A Technique to Obtain Stable Centric Occlusion Records Using Impression Plaster

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Recording the maxillomandibular relationship is often a challenge. In situations where there is vertical support but no horizontal stability, and the space between posterior teeth of opposing jaws is not adequate for an interocclusal record, impression plaster can be used. Despite limited clinical use, impression plaster is known for its stability. With this technique, the interocclusal record is obtained by applying the material to the buccal surfaces of the posterior teeth, resulting in a precise and stable cast relationship.

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STABLE AND accurate interocclusal records can be made in clinical situations using several techniques and materials.[1] In situations where vertical support between opposing arches is evident, but horizontal stability is lacking, making a record is necessary for cast articulation.[1,2] One must be very careful to avoid any material intervening between the teeth that have opposing tooth contacts when making an occlusal record. This could result in the inadvertent increase of vertical dimension and lateral displacement of the mandible.[3-6] In patients who lack horizontal stability and present with several posterior unprepared teeth in both arches, the space between the arches is not adequate for a recording material to be used.[1,2]

When the mandible is positioned in centric occlusion coincident with maximum intercuspation, buccal application of the recording material is an easy and safe procedure. When horizontal instability is present, impression plaster can be the material of choice. Despite its limited clinical use, this material is precise, dimensionally stable,[7] long lasting,[8] and cost-effective. A procedure for its use as a recording material follows.

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Technique

1. Ask the patient to close into maximum intercuspation (Fig 1).
2. Place a small, weighed quantity (10 g) of impression plaster (similar to a scoop of alginate) (Bitestone, Whip Mix Co, Louisville, KY) into a mixing bowl and add 3 ml of water (using more water as needed to lower the viscosity). Mix vigorously using a stiff spatula for a maximum of 30 seconds.
3. Apply the plaster. A disposable 60 cc syringe (Monoject, Kendall-LTP, Chicipee, MA) with the tip cut to a larger opening of approximately 3 mm can be used to apply the plaster for this technique. *Remember there is a maximum time of 30 seconds to load the syringe and apply the plaster.*
4. Reflect the left cheek and inject the plaster into the buccal sulcus opposite the molar and premolar teeth (Fig 2). Ensure the material records at least three teeth for each jaw. Check the occlusion from the right side. Let the cheek relax and press lightly inward. Let the plaster set for 2 additional minutes. Using an explorer, verify that setting is complete. Remove the record and instruct the patient to rinse to remove plaster fragments.
5. Repeat the same procedure for the right-hand side.
6. Let the records dry and if necessary, trim any excess material so the records fit only the buccal tooth surfaces (Fig 3). Identify the records, R and L, with a pencil on the outer surface for the right and left record, respectively.

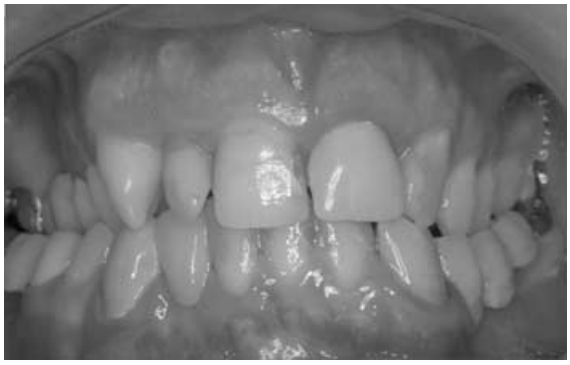

Figure 1. Patient's centric occlusion. Poor intercuspation is evident, leading to lack of horizontal stability.

7. Verify that the two records are tightly retained to each cast separately (Fig 4).
8. Combine the two casts using impression plaster records bilaterally (Fig 5). Use sticky wax to fix records to the casts before mounting.

Discussion

In situations where several posterior unprepared teeth in both jaws are present, the space between the posterior teeth is not enough for occlusal registration.[1,2] Elastomeric interocclusal registration materials have been recommended when horizontal stability is lacking;[2] however, mandibular deflection is possible when elastomeric materials are placed between the jaws, despite the materials' low resistance to closure. Elastomers can be trimmed effectively, but when intervening, even in thin sections, their elasticity and rebound can impede full cast seating, especially when typical occlusal morphology is evident. In patients with abraded teeth, elastomers between the jaws can displace the relationship, and insecure records with perforations result.

