

# Publications

> [1. Meta analysis / Reviews](#) > [2. Post Extraction Socket](#) > [3. Ridge Augmentation](#) > [4. Sinus Floor Augmentation](#) > [5. GTR and GBR - Benefit of Membrane](#) > [6. Peri-Implantitis](#) > [7. Periodontitis](#) > [8. Soft-tissue Regeneration](#) > [9. Geistlich Bio-Oss® Characteristics](#) > [10. Geistlich Bio-Gide® Characteristics](#) > [11. Safety](#) > [12. Comparisons with other...](#) > [13. Growth factors and carriers](#) > [14. PRP and stem cells](#) > [15. Cranio Maxillofacial](#)

[Download reference list as PDF](#)

[Download major works as PDF](#)

## 1. Meta-analysis/ Reviews

A systematic review of the success of sinus floor elevation and survival of implants inserted in combination with sinus floor elevation. Pietursson BE, Tan WC, Zwahlen M, Lang NP J Clin Periodontol, 2008; 35: 216-240.

Which Hard Tissue Augmentation Techniques Are the Most Successful in Furnishing Bony Support for Implant Placement? Aghaloo TL, Moy PK J Oral Maxillofac Implants 2007; 22 (Suppl): 49-7.

Bone Augmentation Techniques. Mc Allister B, Haghghat K J Periodontol 2007, 78, 377-396

Systematic review of survival rates for implants placed in the grafted maxillary sinus Del Fabbro M, Testori T, Francetti L, Weinstein R Int J Periodontics Restorative Dent. 2004; 24: 565-77.

Effect of maxillary sinus augmentation on the survival of endosseous dental implants. A systematic review Wallace SS, Froum SJ Ann Periodontol 2003; 8: 328-343.

Efficacy of Porous Bovine Bone Mineral in Various Types of Osseous Deficiencies: Clinical Observations and Literature Review Z. Artzi, C. Nemcovsky, H. Tal Int J Periodontics Restorative Dent, 21(4), 2001

Regeneration of periodontal tissues: combinations of barrier membranes and grafting materials - biological foundation and preclinical evidence: a systematic review. Sculean, A., D. Nikolidakis, et al. J Clin Periodontol 2008; 35(8 Suppl): 106-16.

[to top](#)

## **2. Post Extraction Socket**

Stability of contour augmentation and esthetic outcomes of implant-supported single crowns in the esthetic zone: 3-year results of a prospective study with early implant placement postextraction. Buser D, Wittneben J, Bornstein MM, Grütter L, Chappuis V, Belser UC. *J Periodontol.* 2011 Mar;82(3):342-9.

Osteogenic potential of mesenchymal cells embedded in the provisional matrix after a 6-week healing period in augmented and non-augmented extraction sockets: an immunohistochemical prospective pilot study in humans. Heberer S, Wustlich A, Lage H, Nelson JJ, Nelson K. *Clin Oral Implants Res.* 2011 Mar 24.

Socket grafting with the use of autologous bone: an experimental study in the dog. Araújo MG, Lindhe J. *Clin Oral Implants Res.* 2011

Esthetic alveolar ridge preservation with calcium phosphate and collagen membrane: preliminary report. Kesmas S, Swasdison S, Yodsanga S, Sessirisombat S, Jansisyant P. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod.* 2010 Nov;110(5):e24-36.

Socket grafting in the posterior maxilla reduces the need for sinus augmentation Rasperini G, Canullo L, Dellavia C, Pellegrini G, Simion M. *Int J Periodontics Restorative Dent* 2010;30(3):265-73.

Analysis of the socket bone wall dimensions in the upper maxilla in relation to immediate implant placement. Huynh-Ba, G., Pjetursson, B. E., Sanz, M., Cecchinato, D., Ferrus, J., Lindhe, J., Lang, N. P. *Clin Oral Implants Res* 2010; 21(1):37-42.

