases where the centric relation was correct, 16 % of the dentures exhibited a wrong centric occlusion; in other words, the cusps and fossa relationship of the artificial teeth were wrong. However, this was possible to be corrected by means of occlusal grinding.

In 6 % of the total amount of patients presented themselves with wrong centric relation, the mandible was recorded in protrusive relationship to the maxilla.

In 2 % of the patients, the mandible was recorded in lateral relationship to the maxilla.

| **Centric relation and Centric occlusion** | **Correct 73 %** |
|---|---|
| Centric relation | Correct, but an openbite is produced (3 %) |
| Centric relation | Correct, but centric occlusion is wrong (16 %) |
| Centric relation | Not correct (6 %) Mandible is protruded in relation to the maxilla |
| Centric relation | Not correct (2 %) Mandible is recorded laterally in relation to the maxilla |

**Table I**

Discussion :

As Swenson (8) and Boucher (9, 10) advocate, the mandible is brought into centric relation during the act of swallowing and they also state that this procedure will be an aid to the recording of centric relation. On the other hand, some authors have suggested that this method is not scientific. But many dentists have preferred this method. Landa (11) states that it is more difficult to conrol the biting force applied by the patient using the graphic method. For this reason, the swallowing method to register the centric relation

by means of occlusal rims are generally used among dentists (12). To support the fact, many investigators have also indicated that the act of swallowing is related with the centric relation (13, 14, 15, 16). Although this relationship is acceptable by many, there is no agreement among the investigators on definite localization of the condyles in centric relation.

Some authors (8, 16, 10) suggested that the condyles should be at the most backward position in the envelope of motion while the others (17, 18, 19, 20) advocate that the centric relation is the habitual position of the mandible and that the condyles may not necessarily be at the most backward position in the glenoid fossa. The important point is that the temporomandibular joint, the muscles, the teeth and the supporting structures should be in equilibrium while recording the centric relation in which the patient is accustomed for years.

Our findings concur with that of several other people such as Hickey along with two recent investigations (21, 22) by means of cephalometric roentgenograms that the physiologic method is quite reliable in recording the habitual centric relationship of the patients. But Schweitzer (23) has showed that on this case the condyles are not at the most backward position and are slightly anterior in the major part of the functional movements, which is not our concern in this observation.

There is also no use to decide in which type of alveolar ridge is more suitable for physiologic method to register the centric relation satisfactorily. Because the subjects as well as the operators who registered the jaw relationship are different. Our purpose in this study is to reach to a general conclusion only about the reliability of this method.

Disharmonies of cups and fossa relationship may be related with the displacement of the artificial teeth during packing. For that, believe the necessity that every protheses has to be adjusted to eliminate the processing errors inherent in the properties of the materials, and also to correct minute discrepancies due to the resiliency of the soft tissues (24). In most of the cases, dentures which have a wrong cusps and fossa relationship provided an adequate balanced occlusion following spot grinding.

Conclusion :

The centric relation registered by the physiologic method is quite

satisfactory for the majority of cases. But this method can only give the position of the mandible in the habitual manner in which the patients have for their lifetime, and if done properly, satisfactory set of dentures can be constructed.

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