Gingival Prostheses — A Review

• **Izchak Barzilay,** DDS, Cert Prostho, MS
• **Irene Tamblyn,** RDT •

Abstract

Gingival replacement is often a component of comprehensive prosthodontics. Gingival prostheses may be fixed or removable and may be made from acrylics, composite resins, silicones or porcelain-based materials. Undercuts or dental attachments are used to secure removable prostheses, which are esthetically pleasing and easy to maintain. This paper describes several clinical situations in which gingival prostheses were used effectively.

MeSH Key Words: *gingiva; periodontal prosthesis; prosthesis design*

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Gingival replacement prostheses have historically been used to replace lost tissue when other methods (e.g., surgery or regenerative procedures) were considered unpredictable or impossible. With this method, large tissue volumes are easily replaced. Gingival prostheses take several forms, and various authors have described their uses and methods of construction.[1–9] Tissue replacement prostheses may be used to replace tissue lost through surgical gingival procedures, trauma, ridge resorption or traumatic tooth extraction. From a prosthodontic point of view, restoration of these areas can be accomplished with either fixed or removable prostheses.

Materials used for gingival prostheses include pink autocure and heat-cured acrylics, porcelains, composite resins and thermoplastic acrylics, as well as silicone-based soft materials.

This paper presents several cases in which different gingival replacement prostheses were used.

Case 1

A 25-year-old man presented with phonetic problems, as well as unanticipated expectoration during speech. The patient had recently undergone periodontal surgery, which resulted in the loss of the papilla between the 2 maxillary central incisors (**Fig. 1**).

The patient was not interested in an additional surgical procedure to reconstruct the papilla. Previous bonding procedures had been performed by other dental practitioners in attempts to reduce the interproximal space and thus to improve esthetics and phonetics, but the results had been less than ideal. In accordance with the patient's wishes, a removable prosthesis was planned.

An intraoral try-in of a wax-up was accomplished, whereby blue utility wax (Surgident Periphery Wax, Heraeus-Kulzer, South Bend, Ind.) was placed into the diastema between the central incisors to evaluate the effect of obturation of the space (**Fig. 2**). The patient found that filling the space significantly improved his phonetic comfort. This wax-up was then duplicated to form a removable prosthesis.

A polyether impression (Impregum, ESPE America Inc., Norristown, Pa.) was made and the shade was matched to the patient's tissue. The impression was then poured multiple times in type IV die stone (Die-Keen, Heraeus-Kulzer). With the wax-up as a guide, 2 different prostheses were fabricated. The first was fabricated exclusively from Molloplast B soft lining material (Detax GmbH & Co., Ettlingen, Germany), and the second was fabricated from a clear acrylic facing (Pro Base — Hot, Ivoclar North America, St. Catharines, Ont.) with a Molloplast B internal component to enhance prosthetic retention (**Fig. 3**).

The patient tried both prostheses, and found the colour of the Molloplast B prosthesis more satisfactory. Additional prostheses were then fabricated, as requested by the patient. The patient has been wearing the prostheses with great success from the perspectives of phonetics, expectoration and comfort (**Figs. 4a and 4b**).

This type of prosthesis has limitations. Retention may be difficult, and because of the inherent porosity of the silicone-based material, staining and plaque accumulation

Figure 1: Because of recent periodontal procedures, soft tissue is missing between the central incisors in this 25-year-old man.

Figure 2: A wax-up is tried in to evaluate effects on function.

Figure 3: Two prostheses were fabricated so that the best fitting and most esthetically pleasing prosthesis could be chosen.

Figure 4a: Frontal view of the Molloplast prosthesis shows good contour and tissue adaptation.

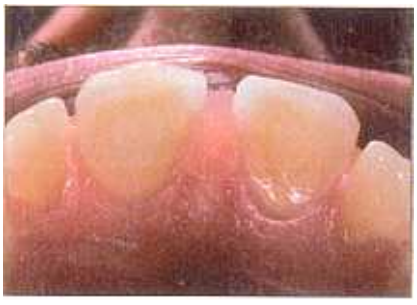

Figure 4b: Occlusal view of Molloplast prosthesis shows good contour and tissue adaptation.

