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DENTAL TECHNIQUE

Recording an accurate maxillomandibular relationship by adding vertical stops to the occlusal rims

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ABSTRACT

Complete denture fabrication includes accurate recording of the maxillomandibular relationship to ensure the functional requirements of occlusion and minimize the traumatic effects on the residual alveolar ridges. However, errors may occur when the occlusal rims have uneven and nonuniform occlusal contacts. The technique described is a straightforward method for recording an accurate silicone centric relationship record with dome-shaped baseplate wax added as vertical stops on the occlusal surface of the mandibular occlusal rim. (J Prosthet Dent 2019;121:242-5)

An accurate recording of the maxillomandibular relationship is essential for complete denture fabrication.[1] This clinically critical procedure harmonizes the occlusal contacts and maximizes the requirements of occlusal function.[2] The common procedure for recording the maxillomandibular relationship involves adjustment of the occlusal rims to establish the occlusal plane, occlusal vertical dimension (OVD), and lip support.[1]

The maxillomandibular relationship is recorded with the mandible guided and closed to demonstrate the OVD in the centric relationship position with a recording medium interposed between the maxillary and mandibular occlusal rims.[1,3] However, this procedure may induce occlusal errors related to the occlusal rims, demonstrating uneven occlusal contacts across the arch and lack of stability of the record bases.[4,5] Alternatively, the occlusal rims are contoured to record the OVD in the anterior segment of the rims and the posterior segments have an interocclusal gap for a recording medium to fill and register the vertical and horizontal relationships of the edentulous arches.[5-7] A viscous recording material (such as wax or modeling plastic impression compound) can be interposed between the occlusal rims to make the centric relationship record.[1]

Contemporary silicone occlusal registration materials are convenient to use and keep the positional relationship of edentulous arches with high dimensional stability.[8] However, this material has low viscosity and requires the patient to hold the mandible in the centric relationship position during polymerization. The patient may continue closing the mandible beyond the initial contact established by the occlusal rims. In addition, the mandible may deviate laterally, leaving the record bases unsecured against the mucosa of the edentulous ridges.[6]

This technique article describes a straightforward method for recording an accurate silicone centric relationship record with dome-shaped baseplate wax added as vertical stops on the occlusal surface of the mandibular occlusal rim.

TECHNIQUE

1. Make the definitive impressions of the edentulous arches and generate the definitive casts for the fabrication of maxillary and mandibular complete dentures.
2. Fabricate the record bases by using photopolymerized acrylic resin (Lightplast base plates; Dreve Dentamid GmbH) on the definitive casts and build occlusal rims using baseplate wax (Modeling wax WP225; Atria Inc) (Fig. 1).

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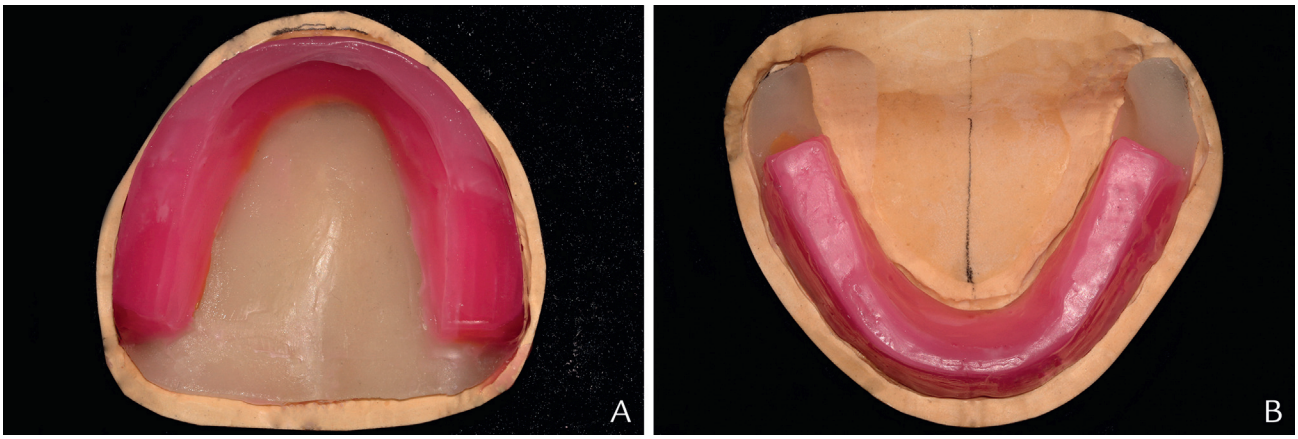

Figure 1. Wax occlusal rims on resin record bases. A, Maxilla. B, Mandible.

