

Immediate implant in the esthetic zone: Autogenous versus Alloplast. A 1-year prospective study

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Abstract

Immediate implant placement and provisionalization (IIPP) has been described as a treatment option with acceptable esthetic results for anterior single tooth loss. Some studies considered that the association of low resorption bone grafts could maintain the facial bone wall width and minimize the risk for midfacial mucosa recession.

Twenty patients with a central or lateral maxillary incisor indicated for extraction and IIPP were selected. Implants (BL SLA@ctive, Straumann) were placed by the same surgeon in sockets with intact facial walls. Autogenous bone harvested from the tuberosity was grafted in group A and an alloplast (Boneceramic, Straumann) was used in group B. Ten implants were placed in each group and after 1 year, all implants were osseointegrated. There was no statistical difference for FGL between the groups over time, the BCL revealed a significant reduction over time ($p = 0.027$) and BAPT showed a significant reduction between T1 and T3 ($p = 0.01$) only for the group A.

The use of alloplastic bone substitute allowed a better behavior of the hard and soft tissues after the IIPP in the aesthetic zone in 1 year of observation.

Background and Aim

To evaluate the influence of the graft material in the response of periimplant hard and soft tissues after IIPP in the esthetic zone.

Methods and Materials

Twenty patients with a central or lateral maxillary incisor indicated for extraction and IIPP were selected. Implants (BL SLA@ctive, Straumann) were placed by the same surgeon in sockets with intact facial walls. Autogenous bone harvested from the tuberosity was grafted in group A and an alloplast (Boneceramic, Straumann) was used in group B. Screwed acrylic resin prosthesis were built immediately after surgery. Sixteen weeks after implant placement the final screw-retained prosthesis were built (Figures 1A-1D).

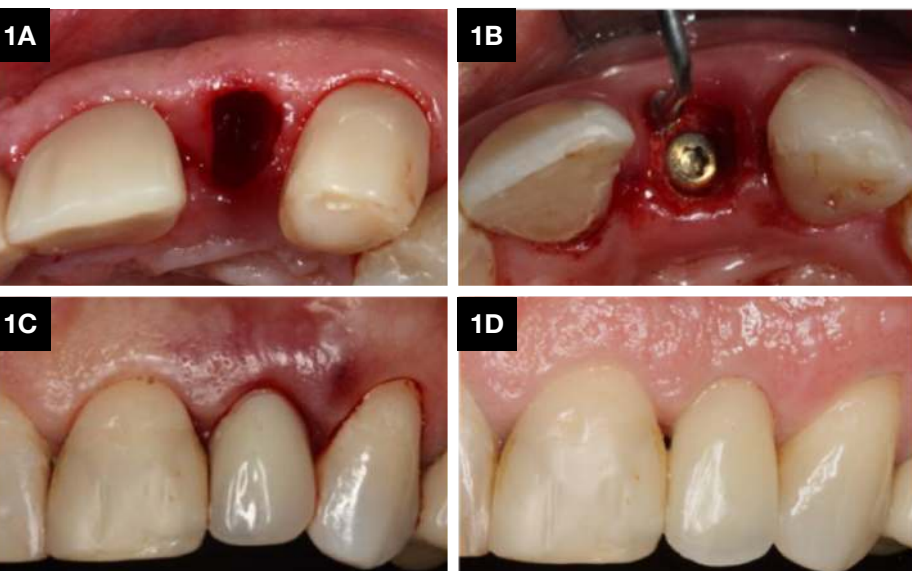


Figure 1A. Aspect of socket immediately after extraction. Figure 1B. Graft condensation. Figure 1C. Temporary crown installation. Figure 1D. Aspect of final crown.

Methods and Materials

The tissues were evaluated two weeks before surgery (T0), at implant placement (T1), 4 months after implant placement (T2) and 1 year after final prosthesis (T3). The following data were evaluated: the variation of the facial gingival level (FGL)(Figure 2A); papilla index score (PIS); mesial and distal marginal bone levels (MBL) (Figure 2B); the buccal crest level (BCL) and the buccal alveolar bone thickness (BAPT)(Figures 3A-3C). Statistical analysis: Friedmann and Mann-Whitney U tests at the significance level of 0.05.



Figure 2A. Measurement of FGL (green line perpendicular to yellow line) in T2. Figure 2B. Measurement of MBL (green lines) in T1.

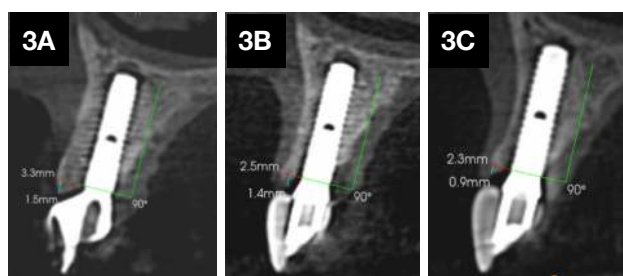


Figure 3A. BAPT (red line) and BCL (green line) CBCT measurements in T1. Figure 3B. BAPT (red line) and BCL (green line) CBCT measurements in T2. Figure 3C. BAPT (red line) and BCL (green line) CBCT measurements in T3.

Results

Ten implants were placed in each group. After 1 year, all implants were osseointegrated and MBL were no statistical difference ($p = 0,097$ mesial e $p = 0,223$ distal)mm in group B and a significant reduction over time in group A with ($p = 0,022$ mesial e $p = 0,029$ distal)mm. There was no statistical difference for FGL between the groups over time, however, group A presented a significant reduction between T0 and T3 ($p = 0.024$). The vertical distance from buccal crestal level (BCL) and implant platform revealed a significant reduction over time ($p = 0.027$) only for the group A; significance was also found between the two groups after 1 year ($p = 0.028$). There was also no statistical difference between groups over time regarding BAPT; however, group A showed a significant reduction between T1 and T3 ($p = 0.01$). At T3, 100% of the group B and 90% of the group A presented the interproximal space more than 50% filled with papilla (PIS 2 or 3).

