

REPLACEMENT OF AN UPPER CENTRAL INCISOR WITH HIGH ESTHETIC EXPECTATIONS

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Initial situation

The patient had a bicycle accident when he was 8 years old. Tooth 21 (ADA: 9) was subluxated and the root was fractured. There was a loss of vitality of teeth 11 (ADA: 8) and 21 and endodontic treatments were performed at the time.

Tooth 21 had recently become painful and the patient consulted with his generalist dentist who referred the patient to me in order to treat the pain as well as to address the esthetic issue of the upper central incisors. The patient is now 20 years old, in good general health and under no medical treatment. He smokes 5 to 10 cigarettes a day. The brown/grey coloration of teeth 11 and 21 is clearly visible (Fig. 1).

The X-ray shows the horizontal fracture of tooth 21, which will be extracted, and periapical radio transparency.

Procedure

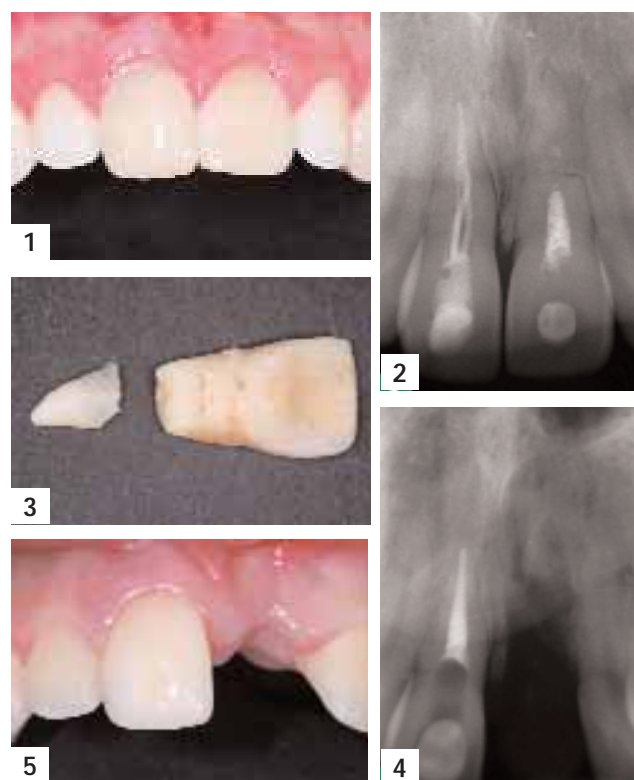
After consulting with the patient, we decided to carry out an internal whitening of tooth 11 and to place an implant and a crown in the place of tooth 21 instead of a bridge on teeth 11 to 22. This treatment option was selected mainly because it would be highly respectful of the dental tissue (Fig. 2). Tooth 21 was extracted without a buccal flap in order to preserve as much of the buccal bone wall as possible (Fig. 3).

An X-ray five weeks after extraction shows the socket of tooth 21. The endodontic treatment of tooth 11 was resumed. The intracoronary cavity is visible. It will serve as a reservoir for the internal whitening (sodium perborate and H₂O₂ at 30 %) (Fig. 4).

Six weeks after the extraction of tooth 21, the excellent healing of the soft tissue is obvious and allows us to proceed with the surgical phase of the treatment which consists in the insertion of an implant in position 21 (Fig. 5). The "esthetic risk factor" chart¹ allows us to anticipate the challenges we will face during the treatment.

A loss of buccal volume is visible from the occlusal view (Fig. 6).

The socket of tooth 21 under the mucoperiosteal flap. A



slight palatal bone loss is visible. This loss is due to the osteotomy which occurred during the extraction of tooth 21 (Fig. 7). After the drilling, a Straumann® Standard Plus Implant (Ø 4.1mm, 12 mm, SLActive) is carefully inserted in the socket (Fig. 8).

After confirming the existence of a primary stability, the implant neck position is checked (Fig. 9).

Straumann® BoneCeramic 400– 700 µm mixed with autogenous bone chips was used for the bone reconstruction. Straumann® BoneCeramic is a biphasic calcium phosphate composed of hydroxyapatite and -tricalcium phosphate and combines the advantages of both of these elements. The advantages are pureness (due to the synthetic origin), and optimized resorption characteristics allowing stabilization of the newly formed bone and substitution of the material with bone (Fig. 10).