Figure 2. Impression plaster is applied to buccal surfaces of posterior teeth with a syringe.

Figure 3. Impression plaster records after trimming to fit tooth surfaces only.

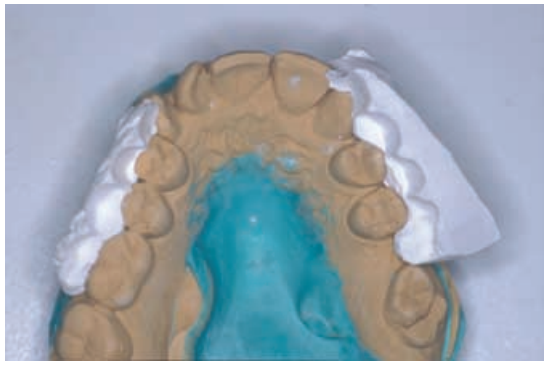

Figure 4. Impression plaster records have excellent retention when seated onto cast buccal surfaces for each cast separately. No plaster is inserted between opposing tooth surfaces.

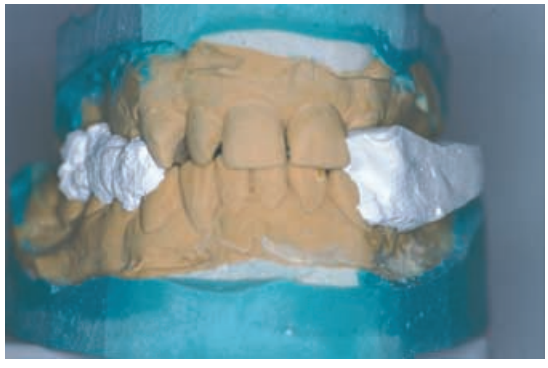

Figure 5. Records as seated in place permit full cast contact. Fixation onto casts using wax is necessary before mounting.

For centric occlusion records, the proposed method recommends the buccal application of impression plaster in any situation where enough posterior teeth exist to support it. The lack of horizontal stability is evident in many clinical situations when vertical support exists. In some patients, despite normal occlusal characteristics of opposing teeth, there is an instable relationship between tooth cusps and opposing fossae and the intercuspation (between teeth in opposing arches) is not adequate. Horizontal instability is also present when excessive abrasion of occlusal morphology is evident. The buccal application of impression plaster is indicated here as well. Impression plaster records can be very useful for the relation of diagnostic casts and also during the reconstruction of anterior teeth for relating the working casts. An accurate articulation can be obtained (for both procedures) using the same plaster records.

Another clinical indication for impression plaster records is to secure orthodontic casts in maximum intercuspation. The permanent characteristic of those records can be helpful for the long-term evaluation of orthodontic treatment. The buccal application of other registration materials is not as secure and accurate as that of impression plaster. Elastomers are easily manipulated, but they lack the rigidity necessary to stabilize the casts. Cost effectiveness is a further advantage of impression plaster. Acrylic resin is a rigid material, but its polymerization shrinkage, especially in thick portions, and exothermic reaction are basic disadvantages of this material.

The impression plaster record is a technique-sensitive process. Impression plaster as a recording material can be used in three ways, (1) by hand manipulation,[9] (2) using a gauze quadrant tray,[5] and (3) using a syringe.[10]

In this method a syringe is used. The dimension of this syringe's opening is approximately 3.0 mm, so applied material can easily record the tooth surfaces of both arches. Among the three methods, the use of a syringe is the most time-sensitive one. Impression plaster sets in approximately 3 minutes, and the use of the syringe offers only 30 seconds maximum working time to fill the syringe and apply the material. Although impression plaster is usually flavored, its plaster aftertaste does not encourage its extensive clinical use. The application of impression plaster as a registration material in special situations as described above, arises from the authors' experience of many years, and can offer excellent solutions to typical recording challenges.

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