EDITORIAL

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Centric relation

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Centric relation (CR) is the positional relationship of the mandibular condyle to the glenoid fossa. The concept of CR has undergone many changes and remains controversial. Centric relation first was described by Hanau[1] as the mandibular position at which the mandibular condyle in within the glenoid fossa with disc in between them. Schuyler[2] reported a method for CR guidance and the freedom in centric in the occlusion. He suggested that the patient's tongue tip be rolled back to the posterior palate during mouth closure to guide the mandible to CR. In 1947, Aprile and Saizar[3] investigated the effects of soft tissue, such as ligaments around the temporomandibular joint (TMJ) and masticatory muscles, on the position of the condyle in CR. The Glossary of Prosthodontic Terms is a good reference for discussion of CR[4], in which CR was considered the most retruded position of the mandible in the 1950s. A rearmost, uppermost, midmost position for CR was stated by McCollum and Stuart[5] as a terminal hinge position of the mandibular condyle. In 1969, Schuyler[6] explained freedom in centric as the position in which the functional cusp of opposing teeth can move with a degree of freedom about 0.5 to 1 mm on the central fossa of the teeth, if the patient's CR and centric occlusion (CO) are the same. In prosthodontics, a stable mandibular position relative to the maxilla is needed to make a set of upper and lower full dentures. According to the Glossary of Prosthodontic Terms, CR has been changed from rearmost to anterior-superior position relative to the posterior slope of the articular eminence[4]. In 1979, Dr. Dawson introduced bimanual mandibular manipulation to guide the mandible to CR, defined as the most superior position of the condyle in the glenoid fossa. Many researchers who support the most posterior position of the condyle as CR to achieve proper positioning using chin point guidance or Gothic arch tracing[7,8].

It is important to understand the terms related to CR. As CR is the relationship of the mandibular condyles to the cranium, it is independent of tooth contact. Centric occlusion is a synonym of centric relation occlusion and refers to the tooth contact when the condyle is in CR. Maximum intercuspation (MI) refers to the maximum contact between the upper and lower teeth independent of condylar position[4,9]. The CO-MI discrepancy, previously called the CO-CR discrepancy, is the difference between the position of the condyle in CO and MI. If the patient's CO coincides with the MI, CR-CO discrepancy will be the same as CR-MI discrepancy which can be thought as an ideal occlusion[10]. Lucia[11] reported that more than 90% of normal healthy people have a CO-MI discrepancy.

Dentists can control CR position according to the purpose of the treatment methods. There are three treatment categories regarding the position of the mandibular condyle in the glenoid fossa. One is prosthodontic installation of full dentures in a fully edentulous patient. Another is the treatment of patients with TMJ disorders (TMD). The third is orthodontic treatment or orthognathic surgery in patients with jaw deformity. A recent consensus of CR in prosthodontics and TMD patients is an anterior superior position of the condyle in the glenoid fossa. However, some doctors still use the rearmost and uppermost position of the condyle in the glenoid fossa. Orthodontists aim for a stable mandibular position biologically and anatomically in their patients.

In a patient with a jaw deformity planned to undergo orthognathic surgery, all data, including orthopantomogram, cephalo lateral and PA, computed tomography scan, wax bite, and facial photographs, should be taken considered

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for precise analysis and treatment planning. Regardless of the position of CR, gentle guidance of the chin posteriorly, tongue roll back to the posterior palate, bimanual mandibular manipulation, and leaf gauge are used to guide the mandible to CR. During orthognathic surgery of bilateral sagittal split ramus osteotomy (BSSRO), repositioning of the proximal segment is very important for postoperative stability, and the ideal position of the mandibular condyle is CR. However, the definition of CR remains controversial. Some authors prefer uppermost, others use anterior-superior, and still others choose rearmost uppermost. Manfredini et al.[12] suggested that the term maxillo-mandibular utility position be instead of the term CR, and the position of the mandible to the maxilla varies by treatment purpose, such as prosthodontic, orthodontic, and surgical need. An interesting report about the definition of CR between oral and maxillofacial surgeon and orthodontist showed that orthodontists were more likely to favor the anterior-superior position for CR, while surgeons prefer a posterior position for the seating of proximal segments during BSSRO[13]. In this report, there are no information about jaw deformities[13]. The seating position of the proximal segment may be differ from Class II to Class III patients. If condyle position is an anterior-superior position for the seating condyle in Class III patients during BSSRO and a posterior-superior position in Class II patients, postoperative relapse can be reduced. More than 90% of normal people have CR-MI discrepancy, which this is considered a normal adaptive feature of dentition[14]. Anterior-superior seating during BSSRO in a Class III patient may allow CR-MI discrepancy and can result in relapse. If the mandible is seated in a posterior-superior position, the mandible can move only anteriorly. For Class II patients, posterior-superior seating position BSSRO will reduce relapse. However, some surgeons may disagree with such a position because they do not want to overload the condyle head to prevent condyle resorption. For relapse in Class II patients, overcorrection is frequently performed with anterior-superior seating of the condyle. In such cases, however, immediate relapse after intermaxillary fixation may occur due to posterior movement of the mandible, and idiopathic condylar resorption can be problematic. For orthognathic surgery, different concepts of CR may be applicable for positioning of the proximal segment during SSRO for jaw deformity.

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Conflict of Interest

No potential conflict of interest relevant to this article was reported.

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