THE "LOMA LINDA STENT": A SCREW-RETAINED RESIN STENT

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KEY WORDS

Keratinized tissue
Mucogingival surgery
Vestibuloplasty
Surgical stent
Dental implants

This article describes a technique in which an acellular dermal allograft is used in combination with a photopolymerized acrylic resin stent to increase the zone of keratinized tissue around osseointegrated dental implants. During the second-stage surgery, a split thickness labial flap is reflected and apically repositioned by being sutured onto the periosteum and connective tissue. The acellular dermal allograft is then sutured onto the recipient site. The acrylic resin is trimmed and secured with temporary abutments to the implants, fitting passively over the graft and then photopolymerized intraorally. The stent is left for 1 week to secure the graft in place. This technique offers an alternative mucogingival procedure for increasing the zone of keratinized tissue around osseointegrated dental implants.

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INTRODUCTION

Implant-retained or implant–tissue supported mandibular overdentures have become a valid treatment modality.[1,2] The reported high success rate of implants placed at the anterior area of the mandible[3–5] does not seem to be adversely affected by the lack of keratinized tissue around the implants.[3,6] However, the presence of mobile mucosal tissue around the fixtures has been associated with chronic irritation and patient discomfort.[7]

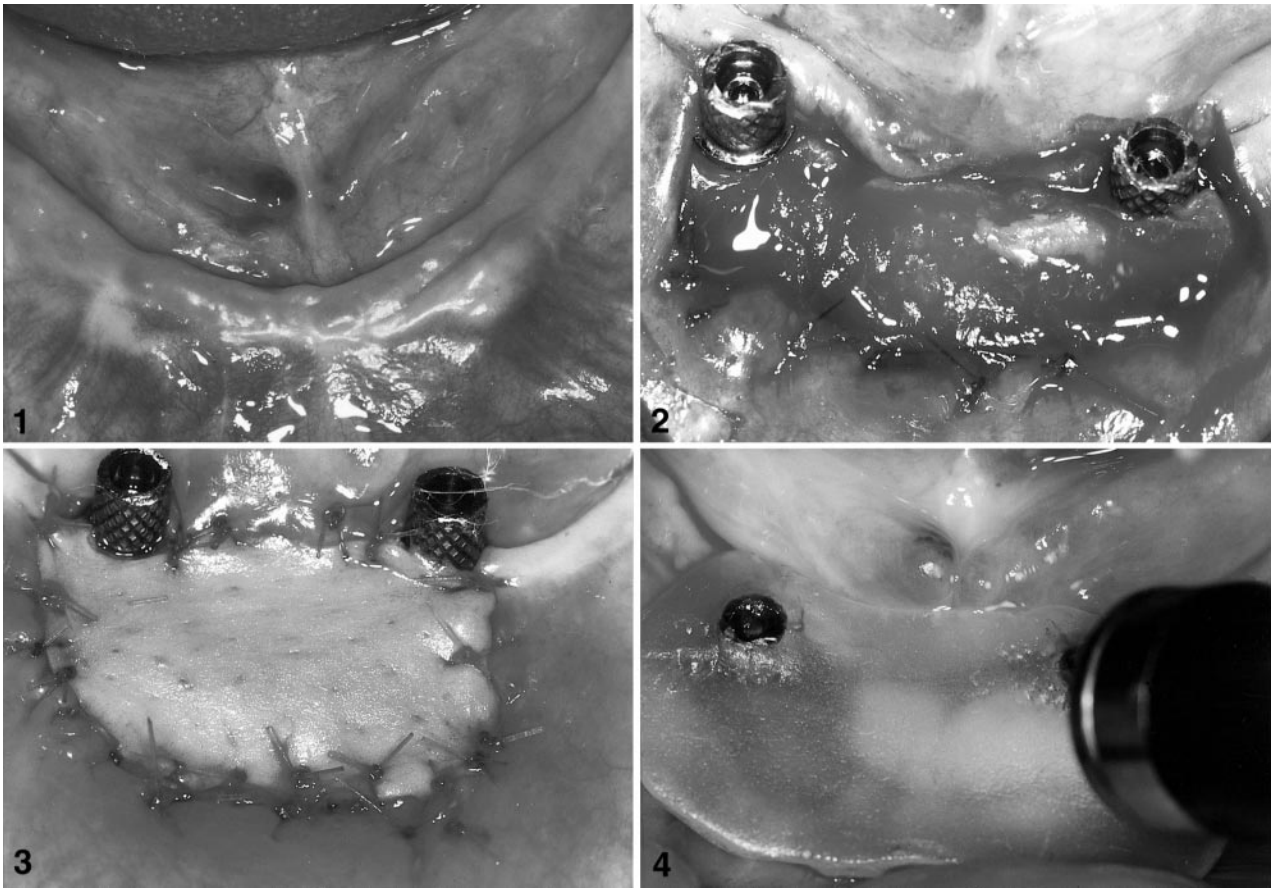
The purpose of the current report is to describe a technique that increases the zone of keratinized tissue around osseointegrated dental implants.