Figure 5: Periodontal surgery in a 45-year-old woman caused loss of papillae between the maxillary teeth, which led to an esthetic problem.

Figure 6: Frontal view of the prosthesis in place shows good adaptation and improved esthetics.

Figure 7: After postextraction healing, a defect was observed under the interim pontics in this 60-year-old woman.

Figure 8: Frontal view of the modified interim prosthesis shows good esthetics.

may be a problem. Another concern is the possibility of inhalation or ingestion of the prosthesis during function. This type of prosthesis therefore requires regular maintenance and occasional revision.

Case 2

A 45-year-old woman had recently undergone gingival surgery to the maxillary teeth. The surgery improved her periodontal condition but left the patient with a significant loss of papillae (**Fig. 5**). The patient found the resulting tooth sensitivity extremely uncomfortable, especially when she breathed in through her mouth. The patient was also very unhappy with the esthetic appearance of the "elongated teeth." The decision was made to fabricate a removable prosthesis to close the spaces between the anterior teeth.

A buccal approach was used to create the master impression, which captured the interproximal detail without tearing the impression upon removal from the mouth. The lingual embrasures were blocked out with utility wax, and a custom tray was used to support the polyether impression material. The impression was poured in type IV die stone, and a gingival prosthesis was waxed up and processed in heat-cured acrylic resin. Retention was achieved with minor interproximal undercuts as well as undercuts on the distal surfaces of the cuspids. The prosthesis was extremely thin and had enough flexibility to engage these undercuts. The patient found the prosthesis very comfortable and affectionately referred to it as her "party gums" (**Fig. 6**).

Figure 9: *A 4-unit fixed partial denture with a Gaussen attachment was fabricated. The flange incorporates a metal insert that connects the flange to the attachment.*

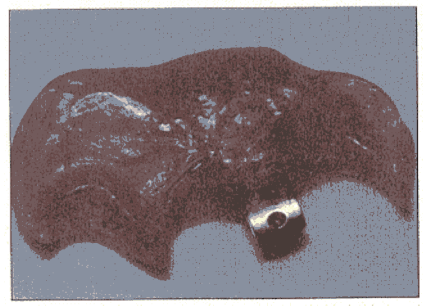

Figure 10: *The metal insert and its dimple can be seen. The dimple engages the internal ball within the attachment slot. When the flange is connected to the fixed bridge, the metal wafer slides in on a curved path and engages the retention elements.*

Figure 11: *The final prosthesis shows good esthetic qualities.*

Figure 12: *A retracted view shows that over the years, the gingival tissues receded to expose the crown margins on many of the maxillary teeth.*

Figure 13: *A retracted view of the new prosthesis in place shows coverage of the exposed root surfaces and prosthesis margins.*

Figure 14: *A single implant prosthesis has been placed in this 50-year-old woman. Because the implant is in the middle of the space, a pink porcelain papilla was used to cover the metal structure of the abutment.*

Figure 15a: *Maxillary prosthesis with gingival section.*

Figure 15b: *Mandibular prosthesis with gingival section.*

Case 3

A 60-year-old woman presented for overall assessment, which led to extraction of teeth 21 and 22. An interim prosthesis was positioned for the healing period. After several months of healing, the patient presented for re-examination in preparation for fixed prosthodontic treatment. Significant postextraction resorption had occurred, which left a defect under the interim pontics (Fig. 7). The space was filled in with pink autocure acrylic bonded directly to the interim prosthesis (Fig. 8).

The patient was offered surgical correction of the defect but preferred a prosthetic solution. Because a multiunit fixed prosthesis was being fabricated for the neighbouring teeth, prosthetic treatment planning included use of a prefabricated dental attachment to support and retain a prosthetic flange. This flange was needed to replace the missing papillae and to help support the lip.

