Background: The subepithelial connective tissue graft (SCTG) is a predictable technique for root coverage. The small number of potential postoperative problems make SCTG the current treatment of choice for reversing gingival recession.

Methods: The purpose of this article is to report three cases of complications after the use of an SCTG where an abscess occurred following the initial healing phase. The surgical technique that was used and the treatment that was provided for the abscesses are reported, and the possible causes of these complications are discussed.

Results: The abscesses were treated conservatively, and no recurrence has been observed after treatment.

Conclusions: Possible causes of the abscesses include “stitch abscess” or reaction to the suture material used for the submerged sutures, or a possible role of epithelium implanted during the procedure. The clinical outcome of the root coverage procedure was not affected. J Periodontol 2003;74:1676-1681.

KEY WORDS
Abscess/etiology; gingival recession/surgery; gingival recession/therapy; grafts, connective tissue.

Since Langer and Langer1 introduced the technique of subepithelial connective tissue graft (SCTG) for root coverage, this procedure has been widely used, and many variations have been proposed.2,3 The predictability of root coverage and the good esthetic results achieved with this technique, combined with the small number of potential postoperative problems, make SCTG the current treatment of choice for reversing gingival recession.

The originally described procedure includes a horizontal sulcular incision and vertical incisions mesially and distally to the area of the recession, followed by reflection of a partial-thickness flap in the recipient site. A graft of connective tissue (CT) is taken from the palate, and adipose and glandular tissues are removed from the graft. Langer and Langer recommend that the band of epithelium which is taken with the donor connective tissue be allowed to remain on that portion which will be covering the denuded root. The combined epithelial and connective tissue graft is placed over the denuded roots and sutured interproximally to the underlying connective tissue. The partial-thickness recipient site flap is positioned coronally in an attempt to cover as much of the graft as possible, and is sutured in this position.1

The purpose of this article is to report three cases of complications after the use of an SCTG, where an abscess occurred following the initial healing phase. The surgical technique that was used and the treatment that was provided for the abscesses are reported, and the possible causes of these complications are discussed.

CASE 1
A 29-year-old Caucasian female patient presented with areas of recession in the lower right quadrant. On teeth #28 and 29, sulcular incisions were performed on the buccal aspect and were connected at the level of the cemento-enamel junction. A full-thickness flap was reflected (becoming partial-thickness apically), but no vertical incisions were used. The papilla between teeth #28 and 29 was deepithelialized. After scaling and root planing with hand instru-
ments, the root surfaces were treated with tetracycline solution (50 mg/ml), using a cotton pellet in a varnishing motion for 1 minute. A connective tissue graft with a narrow band of epithelium was harvested from the palate. The graft was placed over the root surfaces and sutured coronally and apically (Fig. 1A). The flap was positioned coronally and sutured with additional polyglactin 910† #5.0 sutures. At the 10-day postoperative visit, the sutures were removed and healing was judged as uneventful.

Seven weeks later, the patient presented for a periodontal maintenance appointment. She reported that the lower right area, next to tooth #28, had an occasional “minimal swelling.” A sinus tract was observed within the attached gingiva (Fig. 1B). A gutta-percha cone was placed in the sinus tract, and a periapical radiograph taken. The cone did not trace to the apices of the teeth. All the teeth in that area tested vital, and no signs of periapical pathology were noted. After local anesthesia, the area of the sinus tract was curetted with hand instruments, and the granulation tissue was removed. Three weeks later, the area was completely healed, and no recurrence of the abscess has been noted for 9 months (Fig. 1C).

