

Bone grafting using an in situ hardening synthetic material with simultaneous early implant placement

Simplified protocol, successful results

MINAS LEVENTIS, DDS, MS, PHD; PETER FAIRBAIRN, BDS

Literature

1. Buser D, Chappuis V, Bornstein MM, Wittneben JG, Frei M, Belser UC. Long-term stability of contour augmentation with early implant placement following single tooth extraction in the esthetic zone: a prospective, cross-sectional study in 41 patients with a 5-to 9-year follow-up. *Journal of Periodontology*. 2013 Nov;84(11):1517-27.
2. Esposito M, Grusovin MG, Polyzos IP, Felice P, Worthington HV. Timing of implant placement after tooth extraction: immediate, immediate-delayed or delayed implants? A Cochrane systematic review. *European Journal of Oral Implantology*. 2010 Sep 1;3(3).
3. Chen ST, Wilson Jr TG, Hammerle CH. Immediate or early placement of implants following tooth extraction: review of biologic basis, clinical procedures, and outcomes. *International Journal of Oral & Maxillofacial Implants*. 2004 Jan 1;19(19):12-25.
4. Fairbairn P, Leventis M. Protocol for Bone Augmentation with Simultaneous Early Implant Placement: A Retrospective Multicenter Clinical Study. *International Journal of Dentistry*. 2015 Nov 24;2015.
5. Koh RU, Rudek I, Wang HL. Immediate implant placement: positives and negatives. *Implant Dentistry*. 2010 Apr 1;19(2):98-108.
6. Schropp L, Kostopoulos L, Wenzel A. Bone healing following immediate versus delayed placement of titanium implants into extraction sockets: a prospective clinical study. *International Journal of Oral & Maxillofacial Implants*. 2003 Mar 1;18(2).
7. Schropp L, Kostopoulos L, Wenzel A, Isidor F. Clinical and radiographic performance of delayed-immediate single-tooth implant placement associated with peri-implant bone defects. A 2-year prospective, controlled, randomized follow-up report. *Journal of Clinical Periodontology*. 2005 May 1;32(5):480-7.
8. Nemcovsky CE, Artzi Z. Comparative study of buccal dehiscence defects in immediate, delayed, and late maxillary implant placement with collagen membranes: clinical healing between placement and second-stage surgery. *Journal of Periodontology*. 2002 Jul 1;73(7):754-61.
9. Sanz I, Garcia-Gargallo M, Herrera D, Martin C, Figuero E, Sanz M. Surgical protocols for early implant placement in post-extraction sockets: a systematic review. *Clinical Oral Implants Research*. 2012 Feb 1;23(s5):67-79.
10. Horowitz RA, Leventis MD, Rohrer MD, Prasad HS. Bone grafting: history, rationale, and selection of materials and techniques. *Compendium of Continuing Education in Dentistry*. 2014;35(4):1-6.
11. Yip I, Ma L, Mattheos N, Dard M, Lang NP. Defect healing with various bone substitutes. *Clinical Oral Implants Research*. 2015 May 1;26(5):606-14.
12. Miron RJ, Sculean A, Shuang Y, Bosshardt DD, Gruber R, Buser D, Chandad F, Zhang Y. Osteoinductive potential of a novel biphasic calcium phosphate bone graft in comparison with autographs, xenografts, and DFDBA. *Clinical Oral Implants Research*. 2015 Jul 1.
13. Yuan H, Fernandes H, Habibovic P, de Boer J, Barradas AM, de Ruiter A, Walsh WR, van Blitterswijk CA, de Bruijn JD. Osteoinductive ceramics as a synthetic alternative to autologous bone grafting. *Proceedings of the National Academy of Sciences*. 2010 Aug 3;107(31):13614-9.
14. Kasten P, Beyen I, Niemeyer P, Luginbühl R, Bohner M, Richter W. Porosity and pore size of β -tricalcium phosphate scaffold can influence protein production and osteogenic differentiation of human mesenchymal stem cells: an in vitro and in vivo study. *Acta Biomaterialia*. 2008 Nov 30;4(6):1904-15.
15. Palti A, Hoch T. A concept for the treatment of various dental bone defects. *Implant Dentistry*. 2002 Mar 1;11(1):73-8.
16. Harel N, Moses O, Palti A, Ormianer Z. Long-term results of implants immediately placed into extraction sockets grafted with β -tricalcium phosphate: a retrospective study. *Journal of Oral and Maxillofacial Surgery*. 2013 Feb 28;71(2):e63-8.

