A Problem-Solving Impression Technique

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Critical to successful dental prostheses are successful dental impressions. Knowledge of impression materials and the techniques to which each is best suited is essential to achieving consistent results. The choice of impression material should be made based on the intended use for the material. In this case, a frequently used impression technique was modified to maximize patient comfort and achieve accurate results. Use of retraction cord prior to impression taking is frequently an uncomfortable procedure for many patients. The patient's comfort may be further compromised if impression materials tend to run or slump, activating the gag reflex, thereby creating a tedious situation for the patient and clinician. An impression-taking technique was developed to maximize patient comfort and yield accurate and quick results by eliminating use of retraction cord and using a two-step procedure with only one tray insertion. The technique presented is a direct result of recent improvements in physical properties of the polyvinyl siloxane impression materials chosen for this technique.

Introduction

There are seven major chemical classes of elastomeric impression materials: irreversible hydrocolloid (alginate), reversible hydrocolloid, polysulfide (rubber base), polyether, condensation reaction silicones, addition reaction silicones (polyvinyl siloxanes), and light-cured impression materials. A complete review of the physical properties, advantages, and disadvantages of each material type has been well documented.[1,2]

Specific types of impression materials are best suited for certain kinds of impression techniques. It is prudent to consider the physical properties of an impression material to be certain that it can deliver the desired results when used with a selected impression technique.

The putty-wash technique is frequently recommended for use with polyvinyl siloxanes. Relative to patient comfort, polyvinyl siloxanes are clean, odorless, and tasteless?[3]

Variations of the putty-wash technique have been presented as two-step, one-step or simultaneous procedures.[1,3] Full-arch custom trays are recommended to achieve optimum restorative results when three or more units are involved.[3,4]

One frequently used technique is termed a dual-arch or double-bite impression technique. The dual-arch procedure is suggested when the number of prepared teeth is limited to one or two units.[3,4] The dual-arch technique is popular because it is quick, it reduces the chance of patient gagging, increases the comfort of the patient, and saves impression material.[5] However, it often falls short of providing the laboratory technician with adequate detail. Although popular, it has been criticized for being overused. Distortions in the dual-arch technique can occur when materials with high flexibility are used with an open gauze tray, offering little support for the flexible impression material.[1] For this reason, rigid metal trays are recommended.[3]

Procedure

The procedure presented is described as a two-step, dual-arch technique.

Although a dual-arch technique would ordinarily be used for single-unit crowns, modifications to the procedure permit quick, accurate results in cases of multiple unit crowns, with exceptional attention to

the patient's comfort.

The success of this procedure is credited to the Shore A Durometer measurements and thixotropic characteristics of the selected impression materials. Shore A Durometer measurements are used to assess the hardness of elastomers.[6] The Shore A Durometer instrument consists of a blunt-pointed indenter attached by a lever to a scale that is graduated from 0 to 100 units. A reading of 0 indicates the indenter has completely penetrated the sample; a reading of 100 units indicates no penetration has occurred.

A material with a low Shore A Durometer would indicate greater material flex, and one that would cause distortion if used for a dual-arch technique in an unsupported tray. An impression material with a high Shore A Durometer measurement would indicate very little flex and a high degree of rigidity. A high durometer measurement is a desirable characteristic for an impression material that is used in an open gauze tray with a dual-arch technique.

Method and Materials

The impression materials selected were vinyl polysiloxane (Perfectim™ Universal Blue Velvet™ and Perfectim™ Flexi-Velvet™, J. Morita USA, Inc.). The base material (Perfectim™ Universal Blue Velvet™) was chosen due to its high durometer measurement of 75. The wash material (Perfectim™ Flexi-Velvet™) was selected for its mousse-like consistency and durometer measurement of 40. The Perfectim materials are highly thixotropic, permitting the flow of material to be controlled by operator pressure. The delivery system used was an automix cartridge and dispensing gun (Perfectim™ System cartridge gun, J.Morita USA, Inc.).

Clinical Case

Clinical exam revealed the maxillary right first molar missing, with mesial migration of the maxillary second molar **(Fig. 1)**. The adjacent first and second premolars and second molar were prepared to receive a fixed four-unit bridge **(Fig. 2)**. Teeth numbers two, four, and five served as abutment teeth, with tooth number three as a pontic.

Figure 1. Maxillary right second molar and first and second premolars prior to preparation.

Figure 2. Maxillary right premolars and second molar prepared for four-unit fixed bridge.

Technique

1. Following tooth preparation, the area was thoroughly irrigated with water and air dried. Due to the physical properties of the impression materials and sequence of their use, no retraction cord was necessary. A flexible, one-half arch, plastic gauze tray with a slight buccal side-wall was chosen (TriBite™ Impression Tray, Direct Dental Service). The tray was placed into the patient's mouth to assess size and clearance **(Fig. 3)**.

Figure 3. Impression tray try-in for a two-step, dual-arch impression technique.

