Short term clinical comparison of Trausim implant applied in 1 subject with dentition defect

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Data of medical history

Patient Ms. GUAN, 65 years old, female. Main complaint: right dentition defect for several years, implant restoration was needed. No history of removable denture restoration. Past history: history of anemia (due to hemorrhoids), hemoglobin value 17pg. History of diseases in other system denied, family genetic history denied, history of allergy denied.

Examination of oral cavity

Extraoral examination: symmetric face, basically normal height of one third of inferior face. Normal oral opening degree and type.

Intraoral examination: good oral hygiene. No obvious red swelling or fistula in intraoral gingiva. Mild periodontal atrophy. Obvious abrasion of dental enamel in mouth. Tight occlusion. 15, 41, 46 missed, 15 with reduced gap, about 5mm, 46 with a gap of about 10mm. 36, elongated by about 1mm. 47, oblique near central part, degree 2 tooth mobility. 41, basically disappeared gap (Fig. 1).

Imaging examination: most dental periphery of the whole mouth showed mild to moderate horizontal absorption, site 47 showed obvious vertical absorption at near central part, with shadow reached apical area (Fig. 2).

Fig. 1: Intraoral picture at the first visit

Therapeutic plan

1. Analysis

The patient wanted to repair using fixed denture. However, considering the economic factor, the patient agreed to have Trausim implant to support fixed denture for restoration.

2. 47, advanced periodontal disease, extracted

Inferior alveolar bone had no sufficient available height, osteoinductive hyperplasia was firstly performed after extraction, then implantation was performed selectively.

Plan

(1) Complete periodontal basic treatment

(2) 15 and 46 implantation + restoration for the first phase treatment to try to recover occlusal function on the right.

(3) Perform PRF+GBR immediately after extracting 47, and perform implantation 9 months after operation.

(4) Available bone width and height were displayed in the picture. Adjacent tooth would be slice cut at 15 to implant Trausim Φ3.3*10mm bone horizontal implant. For the availability of implant, after communicated with the patient, DIO SM-Submerged Φ4.1*8mm bone horizontal implant was implanted at 46.

Fig. 2: Preoperative panorama and screenshot of maxillofacial section at implant site.

Implantation and repair

(1) Draw 10ml of blood from elbow vein, centrifuge to prepare PRF membrane.

(2) Perform local Bilan infiltration anesthesia, cut on the alveolar bone crest in a transverse line in near, central and distal parts of 15, turn over the flap, scrape alveolar bone, prepare the hole gradually, implant Trausim Φ3.3*10mm bone horizontal implant with a torque of 35Ncm, the margin of implant was 0.5mm below the bone margin. Screw in the healing abutment and suture the incision.

(3) Perform local Bilan infiltration anesthesia, extract 47, cut transversely at 1mm from distal and central part of 45, cut on the alveolar bone crest in near, central and distal parts, turn over the flap, prepare the hole gradually at 47, flush the tooth socket, implant DIO SM-Submerged Φ4.1*8mm bone horizontal implant with a torque of 40Ncm, screw in the sealing screw, the margin of implant was 0.5mm below the bone margin. Clean the tooth socket of 47, implant artificial bone powder, cover PRF membrane, and close the wound (Figs. 3 and 4).

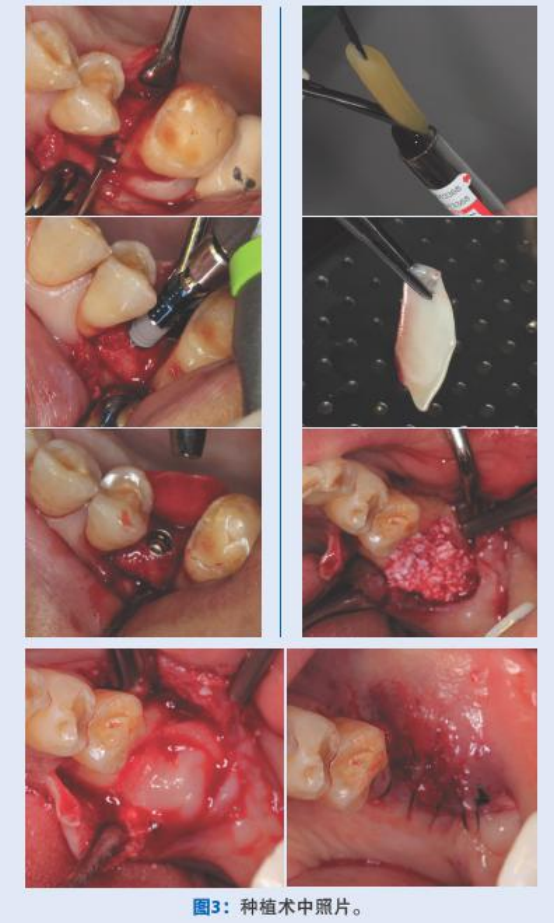

图3：种植术中照片。

Fig. 3: Picture taken during implantation.

