Treatment of a peri-implant buccal bone dehiscence with the sub-periosteal peri-implant augmented layer (SPAL) technique

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Clinical evaluation/ Diagnosis

A systemically healthy, 65-year female patient presented for the fixed rehabilitation of an isolated edentulous, lower first molar site. The patient did not present any contraindication to oral surgery, in general, and implant surgery, in particular. Periodontal screening resulted in a diagnosis of gingivitis on a reduced periodontium in a non-periodontitis patient, in association with traumatic recessions. The tooth was extracted 18 months due to vertical root fracture. On bucco-lingual tomographic sections, bone height was 14.2 mm. However, a bone width of 4 mm was observed, thus limiting the possibility to place a 4-mm wide implant entirely in native bone. Therefore, horizontal bone augmentation was needed to restore proper transversal dimensions of the bone crest.

Treatment goals

Insufficient bone dimensions may lead to a deficiency of peri-implant tissues, thus calling for hard and/or soft tissues reconstructive procedures. The presence of a buccal bone dehiscence around implants has been shown to be associated with greater mucosal recession on the long-term and a greater risk of bleeding on probing when deeper than 1 mm [Schwarz et al. 2012]. The present case report illustrates a simplified soft tissue management technique, namely the sub-periosteal peri-implant augmented layer (SPAL) [Trombelli et al. 2018a,b]. SPAL represents a soft tissue management procedure aimed at increasing the horizontal and vertical dimensions of the sub-periosteal tissues at the most coronal portion of an implant presenting missing or thin buccal cortical bone plate (BCBP) at the time of implant placement. In this specific case, the treatment goal was to determine an increase in bone width to correct a buccal peri-implant bone dehiscence through the application of the SPAL technique.

Description of clinical/surgical procedures

A split-thickness buccal flap with two vertical releasing incisions was raised, thus separating the mucosal and periosteal layer. A crestal incision was performed to the bone crest, and the periosteal layer was elevated, thus creating a pocket that could accommodate an adequate volume of graft material. Immediately after the insertion of a 4-mm wide and 9.5-mm long implant with the polished collar slightly below the bone crest, a 2-mm deep bone dehiscence was observed at the buccal aspect. A healing cap was positioned. A bovine-derived xenograft (Bio-Oss spongiosa granules, particle size: 0.5-1 mm; Geistlich Biomaterials, Thiene, Italy) was used as a space-making device to fill the space between the periosteal layer and the exposed implant surface. The periosteal layer was sutured to the oral mucoperiosteal flap. The mucosal layer was coronally advanced and sutured tension-free to submerge both the graft and the implants. Sutures were removed at 2-weeks post- surgery.

Clinical outcomes

At 5 months following implant placement, the healing cap was partly exposed and the buccal keratinized tissue (KT) width was less than 1 mm. Surgical re-entry for implant uncovering was performed. The implant was stable and the rough surface was entirely submerged. At the buccal aspect, the subperiosteal tissue thickness at the most coronal portion of the implant was 2 mm. A healing abutment was positioned, and a buccal split-thickness flap was raised and apically positioned to allow for the placement of a free gingival graft at the most coronal portion of the implant. The implant was loaded at 7 months following implant placement. No radiographic signs of peri-implant bone loss were observed between implant insertion and 17-month follow-up from implant surgery. At the 17-month visit, peri-implant pocket depths were lower than 4 mm, no bleeding on probing or suppuration were detected upon probing, and KT was 4 mm.