Intraoral Registration Coping Formation Using an Interim Restoration as a Matrix

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Abstract

An intraoral procedure for registration coping fabrication is described. The indirectly constructed shell of the interim fixed partial denture is used as a matrix, and a light-cured resin is added directly to form the copings. The proposed technique reduces the total number of clinical sessions and can be useful in cases when tooth preparations and final impressions can be completed at the same appointment.

When planning a fixed partial denture (FPD), certain requirements (biological, mechanical, esthetic) of a properly made interim restoration have to be fulfilled. One of the methods available for an interim FPD fabrication is the indirect–direct technique.[1] The technique involves the fabrication of a thin shell indirectly on a minimally reduced cast of the proposed restorations. This shell is relined with the provisional restorative material intraorally. The indirect–direct technique combines the best marginal accuracy with the least risk for thermal damage to the pulpal tissues.[2]

A crucial clinical step for overall prosthetic treatment success is recording the maxillo-mandibular relationship. Among different recording materials, acrylics, if properly used, can produce rigid and stable records.[3] Using acrylic copings for making interocclusal records is a reliable method that can give accurate results[4–6] even in complicated cases.[7] Registration copings are usually made on working casts, transferred to the mouth and placed on prepared teeth. They are combined with a self-curing acrylic resin to complete the record, so an extra appointment is necessary for interocclusal records to be taken.

In the present article, a technique is proposed to fabricate acrylic resin copings intraorally. The shell of the interim FPD is indirectly made and is used as a matrix for the direct coping formation. Registrations are made at the same appointment as final impression making.

Technique

(1) Make preliminary alginate impressions of both arches and make diagnostic casts from hard stone. Produce an additional cast for the construction of the interim restoration.

(2) Minimally prepare the abutment teeth on accurately mounted diagnostic casts. Fabricate a laboratory-made shell of the provisional FPD, using a heat-cured polymethyl methacrylate (PMMA) resin (SR Ivocron, Ivoclar Vivadent AG, Schaan, Liechtenstein). This shell must be lined intraorally with a polyethyl methacrylate (PEMA) resin after tooth preparations are finalized in order to have the interim restoration completed.

(3) Complete tooth preparations in the mouth and make final impressions.

(4) At the same visit, interocclusal registrations are made as follows: Try-in the interim restoration and ensure it is fully seated on prepared teeth. Use an 8 μm shimstock occlusion foil (Almore International, Portland, OR) on adjacent teeth to identify any antagonistic contact. Then, thinly smear petroleum jelly to lubricate the internal surfaces of the shell. Use a light-cured acrylic resin (Unifast LC; GC Europe NV, Leuven, Belgium) to form copings intraorally. Add powder to liquid in the mixing cup (the standard powder/liquid ratio is 1.0 g/0.5 ml) and mix quickly for 10 to 15 seconds. Use the provisional shell

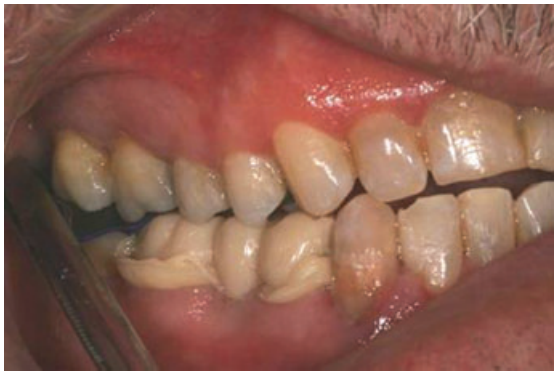

Figure 1 Interim restoration is relined with light-cured resin to form the copings.

as a matrix and reline it (fill about two-thirds) with the resin mixture. Seat it gently on prepared teeth and ask the patient to start closing the mouth into maximum intercuspation. To avoid a complete closure, hold three pieces of 200 μm articulating paper (Dr Jean Bausch KG, D-50769, Koln, Germany) with a Miller articulating forceps and insert them between adjacent teeth and their antagonists (posteriorly or anteriorly to retainer teeth) (Fig 1).

(5) After 2 to 3 minutes, when resin has reached a rubber-like consistency, remove interim restoration from the mouth and light cure the copings extraorally, using an appropriate visible-light-curing device (470 nm wavelength) for 40 seconds, for each one. Check if coping resin has hardened and separate it from the shell using an explorer. The provisional shell is no longer useful for record making. It is cleaned with cotton and will be relined with a self-curing acrylic resin intraorally, so that the interim restoration can be completed at the same appointment.