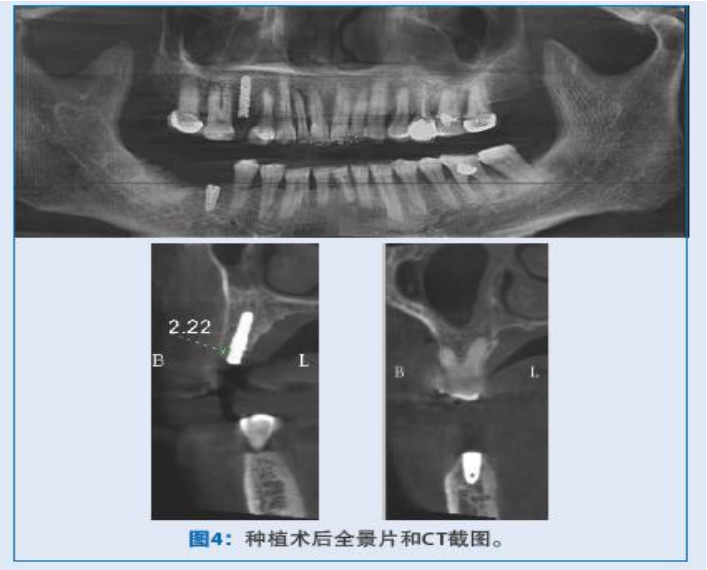

图4：种植术后全景片和CT截图。

Fig. 4: Panoramic radiograph and CT screenshot after implantation.

(4) Reexamine 3 months later, imaging findings showed good bone union, 15, mandibular neck bone level of implant was lowered to cervical margin level, buccal bone level was located at 1.37mm from neck margin of implant. Buccal bone level of implant at 46 was lowered by 1.58mm, lingual bone level was lowered by 1.13mm. Implants at 15 and 46 showed good stability, so second phase surgery was performed to respectively screw in healing abutments (Fig. 5).

Fig. 5: CT at reexamination 3 months after implantation.

(5) Four months later, impress, and restore with the all ceramic crown. Retain with screw, and retain the abutment with a torque of 35Ncm. Take the panoramic radiograph, restoration abutment was completely in place, and it was found that the neck of implant at 46 further had bone absorption (Fig. 6).

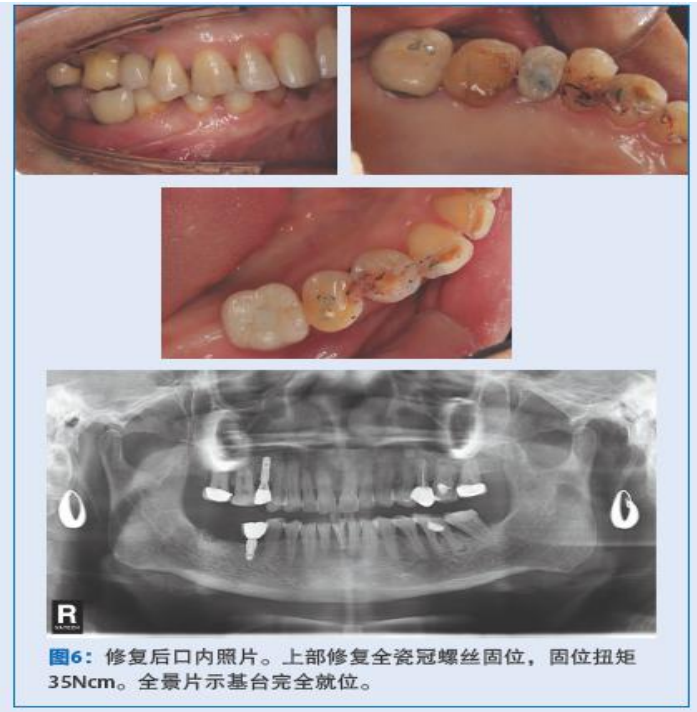

Fig. 6: Intraoral picture after restoration. Retain the all ceramic crown for restoration with a screw, with a fix torque of 35Ncm. The panoramic radiograph showed the abutment was completely in place.

