

Lip prosthesis retained with resin-bonded retentive elements as an option for the restoration of labial defects: A clinical report

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The most commonly used extraoral maxillofacial prosthetic materials is silicone elastomer.¹⁻⁶ Various methods of retention for extraoral maxillofacial prostheses have been described in the literature.⁷⁻⁹ These approaches to retention include engagement of tissue undercuts and the use of adhesives, tissue tape, and osseointegrated implants.

When there is a combination of extraoral and intraoral defects, another method of retention relies on connecting the extraoral prosthesis with the intraoral prosthesis.¹⁰ Osseointegrated implants can also provide reliable retention, but their use depends on the presence of viable bone that is capable of remodeling and turnover because the implants are subjected to loads associated with retaining the prosthesis. A previous history of radiotherapy to the area¹¹ and financial constraints are common limits on the use of osseointegrated implants.¹²

Surgical resection of the lips is a relatively rare procedure. Rehabilitation of patients with this type of surgery creates numerous challenges for both the surgical and the maxillofacial prosthetic teams.^{13,14} More recently, reconstructing the tissue defect with autogenous tissues has played a major role in maxillofacial reconstruction.¹⁵ Acceptable esthetic and functional results are difficult to achieve with surgical reconstruction of the lip.

Patients with labial defects experience speech problems,¹⁶ along with drying and crusting of the tissues in the area of the defect. The lip and cheek provide a valve mechanism for speech. Formulation of consonant phonemes requires the lips to achieve a variety of positions. Semisphincteric posture is assumed during the production of the "oo" sound, and a tense, spread posture is necessary for the "ee" sound. Difficulties with bilabial ("b" and "p") and labiodental ("f" and "v") speech phonemes also occur.¹⁶ Defects in the mandibular lip adversely affect speech more than defects of the maxillary lip because of the greater potential for movement of the mandibular lip.¹⁷

Lip defects frequently lack suitable tissue undercuts



Fig. 1. Frontal view of defect of mandibular lip. Mandibular anterior teeth were relatively healthy, with fair oral hygiene.

for retaining a prosthesis. Use of adhesives remains one of the most popular modes of retention for lip prostheses. However, the combination of tissue adhesive with a silicone elastomer results in unpredictable periods of retention.¹⁸ Aqueous-based tissue adhesives can be adversely affected by saliva and mandibular movements,^{8,16} and recementation of the prosthesis is commonly required during the day. The use of a removable partial denture for retaining a lip prosthesis is only applicable if there is a need to replace missing teeth. A defective lip may cause the patient to feel socially vulnerable, as well as functionally handicapped,⁶ and the defect will influence the patient's self-esteem and body image.^{19,20}

Resin-bonded fixed partial dentures have gained in popularity since Rochette²¹ described the technique for splinting mandibular anterior teeth. Resin-bonded restorations are retained by the resin that locks mechanically into acid etched enamel and the macroscopic or microscopic undercuts in the metal casting.²² High bond strengths between resinous cements and a variety of dental alloys, dentin, and enamel have been reported.^{18,23,24}

This clinical report describes a silicone mandibular lip prosthesis retained by tooth-supported resin-bonded retentive elements. This prosthesis restored speech,

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Fig. 2. Stone cast reproducing tissue defect, maxillary lip, labial surface of mandibular anterior teeth, and wide area of tissue coverage.

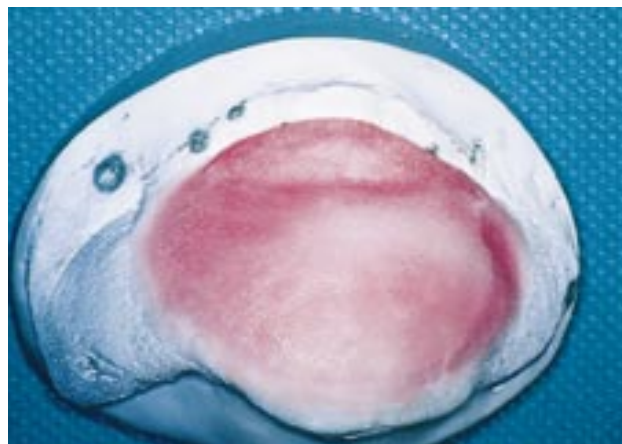


Fig. 4. Completed wax pattern for mandibular lip developed on cast.



Fig. 3. Completed custom-cast retentive elements in selected path of insertion with resin-bond retainers on mandibular left central incisor, and right and left canines. Incisal extensions on castings for accurate initial placement during cementation.



