The dual-arch impression

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Introduction

Dual-arch impressions and trays have been used for many years. This technique saves time because it eliminates several procedures. It enables the dentist to make simultaneous impressions of both the maxillary and mandibular arches, or segments thereof, and record the occlusal relationship. The technique also reduces patient discomfort and can reduce gagging. The major advantage of this technique is that it can reduce errors and the need for occlusal adjustment which result from:

- 1. Inaccuracies produced by the flexion of the mandible during the wide opening required for conventional impression techniques
- 2. Errors that may occur during articulation of casts either with or without interocclusal records
- 3. Discrepancies in opposing casts which are made from irreversible hydrocolloid

The impression tray can also be used for interocclusal records, in provisional crown fabrication, or as a transfer impression for fixed partial dentures.

Currently, trays are available in both anterior and posterior designs and consist of an outer rim that is spanned by a mesh fabric. Both plastic and metal designs are produced. Any elastic impression material can be used, but more rigid-bodied materials are preferred.¹ Trays have also been developed to be used with reversible hydrocolloid impression materials.

The dual-arch tray may be used to make impressions for single-unit crowns where a well-established intercuspal position is present and lateral contacts are not a factor (anterior guided occlusion). The technique may also be used for multiple restorations¹ or fixed partial dentures up to four units. However, if the most posterior tooth in the arch is prepared for a fixed partial denture, the patient may close at a decreased vertical dimension of occlusion, which would result in a significant negative occlusal error.

Care must be excercised when this type of impression tray is used. Before the impression is made the tray must be placed in the mouth to ensure that the impression will include a sufficient number of teeth to provide a definite occlusal relationship of the casts. Ideally, there should be at least two teeth in the same quadrant which have contact with the opposing arch. Sufficient room behind the most distal tooth in the quadrant is needed to accommodate the posterior bar of the tray when the mouth is completely closed. If not, the patient can occlude on the bar, resulting in an increased occlusal vertical dimension.

Previous literature, however, does not mention the importance of horizontal clearance between the vertical rim of the tray and the alveolar ridges. If the buccolingual width of the alveolar ridge is wider than the width of the tray, the plastic outer rims will be wedged apart when the patient closes into the impression material (Fig. 1). The tray will be expanded during the set of the impression material, and upon tray removal, the outer rim will return to its original shape and distort the impression. Once poured, the resulting die will be smaller than (or of different configuration from) the tooth preparation, yielding a casting that is too small. If this situation occurs, a new tray may be modified by cutting the mesh and spreading the tray several millimeters. This prevents hard contact between the outer rims and the soft tissue during the impression procedure (Fig. 2). The remainder of this article will present a clinical situation in which this problem occurred.

Case report

A 39-year-old man in good health came to the prosthodontic department of the Eastman Dental Center with a

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Fig. 1 The tray must not contact alveolar ridge tissues with pressure when it is seated because the tray may be wedged apart (arrows), causing a distorted impression.



Fig. 2 The tray is modified by cutting the mesh and expanding the tray to accommodate a wide ridge.



Fig. 3 The tip of an explorer indicates the position of the buccal margin of the tooth preparation. The crown is significantly undersized in the buccolingual dimension.





Fig. 4 Perforated area of the tray (arrow) indicates contact between the tray and ridge tissues leading to wedging of the tray.



severely broken down maxillary first molar. The tooth was prepared to receive a complete cast restoration. A Triple Tray impression (Premier Dental Products Co.) was made using a polyether impression material, and a complete cast gold crown was fabricated. At the insertion appointment it was observed that the crown would not seat completely, and after the use of a disclosing medium, it was apparent that the casting was significantly undersized in the buccolingual dimension (Fig. 3). Upon closer evaluation of the impression, it was noted that in certain areas the impression material had been perforated to the plastic tray by the tissues of the alveolar ridge. These areas indicated contact between the tray and the ridge tissue which caused the tray to be wedged apart (Fig. 4).

Another impression was made using the Triple Tray and a polyether impression material; however, the tray was modified by cutting the mesh and expanding the tray. This impression showed no perforation of the impression material by the alveolar ridge soft tissues, and the restoration fabricated on this die fit accurately on the prepared tooth.

Measurement of the two dies with a measuring microscope was accomplished by two examiners. The

mean widths from the measurements showed that there was a difference in the buccolingual dimension of 0.8 to 0.9 mm and little difference in the mesiodistal width (Fig. 5). This discrepancy would be expected, considering the direction of pressure placed on the tray by the alveolar ridge tissue.

Summary

The dual-arch impression is a very useful technique in fixed prosthodontics. It is inexpensive, can save time and impression material, can reduce gagging, and is useful when a sectional impression is needed. It can result in fewer occlusal adjustments during insertion of the restoration. However, it must be used only when indicated and with the proper technique in order to achieve good results.

References

 Wilson, E. G., and Werrin, S. R. Double arch impressions for simplified restorative dentistry. J Prosthet Dent 49(2):198–202, 1983.



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