

Supplementary Table 1. Summary of the Included Articles

Study	Design	Patients		Implants				Surgical phase*						Mucosal level (mm) [†]		Main conclusions
		n (M/F)	Age (years)	Test (n)	Control (n)	Follow-up (months)	Location	1	2	3	4	5	6	Test	Control	
Schwartz-Arad & Chausu (1998) ⁵³	CS	9 (0/9)	21 to 58	IIP (9)	None	7	All anterior maxilla	No	No	Yes	Yes	No	No	Minimal	NA	IIP in the anterior maxilla could be successful even without primary closure.
Groisman et al. (2003) ⁵⁴	CS	92 (?)	?	IIP (85)	None	12	All anterior maxilla	Yes	No	Yes	Yes	No	Yes	≥2 in 3 sites	NA	IIP with immediately provisionalized single implants did not present adverse effects with regard to osseointegration.
Kan et al. (2003) ⁶ [(2011) ⁷]	CS	35 (?)	18 to 65	IIP (35) [35]	None	12 [96]	All anterior maxilla	No	No	Yes	No	No	Yes	-0.55 (0.53) [-1.13 (0.87)]	NA	Peri-implant tissue responses and esthetic outcomes could be achieved with IIP and immediate provisionalization.
Covani et al. (2004) ⁵⁵	CS	15 (9/6)	31 to 54	IIP (15)	None	12	5 anterior maxilla; 5 premolar maxilla; 1 anterior mandible; 4 premolar mandible	No	No	Yes	No	No	No	-0.03 [‡]	NA	Soft-tissue anatomy after IIP was considered clinically satisfactory for all patients.
Cornelini et al. (2005) ⁵⁶	CS	22 (7/15)	39 [§]	IIP (22)	None	12	9 anterior; 13 premolar	No	No	No	No	No	Yes	Minimal	NA	Stability of soft tissues made IIP a predictable treatment.
Barone et al. (2006) ⁵⁷	CS	18 (6/12)	22 to 60	IIP (18)	None	12	5 anterior maxilla; 8 premolar maxilla; 2 anterior mandible; 3 premolar mandible	No	No	Yes	No	No	Yes	-0.4 [‡]	NA	IIP with flapless intervention maintained the preexisting architecture of soft and hard tissues.
Lindeboom et al. (2006) ⁵⁸	RCT	48 (17/31)	19 to 78	IIP + immediate loading (23)	IIP + immediate non-occlusal loading (22)	12	26 anterior maxilla; 19 premolar maxilla	No	No	No	No	No	Yes	No recession	0 to -1 in 2 sites	No SSD was found in gingival esthetics between test and control group.
Canullo and Rasperini (2007) ⁵⁹	CS	9 [¶] (2/7)	33 to 69	IIP + platform switching (10)	None	22	4 anterior maxilla; 6 premolar maxilla	No	Yes	Yes	Yes	No	Yes	0.2 (0.42) [¶]	NA	IIP with platform switching could provide peri-implant soft-tissue and papilla preservation.
Chen et al. (2007) ²	RCT	30 (10/20)	45.2 (10.1) [¶]	T1: IIP + BG (10) in 3 sites; T2: IIP + BG + RM (10)	IIP (10)	6	All anterior or premolar maxilla	Yes, <i>P</i> = 0.045	No	No	Yes, <i>P</i> >0.05	No	No	-1 to -3	-1 to -3	MR was significantly associated with buccally positioned implants.
Covani et al. (2007) ⁶⁰	CS	10 (5/5)	42 to 55	IIP + CTG (10)	None	12	3 anterior maxilla; 4 premolar maxilla; 2 anterior mandible; 1 premolar mandible	No	No	Yes	No	Yes	No	2.8 [‡]	NA	One-stage CTG technique improved quality of soft tissues.
Juodzbals and Wang (2007) ⁶¹	CS	12 [¶] (8/4)	18 to 49	IIP + BG ± CTG (14)	None	12	All anterior maxilla	No	No	No	Yes	Yes if needed	No	-1 to -2 in 3 cases (21.4%)	NA	Extraction sockets with compromised soft tissues could be successfully corrected using guided bone regeneration and CTG.