Fig. 5. Invested cast with wax pattern removed after boil-out. Acrylic resin substructure with numerous perforations was fabricated on cast.

lower facial contour, and anterior oral seal for a patient with a surgically resected lower lip.

CLINICAL REPORT

A 69-year-old white man was referred to the Ontario Cancer Institute-Princess Margaret Hospital for prosthetic assessment of a mandibular lip defect (Fig. 1). The surgical procedure occurred more than 10 years previously, and postsurgical radiotherapy was not prescribed. The patient had been using an adhesive-retained lip prosthesis. Repeated loosening of the prosthesis during function, poor color match, and marginal breakage were the chief complaints. A clinical examination revealed relatively healthy mandibular anterior teeth without clinical mobility and an acceptable crown-root ratio. A new lip prosthesis that incorporat-

ed tooth-supported resin-bonded retentive elements was designed.

A working impression of the lower face, the labial defect, and the labial aspects of the mandibular anterior teeth was made in polysulfide impression material (Permlastic, Kerr Manufacturing Co., Romulus, Mich). The mandibular left central incisor and right and left canines were selected for bonding the cast metal retentive elements. The abutments were polished with fine pumice and an impression of the mandibular teeth was made in polyvinyl siloxane (Reprosil, Dentsply Intl., Milford, Del.). The facial and mandibular impressions were poured in dental stone (Die Keen, Bayer Corp., South Bend, Ind.) for the laboratory phase of prosthesis fabrication (Fig. 2).

Retentive elements (ERA, Sterngold, Attleboro,



Fig. 6. Completed prosthesis with extrinsic coloration before addition of prosthetic beard.



Fig. 8. Tissue surface of completed prosthesis. Two ERA attachments were incorporated with autopolymerizing acrylic resin.



Fig. 7. Immediate postcementation of retentive elements.

Mass.) were waxed onto the labial surface of the abutments consistent with the selected path of insertion. Margins were located at least 1 mm from the gingival margins. A small incisal extension was incorporated in each wax pattern to aid initial placement of the retentive elements on the teeth. The wax patterns were then invested (Cerafina, Whipmix Corp., Louisville, Ky.), cast in dental alloy (Olympia, J.F. Jelenko, Newark, N.J.), and recovered. The bonding areas were air-abraded with 100 μ m aluminum oxide (Fig. 3).

Preliminary wax sculpting of the lip was accomplished on the stone facial cast. The definitive contour of the mandibular lip was verified by asking the patient to make bilabial and labiodental consonants (Fig. 4). The completed wax pattern was then flaked in ADA type V dental stone (Die Keen, Bayer Corp.) in the usual manner. An autopolymerizing clear acrylic resin substructure was made on the labial area of the mandibular anterior teeth, with 1.5 mm of clearance



Fig. 9. Completed prosthesis in place. Beard was added to mask lateral and inferior margin.

obtained between the external contour of the prosthetic lip and the acrylic resin substructure.

Numerous 2 mm perforations were made on the substructure for mechanical retention of the overlying

silicone material (Fig. 5). However, the area closest to the resin-bonded retentive elements was left intact. Silicone elastomer (2186, Factor II Inc., Ariz.) was mixed, intrinsic colorants were applied, and the material was processed according to the manufacturer's directions. After processing, the prosthesis was removed from the mold. Excess flash was removed from the prosthesis, and extrinsic color was applied to the prosthesis to blend with the patient's skin tone (Fig. 6).

The bonding surfaces of the abutments were polished with fine pumice, isolated with a rubber dam, etched with 37% phosphoric acid (J. Morita USA, Inc., Austin, Calif.; and Kuraray Co., Ltd., Osaka, Japan), and the cast retentive elements were bonded in place with a resinous cement (Panavia 21, J. Morita USA, Inc.; and Kuraray Co. Ltd.). The incisal extensions were removed after the cement was cured. The retentive element on the mandibular right canine was eliminated because of soft tissue interference during speech (Fig. 7).

On the tissue side of the prosthesis, the acrylic resin substructure overlaying the abutments was hollowed to house the retentive elements. Retentive plastic matrices were then inserted on the resin-bonded retentive elements. Autopolymerizing acrylic resin (GC Pattern Resin, GC Corp.) was applied on the matrices and the corresponding area in the substructure. The lip prosthesis was positioned on the defect, and the acrylic resin was allowed to polymerize. Once the resin was polymerized, the prosthesis was removed, and the tissue surface of the prosthesis was finished in the usual manner (Fig. 8).