CASE 2

A 40-year-old Caucasian female presented for treatment of recession on teeth #3, 4, and 5 (Fig. 2A). A partial-thickness flap was reflected with verticals distal of tooth #3 and mesial of #5. Mechanical and chemical treatment (citric acid pH = 1 for 1 minute) of the roots was performed. A connective tissue graft harvested from the palate was adapted over the roots to be covered, and secured with polyglactin 910 #5.0 periosteal sutures. The flap was coronally positioned and sutured with polyglactin 910 #5.0 suture. A periodontal dressing‡ was used, and no antibiotics were prescribed. Sutures were removed at 1 week and healing was uneventful, except for an area over tooth #5 where the flap was perforated (Fig. 2B). When the patient was seen for a second postoperative visit

† Vicryl, Ethicon, Somerville, NJ.
‡ CoePak, GC America, Inc., Alsip, IL.
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Figure 2.
Case #2. Teeth #3, 4, and 5 of 40-year-old Caucasian female. A) Preoperative condition. B) One-week postoperative photo. C) Two-week postoperative photo shows a diffuse swelling under the flap that was red and sensitive to touch. D) Six-month postoperative condition after treatment of abscess.

6 days later, she reported that the area that had the surgery “felt strange.” The upper right segment showed a diffuse swelling with purulence under the flap that was red and sensitive to touch (Fig. 2C). All teeth tested vital, and both #4 and 5 were sensitive to percussion, but radiographic examination showed no periapical pathology. A prescription of amoxicillin 500 mg t.i.d. × 7 days was given to the patient. One week later, the patient was seen again; she was symptom free; and the treated area was healing normally. The patient has been followed for 16 months, healing is complete, and teeth #4 and 5 respond normally to percussion and to cold test (Fig. 2D).

CASE 3
A 30-year-old Asian Indian male presented with 3 mm recession on tooth #12 (Fig. 3A). A partial-thickness flap was reflected with a technique similar to the cases described above. Mechanical and chemical treatment (citric acid pH = 1 for 1 minute) of the root was performed. A CT donor tissue harvested from the palate was adapted over the root and secured with polyglactin 910 #5.0 periosteal sutures coronally, mesially, distally, and apically (Fig. 3B). The flap was coronally positioned and sutured with the same material. No antibiotics were prescribed, and periodontal dressing was placed. One week later, when the patient was seen for postoperative evaluation, healing was within normal limits. One month later while the patient was being seen for a regular periodontal maintenance appointment, a swelling was noted in the mucosa apical to tooth #12 (Fig. 3C). Adjacent teeth tested vital, and periapical pathology was excluded. The area was drained with a single incision in the mucosa and curet-
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Figure 3.
Case #3. Tooth #12 of 30-year-old Asian Indian male. A) Preoperative view shows 3 mm recession. B) Connective tissue graft adapted over the root and secured with polyglactin 910 #5.0 periosteal sutures coronally, mesially, distally, and apically. C) One month postoperatively, a swelling was noted in the mucosa apical of tooth #12. D) Six-month postoperative view of healed abscess.

Minimal suppuration was seen, but a caseous material was noted, which was hypothesized to be remaining polyglactin 910 suture. The area was left unsutured to drain. The patient was given a prescription of amoxicillin 500 mg t.i.d. × 7 days. The patient has been followed for 6 months, and there has been no recurrence of the abscess; the area is symptom-free and healing well (Fig. 3D).

DISCUSSION

According to the 1999 International Workshop for a Classification of Periodontal Diseases and Conditions, a gingival abscess is a localized purulent infection that involves the marginal gingival or interdental papilla. It is usually an inflammatory response to foreign substances forced into the gingiva. A periodontal abscess is a localized accumulation of pus within the gingival wall of a periodontal pocket.\(^4\) Of the cases described here, one case (case #1) appeared with the classic definition of a gingival abscess, with the abscess located in the keratinized gingiva, and with a surface orifice in the area of the interdental papilla. The other two cases appeared as diffuse abscesses in the area corresponding to the original flap (including mostly mucosa), and they do not fit the classic definition of gingival abscess.

All three cases reported in this paper have certain things in common in that a similar technique was used, the roots were treated mechanically and chemically, and the connective tissue that was harvested from the palate had a band of epithelium, although care was taken for that band to remain uncovered by the recipient area flap. In all three cases, a poly-lactic acid/polyglactic acid (PLA)-based bioab-
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sorbable suture was used to secure the connective tissue graft to the recipient bed. The flap was coronally positioned up to the CEJ covering the graft and the sutures, and no antibiotics were administered postoperatively. The abscesses did not appear clinically in the first postoperative appointment, but at various time frames from 2 to 7 weeks postoperatively.

