

# Supplemental techniques for registering interocclusal records for complete dentures

## Abstract

The functional performance of a patient wearing a complete denture is related to the accuracy of the interocclusal record registration during the fabrication procedure. This article describes different techniques to register accurate maxillary-mandibular relation record by utilizing 'stabilizing handles' to enhance the stability of the mandibular denture record base during the acquisition of interocclusal records and by placing wax cones on the occlusal surface to record centric record. These techniques are especially important for the patients who are placed in classes III and IV of the Prosthodontic Diagnostic Index created by the American College of Prosthodontists.

**Keywords:** prosthodontics, complete denture, interocclusal records, centric relation

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## Introduction

There are at least four important aspects in complete denture fabrication: (1) the intaglio surface, (2) the denture extensions and seals for retention, (3) the polished denture surfaces, along with the neutral zone, and (4) the occlusion. If one of the four components are not ideal, it will affect the functional outcome of the prosthesis. Therefore, each step in the denture fabrication process must be perfected for the definitive prostheses to function harmoniously.

The goal of interocclusal record in complete denture fabrication is to accurately relate maxillary and mandibular denture bases at the patient's centric relation. Centric relation is defined as a maxillomandibular relationship, independent of tooth contact, in which the condyles articulate in the anterior-superior position against the posterior slopes of articular eminences in a rotary movement.<sup>1,2</sup> For the edentulous patient, the centric relation record is the most important step to relate the maxilla to the mandible for the functionality of the definitive prostheses.<sup>3</sup> This is because it is the most consistent and repeatable position relating the maxilla and the mandible.<sup>4</sup>

During the fabrication of complete denture prostheses, centric relation should be recorded at three separate occasions: (1) at the interocclusal record appointment with record bases and wax rims, (2) at the wax try-in appointment, to verify the accuracy of the previous record, and (3) at the denture delivery appointment, for the potential clinical remount.<sup>5</sup>

Accurate and repeatable centric relation records assist in the ease of remount procedures and occlusal corrections, ultimately reducing the number of post-insertion visits.<sup>6,7</sup> The accuracy of a centric relation record is essential to the functional outcome of the resulting denture prostheses.<sup>8</sup> Stability of the mandibular record base on the denture bearing areas during record making is a limiting factor in obtaining an accurate centric relation record.<sup>9</sup> This is owing to the smaller surface area of coverage of the foundation tissues compared to maxillary record base. Maxillary denture base has the advantage of palate to provide additional stability. Mandibular denture base also has to account for the mobile tongue on the floor of the mouth.<sup>9</sup> The stability

of record base is reduced especially when the patient's alveolar ridges are flat, resulting in limited height between the record base and the occlusal rims/denture teeth, and when the patient has steep buccal denture surfaces. Manual assistance from the clinician may be needed for a more accurate positioning of the record base on the patient's mandibular arch. There are several methods to stabilize the mandibular denture base. One way is to utilize neutral zone technique.<sup>10</sup> The neutral zone is defined as the potential space between the lips and cheeks on one side, and the tongue on the other side. Denture teeth can be set in area where the forces between the tongue and cheeks or lips are equal.<sup>10</sup> Utilizing implants in implant overdenture situation is another technique to stabilize mandibular denture base.<sup>11</sup> An implant level impression is made using locator analogs at the time of border molding and final impression to capture implant position in the master cast on which the denture base is fabricated for centric relation record. Last but not the least, denture adhesives can also aid in stabilizing the mandibular denture base.

The purpose of this article is to demonstrate the use of stabilizing handles and wax cones on the mandibular record base in order to enhance its stability and to help guide patients into centric relation at the time of recording interocclusal records for American College of Prosthodontists Prosthodontic Diagnostic Index (PDI) classifications III and IV.<sup>1</sup>

## Materials and methods

### Technique description

#### Stabilizing handles

Wax or green compound material is recommended to make handles when the patient has either steep buccal denture surfaces or the patient lacks the vertical space for the clinician's finger placement intraorally, to stabilize the lower prosthesis (Figures 1-3). Below is the step-by-step instruction on how to utilize this technique.

