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An Alternative Technique for Fabrication of an Occlusal Device

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Abstract

Several methods have been described for fabrication of occlusal devices, but many require complex and time-consuming laboratory procedures. In this article, an alternative fabrication method for a hard occlusal device while maintaining the articulation of the cast is described.

Bruxism is defined as the parafunctional grinding of teeth, which may lead to occlusal trauma.[1] Occlusal devices have been used for the treatment of bruxism to protect the dentition against abrasion and attrition due to parafunctional habits.[2]

Although the effectiveness of occlusal devices has been controversial for many years, it has been shown that the use of an occlusal device helps in reducing hyperactivity of masticatory muscles in patients with bruxism or temoporomandibular joint (TMJ) dysfunction.[3–5] In a study by Sheikholeslam et al, 80% of patients with symptoms of nocturnal bruxism recurred to the pretreatment level after occlusal device therapy was discontinued.[4] The recurrence of TMJ dysfunction following removal of the occlusal splint was also documented in a study by Beard and Clayton.[3] Therefore, it is important for clinicians to recognize patients with persistent bruxism and incorporate an occlusal device as a part of the pre- and/or posttreatment regimen.

In the past, several fabrication techniques have been described in an attempt to improve dimensional stability, including: (1) use of autopolymerizing acrylic resin in a doughy stage;[6] (2) fabrication of the occlusal device on the articulated models with heat-cured acrylic resin;[7] (3) addition of clear autopolymerizing acrylic resin on the occlusal surface of a vacuum-adapted resin sheet;[8] (4) sprinkle-on technique with autopolymerizing acrylic resin;[9,10] (5) use of autopolymerizing acrylic resin at 100°F under pressure;[11] (6) use of heat-cured acrylic resin after flasking under 3500 pounds of pressure for 10 minutes.[12] Bohnenkamp et al[13] compared five fabrication techniques and two storage methods, and found that the sprinkle-on technique with autopolymerizing acrylic resin as described by Kass and Tregaskes[9] showed less linear dimensional change than the dough application, the vacuum-adapted resin sheet with dough autopolymerizing acrylic resin application, and the heat-cured technique. Also, Bohnenkamp showed that the vacuum-adapted resin sheet and the acrylic resin dough application technique resulted in the greatest linear dimensional change of any technique described in the study.[13] As a result, Bohnenkamp recommends the use of autopolymerizing acrylic resin to minimize dimensional change.

Furthermore, the use of a facebow transfer and centric relation record for the articulation of casts on a semi-adjustable articulator is recommended to minimize intraoral adjustment.[14]

This article describes the fabrication of a hard occlusal device from the articulated casts of definitive prostheses using autopolymerizing acrylic resin. This technique is an alternative

to the traditional flasking technique, which requires separating the articulated cast from the mounting stone. This facilitates more accurate occlusal adjustment on the articulator.

Procedure

1. Casts of completed prostheses are articulated using the facebow transfer and centric relation record on a semi-adjustable articulator.
2. The maxillary cast is surveyed to locate the heights of contour of the restorations (Ney Dental, Inc., Bloomfield, CT).
3. The incisal pin is adjusted to allow for the desired thickness of the occlusal device.
4. The occlusal device is waxed-up with baseplate wax (Dentsply Caulk, Milford, DE) on the occlusal surface extending up to the height of contours of the restorations (Fig 1).
5. Centric contacts and all excursive movements are established and incorporated in the wax-up (Fig 2).
6. Laboratory silicone putty (Coltene/Whaledent, Cuyahoga Falls, OH) is adapted around the maxillary teeth and the wax-up, extending up to the occlusal surface. After polymerization of the putty, four indexing notches are made in the periphery of the silicone putty index. Boxing wax (Corning Rubber Co., Inc., Brooklyn, NY) is then adapted and secured around the silicone putty index using sticky wax (Dentsply International, York, PA) (Fig 3).
7. Fast-set type II plaster (KerrLab, Orange, CA) is used to invest the wax-up. After complete setting of the plaster, separate the plaster index from the silicone putty index and remove the occlusal device wax-up from the silicone putty index (Fig 4).
8. Three access channels are made with a number 6 round bur (SS White, Lakewood, NJ) in the silicone putty index to allow for injection of autopolymerizing acrylic resin