Dynamics of Bio-Oss Collagen incorporation in fresh extraction wounds: an experimental study in the dog. Araujo, M. G., Liljenberg, B., Lindhe, J. *Clin Oral Implants Res* 2010; 21(1):55-64.

Extraction site management using a natural bone mineral containing collagen: rationale and retrospective case study. Ackermann, K.L. *Int J Periodontics Restorative Dent* 2009; 29(5): 489-97.

Comparative histomorphometric analysis of extraction sockets healing implanted with bovine xenografts, irradiated cancellous allografts, and solvent-dehydrated allografts in humans. Lee, D. W., S. H. Pi, et al. *Int J Oral Maxillofac Implants* 2009 ; 24(4): 609-615.

Effect of a xenograft on early bone formation in extraction sockets: an experimental study in dog Araujo, M., E. Linder, et al. *Clin Oral Implants Res* 2009; 20(1): 1-6. Early implant placement with simultaneous guided bone regeneration following single-tooth extraction in the esthetic zone: 12-month results of a prospective study with 20 consecutive patients. Buser, D., S. Halbritter, et al. *J Periodontol* 2009; 80(1): 152-62.

Hard tissue alterations after socket preservation: an experimental study in the beagle dog Fickl S, Zuhr O, Wachtel H, Bolz W, Hürzeler MB. Clin Oral Implants Res, 2008; 19: 1111-1118.

Dimensional changes of the alveolar ridge contour after different socket preservation techniques Fickl S, Zuhr O, Wachtel H, Stappert CFJ, Stein JM, Hürzeler MB. J Clin Periodontol, 2008; 35: 906-913.

Tissue alterations after tooth extraction with and without surgical trauma: a volumetric study in the beagle dog Fickl S, Zuhr O, et al. J Clin Periodontol 2008; 35(4): 356-63.

The influence of Bio-Oss Collagen on healing of an extraction socket: an experimental study in the dog Araujo M, Linder E, et al. (2008) Int J Periodontics Restorative Dent 28(2): 123-35.

A prospective clinical study of non-submerged immediate implants: clinical outcomes and esthetic results. Chen ST, Darby IB, et al. (2007). Clin Oral Implants Res 18(5): 552-62.

Effect of bone mineral with or without collagen membrane in ridge dehiscence defects following premolar extraction. Kim M. et al. In Vivo 2008. 22(2): 231-236.

Immediate implant placement with transmucosal healing in areas of aesthetic priority. A multicentre randomized -controlled clinical trial I. Surgical outcomes. Lang N., Tonetti M.S., Suvan J.E., Bernard J.P., Botticelli D., Fournousis I, Hallund M., Jung R., Laurell L., Salvi G., Shafer D, Weber H.P Clin Oral Impl Res 2007; 18: 188-196.

Effect of Bio-Oss on osseointegration of dental implants surrounded by circumferential bone defects of different dimensions: an experimental study in the dog. Polyzois I, Renvert S, Bosshardt DD, Lang NP, Claffey N. Clin Oral Implants Res 2007

A study of the fate of the buccal wall of extraction sockets of teeth with prominent roots. Nevins M, Camelo M, et al. Int J Periodontics Restorative Dent 2006; 26(1): 19-29

Healing of extraction sockets and surgically produced - augmented and non-augmented - defects in the alveolar ridge. An experimental study in the dog Cardaropoli G, Araujo M, Hayacibara R, Sukekava F, Lindhe J. J Clin Periodontol 2005; 32: 435-440.

Postextraction Tissue Management: A Soft Tissue Punch Technique Jung R, Siegenthaler D, Hämmerle CH. Int J Periodontics Restorative Dent 2004 ;24: 545-553.

Efficacy of bovine bone mineral for alveolar augmentation: a human histologic study Norton M, Odell E, Thompson I, Cook R Clin Oral Implants Res. 2003; 14: 775-783

The clinical use of deproteinized bovine bone mineral on bone regeneration in conjunction with immediate implant installation Van Steenberghe D., Callens A.,

Geers L., Jacobs R. Clin Oral Impl Res 200; 11: 210-16.

