

## Immediate bridgework

M. Darveniza, M.D.Sc., F.R.A.C.D.S.

*Lecturer in Operative Dentistry, University of Queensland*

**ABSTRACT:** A technique is described for the construction and immediate insertion of a fixed bridge, replacing retained lower deciduous incisors, in which the gingival tissues adjacent to the alveolar socket are surgically contoured to immediately create a ridge form suitable for a fixed bridge.

*(Received for publication May, 1980. Revised May, 1981.)*

### Introduction

When a fixed bridge is required as a replacement for a tooth or teeth to be extracted, the usual procedure is to insert a partial denture as an immediate replacement to be followed by the insertion of the bridge when healing of the tissues is complete. Alternatively, a bridge may be constructed immediately after the extraction of the teeth. Various techniques have been described<sup>1-5</sup> but none have advocated surgical preparation of the gingival tissue around the alveolar socket.

A problem with immediate replacement is usually solved by extending the porcelain pontic to form a root tip which extends into the alveolar socket. Wolfson recommended<sup>1</sup> that where this is done the bridge should not be permanently cemented until healing had occurred. Ireland<sup>2</sup> inserted immediately a temporary bridge to be replaced later and Tylman<sup>3</sup> delayed cementation of the final restoration until the required tissue response to the pontic had been achieved.

Extension of the pontic forming a root tip does not retard the epithelization or soft tissue healing of the

socket<sup>4</sup> but care must be taken not to extend the length of the tip more than one quarter of the depth of the alveolar fundus, furthermore it should not contact the surrounding alveolar bone.<sup>5</sup>

Johnson<sup>6</sup> concluded that alveolar bone resorption under immediate dentures was unpredictable and increased with mechanical impingement. Arey<sup>7</sup> found that during soft tissue healing cicatrization increased as a result of mechanical pressure. Watt and MacGregor<sup>8</sup> found that the removal of rough edges of bone and careful suturing following extractions promoted wound healing and improved ridge shape.

Consideration of those procedures suggested that surgical preparation of the gingival tissue applied in immediate bridgework would be advantageous. The technique used for this purpose, I have called ridge creation surgery, is described.

### Method

#### Surgery

The aim is the surgical conversion of a socket or sockets and surrounding gingival tissue to a favourable ridge form so that the wound heals by primary intention. Following extraction of the teeth, incisions are made

<sup>1</sup> Wolfson, E. The insertion of a fixed bridge immediately after extraction. *Dent. Digest*, 41: 186-188 (June) 1935.

<sup>2</sup> Ireland, R. L. Immediate temporary bridges for anterior teeth. *Dent. Digest*, 42: 340-343 (Oct.) 1936.

<sup>3</sup> Tylman, S. T. Theory and practice of crown and bridge prosthodontics. St. Louis, The C. V. Mosby Company, 5th edn, 1965 (pp. 94-96).

<sup>4</sup> Dewey, K. W., and Zugsmith, R. An experimental study of tissue reactions about porcelain roots for fixed bridgework. *J. D. Res.* 13: 459 (Oct.) 1933.

<sup>5</sup> Tylman, S. T. Theory and practice of crown and fixed partial prosthodontics (bridge). St. Louis, The C. V. Mosby Company, 6th edn, 1970 (p. 652).

<sup>6</sup> Johnson, K. Immediate denture treatment for patients with Class II malocclusions. *Austral. D. J.*, 23: 5, 383-388 (Oct.) 1978.

<sup>7</sup> Arey, L. Wound healing. *Physiol. Rev.*, 16: 3, 327-406 (July) 1936.

<sup>8</sup> Watt, D. M., and MacGregor, A. R. Designing complete dentures. Philadelphia, W. B. Saunders Co., 1976 (p. 100).