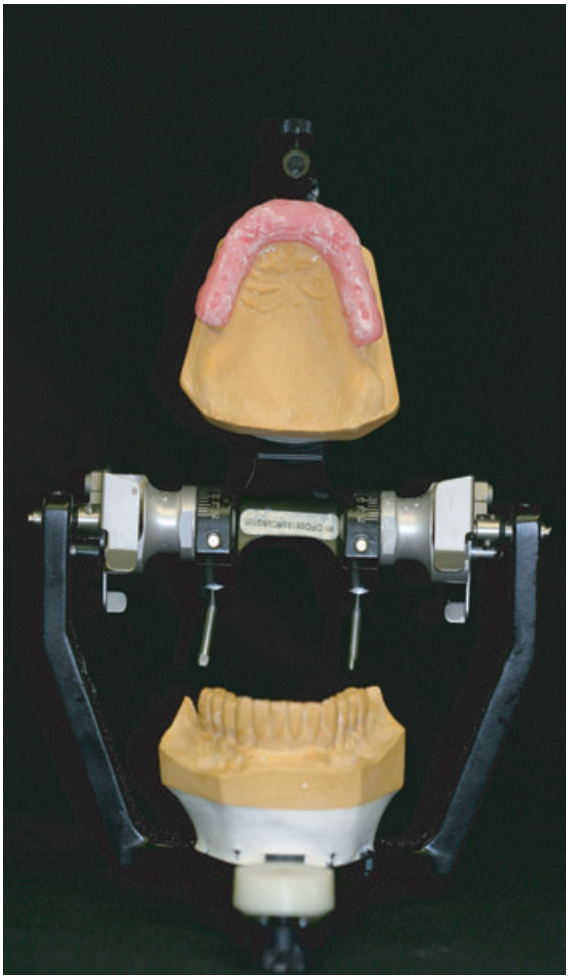

Figure 2 Development of centric contacts and excursive movements.

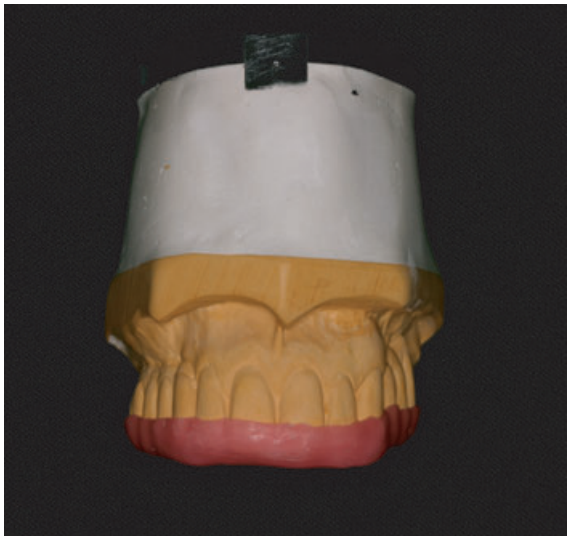

Figure 1 Wax-up of occlusal device on the articulated model of definitive prosthesis.

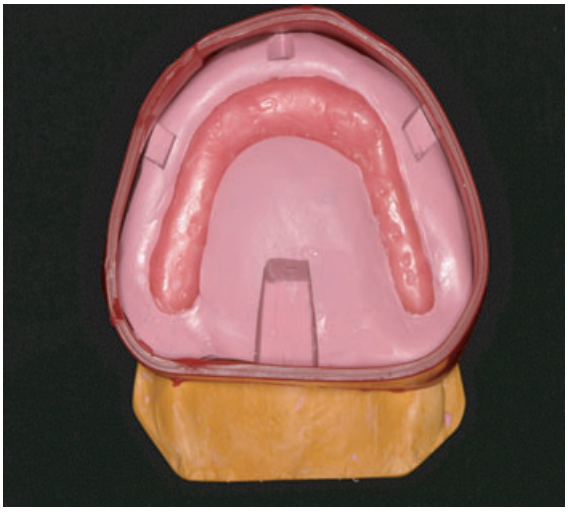

Figure 3 Adaptation of silicone putty and boxing wax around the wax-up of occlusal device. Indexing notches are prepared prior to the plaster investment procedure. Note that all procedures are completed without separating the model from the mounting ring.