(6) Trim the resin copings, if necessary, to have a wall thickness of about 1 mm and place them on prepared teeth. Using a waterproof pencil, mark their buccal edge to verify proper seating. Place the resin copings back inside the mouth (Fig 2). Ask the patient to close into maximum intercuspation and verify that there is adequate occlusal clearance. Lubricate occlusal surfaces of antagonistic teeth with petroleum jelly. Using the bead brush technique, add small quantities of low-shrinkage autopolymerizing acrylic resin (GC Pattern Resin, GC Europe NV) to the occlusal surface of the copings and ask the patient to close into maximum intercuspation (Fig 3). Keep teeth in contact until complete polymerization. After polymerization, the records are trimmed to remove flash, leaving the impression of the opposing cusp tips intact. Send the records with the final impressions to the laboratory.

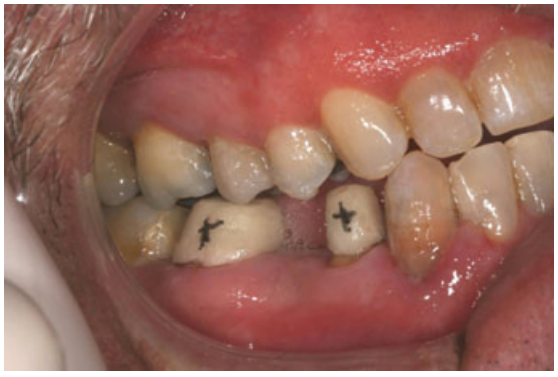

Figure 2 Acrylic copings in place permit full closure into maximum intercuspation.

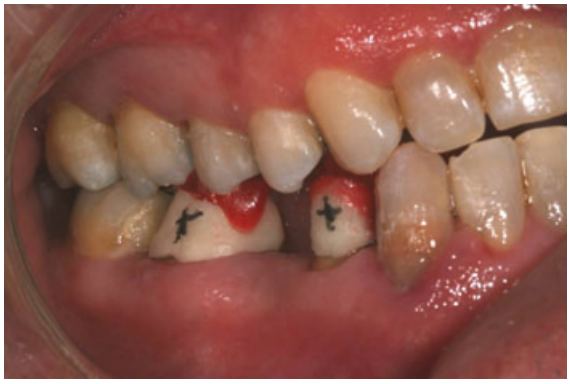

Figure 3 Self-cured acrylic resin is added to complete the records.

Discussion

Acrylic copings have been used for a long time in clinical dentistry to transfer the maxillomandibular relationship to the articulator. This method has proved useful when used either for a centric relation registration (in more complicated cases), or when a maximum intercuspation record is needed. In the case presented, a segmental short-span FPD is constructed, and a terminal stop (second mandibular molar) exists. Besides evident vertical support, horizontal stability is lacking, so a registration is necessary.[8]

Different methods have been proposed for the record-coping formation. Acrylic copings are commonly fabricated indirectly on the master cast, so an extra clinical visit is necessary to complete the record directly with a rigid self-cured acrylic resin. Flowable composite resin has been proposed to form registration copings intraorally;[9] however, in everyday clinical reality this is a very technique-sensitive procedure, because of the handling difficulties presented and the instability of this material. A challenging method has been presented for the direct coping construction.[10] Copings are fabricated from a light-cured acrylic resin by means of a soft polyethylene matrix. In the present article, the same acrylic resin has been employed to form the copings, using the shell of an interim FPD as a matrix. This procedure is safe even for freshly prepared teeth, as the light-cured PEMA resin is polymerized outside the mouth to avoid any possible thermal effect on vital abutments.[11]

The interim restoration used to obtain the interocclusal records was not yet completed. A shell, prepared indirectly, serves as a matrix for the coping formation. A PMMA resin is usually used to give an adequately strong shell, and a PEMA

resin is used to line it intraorally. Although a heat-cured acrylic resin has been used in the proposed technique for the shell construction, a self-polymerizing one can serve satisfactorily if no exceptional esthetic demand or need for long-term use exists. Self-cured acrylic resin can be polymerized, under pressure, in a hydroflask, which effectively reduces porosity.[12] It can be produced in the dental office by experienced personnel, as described by Christensen.[13]

Although an even more extended interim FPD could be used as a matrix for registration coping formation, this technique is particularly proposed for the cases with a short number of retainers that could be prepared at the same session. When final impressions and records could be taken at that appointment, a prefabricated provisional shell could serve as a matrix for the recording completion, so the total number of sessions can be reduced, benefiting both doctor and patient. Of course, clinical parameters such as the gingival biotype, esthetic demands, and the preparation margin line can essentially determine when the final impression making should take place. Such parameters have to be taken into account when the treatment plan is decided.

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