A Gaussen attachment (Epiloc / L. Gaussen, Cendres & Métaux Inc. (Canada), Toronto, Ont.) was incorporated into the pontic region of the prosthesis. This attachment consists of a curved slot (accessed from the buccal aspect) containing a spring-loaded ball. A curved metal wafer was processed into a heat-cured acrylic flange. The terminal end of the wafer had a dimple to engage the internal ball and provide retention (Figs. 9–11).

The patient considered the esthetic result excellent. The removable soft-tissue component was stable and could be used during mastication as well as all other daily activities.

After using the prosthesis for 11 years, the patient lost the removable gingival portion of the prosthesis. Over the years, gingival recession had occurred on the neighbouring teeth (Fig. 12). A new prosthesis was planned that would involve not only the pontic area but also the other anterior teeth. A buccal impression was made in polyether

impression material and poured in type IV die stone, and a heat-cured set of "party gums" was fabricated that bypassed the attachment itself. The patient is now functioning well with her new prosthesis (Fig. 13).

Case 4

A 50-year-old woman was missing 2 mandibular incisors. The interdental space did not allow for placement of 2 implants, and it was the patient's wish that the neighbouring teeth not be adjusted to support a prosthesis. Implant treatment was performed, and a single externally hexed implant (3I Implant Innovations Inc., Palm Beach Gardens, Fla.) was placed in the middle of the available space. After an uneventful healing period, the implant was uncovered and restored. Because of the position of the implant (in the middle of the available space), a prosthetic papilla was planned, for esthetic reasons. The prosthesis consisted of 2 crown units with an interproximal gingival papilla of fused porcelain to metal. Pink porcelain was the material of choice because of its esthetic qualities and because this maintained continuity of materials within the prosthesis (Fig. 14).

Case 5

A 60-year-old man was involved in an accident that caused the loss of several teeth and the alveolar bone supporting them. Prosthetic reconstruction included placing implants and then restoring them with a fixed prosthesis that had a gingival component. Three Osseotite fixtures (3I Implant Innovation Inc.) were placed in the mandibular defect, and 5 fixtures were placed in the maxillary defect. After an uneventful healing period, the implants were uncovered and restored with fixed porcelain-fused-to-metal prostheses that included gingival components. The gingival components were characterized to match the neighbouring tissues (Figs. 15a and 15b).

Discussion

Gingival defects may be treated with surgical or prosthetic approaches. With successful surgical treatment, the result mimics the original tissue contours. Such treatments include minor procedures to rebuild papillae and grafting procedures that may involve not only soft-tissue manipulation but also bone augmentation to support the soft tissue. It is possible to create esthetically pleasing and anatomically correct tissue contours when small volumes of tissue are being reconstructed, but this method is unpredictable when a large volume of tissue is missing. The surgical costs, healing time, discomfort and unpredictability make this choice unpopular.

Prosthetic replacement, with acrylics, composite resins, porcelains and silicones, is a more predictable approach to replacing lost tissue architecture. It is especially useful when

Table 1 **Comparison of gingival prostheses**

Characteristic	Removable prosthesis	Fixed prosthesis
Cost	Additional to the original cost of the prosthesis (if a secondary prosthesis is being made)	Cost part of the original prosthesis
Stability and retention	Prosthesis mobile, so retention must be maintained; adhesives or attachments may be used to enhance retention	Prosthesis fixed and therefore always stable
Oral hygiene	Easy access to interproximal embrasures	Hygiene more difficult because of lack of space for instrumentation
Staining	Porous prosthetic material stains easily	Prosthetic material (glazed porcelain) stains less and is easily cleaned
Long-term prognosis (wear, damage, loss)	Prosthesis may wear, become damaged or be lost	Minimal wear, with no danger of damage or loss
Complications (ingestion and inhalation)	Prosthesis susceptible to ingestion or inhalation	Prosthesis not subject to ingestion or inhalation
Psychological aspects	Patient may not feel like himself or herself (typical of a removable prosthesis)	Patient feels like himself or herself
Function	Patient may experience movement or discomfort during function	Functions without any discernible movement
Esthetics	Larger volumes of tissue can be replaced, and adequate bulk can be created for esthetic appearance	Esthetics may be less pleasing because of limited applicable volume (must leave interproximal areas open for oral hygiene); the prosthesis must be cleanable, therefore ridge lapping needs to be avoided
Ability to retrofit	Prosthesis can be adjusted as tissue changes	Tissue portion of prosthesis cannot be adjusted easily

