

Single-Tooth Replacement: Bridge vs. Implant-Supported Restoration

- Ken Hebel, B.Sc., DDS, MS, Cert. Prosthodontics •
- Reena Gajjar, DDS, Cert. Prosthodontics •
- Theresa Hofstede, B.Sc., Cert. Prosthodontics •

A b s t r a c t

Options for restoring a single tooth include fixed partial denture, resin-bonded restoration and single-tooth implant. In this paper, we discuss the advantages and disadvantages of these methods and factors that must be considered when choosing between them for the replacement of a single tooth. Although in some cases a fixed partial denture is the most appropriate choice, implants have the advantage of allowing preservation of the integrity of sound teeth adjacent to the edentulous area.

MeSH Key Words: dental implants, single tooth; dental prosthesis, implant-supported; tooth loss/rehabilitation

© J Can Dent Assoc 2000; 66:435-8
This article has been peer reviewed.

Clinicians are routinely faced with the need to restore a single tooth in an otherwise nonrestored dentition. Traumatic incidents, caries and congenitally missing teeth are common etiologies. In these situations, the treatment options include a traditional fixed partial denture, a resin-bonded restoration and a single-tooth implant. Although each is a viable treatment alternative, the implant restoration has definite advantages. It has become an esthetic, functional restoration with long-term predictability,¹ and it is the ideal treatment for a single-tooth replacement in a pristine dentition.

The Fixed Partial Denture

The traditional treatment for a single edentulous space is a conventional fixed partial denture. A major shortcoming of this alternative is the significant tooth reduction of the abutments.² Subgingival margins are required in esthetic situations, but these are associated with increased gingival inflammation.^{3,4} In addition, the longevity of a fixed partial denture is estimated at 8.3-10.3 years.^{5,6} Consequently, a young patient would require numerous replacements of this restoration over a lifetime.

However, in some instances, a fixed partial denture is the most appropriate choice, as shown in **Figs. 1 to 4**. This young woman presented with missing lateral incisors due to bilateral cleft lip and palate (**Fig. 1**). As a result of demineralization of the lingual surfaces of the central incisors, resin-bonded bridges were not an option. The lack of bone prevented place-

ment of implants and, thus, fixed partial dentures were the treatment of choice. **Figures 2, 3 and 4** show Empress 2 bridges.

Resin-Bonded Restoration

Resin-bonded bridges were introduced as an alternative to traditional fixed partial dentures after Rochette⁷ introduced this restoration as a periodontal splint. The option offered a more conservative method of tooth replacement; tooth preparations are limited to the lingual surfaces of abutment teeth. However, these preparations are more technique sensitive because they must remain in enamel yet provide occlusal clearance and adequate room for the restorations. A major disadvantage of the resin-bonded bridge is the frequency of debonding. Debonding rates of 25-31% have been reported.^{8,9}

Implants

Since the early 1980s, the use of osseointegrated implants has become a well-established and predictable treatment. Initially, oral implants were used in the completely edentulous situation.^{10,11} Later, a high degree of success was achieved with implants in partly edentulous jaws.^{12,13} The single-tooth implant has also become a predictable treatment option.^{1,14}

Implants offer significant advantages over resin-bonded or conventional bridges. They prevent the needless restoration of sound teeth adjacent to the edentulous area as would be required for a fixed partial denture. In instances where the



Figure 1: A young woman with a history of cleft lip and palate. Although there is adequate soft tissue, the lack of bone precludes implants as a treatment option.



Figure 2: Empress 2 bridge fabricated to replace the maxillary right lateral incisor. The supragingival margins help to maintain gingival health while providing a highly esthetic result.



Figure 3: Empress 2 bridge replacing the maxillary left lateral incisor.



Figure 4: Natural smile showing the esthetic result of conventional all-ceramic restorations shown in Figs. 2 and 3.



Figure 5: This middle-aged woman lost her maxillary right central incisor due to trauma. The adjacent teeth did not contain any restorations. A single-tooth implant was the chosen treatment.



Figure 6: Using bone preservation techniques, enough bone was maintained to replace the missing tooth with a single-tooth implant. The final crown has been cemented on the implant abutment.

adjacent teeth have no restorations, a single-tooth implant provides the opportunity to preserve the integrity of the existing teeth (Figs. 5, 6 and 7).

For young people with congenitally missing teeth, a single-tooth implant is undoubtedly the restoration of choice.

Figures 8 to 11 show the restoration of congenitally missing maxillary lateral incisors with 2 single-tooth implants. The final restorations are highly esthetic and functional, and preserve sound tooth structure of the existing teeth.



Figure 7: The result is an esthetic, functional restoration and the integrity of the adjacent virgin teeth has been maintained.



Figure 8: This young woman has a congenitally missing right lateral incisor. After orthodontic treatment, she is ready for a fixed replacement of her missing tooth.



Figure 9: The same young woman is also missing her left lateral incisor. Note the abundance of soft tissue, which is a critical factor in meeting high patient expectations for esthetic results.



Figure 10: A close view of a single-tooth implant replacing the maxillary left lateral incisor. The soft tissue framing of the final restoration creates an outstanding esthetic result.

Bridge or Implant

Many factors must be considered when choosing between a 3-unit bridge and an implant for the replacement of a single tooth. Often the bias of the dentist plays a role rather than objective appraisal of the treatment options. There are advantages and disadvantages to both forms of treatment.