CASE STUDY

A 67-year-old Caucasian woman presented at the center for Prosthodontics and Implant Dentistry at Loma Linda University seeking treatment for her fully edentulous mandible. After discussing the different treatment modalities, she decided to have an implant–tissue supported mandibular overdenture.

Two Steri-Oss 3.8 × 14 mm threaded TPS-coated root-form implants (Nobel Biocare, Yorba Linda, Calif) were placed in areas 22 and 27. Implant surgery and subsequent healing were uneventful. At the time of second-stage surgery, mobile mucosa was covering the area above the implants with a lack of keratinized tissue (Figure 1). It was decided to perform mucogingival surgery around the 2 implants in order to provide a zone of keratinized tissue around the implants.

A split-thickness flap was reflected around the 2 implants. The mucosal part was severed[8] and, after performing periosteal fenestration[9,10] in order



FIGURES 1–4. FIGURE 1. Preoperative view. FIGURE 2. A split thickness flap has been reflected. The labial flap is sutured onto the underlying connective tissue and periosteum. Two hexed temporary abutments have been adjusted at a 3 mm height above the fixtures. The abutments are screw-retained at the fixture level. FIGURE 3. The allograft is sutured onto the recipient site. FIGURE 4. The photopolymerized acrylic resin is positioned passively above the graft and photopolymerized.

to prevent muscle reattachment, the labial flap was sutured on the underlying connective tissue and periosteum with a resorbable chromic gut 6-0 suture (Johnson & Johnson, Somerville, NJ; Figure 2).

Two Steri-Oss temporary nonhexed titanium abutments (Nobel Biocare) were placed onto the implants. The height was adjusted to 3 mm above the implant level (Figure 2).

An AlloDerm acellular dermal allograft (Lifecore, Chaska, Minn)[11–14] was trimmed and sutured onto the recipient site with the same suture material (Figure 3). Photopolymerized Triad acrylic resin material (Dentsply International, York, Penn) was trimmed and placed on the top of the temporary abutments. The acrylic resin was then photopolymerized (Optilux, Kerr, Danbury, Conn; Figure 4).

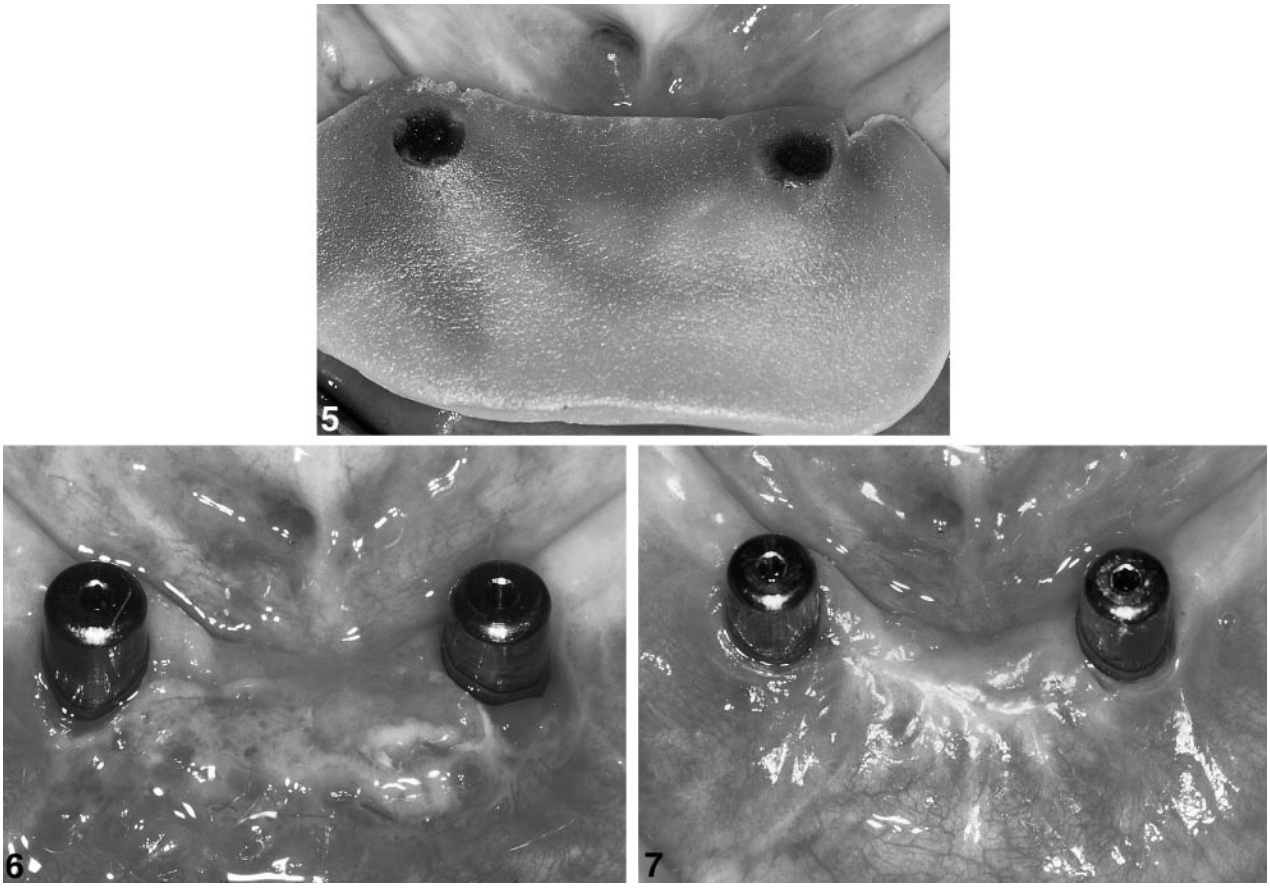
After curing, the stent was removed along with the attached temporary abutments, trimmed, and polished on a lathe unit (Baldor Electric, Ft Smith, Ark) with pumice. The stent was then placed in the mouth and the abutment screws were hand-tightened (Figure 5). The stent was removed 7 days after placement.