At the delivery appointment, the patient was instructed in the insertion and removal of the prosthesis. Oral hygiene instruction was reinforced and routine follow-up appointments were scheduled every 6 months (Fig. 9).

DISCUSSION

Extraoral maxillofacial prostheses retained by resin-bonded retentive elements offer several advantages over conventional and implant-retained facial prostheses. With the natural teeth for retention, additional surgical procedures for placement of dental implants are avoided. It is also applicable for patients with a previous history of high-dosage radiotherapy where predictability of osseointegration is decreased.¹¹

The selection of abutments for placement of the retentive elements is crucial for long-term success of this method. Abutments should demonstrate adequate periodontal health, acceptable crown-root ratios, sufficient bonding area, absence of clinical mobility, and acceptable oral hygiene. It is known that potential for debonding of resin-bonded prostheses increases with time.^{25,26} Dislodgment of resin-bonded restorations

may be the result of functional forces and inadequate isolation during the bonding procedure.^{25,27} The patient must be informed of the possibility of debonding before treatment. Appropriate patient selection and regular follow-up must be maintained to detect debonding and the presence of dental caries.^{28,29} In addition, this procedure is limited to dentate patients in which a previous surgical procedure did not involve removal of teeth next to the defect. In the presence of any contraindication, a conventional silicone prosthesis retained by tissue tape, adhesive, and/or tissue undercut should be considered.

SUMMARY

Surgical resection of the lips is a relatively uncommon procedure, and it usually presents surgical and prosthodontic rehabilitation challenges. The goals of prosthetic treatment include regaining favorable speech and restoration of esthetics. This clinical report described a method for fabricating a lip prosthesis that uses resin-bonded retentive elements bonded to the patient's teeth for retention. Clinical and laboratory procedures of the prosthetic treatment were described, and the advantages and disadvantages were reviewed.

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Noteworthy Abstracts of the Current Literature

Does the quality of advanced prosthetic dentistry determine patient satisfaction?

Hakestam U, Karlsson T, Söderfeldt B, Rydén O, Glantz PO.
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Purpose. It is important to assess the quality of restorative treatment because dissatisfaction with prosthodontics is one of the main areas of complaints and conflicts in dentistry. This study had 2 specific aims: (1) to analyze prosthetic treatment and evaluate marginal integrity, anatomic form, and color/surface using the prosthetic portion of the California Dental Association (CDA) evaluation system prosthetic treatment; and (2) to correlate the technical quality with patient satisfaction both bivariately and in logistic regression multivariate models using a multidimensional measure of patient satisfaction as a screening tool. These analyses were performed on a group of patients who underwent advanced prosthetic treatment and were followed up for at least 1 year.

Material and Methods. In a previous study, the authors studied the dimensions of dental satisfaction in a group of 335 individuals who had received advanced prosthetic dentistry. The dimensionality of the components of the measure were assessed through factor analysis and the constituent items could be combined into 7 dimensions. The index summarized information from the 17 initial variables and then was constructed by summing dichotomies for each of the 7 dimensions, with satisfaction indicated as 10 and dissatisfaction by 0. The index could range from 0 to 7 dimensions of satisfaction. From this total group, patients were asked to participate in a 1-year clinical follow-up. Based on the original index, 2 patient groups were formed; one in which patients ($n = 34$ patients) indicated satisfaction in 3 or fewer dimensions and the other in which patients ($n = 31$) were satisfied in all 7 dimensions. These prosthodontists in prosthodontics using the CDA quality assessment system. New and old prosthetic treatments were examined whenever possible. Data were collected and the results statistically analyzed.

Results. Most of the new restorative treatment was rated as satisfactory. Removable partial dentures had a somewhat higher share of nonacceptable prostheses according to the CDA criteria. There was an association between the CDA categories and patient satisfaction. Using regression analysis and knowing the CDA rating the authors were able to correctly classify 67% of the patients with regard to the satisfaction measure. When the satisfaction measure was modified on a patient interview, this improved the model to 83% correctly classified.

Conclusions. The results highlight the importance of high technical quality as a cornerstone of prosthetic dentistry especially regarding quality of life and patient satisfaction issues. Almost all patients in the study expressed great satisfaction with their treatment and claimed that it had influenced their quality of life in a positive manner. 33 References.—RP RENNER