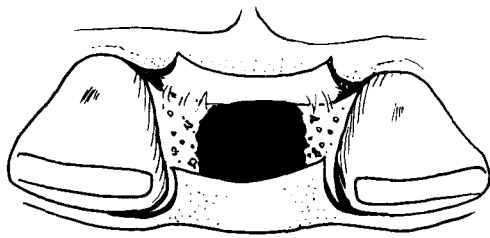


Fig. 1. Incisal view of lower tooth socket with interdental tissue removed, labial flap coronally positioned and lingual flap reflected.

through the mucosa from the lingual to the lingual line angles and from the labial to the labial line angles of the abutment teeth adjoining the socket. With the blade held vertically, incisions are made approximately 1 mm from the margins of the socket to the crest of the alveolar bone. The soft tissue between the labial and lingual incisions, together with the interdental papillae, is removed with curettes. With a periosteal elevator, the labial and lingual mucosa is raised to expose the crest of alveolar bone and 1-2 mm of the labial and lingual alveolar plates (Fig. 1). The height of the alveolar bone is not reduced but, if necessary, sharp edges on the crest are rounded with a hand instrument. The labial and lingual flaps are tightly sutured 1-2 mm from each abutment tooth so that the flaps slide, stretch and oppose.

**Bridgework**

The abutments are then prepared for the appropriate retainers and a temporary bridge is constructed, using an acetate template with a crown and bridge acrylic resin.<sup>9</sup> It is advantageous to coat the mucosa, sutures and abutments with a film of petroleum jelly prior to intra-oral temporary bridge construction.

The pontic should be designed to ensure that no pressure is exerted on the mucosa and the temporary bridge is cemented with a zinc oxide eugenol cement.

One week later the sutures are removed and preparation of the abutment teeth is completed. If oedema is present the mucosal aspect of the pontic is adjusted before the temporary bridge is replaced.

Three weeks after surgery the ridge is healed sufficiently for an elastomeric impression to be taken. If surface irregularities are present on the ridge of the model the technician is instructed to avoid socketing and not to remove more than 0.25 mm from the model since this would induce unwanted tissue changes.<sup>10</sup> The instruction furthermore should be for constructing a tissue contacting porcelain pontic with modified ridge lap.<sup>11</sup>

The permanent bridge is placed in position and the pontic is examined for adaptation to the ridge. Any deficiency is adjusted by the addition of porcelain until tissue contact occurs when the bridge is tried in, the pontic is shaped until the mucosa is free of all pressure.<sup>11</sup>



Fig. 2. -Pre-operative view of anterior teeth.

A zinc oxide eugenol cement mixed with petroleum jelly is used for temporary luting to allow easy removal of the bridge at the next appointment which should be about two weeks later. If no adjustment is necessary and provided the bridge meets all other requirements it is ready for glazing of the pontic and final cementation. If further adjustment is required this is repeated with the patient being recalled at intervals of two weeks until stabilization of the ridge is achieved. The bridge can then be permanently cemented.

**Case report**

The technique and result can be illustrated by this example.

A woman, 24 years of age, was referred concerning her dentition (Fig. 2). She had commenced a modelling career and required a photogenic dentition. The treatment proposed as a solution to the aesthetic problem was a fixed bridge restoration with porcelain bonded to metal crowns on the upper laterals and left canine and an immediate three unit bridge replacing the lower deciduous incisors. The lower incisors were extracted, ridge creation surgery performed (Fig. 3), the lower laterals were prepared and an immediate temporary bridge constructed from **TAB\*** in an **Omnivac†** template and cemented with **Temp-Bond\***.

\* Kerr Mfg. Co., Romulus, Michigan, U.S.A.  
 † Omnidental Corporation, Harrisburg, Pennsylvania, U.S.A.

<sup>10</sup> Cavazos, E. - Tissue response to fixed partial dentures. *J. Pros. Dent.*, 20: 2, 143-153 (Aug.) 1968.  
<sup>11</sup> Henry, P. J. - Pontic form in fixed partial dentures. *Austral. D. J.*, 16: 1, 1-7 (Feb.) 1971.