3. Seat the patient in a dental chair and evaluate the stability of record bases in the mouth. Contour the occlusal rims by using a wax spatula (#848; Kims) to establish the occlusal plane, lip support, and OVD. Evaluate rest position, swallowing, tactile sensation, phonetics, and esthetics.[1]
4. Evaluate occlusal contacts of the occlusal rims in the centric relationship position and at the established OVD. Reduce the occlusal height of the mandibular occlusal rim slightly (less than 1 mm) with a wax spatula (#848; Kims).
5. Apply a thin layer of petroleum jelly (Vaseline; Unilever) to the occlusal surface of the maxillary occlusal rim and place it in the mouth. Create dome-shaped wax vertical stops on the first premolar and molar areas across the occlusal surface of the mandibular occlusal rim with baseplate wax (Modeling wax WP225; Atria Inc), using a wax carver (#7; Kims) (Fig. 2).
6. Place the mandibular occlusal rim in the mouth while the dome-shaped wax vertical stops are soft and displaceable under gentle pressure. Use a wax carver (#7; Kims) to soften the vertical stops. To avoid softening the occlusal rim and altering the OVD, do not use an alcohol torch. Instruct the patient to swallow and bring the mandible into centric relationship position and displace the wax vertical stops at the OVD.[7,9] Repeat this procedure until even contact of the vertical stops at the OVD is established.
7. Guide the mandible in the centric relationship position and evaluate the occlusal contacts of the occlusal rims established by means of the wax vertical stops (Fig. 3A). Repeat steps 5 and 6 until the occlusal rims demonstrate even contact across the arch by means of the wax vertical stops in centric relationship position and without increasing the OVD. Note a small occlusal gap in the anterior segment between the occlusal rims indicating the space occupied by the wax vertical stops (Fig. 3A) and the mandibular occlusal rim demonstrating wax vertical stops flattened against the maxillary occlusal rim (Fig. 3B).
8. Mark the midline and other reference points for the alignment of artificial denture teeth in the occlusal rims and create V-shaped indices in the maxillary and mandibular occlusal rims using a sharp knife (#25; Feather Safety Razor Co, Ltd) (Fig. 4).[1]
9. Place the maxillary and mandibular occlusal rims in the mouth. Guide the mandible to record the maxillomandibular relationship at the established OVD by using an addition silicone occlusal registration material (O-Bite; DMG) (Fig. 5). Ensure that the recording medium engages the occlusal indices and fills the interocclusal gap located between the vertical stops created by the dome-shaped wax and maxillary occlusal rim.
10. Evaluate the maxillomandibular relationship record and trim the excess with a sharp knife (#25; Feather Safety Razor Co, Ltd) to mount the definitive casts on an articulator (Hanau Modular Articulator System; Whip Mix Corp).

DISCUSSION

Occlusal rims are contoured to establish the occlusal plane, OVD, and lip support and to support a recording medium and record the maxillomandibular relationship of edentulous arches.[1,3] When occlusal rims are occluded, they should contact each other evenly across the arch without displacing or lifting the record bases from the ridge mucosa. However, the occlusal rims may demonstrate uneven occlusal contacts across the arch and rely on the recording medium to fill the occlusal gap in recording the centric relationship position.

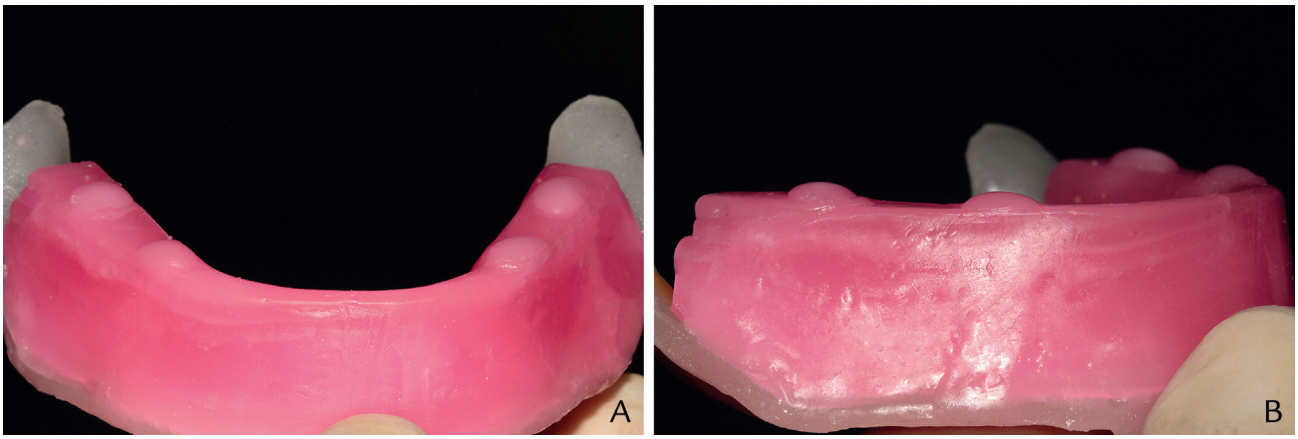

Figure 2. Dome-shaped baseplate wax added as vertical stops on occlusal surface of mandibular occlusal rim. A, Frontal view. B, Lateral view.

