

Using the neutral zone to obtain maxillomandibular relationship records for complete denture patients

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A technique for obtaining maxillomandibular registration for complete denture patients is presented. The maxillary rim is formed with the use of conventional techniques. The mandibular rim is made from modeling plastic impression compound on a record base formed by the patient into the neutral zone. The mandibular rim then is reheated, and the patient determines the occlusal vertical dimension by swallowing. An imprint of the maxillary rim is made on the mandibular rim at the occlusal vertical dimension. The posterior extent of the mandibular rim is relieved 1 mm. Orientation notches are placed in both rims, and centric relation is recorded with a fast-setting vinyl polysiloxane material. (J Prosthet Dent 2001;85:621-3.)

The clinical technique of recording jaw relationships in complete denture patients requires significant experience for the dentist to become proficient. The commonly used method involves making wax occlusal rims on record bases.¹ These rims must contact evenly in centric relation, and this often presents difficulty. When examined visually the rims may appear to contact evenly, the resiliency of the tissue may alter the contact, and the dentist may be misled.

Incorrect determination of the occlusal vertical dimension and the centric relation position is a major cause for failure in complete denture treatment. Shanahan² described the use of soft wax on the mandibular record base and stated that “swallowing saliva is the determinative factor in obtaining vertical dimension and centric relation.” By reducing the mandibular occlusion rim 3 mm and placing cones of soft wax, the vertical dimension was established after the patient swallowed several times. Shanahan also believed that the mandible would assume the centric relation position as the swallow was completed. Ismail and George³ found swallowing to be reliable for determining the occlusal vertical dimension.

Methods for making the centric relation record have been described as a static, graphic, functional, and cephalometric.⁴ Most static records use waxes, modeling plastic impression compound, zinc-oxide eugenol, plaster, or a fast-setting vinyl polysiloxane material between the wax occlusion rims to later relate them to the articulator. In 1939, Wright⁵ described a



Fig. 1. Mandibular record base with modeling plastic impression compound formed to patient's neutral zone.

technique that allowed the patient to close onto an anterior stop while a recording material was placed in the posterior.

The technique described in this article uses a combination of functional and static recording methods. The occlusal vertical dimension is obtained functionally after the dentist has assisted closure into centric relation. The centric relation record is made with the use of an anterior flat stop made during the determination of vertical dimension and completed with the dentist assisting closure. The anterior stop, similar to that which Wright⁵ describes, allows the operator to concentrate on 1 step at a time. This anterior stop remains broad and flat and allows the patient to close onto an area rather than a point.

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Fig. 2. Imprint of maxillary occlusal rim into mandibular occlusal rim.



Fig. 3. Mandibular occlusal rim after trimming of excess material and placement of notches to record centric relation. Anterior portion remains as flat stop.



Fig. 4. Final maxillomandibular registration.

PROCEDURE

1. After final impressions have been made, fabricate record bases, and evaluate their stability. Bases must be stable to proceed.
2. Contour the wax rim on the maxillary base as normal. The use of a Fox plane is mandatory because the occlusal plane will be dictated by the contours of the maxillary rim.
3. Mark midline, distal of canines, and smile line on the maxillary rim.
4. Place sticky wax on the mandibular record base.
5. Uniformly soften red modeling plastic impression compound in a water bath at 132°F to 137°F, and place the modeling plastic on the mandibular record base.
6. Place the record base with the modeling plastic in the patient's mouth.
7. Have the patient suck and swallow⁶ to mold the modeling plastic impression compound into the area of the neutral zone. Remove the record base and inspect it (Fig. 1).
8. Place petroleum jelly on the maxillary wax rim, and place the maxillary record base in the patient's mouth.
9. Uniformly reheat the mandibular rim, and place the record base into the patient's mouth. Guide the patient into centric relation until the rims lightly touch. Instruct the patient to swallow. An imprint of the maxillary occlusal rim into the mandibular rim will result. The tentative occlusal vertical dimension has been determined, and the anterior stop has been created (Fig. 2).
10. Trim all excess from the mandibular rim, and replace the rim in the patient's mouth. Evaluate the occlusal vertical dimension by judging overall facial support, the vertical dimension of rest, and the closest speaking space. Steps 9 and 10 should be repeated until the appropriate vertical dimension of occlusion is determined.
11. Do not alter the anterior portions of the rims. Place v-shaped notches in the maxillary rim, and lubricate the rim. Trim 1 mm of the rim in the posterior of the mandibular rim. Then place v-shaped notches and lubricate the mandibular rim (Fig. 3).
12. Record the face-bow registration using the anatomic average hinge axis location of choice, and set aside for articulation of the maxillary cast.
13. Place both record bases in the patient's mouth, and practice guiding the patient into the centric relation position.
14. Record the position by injecting a fast-setting vinyl polysiloxane material onto the mandibular rim, and have the patient close into centric relation (Fig. 4).

15. Verify repeatability, make a protrusive record, and articulate the cast.
16. Proceed with tooth selection and evaluation of the trial denture.

DISCUSSION

When the patient functionally molds the mandibular rim into the area of the neutral zone, the result is a more stable record base. This technique uses the anterior stop described by Beresin and Schiesser⁷ and similar to that described by Wright.⁵ The technique differs from Beresin and Schiesser⁷ in that the maxillary rim is not formed into the neutral zone by the patient, and the occlusal plane is first identified in the maxillary rim. Uniformly reheating the modeling plastic impression compound occlusion rim is critical for success. If this step is not completed successfully, an incorrect occlusal vertical dimension may result. The use of an anterior stop in the record may introduce error to the procedure because of possible displacement of the record base. When the operator observes that the anterior stop has just made contact with the maxillary wax rim, he or she should instruct the patient to stop closing.

SUMMARY

A technique has been presented that allows the practitioner to accurately record the maxillomandibular relationship of a patient. Because the patient

functionally molds the mandibular rim into the area of the neutral zone, a more stable record base is created.

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