

An overview of synthetic and non-synthetic materials

Bone substitute materials in dental implantology

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Literature

1. Artzi Z, Tal H, Dayan D. Porous bovine bone mineral in healing of human extraction sockets: 2. Histochemical observations at 9 months. *Journal of periodontology*. 2001;72(2):152-9.
2. Bassil J, Naaman N, Lattouf R, Kassis C, Changotade S, Baroukh B, et al. Clinical, histological, and histomorphometrical analysis of maxillary sinus augmentation using inorganic bovine in humans: preliminary results. *The Journal of oral implantology*. 2013;39(1):73-80.
3. Carini F, Longoni S, Amosso E, Paleari J, Carini S, Porcaro G. Bone augmentation with TiMesh. autologous bone versus autologous bone and bone substitutes. A systematic review. *Annali di stomatologia*. 2014;5(Suppl 2 to No 2):27-36.
4. Carmagnola D, Berglundh T, Lindhe J. The effect of a fibrin glue on the integration of Bio-Oss with bone tissue. A experimental study in labrador dogs. *Journal of clinical periodontology*. 2002;29(5):377-83.
5. Cordaro L, Bosshardt DD, Palattella P, Rao W, Serino G, Chiapasco M. Maxillary sinus grafting with Bio-Oss or Straumann Bone Ceramic: histomorphometric results from a randomized controlled multicenter clinical trial. *Clinical oral implants research*. 2008;19(8):796-803.
6. Elgali I, Igawa K, Palmquist A, Lenneras M, Xia W, Choi S, et al. Molecular and structural patterns of bone regeneration in surgically created defects containing bone substitutes. *Biomaterials*. 2014;35(10):3229-42.
7. Fickl S, Zuhr O, Wachtel H, Bolz W, Huerzeler MB. Hard tissue alterations after socket preservation: an experimental study in the beagle dog. *Clinical oral implants research*. 2008;19(11):1111-8.
8. Jensen SS, Broggin N, Hjorting-Hansen E, Schenk R, Buser D. Bone healing and graft resorption of autograft, anorganic bovine bone and beta-tricalcium phosphate. A histologic and histomorphometric study in the mandibles of minipigs. *Clinical oral implants research*. 2006;17(3):237-43.
9. Klijn RJ, Meijer GJ, Bronkhorst EM, Jansen JA. A meta-analysis of histomorphometric results and graft healing time of various biomaterials compared to autologous bone used as sinus floor augmentation material in humans. *Tissue engineering Part B, Reviews*. 2010;16(5):493-507.
10. Manfro R, Fonseca FS, Bortoluzzi MC, Sendyk WR. Comparative, Histological and Histomorphometric Analysis of Three Anorganic Bovine Xenogenous Bone Substitutes: Bio-Oss, Bone-Fill and Gen-Ox Anorganic. *Journal of maxillofacial and oral surgery*. 2014;13(4):464-70.
11. Mardas N, Chadha V, Donos N. Alveolar ridge preservation with guided bone regeneration and a synthetic bone substitute or a bovine-derived xenograft: a randomized, controlled clinical trial. *Clinical oral implants research*. 2010;21(7):688-98.
12. Martinez A, Balboa O, Gasamans I, Otero-Cepeda XL, Guitian F. Deproteinized bovine bone vs. beta-tricalcium phosphate as bone graft substitutes: histomorphometric longitudinal study in the rabbit cranial vault. *Clinical oral implants research*. 2015;26(6):623-32.
13. Miron RJ, Gruber R, Hedbom E, Saulacic N, Zhang Y, Sculean A, et al. Impact of bone harvesting techniques on cell viability and the release of growth factors of autografts. *Clinical implant dentistry and related research*. 2013;15(4):481-9.
14. Niedhart C, Maus U, Redmann E, Siebert CH. In vivo testing of a new in situ setting beta-tricalcium phosphate cement for osseous reconstruction. *Journal of biomedical materials research*. 2001;55(4):530-7.
15. Nkenke E, Neukam FW. Autogenous bone harvesting and grafting in advanced jaw resorption: morbidity, resorption and implant survival. *European journal of oral implantology*. 2014;7 Suppl 2:S203-17.
16. Sartori M, Giavaresi G, Tschon M, Martini L, Dolcini L, Fiorini M, et al. Long-term in vivo experimental investigations on magnesium doped hydroxyapatite bone substitutes. *Journal of materials science Materials in medicine*. 2014;25(6):1495-504.

17. Stahl SS, Froum SJ. Histologic and clinical responses to porous hydroxylapatite implants in human periodontal defects. Three to twelve months postimplantation. *Journal of periodontology*. 1987;58(10):689-95.
18. Tete S, Zizzari VL, Vinci R, Zara S, Di Tore U, Manica M, et al. Equine and porcine bone substitutes in maxillary sinus augmentation: a histological and immunohistochemical analysis of VEGF expression. *The Journal of craniofacial surgery*. 2014;25(3):835-9.
19. Thalmair T, Fickl S, Schneider D, Hinze M, Wachtel H. Dimensional alterations of extraction sites after different alveolar ridge preservation techniques - a volumetric study. *Journal of clinical periodontology*. 2013;40(7):721-7.
20. Vance GS, Greenwell H, Miller RL, Hill M, Johnston H, Scheetz JP. Comparison of an allograft in an experimental putty carrier and a bovine-derived xenograft used in ridge preservation: a clinical and histologic study in humans. *The International journal of oral & maxillofacial implants*. 2004;19(4):491-7.
21. Wang HL, Tsao YP. Histologic evaluation of socket augmentation with mineralized human allograft. *The International journal of periodontics & restorative dentistry*. 2008;28(3):231-7.
22. Zafiropoulos GG, Hoffmann O, Kasaj A, Willershausen B, Weiss O, Van Dyke TE. Treatment of intrabony defects using guided tissue regeneration and autogenous spongiosa alone or combined with hydroxyapatite/beta-tricalcium phosphate bone substitute or bovine-derived xenograft. *Journal of periodontology*. 2007;78(11):2216-25.