1. Adjust the wax occlusal rim on a record base until the desired vertical dimension and lip support are obtained.

2. Add wax handles on the lateral side of the premolar area. The handles should be approximately 5 mm in width and 10 mm in length, for ease of stabilizing the record base in the mouth (Figure 1).
3. Prior to recording centric relation, practice obtaining the centric relation record by guiding the patient. Place index fingers on the wax handles to stabilize the mandibular record base and with thumbs gently resting under the patient's chin guide the patient into centric relation position.
4. Patient must relax, open, and gently close, while record bases are stable in the mouth. Have the patient repeat this exercise until movement into centric relation is repeatable prior to obtaining the interocclusal record.
5. When ready to make centric relation records, place the record base intraorally, using the wax handles and record the centric relation as described above. Make sure to hold the record base in position with gentle finger pressure while gently clamping the lower mandibular rim with the clinician's thumbs under the patient's chin (Figure 2). Proceed in making the record with clinician's choice of material.



**Figure 1** Wax denture with wax handles.



**Figure 2** Wax handles at wax try-in appointment.



**Figure 3** Compound handles at the delivery appointment.

### Use of wax cones

Aluwax can be used to place four cones on the mandibular denture base to guide patient into centric record.

1. Place Aluwax on four locations on the posterior occlusal surfaces of the denture teeth.
2. Gently guide the patient into centric relation using either chin point guidance or bimanual manipulation (Figure 4).<sup>12</sup> The three cones provide tripodization and the fourth cone verifies the centric record.



**Figure 4** Aluwax cones placed on the posterior teeth at the clinical remount appointment.

This procedure is versatile as it can be used at the wax teeth try-in stage or at the clinical remount stage (to verify centric relation record). Once centric relation is recorded, the denture bases can be stabilized and mounted on the articulator.

### Results

The techniques described above helps in stabilizing the denture base on a resorbed PDI class III and IV patients and aid in accurately recording maxillary mandibular records, thus enhancing the stability and occlusal relationship of the complete dentures.

### Discussion

The proposed technique describes the use of stabilizing handles and wax cones to aid in the stability of the denture record base during the acquisition of the interocclusal records. This technique can be utilized for making any centric or eccentric records in removable denture prostheses. Measurements for the handles were listed to avoid excessive length, and to provide for enough material for the clinician's finger to rest upon. Making handles too long could cause disharmony between the buccal mucosa and the polished denture surface, where the operator's fingers are placed. Making the handles too short could cause inadequate retention of the clinician's fingers, defeating the purpose of this technique. Further, using four wax cones to record centric relation provides a verification of maxillary mandibular record for establishing accurate occlusal relationship in denture patients. Though the technique is described for enhancing the stability of the mandibular record base prior to processing the prosthesis, these methods are applicable in capturing interocclusal records at any stage of denture fabrication including after the denture has been processed for clinical remount purposes, and can also be implemented on the maxillary arch. Moreover, it may assist dental students to make repeatable interocclusal records. In addition, accurate centric relation minimizes post-fabrication adjustments.

## Conclusion

This technique article describes the use of stabilizing handles and cones to aid clinicians to stabilize the record bases in severely resorbed ridges to register an accurate jaw relation record. This helps in fabrication of complete denture with a harmonious occlusal relationship.

## Author contributions

“Conceptualization, A.W.; methodology, A.W.; investigation, A.W.; writing- original draft preparation, AW, AN and SP; writing-review and editing, AN.; supervision, A.W.; project administration, A.W. All authors have read and agreed to the published version of the manuscript.”

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## Institutional review board statement

The study was conducted according to the guidelines of Declaration of Helsinki. Ethical review and approval were waived for this study, since the study is based on common clinical practices.

## Informed consent statement

Not applicable.

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## Conflicts of interest

The authors declare that there are no conflicts of interest.

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