<sup>9</sup> Kaiser, D. A. - Accurate acrylic resin temporary restorations. *J. Pros. Dent.*, 39: 2, 158-161 (Feb.) 1978.



Fig. 3. - Favourable ridge created by surgery between the lower laterals. Flaps opposed and sutured.



Fig. 4. - Eight weeks post-extraction: There was a favourable ridge, note prepared abutments. Final cementation was performed at this appointment.



Fig. 5. - Bridge six months after extraction of lower deciduous incisors. Note similar length pontic relative to the abutment crowns and favourable tissue response to the pontic.

After one week the sutures were removed and preparation of the abutments completed. Three weeks following surgery **Permlastic\*** impressions were made for the construction of the permanent bridge. At the try-in, six weeks after surgery, it was found necessary to add porcelain to the mucosal surface of the pontic; after adjustment the permanent bridge was temporarily luted. Figure 4 shows the condition of the ridge two weeks following soft cementation of the bridge. Since the pontic-mucosal contact was ideal, the bridge was cleaned, glazed, and cemented using a zinc phosphate cement<sup>‡</sup>. The patient was instructed to clean daily under the pontic with dental floss using a dental floss threader<sup>§</sup> to pass the floss below the pontic.

#### Discussion

Ridge creation surgery results in rapid healing and the development of an optimal ridge shape. Tissue shrinkage is minimized and usually occurs in the first month

following extraction. The gingival periphery of the pontic is similar to that of the adjacent teeth an advantage over the use of immediate tissue borne partial dentures prior to bridge construction which may cause greater tissue resorption from their mechanical impingement— hence longer pontics are not required to reach the resorbed ridge. These observations agree with previously mentioned studies.<sup>4, 6, 7, 10</sup>

Ridge creation surgery also offers an opportunity to eliminate periodontal lesions involving the interdental papillae. The removal of the interdental papillae provides a longer coronal length for the abutment teeth and retention of the bridge can be increased, with more space to accommodate the connector and provide better embrasures. Closure of the wound after surgery, enables the impression stages for the temporary bridge to be completed without the risk of material entering the socket.

Contraindications may exist in those cases requiring multiple adjacent pontics, surgical removal of teeth with extensive bone loss or removal of pathological tissue.

\* Richter and Hoffmann Harvard Dental-Gesellschaft, Berlin, Germany.  
 ‡ Floss Aid Corporation, Santa Clara, California, U.S.A.

Such cases often require prolonged soft cementation and resorption may require the remaking of the bridge. Nevertheless, the lesser traumatic effects of ridge creation for immediate bridgework are likely to be more acceptable than trauma to the tissues from a tissue borne denture.

Of four cases completed the soft tissue response to the pontics has been excellent, there was no inflammation, ulceration, or discomfort to the patient and the tone of the soft tissue ridge was firm (Fig. 5). Soft tissue proliferation was evident in the gingival embrasures but no proliferation occurred around the labial margin of the pontics or connectors. The widened lingual embrasure of the pontic was free of proliferation and remained open. The post-operative pain following ridge creation surgery was minimal.

The resorption or stabilization of the alveolar bone height below the pontic over the years is unpredictable; however, if resorption of bone occurs it will probably be replaced by fibrous tissue. It is unlikely that cicatriza-

tion of this fibrous tissue will create a space between the mucosa and pontic as proliferation towards a pontic is the rule if a small space exists.<sup>11</sup>

#### Conclusion

Immediate bridgework with ridge creation surgery would appear to be a successful technique which obviates the need for a partial denture, favours prompt healing, promotes a healthy soft tissue reaction to the pontic, and results in an excellent aesthetic appearance of the pontic-mucosal junction and length of pontic.

#### Acknowledgements

I would like to express my thanks to Mr R. Cox and Mr J. Martin, Ceramists, for their laboratory support.

Dental School,  
University of Queensland,  
Turbot Street,  
Brisbane, Qld, 4000.