A double layer of resorbable collagen membrane was used to

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Table 1: Esthetic risk assessment for edentulous sites.

Esthetic Risk Factors	Low	Medium	High
Medical status	Healthy patient and intact immune system		Reduced immune system
Smoking habit	Non-smoker	Light smoker (< 10 cig/d)	Heavy smoker (> 10 cig/d)
Patient's esthetic expectation	Low	Medium	High
Lip line	Low	Medium	High
Gingival biotype	Low-scalloped, thick	Medium scalloped, medium-thick	High scalloped, thin
Shape of tooth crown	Rectangular		Triangular
Infection at implant site	None	Chronic	Acute
Bone level at adjacent teeth	≤5 mm to contact point	5.5–6.5 mm to contact point	≥7mm to contact point
Restorative status of neighboring teeth	Virgin		Restored
Width of edentulous span	1 tooth (≥7mm) ² 1 tooth (≥5.5mm) ³	1 tooth (< 7mm) ² 1 tooth (< 5.5mm) ³	2 teeth or more
Soft-tissue anatomy	Intact soft tissue		Soft-tissue defects
Bone anatomy of alveolar crest	Alveolar crest without bone deficiency	Horizontal bone deficiency	Vertical bone deficiency

¹ Martin W, Morton D, Buser D: Pre-operative Analysis and Prosthetic Treatment Planning in Esthetic Implant Dentistry. From: ITI Treatment Guide, Vol. I, Quintessenz Publishing Co. Ltd., 2007.
² Straumann® Standard Plus Implants, Regular Neck
³ Straumann® Standard Plus Implants, Narrow Neck

stabilize the bone reconstruction (Fig. 11).

The wound was sutured without tension. A submerged technique was used, covering the neck and the cap of the implant (Fig. 12).

This X-ray shows the implant in position 21 as well as the bone reconstruction (Fig. 13).

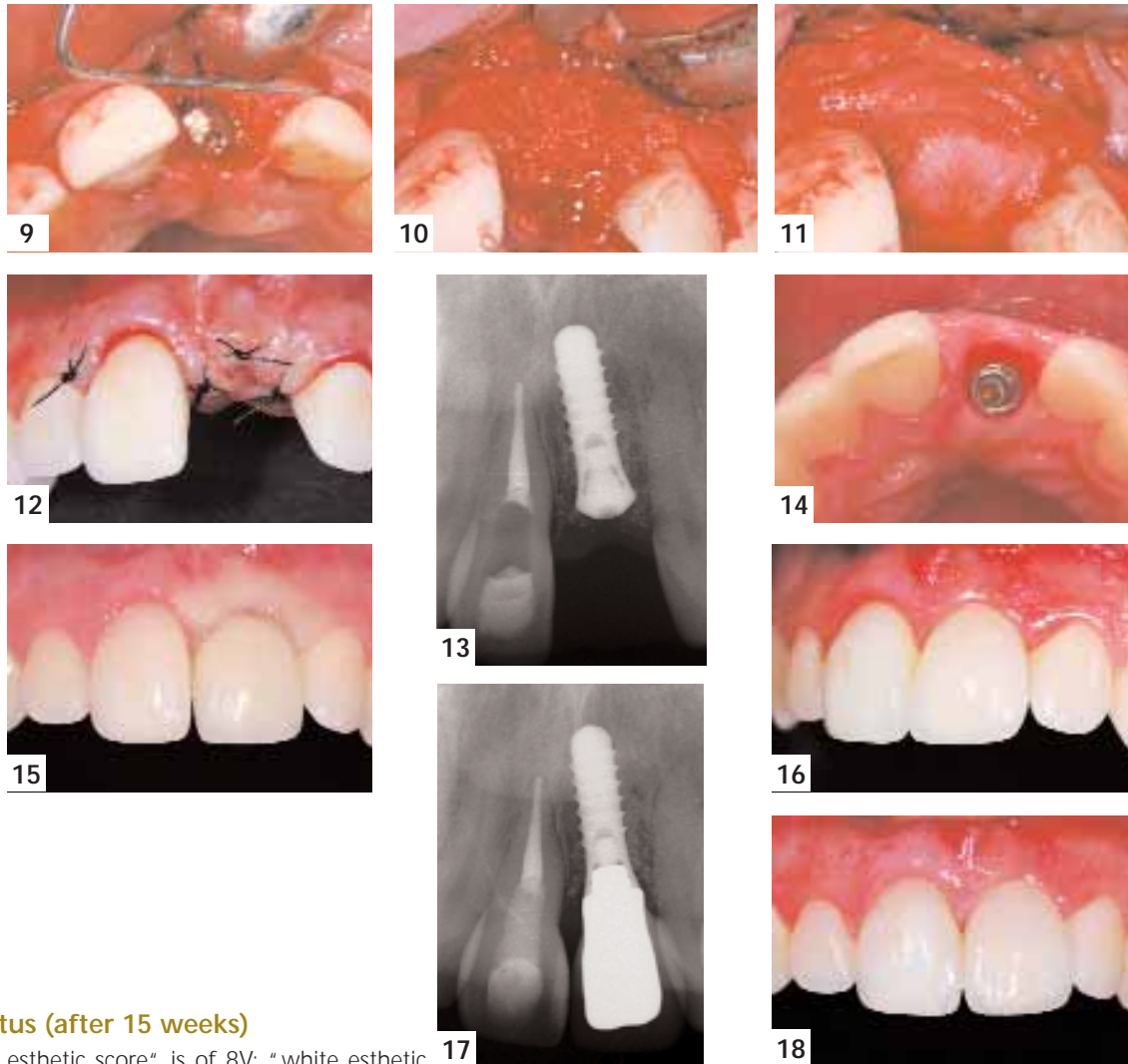
Eight weeks after the insertion, the buccal contour is re-established and the implant is ready to be provided with a temporary crown in order to shape the gum (Fig. 14).

