



# Immediate Provisionalization of Single-tooth Implants: A Treatment Option in the Anterior Maxilla

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According to the Branemark protocol, a stress free healing period is one of the most emphasized requirements for implant integration. Recent experimental (Plattely et al. 1997) and clinical (Wöhrlé et al. 1998, Ericsson et al. 2000) results have encouraged a progressive shortening of the healing period for single-tooth implants and immediate loading has been proposed for the esthetic zone in the maxilla. The hypothesis of this clinical study was that the clinical outcome of immediately loaded unsplit

## Materials and Methods

In the course of an ongoing study (Lorenzoni et al. 2003) 17 patients have been treated following an immediate loading protocol so far. Dental scans, panoramic and periapical radiographs were evaluated for alveolar height and width, residual bone beyond the apex, buccal socket wall and root angulation. The stepped-screw type implants were inserted with a step-by-step increasing torque up to 45 Ncm (Torque-Control, Nobel-Biocare) thus estimating mechanical bone quality and primary stability of the implants. All implants were immediately restored with acrylic resin provisional crowns and the patients provided with occlusal splints. Regular controls were performed after 2, 4, 6, 8, 10, 12, 16 and 20 weeks. After a healing period of six months impressions were carried out and the final restorations fabricated (table). Clinical stability (Periotest), radiographic coronal bone defects (CBD) and survival rate were evaluated at delivery of the definitive superstructures (CBD 6), 6 months later (CBD 12) and 18 months (CBD 18) post implant insertion. (Fig. 1-12, 13-24).

## Discussion and Conclusion

This investigation involves a method of placing implants into immediate function at first-stage surgery and restoring the patient with an implant retained provisional prosthesis. The advantages of this 1-stage procedure are obvious and include immediate function and esthetics. Second-stage surgery is eliminated and adjacent papillae are well preserved, contributing to the final esthetic result (Chausu et al. 2001). The presented radiographic 18-months results showed a very favorable bone adaptation with a mean coronal bone loss equal to or even lower than reported for implants placed according to a submerged protocol. The excellent soft tissue conditions are likely related to the observed bone maintenance (Cooper et al. 2001). In accordance with other authors (Wöhrlé 1998) we suggest immediate provisionalization only in case of optimal primary stability > 32 Ncm. In this patient population, the potential for micromovement was minimized by avoiding any centric and eccentric contacts and providing occlusal splints for a minimum of 8 weeks. Implant placement immediately following tooth extraction did not increase the risk of implant failure in our patients and is therefore recommended in order to prevent horizontal bone atrophy following tooth extraction. Within the limits of the present study the preliminary data indicate that immediate loading of single-tooth implants in the anterior maxilla can result in successful implant integration and stable peri-implant conditions up to 18 months. Future studies will have to evaluate long-term data of immediate restorations on implants and possible applications of this technique in situations where problems of poor bone quality, multiple implants or augmentation procedures must be overcome.

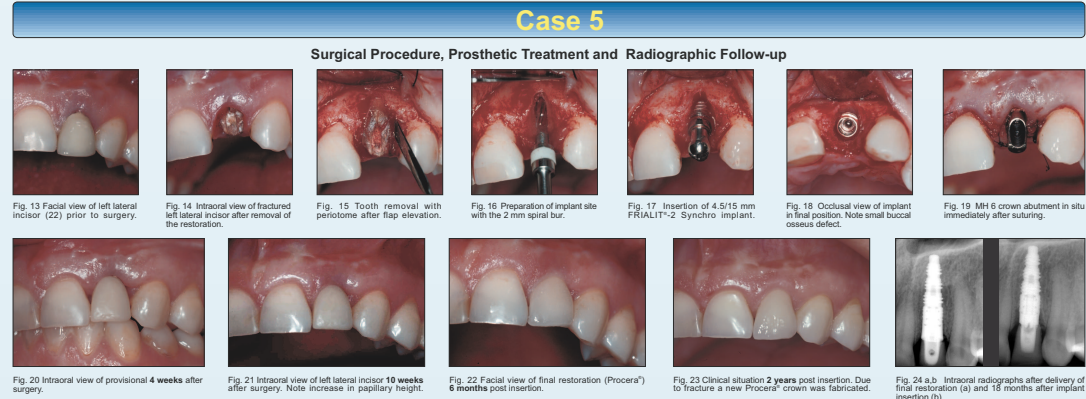
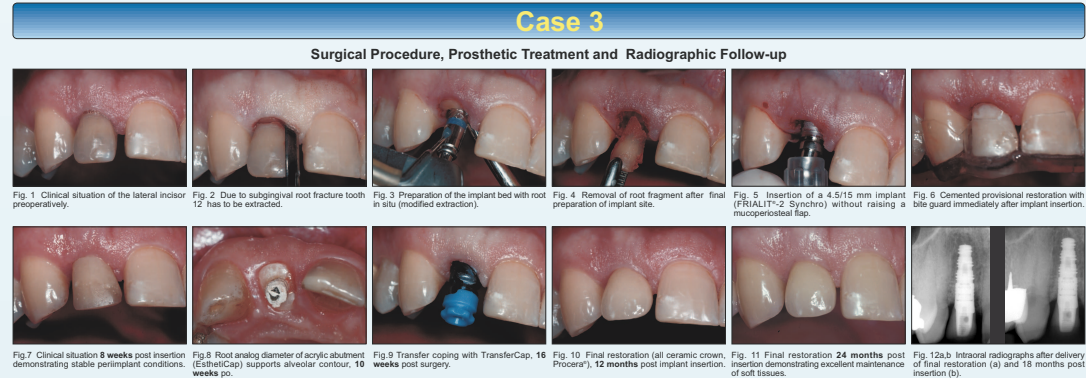
FRILIT®-2 Synchro stepped screw implants in the maxillary incisal region could be a predictable treatment approach, clinically comparably successful to submerged maxillary anterior single-tooth implants placed according to a standard protocol. The outcome measures were based on survival, clinical stability and on changes of radiographic coronal bone level from implant placement up to 18 months after insertion.