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		n (M/F)	Age (years)	Test (n)	Control (n)	Follow-up (months)	Location	1	2	3	4	5	6	Test	Control	
Kan et al. (2007) ⁸	CCS	23 (?)	25 to 63	IIP + BG (23)	None	12	All anterior maxilla	No	No	Yes in 8 sites, $P > 0.05$	Yes	Yes in 11 sites, $P > 0.05$	Yes	≥ -1.5 in 8 sites	NA	No benefit was shown with flapless or CTG procedures.
Cornelini et al. (2008) ⁶²	CCS	34 (19/15)	21 to 62	IIP + CTG (17)	IIP (17)	12	13 anterior; 21 premolar	No	No	No	No	Yes in test sites	Yes	3.2 from platform	2.1 from platform	The stability of peri-implant soft tissue might be improved with the use of a CTG.
De Rouck et al. (2008) ⁷ / Cosyn et al. (2011) ⁶⁸	CH/CS	30/25 (14/16)	24 to 76	IIP (28/25)	None	12/26	21 anterior maxilla; 9 premolar maxilla	Yes	No	No	Yes	No	Yes	-0.53 (0.76)/ -0.34 (0.80) [‡]	NA	IIP with flap elevation, gap fill, and screw-retained provisional restoration could be considered a valuable treatment option.
Evans and Chen (2008) ¹¹	CS	42 (17/25)	47.9 (12.8) [§]	IIP (42)	None	18.9 (11)	37 anterior maxilla; 4 premolar maxilla; 1 premolar mandible	Yes, $P < 0.001$	No	No	No	No	Yes, removable	-0.9 (0.79) [§]	NA	Implants with buccal shoulder position showed three times more MR than implants with lingual shoulder position.
Palattella et al. (2008) ⁶³	RCT	16 (6/10)	21 to 49	IIP + immediately restored (9)	CIP + immediately restored (9)	24	All anterior maxilla	No	No	No	No	No	Yes	-0.8 (0.7) [§]	-0.6 (0.6)	No SSD was found in any soft-tissue parameter between test and control groups.
Block et al. (2009) ³²	CCS	55 (24/31)	21 to 65	IIP + immediately restored (26)	CIP + delayed restored (29)	24	25 anterior maxilla; 30 premolar maxilla	No	No	Yes in half of sites, $P > 0.05$	No	No	Yes, $P < 0.05$	Test 1 mm less MR than control		Immediately restored group preserved 1 mm more facial gingival margin than delayed restored group.
Canullo et al. (2009) ⁶⁴	RCT	22 (13/9)	32 to 76	IIP + platform switching (11)	IIP + internal connection (11)	25	6 anterior maxilla; 16 premolar maxilla	No	Yes, $P < 0.005$	Yes	Yes, $P > 0.05$	No	Yes	0.18 (0.46) [§]	-0.45 (0.27) [§]	IIP using platform switching implants could provide peri-implant tissue stability.
Chen et al. (2009) ³	CS	85 (32/53)	17.6 to 72.2	IIP + flapless (85)	None	12	All anterior maxilla	Yes, $P = 0.009$	No	Yes	No	Yes in 36 sites, $P = 0.096$	Yes in 28 sites, removable, $P > 0.05$	-4.6% (6.6%), versus baseline	NA	IIP without flaps was associated with MR that might result in clinically undetectable change.
Kan et al. (2009) ³⁰	CS	20 (6/14)	28 to 71	IIP + CTG (20)	None	25.8	All anterior maxilla	No	No	No	Yes	Yes	Yes	0.13 (0.61) [§]	NA	Facial gingival level could be maintained after CTG with IIP, regardless of gingival biotype.
De Rouck et al. (2009) ⁵	RCT	49 (23/26)	53.5 (12.5) [§]	IIP + immediately restored (24)	IIP + delayed restored (25)	12	32 anterior maxilla; 17 premolar maxilla	No	No	No	Yes	No	Yes, $P = 0.005$	-0.41 (0.75)	-1.16 (0.66) [§]	IIP should be instantly provisionalized in the interest of optimal midfacial esthetics.
Redemagni et al. (2009) ⁶⁵	CS	28 (13/15)	21 to 76	IIP + CTG (33)	None	20.4	11 anterior maxilla; 16 premolar maxilla; 2 anterior mandible; 4 premolar mandible	No	No	Yes	Yes	Yes in sites with thin biotype	Yes	0, range -0.5 to 1	NA	Recorded sites of this study showed buccal soft-tissue stability after IIP and very little recession.
Crespi et al. (2010) ¹³	CCS	29 (18/11)	25 to 67	IIP + KM ≥ 2 mm (125)	IIP + KM < 2 mm (39)	48	77 anterior maxilla; 55 posterior maxilla; 19 anterior mandible; 13 premolar mandible	No	No	Yes	No	No	Yes	-0.24 (0.16) [§]	-1.30 (0.80) [§]	Less wide KM was significantly associated with more gingival recession.