Healing around implants placed in bone defects treated with Bio-Oss® An experimental study in the dog Berglundh T., Lindhe J. Clin. Oral Impl Res 1997; 8: 117-124.

Healing Response to Anorganic Bone Implantation in Periodontal Intrabony Defects in Dogs. Part I: Bone Regeneration. A Microradiographic Study. Clérgeau L.P., Danan M., Clergeau-Guérithault S., Brion M. J Periodontol 1996; 67(2): 140-149.

[to top](#) **3. Ridge Augmentation a Horizontal**

Ridge augmentation by applying bioresorbable membranes and deproteinized bovine bone mineral: a report of twelve consecutive cases. Hämmerle CHF, Jung RE, Yaman D, Lang NP. Clin Oral Implants Res 2008; 19(1) :19-25.

Horizontal ridge augmentation using autogenous block grafts and the guided bone regeneration technique with collagen membranes: a clinical study with 42 patients. von Arx T, Buser D. Clin Oral Implants Res 2006; 17(4): 359-366

**b Vertical**

Vertical ridge augmentation of the atrophic posterior mandible with interpositional bloc grafts: bone from the iliac crest vs. bovine anorganic bone. Clinical and histological results up to one year after loading from a randomized-controlled clinical trial. Felice, P., C. Marchetti, et al. Clin Oral Implants Res (2009); doi: 10.1111/j.1600-0501.2009.01765.x

Vertical ridge augmentation using xenogenous bone blocks: a histomorphometric study in dogs Rothamel, D., F. Schwarz, et al. Int J Oral Maxillofac Implants 2009; 24(2): 243-50.

Vertical ridge augmentation around implants by e-PTFE titanium-reinforced membrane and bovine bone matrix: a 24- to 54-month study of 10 consecutive cases. Canullo, L. and V. A. Malagnino Int J Oral Maxillofac Implants 2008; 23(5): 858-66.

Vertical ridge augmentation with autogenous bone grafts: resorbable barriers supported by osteosynthesis plates versus titanium-reinforced barriers. A preliminary report of a blinded, randomized controlled clinical trial. Merli M, Migani M, Esposito M. J Oral Maxillofac Implants 2007; 22(3): 373-382.

Vertical ridge augmentation by expanded-polytetrafluoroethylene membrane and a combination of intraoral autogenous bone graft and deproteinized anorganic bovine bone (Bio Oss). Simion M, Fontana F, Raspereini G, Maiorana C. Clin Oral Implants Res 2007; 18(5): 620-629.

Vertical Ridge Augmentation Around Implants Using e-PTFE Titanium-Reinforced

Membrane and Deproteinized Bovine Bone Mineral (Bio-Oss): A Case Report. Canullo L, Trisi P, Simion M. *Int J Periodontics Restorative Dent*, 2006; 26(4): 355-361

Vertical ridge augmentation using xenogenic material supported by a configured titanium mesh: clinicohistopathologic and histochemical study. Artzi Z, Dayan D, Alpern Y, Nemcovsky CE. *Int J Oral Maxillofac Implants* 2003; 18(3): 440-446.

### **c Miscellaneous**

Clinical evaluation of particulate allogeneic with and without autogenous bone grafts and resorbable collagen membranes for bone augmentation of atrophic alveolar ridges. Beitlilum I, Artzi Z, Nemcovsky CE. *Clin Oral Implants Res*. 2010 Nov;21(11):1242-50.

Clinical and radiographic comparison of implants in regenerated or native bone: 5-year results. Benic, G. I., R. E. Jung, et al. *Clin Oral Implants Res* 2009; doi: 10.1111/j.1600-0501.2008.01583.x

Reduction of autogenous bone graft resorption by means of Bio-Oss coverage: a prospective study Maiorana C, Beretta M, Salina S, Santoro F. *Int J Periodontics Restorative Dent* 2005; 25: 19-25.