The healing of the grafted area was uneventful (Figures 6 and 7). The patient reported minimal discomfort during the healing period.

DISCUSSION

The use of acrylic stents in mucogingival surgeries has been proposed as a way to provide stability and protection to the grafted area (Table 1).[15–26] The stents can be secured onto the recipient site through perimandibular sutures,[15–21] fixation bone screws,[22,23] adhesive,[21,24] or osseointegrated dental implants.[25,26] Typically, the surgical stents are fabricated in the laboratory by using an altered cast.[23,25] The significance of the current method (''Loma Linda stent'') is that it eliminates the laboratory step, reducing the time and cost for the preparation of the stent. In addition, the risk of having necrosis because of the pressure that the stent may apply on the graft[27] is reduced because the acrylic resin is applied passively and photopolymerized at a passive stage onto the grafted area.

The use of an acellular dermal allograft[11–14] eliminates the need of har-



FIGURES 5–7. FIGURE 5. The implant-supported, screw-retained stent is placed. FIGURE 6. The grafted area 2 weeks postoperatively. FIGURE 7. The final result 6 weeks after the procedure.

TABLE 1

Surgical stents described in combination with mucogingival surgery

Author	Type of Template	Graft Used	Securing Mechanism	Location	Days in Place
Moore[15]	Overextended impression/ acrylic stent	Skin	Ligatures/Steinman pins	Mandible	Not reported
Hall[24]	Acrylic stent	Palatal-buccal	Adhesive	Mandible	7
Sanders and Starshak[16]	Acrylic stent	Palatal	Ligatures	Maxilla	10
Firtell et al[17]	Overextended impression/ acrylic stent	Skin	Circummandibular sutures	Mandible	10–14
Grguveric et al[23]	Modified cast/acrylic stent	No graft	Fixation screws	Maxilla	10
Small[21]	Acrylic stent border molded after surgery	Skin	Dermatome glue/ circumvendibular ligatures	Maxilla	7–14
Brygider and Bain[25]	Modified cast/acrylic stent	Palatal	Screw-retained on dental implants	Mandible	7
Kahnberg et al[19]	Acrylic stent	Bone graft	Suspension wires around zygomatic arch	Maxilla	3
Ten Bruggenkate et al[22]	Acrylic stent	Palatal	Single fixation screw	Mandible	7
Hughes and Howard[18]	Modified impression/acrylic stent	Skin	Circummandibular sutures	Mandible	7
Ziccardi et al[26]	Acrylic stent	No graft	Screw-retained on dental implants	Mandible	5
Nystrom et al[20]	Acrylic stent	Hip	Zygomatic arch suspension wires	Maxilla	3
Loma Linda stent (2002)	Photopolymerized acrylic resin applied intraorally	Allograft	Screw-retained on dental implants	Mandible	10

vesting a free gingival graft from the palate, which extends the surgical time and causes postoperative discomfort[24] in the donor site. However, although histologic analysis,[12,13] short-term clinical studies,[13] and case reports[12,14] have provided promising results, there are no long-term studies to support the use of an allograft as the material of choice for mucogingival surgeries. Increasing the zone of keratinized tissue has been proposed without the use of any graft material.[22,28–30] However, secondary epithelization has been associated with recurrence of the mucogingival problem.[31–33]

The described grafting procedure may extend the total treatment time. The healing of the graft will necessitate additional time before further prosthodontic work can be performed. The reported irritation of the area labially to mandibular anterior implants in patients wearing overdentures,[2,7] the enhanced plaque accumulation,[34–36] increased bleeding tendency on probing,[37] and peri-implant probing depth[36,38] around dental implants surrounded by mobile mucosa can justify the attempt to increase the zone of keratinized tissue. Alternatively, mucogingival surgery can be performed prior to implant placement. However, the pressure applied by the temporary complete denture may compromise healing of the grafted area.

In summary, the proposed technique can offer a relatively easy and time-effective technique to increase the zone of keratinized tissue around osseointegrated dental implants.

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