Surgical Reconstruction of the Interdental Papilla

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The traditional goal of disease elimination in the anterior region opens the interproximal spaces, causing flattening or cratering of the interdental papilla. Today’s patients increasingly demand esthetic results in addition to periodontal treatment, and recent advances in periodontal plastic surgery have enhanced the periodontist’s ability to address these concerns. Three case reports demonstrate a proposed surgical technique for the reconstruction of collapsed interdental papillae using a connective tissue graft under the buccal and palatal flaps. (Int J Periodont Rest Dent 1998;18:467–473.)

Historically, periodontists have been able to successfully treat and maintain cases of advanced periodontal disease. In many of these cases, however, pocket elimination in the anterior region opens the interproximal spaces, elongating the visible clinical crown and often causing flattening or cratering of the interdental papilla. Recent years have seen growing patient demand for improved esthetic results in addition to the traditional goal of disease elimination.

Several procedures have been proposed to preserve esthetics in the anterior region of the mouth by maintaining the existing interdental papillae.1–4 The reconstruction of an atrophied interdental papilla, on the other hand, offers a greater challenge. In 1985 Shapira5 described a technique of periodic curettage to stimulate the regrowth of interdental papillae destroyed by acute necrotizing ulcerative gingivitis. In a case report, Beagle6 described the

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surgical reconstruction of the interdental papilla combining the basic principles of Abrams' roll technique for ridge augmentation and the papilla preservation technique of Evian et al. Han and Takei described a technique consisting of a pedicle graft using a semilunar incision and the coronal displacement of the entire gingival-papillary unit.

The use of a connective tissue graft placed under a flap for the purpose of root coverage has been described by several authors. The present paper describes a technique for surgically reconstructing the interdental papilla using buccal and palatal split-thickness flaps and a connective tissue graft.

Surgical technique

Preparation of the patient includes careful scaling and root planing of the entire mouth and instruction in oral hygiene. Patients who smoke are requested to stop because smoking delays healing and impairs clinical results. Smoking should cease from at least 1 week prior to the surgical procedure to 2 to 3 weeks after surgery.

Immediately prior to the surgical procedure the patient is instructed to rinse for 30 seconds with chlorhexidine gluconate solution 0.12%. After adequate anesthesia of the region surgery is performed.

An intrasulcular incision is made around the necks of the maxillary central incisors (Figs 1a and 2). Another incision is made buccally across the interdental papilla to be reconstructed, at the level of the cementoenamel junction, leaving the existing papilla attached to the palatal flap (Fig 2). An envelope-type split-thickness flap is then elevated buccally and palatally (Fig 1b). The buccal portion of the flap is dissected well beyond the
mucogingival line, leaving the periosteum and a thin layer of connective tissue on the bone. Care must be taken not to perforate the flap to avoid compromising the blood supply. The palatal portion of the flap, also split-thickness, includes the interdental papilla.

A second surgical site is created to obtain a connective tissue graft of adequate size and shape for placement under the flaps in the recipient site. A preferred donor site for the graft is the retromolar tuberosity area, although other sites can be used. The technique for harvesting tissue from the tuberosity area is as follows.

A wide distal wedge-shaped incision is made, combined with thinning of the flap on the palatal aspect. The two parallel incisions are begun at the distal aspect of the terminal molar and extended to the mucogingival junction distal to the tuberosity (Fig 3). The distance between the incisions depends on the depth of the pocket and the amount of fibrous tissue in the area. A third incision is carried out at the distal end of the two parallel incisions. This incision is made straight down for the first millimeter and continued apically as an inverse bevel incision toward the bone. The flap is then reflected and the underlying tissue is removed to the bone. The tissue obtained has a large trapezoidal shape corresponding to the distal wedge, with an extension corresponding to the incisions made on the palatal aspect (Fig 4). It is preferable to obtain this entire specimen in one piece for later trimming to the desired size and shape. Immediately after removing the tissue from the distal wedge the area is sutured. Healing is usually by first intention.
**Fig 5** Tissue graft trimmed for placement in recipient site.

**Fig 6** Connective tissue graft from donor site is placed under buccal and palatal flaps in interdental area.

**Fig 7** Palatal and buccal flaps are sutured with added connective tissue underneath.

**Fig 8** Three-day postoperative view of case 1.

**Fig 9** Case 1 with old ceramo-metal crowns.

**Fig 10** New In-Ceram crowns have been seated. Preoperative view of area for papilla reconstruction in case 1.

**Fig 11** Postoperative view of case 1.
The connective tissue harvested from the tuberosity area is shaped to fit under the flaps and to provide more bulk in the papillary region (Fig 5). The tissue graft is then placed under the buccal flap and in the interdental papilla area (Fig 6). The buccal and palatal flaps are then brought together and sutured with the connective tissue graft underneath (Figs 1c and 7). The epithelial border of the graft is not removed; it is left in place to cover the segment of exposed connective tissue.

The area is covered with surgical periodontal dressing. The patient is instructed to rinse twice daily with chlorhexidine gluconate, to stop smoking for at least 2 to 3 weeks, and to avoid touching the dressing during oral hygiene procedures. Antibiotics can be administered (amoxicillin, 500 mg three times a day) if necessary. Dressing and sutures are removed 1 week after the procedure. The area appears red and irregular (Fig 8) but in a few days it slowly acquires normal topography and shape and fills most of the interproximal area.

Case reports

Case 1

A 30-year-old woman was referred for the cosmetic treatment of the maxillary central incisors (Fig 9). The first step in treatment consisted of replacing two old ceramometal crowns with two In-Ceram crowns (Vident) (Fig 10). Two weeks later the patient returned requesting that something be done to hide the “black hole” between the two central incisors. Plastic surgery to reconstruct the interdental papilla was discussed and accepted by the patient. Figures 2 to 8 show the technique as performed in this case and Figure 11 shows the final result (compare with preoperative view in Figure 10).

Case 2

A 25-year-old man undergoing orthodontic treatment was referred for a gingival graft on the right mandibular central incisor. Surgery was performed to simultaneously correct the gingival recession and reconstruct the papilla. Figure 12 shows the case preoperatively and Figure 13 shows the postoperative result.
Case 3

A 38-year-old woman was referred for periodontal and cosmetic treatment of the maxillary central incisors. After completion of the periodontal treatment, the central incisors were capped with In-Ceram crowns and the interdental papilla was surgically reconstructed following the procedure described above. Figures 14 and 15 show the preoperative and postoperative views, respectively.

Discussion

The technique described in this paper has been used by the senior author in many cases with consistently good results. The reconstructed interdental papilla almost reaches its normal level, solving the esthetic problem posed by its absence.

The blood supply to the grafted connective tissue is a key element of this technique. This is assured by the flap coverage of the connective tissue extension, in which only a small portion at the tip is left uncovered. The grafted tissue will receive a flow of plasma and an ingrowth of capillaries from the periostium, the underlying connective tissue, and the overlying flaps.

Probing depths at the sides of the reconstructed papillae were 3 to 5 mm in the present cases, and a healthy state without clinically significant inflammation can persist indefinitely if oral hygiene procedures are adequate. Initial cases treated with this technique were performed in 1991, and they have shown that results can be maintained satisfactorily in reasonably compliant patients. Larger series of cases with clinical measurements are needed to confirm the findings presented here. The technique proposed offers a solution to a frequent clinical problem, using a method easily performed by any skillful periodontist.
References