## Results

For a total of 24 FRILIT®-2 Synchro stepped screws placed in the incisal maxillary region (position 12, 11, 21 and 22), diameters of 3.8, 4.5 and 5.5 mm and 13 and 15 mm length were applied. Fourteen implants were placed as immediate implants, 10 implants as delayed immediate implants 8 weeks post tooth extraction. The median Periotest value 6 months post insertion was -2 with a minimum of -05 and a maximum of +02 for the immediately loaded implants. **Survival, Complications:** After a mean observation time of 21 months (SD ± 7.19) 23 implants were successfully integrated and functioning well. One implant failed 6 weeks post insertion resulting in a 96 % survival rate. Complications included loosening and recementation of the provisional or definitive single-tooth crowns as well as local treatment of periimplant mucositis. Two implants demonstrated buccal recession after 12 months. **Radiographic Evaluation:** Median coronal bone defect (CBD) for all implants (n=24), was 0.32 mm (SD ± 0.51) after 6 months ranging from 0 to 2 mm (Table 1). At the 12-month follow-up mean radiographic bone resorption amounted to 0.7 mm (SD ± 0.52), the respective 18-month value (n=17) was 0.75 mm (SD ± 0.35).

patient	tooth	reason	implant	insertion	incision	avulsion	complications	restoration	mean CBD 6	mean Periotest	mean CBD 12	mean CBD 18
M.H.	12	#	4.5/15	immediate	+	32	decontamination	Procera	0.5	-2	0.5	0.5
M.M.	12	avulsion	4.5/15	immediate	+	29		Procera	0	-1	1	1
F.W.	12	#	4.5/13	immediate	+	29		Procera	0	-1	1	1.5
S.R.	21	perio	5.5/13	immediate	+	28	recession	Procera	1	-2	1	1.5
S.U.	22	#	4.5/15	immediate	+	27	coron #	Procera	0	-3	0.5	1
U.G.	12	perio	3.8/15	delayed	+	29		ceramometal	2	01	2	2
U.G.	11	perio	3.8/15	delayed	+	29		ceramometal	1	02	1	1.5
U.G.	21	perio	3.8/15	delayed	+	29		ceramometal	0	-3	0.5	1.5
U.G.	22	perio	3.8/15	delayed	+	29		ceramometal	0	-1	0.5	1
P.E.	21	#	5.5/13	delayed	+	26	mucositis	Empress2	0	-3	0	0
W.L.	22	#	3.8/15	immediate	+	24		ceramometal	0	-4	0	0
W.E.	11	endo	5.5/15	immediate	+	23		Procera	0	-5	0.5	1
K.H.	21	endo	5.5/13	immediate	+	22	recession	ceramometal	0	-4	0.5	1
P.S.	21	avulsion	5.5/13	delayed	+	18	mucositis	Empress2	0	-3	0	0
F.M.	21	avulsion	5.5/13	delayed	+	18		ceramometal	0	-3	1	1
M.M.	11	endo	5.5/13	immediate	+	18		ceramometal	0.5	-2	1.5	1.5
P.C.	22	#	4.5/15	immediate	+	18		ceramometal	0	-4	0.5	1
D.G.	11	#	5.5/13	immediate	+	12		ceramometal	0	-3	0.75	0
D.G.	21	#	5.5/13	immediate	+	12		ceramometal	0	-3	0	0
C.R.	12	endo	4.5/15	delayed	+	12		ceramometal	0.5	-2	0.5	0.5
C.R.	22	#	3.8/15	delayed	+	12		ceramometal	0.5	-2	0.5	0.5
N.M.	21	endo	5.5/13	immediate	+	12		Procera	0	-3	1	1
W.M.	12	explant	3.8/15	immediate	+	12		ceramometal	0.5	-2	1.5	0.75
						21.74			0.32	-2	0.70	0.75
						7.19			0.51	-0.52	0.52	0.35

Table 1 Description of clinical parameters of implants included in the present study (n=24); CBD=radiographic coronal bone defect (mm) after 6, 12 and 18 months; observation period in months.



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