2. A cartridge of impression material and a medium dispensing tip were affixed to the auto-mix dispenser. The impression material was syringed over the top and bottom of the gauze tray **(Fig. 4)**. While extruding the material, the tip of the dispensing syringe was submerged into the impression material to prevent introducing air bubbles into the mix **(Fig. 4)**.

Figure 4. Impression material extruded onto impression tray. The dispensing tip is submerged in the impression material during extrusion to prevent introducing air bubbles into the mix.

3. The loaded tray was placed over the prepared teeth and the patient was instructed to close his teeth firmly together **(Fig. 5)**. The material was allowed to set for 2 minutes.

Figure 5. Impression material and tray placement over the prepared teeth.

During the setting cycle, the impression material was border molded to the soft tissue using gentle finger pressure **(Fig. 6)**.

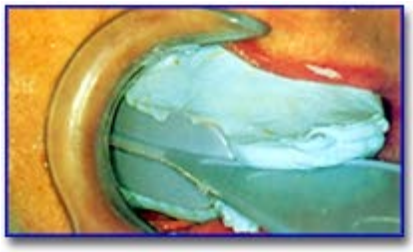

Figure 6. The impression material is border molded during the setting cycle.

4. When the material was set, the patient was asked to open, and the impression was dislodged from the maxillary teeth, while allowing the impression to remain on the mandibular teeth. The impression was visually inspected for completeness **(Fig. 7)**.

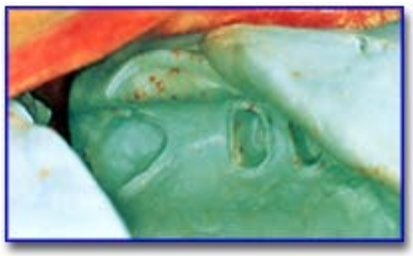

Figure 7. The impression remains in the mouth on the arch opposite the prepared teeth. The base impression (Shore A Durometer 80) is visually inspected. Note the border molding of the base material.

Although there was evidence of gingival bleeding indicating the field was not perfectly dry, the base material exhibited resistance to the moisture present.

5. With the patient's mouth open, the maxillary side of the impression was air dried.

A thoroughly dry field is essential to permit the subsequent wash material to laminate to the set impression material.

6. A slight amount of wash material was syringed into the impression of the prepared teeth **(Fig. 8)**.

Figure 8. The wash material (Shore A Durometer 40) is syringed onto the air dried impression of the prepared teeth. The impression remains in the mouth.

7. The patient was asked to close his mouth firmly. Once the material was set, the patient was asked to open his mouth, and the tray was completely removed. Visual inspection revealed the wash material had successfully duplicated the prepared margins **(Fig. 9)**. A defect on the second premolar and the beginning of furcation involvement on the second molar were also clearly visible in the impression **(Fig. 9)**. A periapical radiograph shows the mesial defect on the second premolar **(Fig. 10)**.

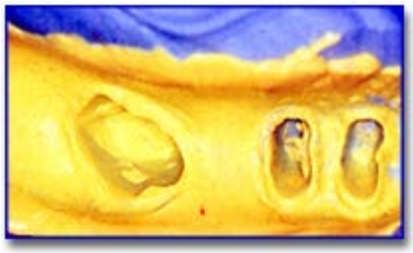

Figure 9. The impression is removed from the mouth and visually inspected for completeness Note the reproduction of the mesial second premolar defect and the furcation detail on the molar.

Figure 10. Radiograph of the working site. The mesial defect on the second premolar was also evident in the wash impression.

8. Individual master stone dies show excellent reproduction of the prepared margins **(Fig. 11)**. Subsequently, a metal framework was fabricated from an articulated working model **(Fig. 12)**. The patient returned to try-in the metal framework, and an interoccusal record was taken with the framework in place. The prosthesis was remounted and finished to completion.

Figure 11. Individual stone dies exhibiting excellent reproduction of the prepared margins.

Figure 12. The articulated working model.

Discussion

A dual-arch impression of the prepared teeth was taken using a base material delivered in a half-arch plastic gauze tray.

The base material chosen for this case exhibited a hard, plaster-like set that resists hydraulic pressure, minimizing distortions under pressure. This is attributed to a high Shore A Durometer measurement of 75 and the filler content of the impression material. When set, the impression was disengaged from the prepared teeth and allowed to remain on the opposing dentition. The wash material was syringed onto the impression of the prepared teeth without removing the impression tray from the mouth. The patient was instructed to bite firmly onto the wash material, thereby hydraulically forcing the wash material into place. The wash material specifications showed a lower Shore A Durometer measurement of 40 and set to a flexible state. When set, the impression was removed from the mouth showing a detailed one-half arch impression of the prepared teeth and a simultaneous impression of the opposing dentition in centric occlusion. The patient perceived the technique as faster than previous impression-taking experiences, and without discomfort or gagging.

Clinically, the technique yielded convenient material placement, no waste of material, and accurate results. If corrections were needed, the wash impression could be repeated, as the polyvinyl siloxane material would allow lamination to itself.

The selected materials were key factors in producing distortion-free impressions using a two-step, dual-arch technique that maximized patient comfort in this clinical situation.

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