A 3-unit bridge is within the training and experience of most restorative dentists. This form of restoration requires the reduction of the abutment teeth resulting in an increased incidence of endodontic therapy and root decay (Fig. 12).¹⁵ If the abutment teeth have large restorations, they would benefit from abutment preparation. However, if the teeth have small restorations or if they are virgin teeth, they would be damaged by abutment preparation and be placed at increased risk. In addition, cement loss or wash out under a retainer can lead to tooth loss. Bridges constitute a single restoration. Based on clinical experience, if one part of the bridge fails, the whole restoration fails, often with the loss of an abutment tooth. Despite these disadvantages, a 3-unit bridge is usually completed in a short time, often with the financial support of dental insurance, and esthetic control is fairly predictable.

Implants require training that is not sufficiently addressed in most undergraduate dental programs and, therefore, is not within the practice realm of all restorative dentists. An implant takes longer to complete than a 3-unit bridge, but costs about the same if grafting is not required. Dental insurance seldom helps with financial support for implants. In addition, implants can be more demanding if bone and soft tissues are inadequate. Areas of tissue deficiency should also be addressed with grafting in the pontic space for 3-unit bridges, but often these defects are ignored.

The tremendous advantage of the single-tooth implant lies in the fact that the adjacent teeth are not prepared. These teeth are left in their current state of health and are not linked as part of a larger restoration. The adjacent teeth have a better prognosis, as they are not subject to a higher incidence of endodontic therapy and decay as a result of tooth preparation. Patients should be properly advised of the advantages and disadvantages of both types of single-tooth replacement, so they can make an informed decision.

Advances in technology have altered our treatment philosophy in the replacement of a single tooth. In many instances,



Figure 11: Single-tooth implants replace the missing lateral incisors. The crowns are cemented on the implant abutments providing a natural, esthetic result. The structure of the adjacent teeth has been preserved.

a single-tooth implant is the restoration of choice, providing a highly esthetic, functional, long-term result. ➤

Dr. Hebel is an assistant professor in the department of graduate prosthodontics, the Eastman Dental Center, Rochester, N.Y., and maintains a private practice in London, Ontario. He is a lecturer for Nobel Biocare on dental implants.

Dr. Gajjar maintains a private practice in London, Ontario.

Dr. Hofstede is an assistant professor at Nova Southeastern University, Fort Lauderdale, Florida.

Correspondence to: Dr. Kenneth S. Hebel, 813 Richmond St., London, ON N6A 3H6. E.mail: khebel@julian.uwo.ca.

References

- Scheller H, Urgell J, Kultje C, Klineberg I, Goldberg PV, Stevenson-Moore P, and others. A 5-year multicenter study on implant-supported single crown restorations. *Int J Oral Maxillofac Implants* 1998; 13:212-8.
- Shillingburg HT, Hobo S, Whitsett LD. Fundamentals of fixed prosthodontics. 2nd ed. Chicago (IL): Quintessence Publishing Co.; 1981. p. 115-9.
- Koth DL. Full crown restorations and gingival inflammation in a controlled population. *J Prosthet Dent* 1982; 48:681-5.
- Silness J. Periodontal conditions in patients treated with dental bridges. 3. The relationship between the location of the crown margin and the periodontal condition. *J Periodontol Res* 1970; 5:225-9.
- Schwartz NL, Whitsett LD, Berry TG, Stewart JL. Unserviceable crowns and fixed partial dentures: life-span and causes for loss of serviceability. *J Am Dent Assoc* 1970; 81:1395-401.
- Walton JN, Gardner FM, Agar JR. A survey of crown and fixed partial denture failures: length of service and reasons for replacement. *J Prosthet Dent* 1986; 56:416-21.
- Rochette AL. Attachment of a splint to enamel of lower anterior teeth. *J Prosthet Dent* 1973; 30:418-23.
- Hussey DL, Pagni C, Linden GL. Performance of 400 adhesive bridges fitted in a restorative dentistry department. *J Dent* 1991; 19:221-5.
- Williams VD, Thayer KE, Denehy GE, Boyer DB. Cast metal, resin-bonded prostheses: a 10-year retrospective study. *J Prosthet Dent* 1989; 61:436-41.
- Adell R, Lekholm U, Rockler R, Branemark PI. A 15-year study of osseointegrated implants in the treatment of the edentulous jaw. *Int J Oral Surg* 1981; 10:387-416.



Figure 12: This occlusal view shows the amount of tooth reduction required for a full-coverage restoration. This patient has chosen a 4-unit bridge to replace the missing maxillary left central and lateral incisors. Virgin abutment teeth have been compromised during tooth preparation. Ovale pontics have been created to enhance the appearance of the final restoration.

- Adell R, Eriksson B, Lekholm U, Branemark PI, Jemt T. Long-term follow-up study of osseointegrated implants in the treatment of totally edentulous jaws. *Int J Oral Maxillofac Implants* 1990; 5:347-59.
- van Steenberghe D. A retrospective multicenter evaluation of the survival rate of osseointegrated fixtures supporting fixed partial edentulism. *J Prosthet Dent* 1989; 61:217-23.
- Lekholm U, Gunne J, Henry P, Higuchi K, Linden U, Bergstrom C, and other. Survival of the Branemark implant in partially edentulous jaws: a 10-year prospective multicenter study. *Int J Oral Maxillofac Implants* 1999; 14:639-45.
- Laney WR, Jemt T, Harris D, Henry PJ, Krogh PH, Polizzi, G, and others. Osseointegrated implants for single-tooth replacement: progress report from a multicenter prospective study after 3 years. *Int J Oral Maxillofac Implants* 1994; 9:49-54.
- Shillingburg HT, Kessler JC. Restoration of the endodontically treated tooth. Chicago (IL): Quintessence Publishing Co.; 1982. p. 143.