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		n (M/F)	Age (years)	Test (n)	Control (n)	Follow-up (months)	Location	1	2	3	4	5	6	Test	Control	
van Kesteren et al. (2010) ⁶⁶	RCT	24 [‡] (?)	28 to 76	IIP (13)	CIP (13)	6	9 anterior maxilla; 12 premolar maxilla; 5 premolar mandible	No	No	No	Yes	No	No	-0.05	-0.28	For MR, there was no significant difference between IIP and CIP ($P = 0.157$).
Chung et al. (2011) ⁶⁷	CS	10 (6/4)	22.7 to 67.1	IIP + platform switching + CTG (9)	None	12	8 anterior maxilla; 1 premolar maxilla; 1 premolar mandible	No	Yes	No	Yes	Yes, mucosal level gained in 7 cases	Yes	-0.05	NA	Peri-implant tissue response of platform-switched implants could be achieved following IIP in conjunction with subepithelial CTG.
Koh et al. (2011) ¹⁰	RCT	20 (12/8)	21 to 73	IIP, subcrestal placement (10)	IIP, crestal placement (10)	12	6 anterior; 14 premolar	No	No	Yes	Yes	No	No	0.4 (0.4) [§] from 6 to 12 months follow-up	0.3 (0.4) [§] from 6 to 12 months follow-up	No SSD was found among groups at any time for changes of mucosal level or papilla height.
Pieri et al. (2011) ⁶⁹	RCT	38 (14/24)	26 to 67	IIP + platform switching (19)	IIP + internal connection (19)	12	All premolar maxilla	No	Yes, $P = 0.4973$	No	Yes	No	Yes	-0.61 (0.54)	-0.73 (0.52)	No SSD was found between platform switching or internal types of abutment connection.
Raes et al. (2011) ³¹	CCS	39 (22/17)	19 to 75	IIP (16)	CIP (23)	52	24 anterior maxilla; 15 premolar maxilla	No	No	Yes in 11 sites, $P = 0.023$	No	No	Yes	-0.12 (0.78) [§]	-1.00 (1.15) [§]	IIP with flapless approach demonstrated stable midfacial soft-tissue levels.
Tsuda et al. (2011) ⁷⁰	CS	10 (4/6)	35 to 70	IIP + CTG (10)	None	12	8 anterior maxilla; 2 premolar maxilla	No	Yes	No	No	Yes, mucosal level gained in 8 cases	Yes	-0.05	NA	Facial gingival level around single IIP could be maintained following CTG.
Cabello et al. (2012) ⁷¹	CS	14 (7/7)	34 to 71	IIP (14)	None	12	All anterior maxilla	No	No	Yes	No	No	Yes	-0.45 (0.25) [§]	NA	No correlation was found between gingival biotype and marginal soft-tissue level.
Cosyn et al. (2012) ²³	CS	22 (12/10)	27 to 74	IIP + platform switching (22)	None	12	18 anterior maxilla; 4 premolar maxilla	No	Yes	Yes	Yes	No	Yes	-0.2 (0.4) [§]	NA	To achieve preservation of pink esthetics following IIP, secondary CTG might be necessary in about one-third of patients.
Lee et al. (2012) ⁷²	CS	10 [‡] (2/8)	22 to 57	IIP + BG + CTG (11)	None	24	All anterior maxilla	No	No	No	Yes	Yes, mucosal level gained	No	1.7 (0.7) [§]	NA	CTG was successfully used to restore soft-tissue defect during IIP.
Paul and Held (2012) ⁷³	CS	26 [‡] (10/16)	18 to 84	IIP (31)	None	60	All anterior maxilla	No	No	No	Yes	Yes	Yes	Minimal	NA	IIP in combination with gap filling and CTG might result in little gingival recession.

CS = case series; NA = not applicable; ? = unknown or unclear; SSD = statistically significant difference; BG = bone grafted; RM = resorbable membrane; CCS = comparative case series; CH = cohort study; KM = keratinized mucosa; CIP = conventional implant placement. Bold † = Palatal/lingual implant position; 2 = platform-switched abutments; 3 = flapless approach; 4 = bone grafts to fill the gap between buccal plate and fixture; 5 = CTG or subepithelial CTG; 6 = immediate provisionalization.
[†] Mid-buccal mucosal level (negative value = MR).
[‡] Of KM.
[§] Average.
[‖] More than one implant placed per patient.
[¶] Mean (SD).