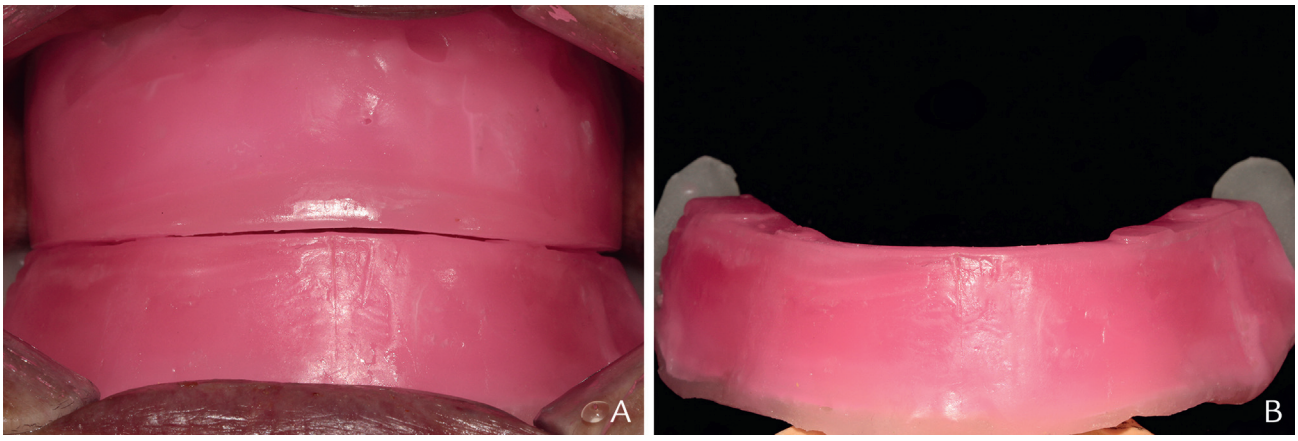

Figure 3. A, Maxillary and mandibular occlusal rims demonstrating even contact established with wax vertical stops. B, Mandibular occlusal rim demonstrating wax vertical stops flattened against maxillary occlusal rim.

A number of different methods focus on stabilizing the record bases to record maxillomandibular relationship and keep the positional relationship of occlusal rims in the centric position.[3,5-7] Regardless of the differences of each procedure, a low-viscosity recording medium is required to minimize pressure and displacement of the ridge mucosa while recording the maxillomandibular relationship.[3,6] Although resilient when polymerized, silicone occlusal registration materials are dimensionally stable and allow a pressureless record to be made.[10,11] However, occlusal error may rise when the record bases become displaced when the mandible is closed, as the mandible may shift during the polymerization of the recording medium.

This method of recording the maxillomandibular relationship of edentulous arches simplifies the procedure of establishing even contact of the occlusal rims by means of wax vertical stops added on the occlusal surface of the mandibular occlusal rim. The wax is added in the posterior segments of the arch to seat the record bases against the posterior residual ridges and avoid pressure in the anterior segment of the ridge.[12] However, the stability of record base should be verified to ensure uniform contact against the ridge mucosa and accuracy of the centric relationship record.

Figure 4. Occlusal index was created as V-shaped notch for registering centric relationship record.

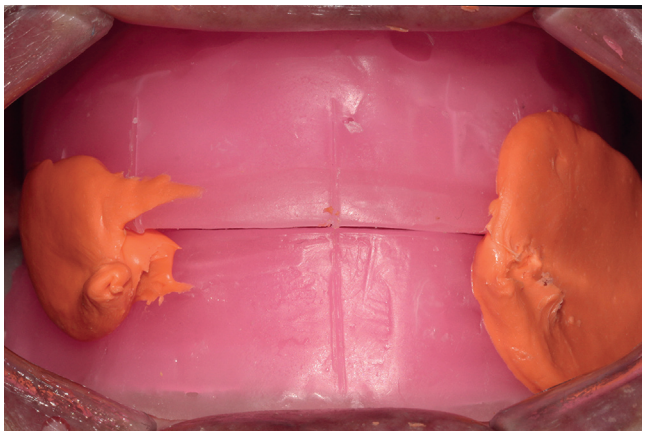

Figure 5. Silicone occlusal registration material interposed between occlusal rims to record centric relationship position.

This technique enables the practitioner to focus on registering the horizontal relationship of edentulous arches with the mandible guided in the centric relationship position. However, care should be taken to soften the wax vertical stops uniformly across the arch while establishing even contact of the occlusal rims. In addition, the occlusal height of the mandibular occlusal rim should be slightly reduced to compensate for the interocclusal space occupied by the wax vertical stops and to avoid consequential increase in the OVD.

SUMMARY

This article describes a straightforward method for recording an accurate silicone centric relationship record with dome-shaped baseplate wax added as vertical stops on the occlusal surface of the mandibular occlusal rim. This method reduces the likelihood of occlusal errors related to uneven contacts of occlusal rims across the arch.

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