17. Artzi Z, Weinreb M, Givol N, Rohrer MD, Nemcovsky CE, Prasad HS, Tal H. Biomaterial Resorption Rate and Healing Site Morphology of Inorganic Bovine Bone and β -Tricalcium Phosphate in the Canine: A 24-month Longitudinal Histologic Study and Morphometric Analysis. *International Journal of Oral & Maxillofacial Implants*. 2004 May 1;19(3):357-68.
18. Trisi P, Rao W, Rebaudi A, Fiore P. Histologic effect of pure-phase beta-tricalcium phosphate on bone regeneration in human artificial jawbone defects. *International Journal of Periodontics and Restorative Dentistry*. 2003 Feb 1;23(1):69-78.
19. Ruga E, Gallesio C, Chiusa L, Boffano P. Clinical and histologic outcomes of calcium sulfate in the treatment of postextraction sockets. *Journal of Craniofacial Surgery*. 2011 Mar 1;22(2):494-8.
20. Pecora G, Andreana S, Margarone JE, Covani U, Sottosanti JS. Bone regeneration with a calcium sulfate barrier. *Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology, and Endodontology*. 1997 Oct 1;84(4):424-9.
21. Dimitriou R, Mataliotakis GI, Calori GM, Giannoudis PV. The role of barrier membranes for guided bone regeneration and restoration of large bone defects: current experimental and clinical evidence. *BMC medicine*. 2012 Jul 26;10(1):81.
22. Buser D, Dahlin C, Schenk RK. Guided bone regeneration. Chicago Quintessence. 1994.
23. Al Ruhaimi KA. Effect of adding resorbable calcium sulfate to grafting materials on early bone regeneration in osseous defects in rabbits. *International Journal of Oral & Maxillofacial Implants*. 2000 Nov 1;15(6):859-64.
24. Strocchi R, Orsini G, Iezzi G, Scarano A, Rubini C, Pecora G, Piattelli A. Bone regeneration with calcium sulfate: evidence for increased angiogenesis in rabbits. *Journal of Oral Implantology*. 2002 Dec;28(6):273-8.
25. Lee A, Fu JH, Wang HL. Soft tissue biotype affects implant success. *Implant Dentistry*. 2011 Jun 1;20(3):e38-47.
26. Sasaki H, Koyama S, Yokoyama M, Yamaguchi K, Itoh M, Sasaki K. Bone metabolic activity around dental implants under loading observed using bone scintigraphy. *International Journal of Oral & Maxillofacial Implants*. 2008 Oct 1;23(5):827-34.
27. Chan HL, Lin GH, Fu JH, Wang HL. Alterations in bone quality after socket preservation with grafting materials: a systematic review. *International Journal of Oral & Maxillofacial Implants*. 2013 Jun 1;28(3):710-20.
28. Duyck J, Vandamme K. The effect of loading on peri-implant bone: a critical review of the literature. *Journal of oral rehabilitation*. 2014 Oct 1;41(10):783-94.
29. Elshahat A, Inoue N, Marti G, Safe I, Manson P, Vanderkolk C. Guided bone regeneration at the donor site of iliac bone grafts for future use as autogenous grafts. *Plastic and reconstructive surgery*. 2005 Sep 15;116(4):1068-75.
30. Zhang X, Awad HA, O'Keefe RJ, Guldberg RE, Schwarz EM. A perspective: engineering periosteum for structural bone graft healing. *Clinical Orthopaedics and Related Research*. 2008 Aug 1;466(8):1777-87.
31. Mahajan A. Periosteum: a highly underrated tool in dentistry. *International Journal of Dentistry*. 2011 Sep 25;2012.