The Bis-Acryl Stent

Dennis Flanagan, DDS*

When placing dental implants, there may be a surgical flap to reposition. The flap can be sutured or held in place with a stent that protects the flap and maintains its position and immobility. Use of a bis-acryl stent may be preferable to sutures or other materials in many cases. Bis-acryl is easily applied from an auto-mixing gun. Stents may be preferable to sutures in that there is no “wicking effect,” where bacteria colonize the suture beneath the healing surgical wound. Additionally, many times there is no submucosa to suture to, and the sides of the wound may not allow appropriate flap positioning and immobility with sutures. In these situations an acryl stent may be placed for easy and proper flap positioning and healing.

Key Words: tissue immobility, surgical flap, apically positioned flap, dental implant, healing

INTRODUCTION

A dental implant surgical flap may need to be repositioned appropriately and fixed into place to cover a surgical site or augment the zone of attached gingiva. This can be done with sutures, a stent, or both. Stents were first used in oral surgery by a 19th-century London dentist, Charles T. Stent (1807–1885). He used a custom-made “improved” gutta-percha molded material dressing to guide oral surgical wound healing. The eponymous term “stent” was then used by plastic surgeons in the 20th century. The term has been used to describe a device that guides, supports, or maintains healing tissue. Recently, the term has been used to describe a device that maintains patency of an artery or ureter or other anatomical conveyer. Contemporary stents are made from a multitude of materials. A stent is not a surgical template or guide.

Stents can be made of several different kinds of materials and are produced by different manufacturers (Barricaid, Dentsply, Milford, Del; Coe-Pak, Coe Pak GC America, Alsip, Ill). Periodontal pack dressing can be a stent. A stent protects and immobilizes the postsurgical site and enhances keratinized tissue formation. The increased zone of keratinized tissue makes for a functional implant outcome. A bis-acryl stent can be made immediately and easily to fixate a surgical flap as described herein.

MATERIALS AND METHODS

A fast and easy technique to create a stent is to use an auto-mix gun to prepare a fast-set provisional bis-acryl that sets in 2 minutes (Figure 1). First, the end of the mixing tip is cut off with crown and bridge scissors at the point where the mixing-spiral terminates, about 10 mm from the tip end (Figure 2). The cut tip is then compressed by the scissors or with a needle holder, creating a slot opening that causes the bis-acryl to be expressed as a thick ribbon. The bis-acryl is automatically combined in the auto-mix gun and expressed as a heavy, very soft, very viscous material that sets in 2 minutes.

Before the acryl is placed, the wound flap is positioned appropriately for proper healing to maximize the creation of the most keratinized tissue or provide optimum site coverage (Figures 3 and 4). The surgical flap may need to be compressed against the submucosa or bone with a surgical sponge for 1–5 minutes to ensure its immobility and proper position during the placement of the stent.

The cut mixing tip is directed at the distal-most area of the surgical site. The gun handle is squeezed to express the automatically mixed bis-acryl to the tip. The bis-acryl is expressed from the tip and
directed to place a smooth ribbon of bis-acryl from
distal to mesial. The ribbon covers the wound and is
also directed to engage undercuts of adjacent teeth
and/or any implant healing caps or abutments
(Figure 5).

The patient’s cheek may have to be retracted to
keep the wound flap in position during the
deposition and setting of the acryl. Once the acryl
sets, the stent is assessed for sharp areas or plaque-
retaining defects that may have formed. They may
be finished with a diamond stone and polished,
taking care not to disturb the underlying tissue. No
sutures are placed unless the wound flap cannot be
held in the appropriate position by compression.

**Figures 1–6.** Figure 1. Bis-acryl gun with auto-mixing tip. Figure 2. The auto-mixing tip is cut with scissors to form a slot opening. Figure 3. The surgical flap. Figure 4. The surgical flap was appropriately positioned to maximize keratinized tissue formation. The abutments and adjacent tooth undercuts are engaged to retain the set bis-acryl stent. Figure 5. The set bis-acryl hardens to immobilize and protect the healing flap. The surface can be finished with a diamond stone and polished. Figure 6. The healed apically positioned flap at 10 days.
Any exposed submucosa or bone at the ridge crest would now be covered for protection from trauma and temperature changes. The patient rinses with 0.12% chlorhexidine gluconate preoperatively and twice daily during the first week of healing. The stent is removed between the 4th and 10th postsurgical day and the site is evaluated (Figure 6).