The incidence of complications is relatively low when connective tissue grafts are used for root coverage. The development of a “gingival surgical cyst” secondary to a subepithelial connective tissue graft has been reported. The cystic lesion presented on the buccal mucosa several months after a graft was placed for root coverage, had a firm consistency, and was excised surgically. Other cases of surgical cysts in the mouth have been reported from other specialties. Epithelium has been implicated in the pathogenesis of gingival and periapical cysts. It has been suggested that cysts may arise from remnants of the dental lamina, enamel organ, or cell rests of Malassez, or by traumatic implantation of surface epithelium.

It is generally recommended that the epithelial collar of tissue be removed if the graft is to be covered by a coronally positioned flap. Histological sections, however, show that the complete exclusion of epithelium is very difficult. The effect that epithelium remnants in the donor tissue will have on the overlying periodontal tissues is not clear. In an animal model, when epithelium from alveolar mucosa was implanted under full-thickness flaps, the epithelial implants were surrounded by connective tissue and did not seem to endanger the connective tissue attachment. The complications reported here presented as acute abscesses. After the abscesses subsided, no clinical indication of gingival cyst was present. No biopsy was performed, and no conclusions can be made on the possible role of any epithelium remnants.

Tissue reactions to suture materials in the oral cavity have been infrequently studied, and factual information appears to be incomplete. Polyglactin 910 is a synthetic copolymer of lactide and glycolide acid (PLA and PGA), is braided to enhance its surgical handling quality, and has an absorption time of 60 to 90 days. Selvig et al. observed that it did not dissolve appreciably within 14 days. It has been reported that both PLA and PGA produce toxic solutions in vitro, probably as a result of the acidic degradation products, but these tests do not necessarily emulate in vivo situations. In general, PLA-PGA copolymers have been found to be biocompatible, non-toxic, and non-inflammatory, although some reduction in cell proliferation has been reported.

Polyglactin 910 is a suture material primarily used in submerged, uncontaminated sites. Braided sutures seem to conduct bacterial migration to a greater extent than monofilament sutures. Even immobile bacteria are transported inside multifilament suture materials, where the cellular and immunologic defense against them is considerably impaired. Selvig et al. concluded that sutures placed in gingiva and oral mucosa produce a prolonged tissue response that is most likely a result of the continual influx of microbial contamination along the suture channel, which may be a lesser problem when sutures are placed in other surgical compartments.

The possibility of a stitch abscess should be considered, since this is quite a common problem reported after other surgical procedures, especially since a braided suture was used. It has never been reported, however, as a complication following SCTG. Therefore, it could be recommended that if sutures are to be used in a submerged environment (that will be eventually covered by the flap), perhaps a non-braided suture (such as cut-gut) should be selected. In the oral cavity, sutures are immediately contaminated the very moment they are used. If sutures are used just after being opened, before being passed through the interproximal gingiva, the microbial load in the sutures will be low and would probably not transfer bacteria in a submerged environment.

The signs and symptoms of this complication were mild. In fact, only two of the three patients were aware of the presence of the abscess. The treatment provided for the abscesses was conservative, consisting of curettage of the area in two of the three cases, and administration of antibiotics in two of the three cases. The patients have been followed, and no recurrence of abscess or development of a clinically detectable cyst has been noticed. The clinical outcome of the SCTG procedure in all cases was favorable, and it appears that it was not adversely affected by the transitional development of the abscess.

In conclusion, three cases of abscesses of obscure etiology following subepithelial connective tissue graft for root coverage are reported. Possible causes of the abscesses include “stitch abscess” or reaction to the suture material used for the submerged sutures, or a possible role of epithelium implanted during the procedure. The abscesses were treated conservatively, and no recurrence has been observed after treatment. The clinical outcome of the root coverage procedure was not affected.
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