Soft Tissue Management with Periosteum Amputation Technique

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Abstract

Objective: To investigate the effect of using periosteum amputation on wound closure during immediate implants.

Methods: 121 patients underwent immediate implants. The wound size of the soft tissue defect was measured. Labial-buccal periosteum amputation was employed in all patients with soft tissue defects to achieve tension-free wound closure.

Results: Mean soft tissue defect width was 8 ± 3 mm. Wound coverage success rate was 91%.

Conclusion: Periosteum amputation technique improves wound closure during immediate implants.

Keywords: Soft tissue; periosteum amputation; immediate implant; wound coverage

Background

Immediate implants have many advantages and are widely used in clinical practice. But it is difficult to achieve immediate implants with tension-free soft tissue wound closure. Wound tension may lead to closed soft tissue dehiscence, seriously affecting the success of the implant and potentially leading to implant failure. Reported use of different types of films covering the bone graft material still have soft tissue incomplete closure rates of 16%~32% [1-2]; such insufficient soft tissue coverage can lead to loss of bone graft material, seriously affecting bone augmentation. Therefore, in order to achieve tension-free wound closure during immediate implants, while also avoiding changes in mucogingival position, incremental processing of soft tissue must be done.

Cases and Methods

General data Cases were accepted in the Department of Implantology, Stomatology Center, Affiliated Haikou Hospital of Central South University Xiangya Medical School from October 2015 to December 2016, with an average age of 35 years (range 18 to 56 years old). The research was approved by our local institutional review board (Number: 2016-003).
Materials: OSSTEM TSIII implants (OSSTEM trading company, South Korea), Bicon (trading company, USA), Bio-Oss (Bone Geistlich Trading Co. Ltd., Switzerland).

1. Inclusion criteria
2. Teeth must be extracted or considered non-viable for treatment.
3. Normal occlusal relationship
4. Patient is able to maintain good oral hygiene and control periodontitis.
5. Exclusion criteria
6. Patients with contraindications (systemic disease or medical history that could negatively impact surgery and healing)
7. Acute or chronic inflammation of adjacent teeth
8. Patient declines periosteum amputation technique

Methods

Preoperative examination and diagnosis was conducted. The general condition of the teeth was examined, aesthetics risk was assessed, and oral health education was provided. Conventional CBCT was used to determine the correct three-dimensional position. A specific program was developed to enhance individually-tailored patient-centered communication. Informed consent was obtained preoperatively. See figure 1, 2.

The procedure was performed under local anesthesia, employing minimally invasive extraction and immediate implant after preoperative chlorhexidine gargle, conventional disinfectant sponges, and curette extraction of fossa granulation tissue. Position of the implant was in the middle of the socket, the buccal-lingual side of the alveolar ridge was bigger than 2 mm, method of preparation was crown to root, See Figure 3. Bio-Oss was used in the remaining gap between the labial-buccal or/and lingual bone plate. See Figure 4.

Preparation of labial-buccal flap: Full thickness flap was made, periosteum on labial-buccal flap was excised using a #15 blade and the flap was pulled until it could be connected tension-free to the palatal mucosa. See Figure 5. The implant was not submerged if initial stability was satisfactory (final torque greater than 35 N-cm). Otherwise submerged healing was employed. See Figure 6. Final soft tissue closure with suture, See Figure 7.
Figure 6: Non-submerged healing.

Figure 7: Suture.
Postoperative CT was used to confirm the position and direction of the implant. See Figure 8. The patient was asked to maintain oral hygiene, including chlorhexidine gargle for 1 week. Prophylactic antibiotics were used for 3 days, and oral pain-relievers as needed for 1 week postoperatively.

Figure 8: Postoperative CBCT.
Two stage operation after closed healing for 3 months. Cover screws or rubber plug was removed and replaced with the healing abutment.

- Permanent restoration: When bone formation showed good osseointegration after surgery, the final impression was done for permanent restoration.
- Efficacy evaluation
- Complete wound closure without tension;
- No soft tissue infection or necrosis. No dehiscence after healing.

Result

The buccal-lingual extraction width was 5-12 mm (average 8 mm). 110 wounds were well-approximated; 11 wounds had a 2-3 mm gap in the soft tissue.

Discussion

Soft tissue defects after immediate implants resulting from tooth extraction are commonly encountered by dentists. Wound coverage strategies have included local and regional pedicle flaps. Reconstruction of these defects is challenging [3]. In cases where timing of coverage is not an issue and additional tissue is required [4] or the flap becomes loose, and patients experience discomfort, mucosa grafting is the current standard of care for wound closure [5]. But the donor site becomes a second, often painful wound, which may take more time to heal than the graft site itself and carries with it risks of infection and scarring [6]. A clinical algorithm has been created (Figure 5) for soft tissue coverage of the wound that is based on the size and location of the defect which has helped us make safe yet rehabilitation-optimized flap choices [7]. Using a Z Tissue flap can increase the major axis by 75%. A mesh skin graft can increase the length of the skin flap two times [8]. In this study, a periosteum amputation technique was used to preserve the connective tissue flap [9], which has a stable blood supply, but also reduces damage to the bone plate. The flap covering the bone provides an enclosed environment for the reconstruction of bone tissue, playing a very good role as a barrier membrane. In addition, the stem cell repository of the periosteum contains a large number of periosteal cells with osteogenic potential for proliferation and differentiation, and a large number of stem cells and regulatory factors which not only provide a barrier film but also lead to good osteogenesis and bone induction. As a soft tissue flap with a pedicle [10], it has been used for soft tissue augmentation of the tooth area [11]. Immediate implants using a periosteum amputation technique can achieve tension free wound closure and increase the thickness of the keratinized gingiva, through its dual roles as a barrier membrane and promoting osteogenesis [12]. At our institution, a soft tissue flap with periosteum amputation technique has been utilized to achieve successful wound coverage. This study confirms that the periosteum amputation remains a well-suited technique for repairing soft tissue defects in immediate implants.
References


