Reconstruction and rehabilitation of a compromised single-tooth gap in the anterior maxilla with a moderately high smile line

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Straumann’s SLActive, launched in 2005, is an innovative, dental implant surface technology, that has clinically been proven to reduce healing times by half to just three to four weeks. The technology is said to minimise the stability dip in the critical early stage of healing and increase implant stability. The following reconstruction and rehabilitation of a compromised single-tooth gap in the anterior maxilla (moderately highly smile line) with the help of SLActive implants was performed by Dr Ken Tan and Dr Alvin Yeo from Singapore.

A 42-year-old male patient, who is a non-smoker with good general health, was referred to us for management of a localised, recurrent periodontitis on his upper right canine (tooth #13).

Pocket depths of 11 to 12 mm were recorded for the distal aspects of tooth #13 with initial signs of pulpal involvement. In addition, the tooth presented with a mobility of Class II. The tooth was deemed unsalvageable and indicated for extraction (Fig. 1). Radiographic examination revealed a localised, severe vertical (through-and-through) defect on the distal of the tooth (Fig. 2).

Three months after extraction, the missing gap site healed uneventfully but demonstrated a severe horizontal ridge defect (Figs. 3–4). A staged guided bone regeneration (GBR) approach utilising an autogenous block graft was indicated to augment the loss of horizontal alveolar ridge prior to the placement of a dental implant.

Radiographic examination of tooth #13 three months after extraction revealed relatively intact adjacent proximal bone with a slight loss detected at the mesial aspect of tooth #15 (Fig. 5).

Once anaesthesia was achieved, a mid-crestal incision was performed with vertical relieving incisions made at the mesial and distal line angles of teeth #12 and #15, respectively. A full thickness micro-periosteal flap was raised with all granulation tissue carefully removed. As expected, a distinct concavity was noted on the facial aspect of tooth #13 (Fig. 6).

An autogenous block graft (12 x 6 x 5 mm) was harvested from the patient’s lower right ramus region, and subsequently positioned and secured using a fixation mini-screw at the tooth #15 recipient site (Fig. 7).

This was followed by placement of additional autogenous bone chips and a demineralised bovine bone substitute for appropriate contour bone adaptation around the secured block graft (Fig. 8). Thereafter, a resorbable collagen membrane was placed over the newly augmented site (Fig. 9).

Prior to flap closure, a periosteal incision was made to ensure a tension-free flap. Wound margins were then re-approximated and closed with interrupted resorbable 5-0 and 6-0 Vicryl sutures (Fig. 10).

Six months after the GBR procedure, healing was without incident. The missing gap site at tooth #13 demonstrated favourable buccolingual ridge widths with good plaque control and healthy soft tissue (Fig. 11). Once anaesthesia was achieved, a mid-crestal incision was performed with only a vertical relieving incision made at the distal line angle of tooth #15. The newly augmented site at tooth #15 displayed excellent alveolar ridge form and integration with the surrounding host bone (Fig. 12).
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Upon the removal of the fixation miniscrew, the implant site preparation was performed with the aid of a surgical stent (Fig. 13). The implant bed was appropriately scalloped and subsequent drills were utilised (Fig. 14).

A Straumann Bone Level implant (Ø 4.1 mm, L 12 mm, SLActive) was selected and placed in the prepared implant osteotomy site. Correct 3-D position and primary stability were achieved (Figs. 15–17).

Primary closure of flaps was achieved using interrupted resorbable 5-0 Vicryl sutures (Fig. 17).

Following eight weeks of healing, a Stage II re-entry procedure was performed and a healing abutment replaced (Ø 6 mm, H 4 mm; Figs. 19–20). A provisional screw-retained crown was placed to allow appropriate healing of the peri-implant soft tissue for a period of three months (Figs. 21–22).

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Stable and healthy peri-implant tissues were observed following peri-implant soft tissue conditioning using a provisional crown restoration over the course of three months (Fig. 23). Thereafter, connection of the cast-gold customised abutment was performed (Fig. 24).

The final restoration, consisting of a customised cast-metal screw-retained abutment and a metal ceramic crown, was cemented. Favourable peri-implant soft tissue contours of the implant and the adjacent teeth were observed six months post-restoration (Figs. 25–28).

The periapical radiographs at six months post-restoration demonstrated stable bone levels around the bone level implant (Fig. 27). Despite the challenging, moderately high smile line, we were able to achieve a pleasing aesthetic result. Overall, the patient was most satisfied with the outcome (Fig. 28).