(6) Reexamine 1 year after restoration, the implant was stable, the prosthesis was not loosened, gingiva showed no red swelling (Fig. 7). Imaging findings showed buccal bone level at 15 was 0.93mm from neck margin of implant, mandibular bone level showed no obvious reduction. Buccal bone level of implant at 46 was lowered by 3.6mm, lingual bone level was lowered by 2.03mm (Fig. 8).

Fig. 7: Intraoral picture 1 year after restoration.

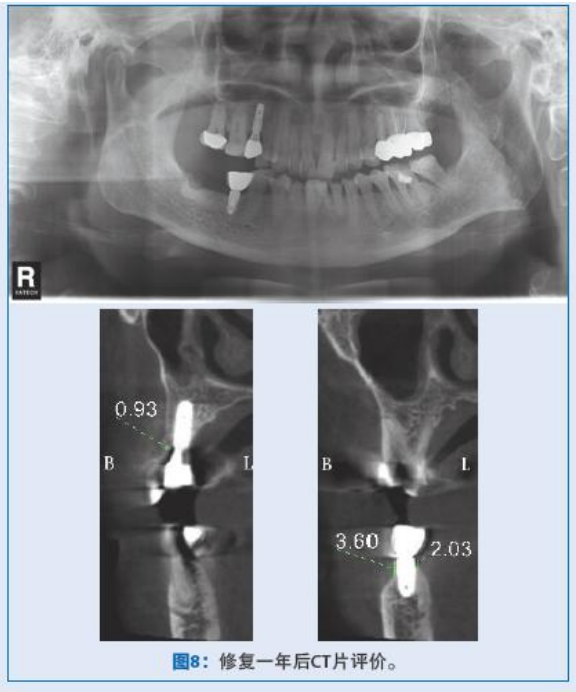

Fig. 8: Assessment by CT 1 year after restoration.

Discussion

1. Bone union is an important sign of successful implantation, and the prerequisite for the occlusal function of implant. By referring to the assessment criteria for successful implantation proposed by Albrektsson et al. in 1986[1], Trausim and DIO SM show good union rate of bone - implant during implanting and healing phases, realizing the targets for successful implantation and implementing occlusal functions.

2. The factors affecting the successful early bone union include initial stability, surface properties and shape of implant, etc.[2, 3] In this subject, 2 implants showed good initial stability, and bone absorption around the implant before restoration was related with the property of implant surface. After the implant with SLA surface treated was implanted into the bone, bone would direct contact the implant [4]. Trausim implant adopts MPS for surface treatment similar to SLA surface treatment, promotes adhesion and growth of osteoblasts by changing surface structure and element distribution of the implant, and can provide good guarantee for bone-implant union rate and initial stability [5].

3. It is believed that 6% of implants fail within 1 year after implantation, and 10% of implants fail in 10 years after implantation [6]. Most studies believe that there is about 1-1.5mm marginal bone loss within 1 year after restoration, and then 0.2mm in each year thereafter [7], and this is the criterion for successful implantation. In this subject, the marginal bone loss is about 1.2mm around Trausim implant, and 2.8mm around DIO SM-Submerged implant. Trausim implant adopts the design of 15°bionic biological thread to effectively guarantee the initial stability of implant, meanwhile disperses the loading stress into tooth socket after the superior structure is restored using the implant, thus effective reduce marginal bone loss. Trausim implant abutment adopts Moire taper design to provide high strength mechanical

locking force, which can effectively reduce the implant-abutment gap and final motion, thus obviously reduce marginal bone loss [8].

4. Bite force is an important factor affecting the successful rate of implant, chewing and excessive load would result in bone absorption around the implant [9]. In this subject, implants are distributed to the second premolar in dentition and the first molar at the free end, and greater bite force at 46 implant should be the reason for higher bone absorption.

Conclusion

Based on clinical observation of this subject, Trausim implant applied in repairing dentition defect can produce better bone union and implant survival, however further study on more subjects and validation by long term clinical observation are needed.

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Brief introduction of author

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Graduated from Anhui Medical University as an undergraduate, has been employed as the director of department of stomatology in a public tertiary 3 hospital. Studied Dental Implantology in Kyushu University and obtained doctoral degree. A member of Japanese Society of Repair, Japan Implanting Society, USA AO Society, national chief inspector of Dental Implantology of Kowa Dental. Worked in a famous Japanese dental hospital for many years, and had education and working experiences in China and at abroad for nearly 10 years. Published many papers in SCI listed and domestic core journals.