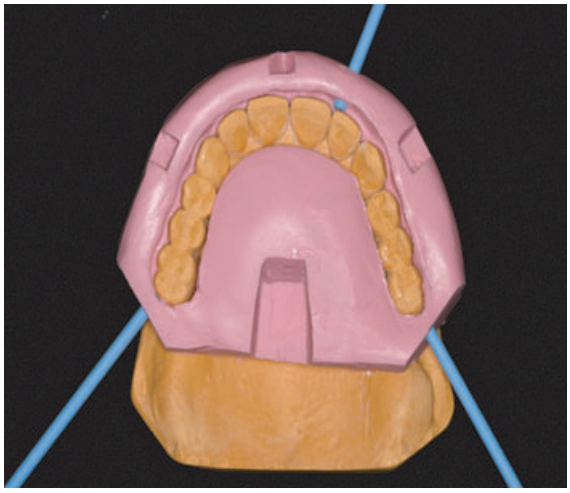

Figure 4 Location of access channels demonstrated with plastic straws for application of autopolymerizing acrylic resin.

Figure 5 Separation of the plaster index. Tin foil substitute is applied on the intaglio surface for ease of removal.

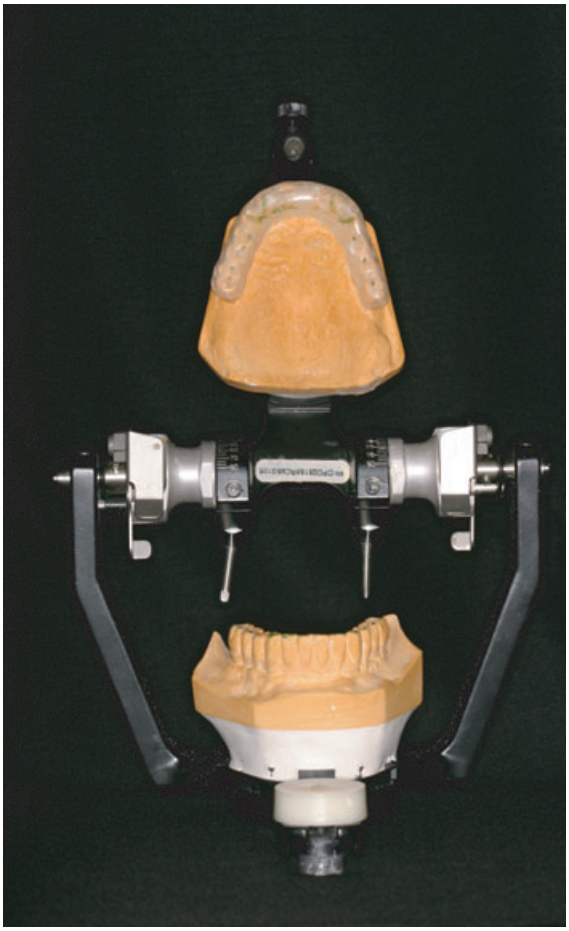

Figure 6 Completely polymerized occlusal device is returned to the articulator for further occlusal adjustment. The occlusal device is inserted for minimal intraoral occlusion refinements and verifications.

(Orthodontic Resin, Dentsply Caulk). Figure 4 shows the locations of the prepared access channels with plastic straws.

9. Tin foil substitute (Al-Cote, Dentsply Caulk) is applied on the intaglio surface of the plaster index (Fig 5).
10. The plaster index is placed back over the silicone putty index after ensuring all the indexing notches are aligned, and is secured with rubber bands. Autopolymerizing acrylic resin is then injected through the middle access channels using a Monoject syringe (The Kendall Company, Mansfield, MA). Inject acrylic resin until the excess extrudes from the other two channels. This will ensure the space previously occupied by the wax-up is completely filled with acrylic resin. The cast is placed in a pressure pot at 20 psi for 20 minutes for the polymerization process.
11. After complete polymerization, the indices are removed, and the cast is placed back in the articulator for adjustments of any processing error before separating the occlusal device from the cast.
12. After the initial adjustment, the occlusal device is intraorally evaluated and refined for centric contacts as well as canine guidance (Fig 6).

Summary

The technique described reduces the processing time by eliminating the traditional flasking method and heat-activated polymerization. In the traditional flasking method, the master cast must be separated from the mounting stone. As a result, accurate occlusal adjustment may be compromised. The technique discussed in this article uses the benefits of the traditional flasking technique while not separating the cast from the mounting stone, allowing for more accurate extraoral occlusal adjustment. In addition, it is cost-effective and can be completed by auxiliary personnel in the office.

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