a larger amount of tissue needs replacement. Ideal tissue contours can be waxed, processed and then coloured to match the surrounding tissue. The patient need not undergo any additional surgical procedures and receives an esthetically pleasing, functional restoration. It is possible to show the patient a waxed-up result or even take a try-in prosthesis directly to the mouth for evaluation before significant treatment is initiated.

A fixed prosthesis gives the patient significant comfort and peace of mind, as well as self-confidence (because the prosthesis is always present). However, its application may be limited to certain clinical situations where oral hygiene is manageable, the desired esthetic result is achievable or esthetics are not critical, and a fixed prosthesis is already planned for the immediate area. With a removable prosthesis, a larger volume of tissue can be replaced, but proper cleaning is still feasible. It is easier to create an ideal contour with removable prosthodontic materials, and missing tissue can be replaced without disturbing the other dental units. If fixed-tooth replacement is planned, a combined approach, with both fixed and removable elements, may be undertaken, with dental attachments being used to increase support and retention.[9]

A clear understanding of the clinical requirements is essential before soft-tissue replacement with either fixed or removable prostheses (**Table 1**). The final result can be esthetically pleasing and usually solves the clinical deficit.

Conclusions

This paper has presented different methods of using various pink materials to create gingival prostheses. Dental esthetics is based not only on the "white component" of the restoration but also on the "pink component." A clear understanding of the colour and form requirements is essential to fabrication of the prosthesis and its acceptance by the patient. Understanding the methods used to incorporate gingival prostheses into prosthodontic treatment is vital to ensuring that patients are offered all possible options at the outset of treatment planning. ◆

Dr. Barzilay is head, division of prosthodontics and restorative dentistry, Mount Sinai Hospital, Toronto, Ontario, and assistant professor, faculty of dentistry, University of Toronto. He also maintains a private practice limited to prosthodontics and implant dentistry.

Ms. Tamblyn is a registered dental technologist, Barzilay Dental Laboratory, Toronto, Ontario, and a professor, dental technology, George Brown College.

Correspondence to: Dr. Izchak Barzilay, 905–2300 Yonge St., Box 2334, Toronto, ON M4P 1E4. E-mail: ibarzilay@tdc.on.ca.

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References

1. Tallents RH. Artificial gingival replacements. *Oral Health* 1983; 73(2):37–40.

2. Botha PJ, Gluckman HL. The gingival prosthesis — a literature review. *SADJ* 1999; 54(7):288–90.

3. Friedman MJ. Gingival masks: a simple prosthesis to improve the appearance of teeth. *Compend Contin Educ Dent* 2000; 21(11):1008–10, 1012–4, 1016.

4. Blair FM, Thomason JM, Smith DG. The flange prosthesis. *Dent Update* 1996; 23(5):196–9.

5. Mekayarajjananonth T, Kiat-amnuay S, Sooksuntisakoonchai N, Salinas TJ. The functional and esthetic deficit replaced with an acrylic resin gingival veneer. *Quintessence Int* 2002; 33(2):91–4.

6. Greene PR. The flexible gingival mask: an aesthetic solution in periodontal practice. *Br Dent J* 1998; 184(11):536–40.

7. Priest GF, Lindke L. Gingival-colored porcelain for implant-supported prostheses in the aesthetic zone. *Pract Periodontics Aesthet Dent* 1998; 10(9):1231–40.

8. Hannon SM, Colvin CJ, Zurek DJ. Selective use of gingival-toned ceramics: case reports. *Quintessence Int* 1994; 25(4):233–8.

9. Brygider RM. Precision attachment-retained gingival veneers for fixed implant prostheses. *J Prosthet Dent* 1991; 65(1):118–22.