Results

TABLE 1 Descriptive and comparative measures of the FGL variable between the 2 interest groups over time (T0, T1, T2 and T3)

Time	FGL (mm)		p** (Conclusion)
	B Group	A Group	
T ₀	0,0 ± 0,0	0,0 ± 0,0	1,000 (B = A)
T ₁	-0,4 ± 0,6	0,1 ± 0,4	0,053 (B = A)
T ₂	-0,4 ± 0,8	-0,2 ± 0,5	0,278 (B = A)
T ₃	-0,5 ± 0,8	-0,2 ± 0,5	0,356 (B = A)
p*	0,245	0,024	
Conclusion	T ₀ = T ₁ = T ₂ = T ₃ (T ₀ = T ₁) > (T ₂ = T ₃)		

DATA BASE: 20 patients (B Group → 10 cases and A Group → 10 cases)

NOTE: p* → Friedman's Test p** → Mann-Whitney's Test
FGL measurements → Mean ± standard deviation

TABLE 2 Descriptive and comparative measures of the MBL Mesial variable between the 2 interest groups over time (T1, T2 and T3)

Time	MBL Mesial (mm)		p** (Conclusion)
	B Group	A Group	
T ₁	0,00 ± 0,00	0,00 ± 0,00	1,000 (B = A)
T ₂	-0,03 ± 0,10	-0,19 ± 0,32	0,447 (B = A)
T ₃	-0,23 ± 0,40	-0,28 ± 0,40	0,842 (B = A)
p*	0,097	0,022	
Conclusion	T ₁ = T ₂ = T ₃ T ₁ > T ₃		

DATA BASE: 20 patients (B Group → 10 cases and A Group → 10 cases)

NOTE: p* → Friedman's Test p** → Mann-Whitney's Test
MBL Mesial measurements → Mean ± standard deviation

TABLE 3 Descriptive and comparative measures of the BCL variable between the 2 interest groups over time (T1, T2 and T3)

Time	BCL (mm)		p** (Conclusion)
	B Group	A Group	
T ₁	1,7 ± 1,0	1,5 ± 0,4	1,000 (B = A)
T ₂	1,7 ± 0,9	0,9 ± 0,7	0,065 (B = A)
T ₃	2,0 ± 1,2	0,8 ± 1,0	0,028 (B > A)
p*	0,157	0,027	
Conclusion	T ₁ = T ₂ = T ₃ T ₁ > (T ₂ = T ₃)		

DATA BASE: 20 patients (B Group → 10 cases and A Group → 10 cases)

NOTE: p* → Friedman's Test p** → Mann-Whitney's Test
BCL measurements → Mean ± standard deviation

TABLE 4 Descriptive and comparative measures of the BAPT variable between the 2 interest groups over time (T1, T2 and T3)

Time	BAPT (mm)		p** (Conclusion)
	B Group	A Group	
T ₁	2,8 ± 0,8	3,0 ± 1,1	0,780 (B = A)
T ₂	2,5 ± 1,0	2,2 ± 0,9	0,400 (B = A)
T ₃	2,6 ± 1,0	1,8 ± 1,0	0,113 (B = A)
p*	0,074	0,010	
Conclusion	T ₁ = T ₂ = T ₃ T ₁ > T ₃		

DATA BASE: 20 patients (B Group → 10 cases and A Group → 10 cases)

NOTE: p* → Friedman's Test p** → Mann-Whitney's Test
BAPT measurements → Mean ± standard deviation

Conclusion

The use of alloplastic bone substitute allowed a better behavior of the hard and soft tissues after the IIPP in the aesthetic zone in 1 year of observation.

References

- Kan JYK, Rungcharassaeng K, Deflorian M, Weinstein T, Wang HL, Testori T. Immediate implant placement and provisionalization of maxillary anterior single implants. *Periodontol* 2000. 2018 Jun;77(1):197-212.
- Noelken R, Moergel M, Kunkel M, Wagner W. Immediate and flapless implant insertion and provisionalization using autogenous bone grafts in the esthetic zone: 5-year results. *Clin Oral Implants Res*. 2018 Mar;29(3):320-327.
- Amato F, Polara G, Spedicato GA. Tissue Dimensional Changes in Single-Tooth Immediate Extraction Implant Placement in the Esthetic Zone: A Retrospective Clinical Study. *Int J Oral Maxillofac Implants*. 2018 Mar/Apr;33(2):439-447.
- Jemt T. Regeneration of gingival papillae after single-implant treatment. *Int J Periodontics Restorative Dent*. 1997 Aug;17(4):326-33.
- Kan JY, Rungcharassaeng K, Lozada JL. Immediate placement and provisionalization of maxillary anterior single implants: 1-year prospective study. *Int J Oral Maxillofac Implants* 2003;18:31-39.
- Vera C, De Kok IJ, Chen W, Reside G, Tyndall D, Cooper LF. Evaluation of post-implant buccal bone resorption using cone beam computed tomography: a clinical pilot study. *Int J Oral Maxillofac Implants*. 2012 Sep-Oct;27(5):1249-57.
- Lemes HP, Sartori IAM, Cardoso LC, Ponzone D. Behaviour of the buccal crestal bone levels after immediate placement of implants subjected to immediate loading. *Int J Oral Maxillofac Surg* 2015; 44: 389-94.