**DISCUSSION**

An oral surgical flap needs to be fixed in position to ensure appropriate positioning and healing. Sutures can be used to fix the flap but an often overlooked modality is the stent. A stent immobilizes and guides tissue healing and provides a surface that prevents mobility of the healing tissue, thereby minimizing the development of mucosal epithelial ingrowth. The stent serves to cover and protect the surgical site from trauma and temperature changes from ingested food.

Several materials are used as stents, such as zinc oxide eugenol and light-cured acryl. Stents of this type are generally not sterile as they are mixed immediately before use. The oral cavity contains multiple pathogenic and nonpathogenic microbial forms that do not appear to colonize the bis-acryl surface during the 1-week healing phase. Bis-acryl is not porous and may not support colonization in such a short time period. It is generally accepted that sutures should be removed between the 4th and 10th postoperative day to prevent wicking infections and to evaluate patient healing. The bis-acryl is directly applied to the wound, and there is no spacing between the bis-acryl and the soft tissue. The set bis-acryl is rigid and holds the soft tissue in the desired position. The hard surface is secured in the undercutts and embrasures of the adjacent teeth and implant healing caps to protect the surgical site from hot food and trauma.

When sutures are used in conjunction with a bis-acryl stent, the sutures are somewhat isolated from the oral fluids and are less likely to be colonized by oral bacteria. Some sites require sutures to hold the surgical flap in an appropriate position and also require the protection of a bis-acryl stent. Many surgical sites require primary coverage for appropriate healing, and the surgical flap can be held in primary closure position. Other sites may require attached tissue augmentation, which can be accomplished by apically positioning the keratinized flap to form attached tissue in this area. Newly formed keratinized tissue will protect the implant- gingiva interface from muscular tension during oral functioning (Figure 8). Many implant sites are deficient in attached keratinized tissue, so gingiva located at the ridge crest or the lingual aspect of the site can be apically repositioned to augment facial keratinized tissue. This will heal and provide protection for the percutaneous implant epithelial attachment.

Sutures can inhibit healing and induce infection. The various suture materials have different qualities that minimize these liabilities; however, sutures still penetrate the tissue and provide an accessible submucosal surface for bacterial colonization. Generally, sutures are not necessary with this technique but a suture may be needed to position or immobilize a particularly unruly surgical flap so a covering stent can subsequently be placed.

In many situations there is no submucosa to suture to, and the sides of the wound may not allow appropriate flap positioning with sutures. In such cases, an appropriately placed bis-acryl stent may ensure proper flap positioning.

The bis-acryl setting reaction is exothermic but does not appear to be detrimental to the mucosa or gingiva. One study that compared the exothermic behaviors of bis-acryl and polymethyl methacrylate (PMM) found that PMM had a consistently higher temperature rise, 4.2–11.6°C, than bis-acryl, which had a temperature increase ranging from 2.0°C to 6.6°C. A single episode of a thermal exposure is much less damaging than multiple exposures. A thermal exposure of a few degrees is not detrimental to gingiva and mucosa.

The stent lies on top of the surgical wound and is not percutaneous but merely holds the tissue in the desired position on the osseous base, using the adjacent teeth for stability. A stent is indeed a foreign body and can provide a surface for bacterial colonization but it does not penetrate tissue and is not positioned submucosally. Additionally, saliva washes over the stent and provides some antimicrobial action from the salivary immunoglobulins and buffering. The patient can carefully brush the stent, can be prescribed a twice daily chlorhexidine rinse, or can use an essential oil rinse (Listerine, Johnson & Johnson, Skillman, NJ) to minimize bacterial colonization.
Other stent materials are used similarly and produce similar results but bis-acryl is very fast and easy to use. Whereas other materials require the surgeon to press the material into place, the bis-acryl is gently laid on the soft-tissue surface and is not forced under the surgical flap. A comparison with other materials is in order but beyond the scope of this report.

This author has been using the bis-acryl stent for 2 years in a few hundred cases with no untoward events or inappropriate healing. There has been no adverse tissue reaction. Even if left on for several weeks, the mucosa and gingiva heal uneventfully but in the topography of the intaglio of the bis-acryl. After several weeks, the gingiva proliferates and assumes an architecture that conforms to the surrounding physiologic conditions. Muscle and frenum tension may affect an outcome and should be addressed before the surgery.

**Conclusions**

A bis-acryl stent may allow for better healing than compared to sutures. Several materials that can be used to make a stent. A gun-type auto-mixed acryl stent may be a quick and easy way to immobilize a surgical flap in an appropriate position, to increase attached tissue, and to protect the surgical wound.

**Abbreviation**

PMM: polymethylmethacrylate

**References**