A Straumann RN synOcta® Post for Temporary Restorations (for crowns) was incorporated into a screw-retained provisional

crown. For the molding of the gum, the temporary crown is purposely oversized at the buccal level. The result is a temporary ischemia of the gum with its characteristic white colour. At this stage of the diagnosis it is obvious that tooth 11 is too narrow compared to the neighbouring space (Fig. 15).

Final status showing the adaptation of the crown to the surrounding soft tissue 15 weeks after implantation. The mesial part of tooth 11 has been filled with composite (Fig. 16).

The X-ray shows the good adaptation of the crown to the implant neck. The mesial composite band on tooth 11 is also visible (Fig. 17).



Final status (after 15 weeks)

The “pink esthetic score” is of 8V; “white esthetic score” is of 8. Therefore, the final result can be qualified as very good (Fig. 18).

The evaluation tables for implant results separate the clinical results into 2 factors: on the one hand there is the implant and the soft tissue (pink esthetic score) and on the other hand there is the suprastructure, i.e. the crown itself (white esthetic score). The number in parenthesis is the maximum score possible for each element.

A total of 10 points would be an excellent result while 6 points would be an acceptable result. These new evaluation criteria were presented at the ITI World Symposium 2007 in New York by Professor Urs Belser and are in the process of being published.⁴

⁴ Belser U, Grütter L, Schmid B, Weber HP, Buser D: Early implant placement of single teeth in the esthetic zone: A cross-sectional study in 45 patients with a 2–4 year follow-up. Part II: Outcome evaluation using objective esthetic parameters (PES/WES). (Unpublished data)

Table 2: Evaluation tables for implant results.

Pink esthetic score		
1	Mesial papilla	2 (2)
2	Distal papilla	1 (2)
3	Level labial mucosa	2 (2)
4	Curvature labial mucosa	2 (2)
5	Root “convexity”	1 (1)
6	Colour/texture of the soft tissue	V(1)
Score		8V (10)

White esthetic score		
1	Tooth form/outline/volume	3 (4)
2	Translucency/characterisation	2 (2)
3	Surface texture	2 (2)
4	Colour (hue/value)	1 (2)
Score		8 (10)