Alveolar Ridge Augmentation with Bio-Oss: A Histologic Study in Humans N. Zitzmann, P. Schärer, C. Marinello, P. Schüpbach, T. Berglundh *Int J Periodontics Restorative Dent* 2001;21: 288-95.

### to top **4. Sinus Floor Augmentation**

A prospective study of implants placed in augmented sinuses with minimal and moderate residual crestal bone: results after 1 to 5 years. Urban IA, Lozada JL. *Int J Oral Maxillofac Implants* 2010;25(6):1203-12.

Effect of anorganic bovine bone to autogenous cortical bone ratio upon bone remodeling patterns following maxillary sinus augmentation. Galindo-Moreno P, Moreno-Riestra I, Avila G, Padial-Molina M, Paya JA, Wang HL, O'Valle F. *Clin Oral Implants Res*. 2011 Aug;22(8):857-64.

Sinus floor augmentation using large (1-2 mm) or small (0.25-1 mm) bovine bone mineral particles: a prospective, intra-individual controlled clinical, micro-computerized tomography and histomorphometric study. Chackartchi T, Iezzi G, Goldstein M, Klinger A, Soskolne A, Piattelli A, Shapira L. *Clin Oral Implants Res*. 2011 May;22(5):473-80.

Immunoexpression of Cbfa-1/Runx2 and VEGF in sinus lift procedures using bone substitutes in rabbits. De Souza Nunes LS, De Oliveira RV, Holgado LA, Nary Filho H, Ribeiro DA, Matsumoto MA. *Clin Oral Implants Res*. 2010 Jun;21(6):584-90. Epub 2010 Jan 23

Histological and histomorphometrical analyses of biopsies harvested 11 years after

maxillary sinus floor augmentation with deproteinized bovine and autogenous bone. Mordenfeld A., M. Hallmann, et al. Clin Oral Implants Res, 2010.

Optimal microvessel density from composite graft of autogenous maxillary cortical bone and anorganic bovine bone in sinus augmentation: influences of clinical variables. Galindo-Moreno, P., Padial-Molina, M., Fernandez-Barbero, J. E., Mesa, F., Rodriguez-Martinez, D., O'Valle, F. Clin Oral Implants Res 2010; 21(2):221-7.

Ridge preservation with the use of Bio-Oss® Collagen: A 6-month study in the dog. Araújo MG, Lindhe J. Clin. Oral Impl. Res. 2009;20:433-440.

Retrospective radiographic investigation of the long-term stability of xenografts (Geistlich Bio-Oss) in the sinus. Ruoff, H. and H. Terheyden Z Zahnärztl Impl 2009; 25(2): 160-169. Prospective observation of 41 perforations of the Schneiderian membrane during sinus floor elevation Becker, S. T., H. Terheyden, et al. Clin Oral Implants Res 2008; 19(12): 1285-9.

RFA Values of Implants Placed in Sinus Grafted and Nongrafted Sites after 6 and 12 Months Degidi M, Daprile G, Piattelli A. Clin Implant Dent Relat 2008 ; Res. Sep 9

A systematic review of the success of sinus floor elevation and survival of implants inserted in combination with sinus floor elevation Pietursson BE, Tan WC, Zwahlen M, Lang NP. J Clin Periodontol, 2008; 35: 216-240.

Impact of implant surface and grafting protocol on clinical outcomes of endosseous implants Marchetti C, Pieri F, et al. Int J Oral Maxillofac Implants 2007; 22(3): 399-407.

Repair of large sinus membrane perforations using stabilized collagen barrier membranes: surgical techniques with histologic and radiographic evidence of success." Testori T, Wallace SS, et al. Int J Periodontics Restorative Dent 2008; 28(1): 9-17.

Sinus elevation with alloplasts or xenogenic materials and implants: an up-to-4-year clinical and radiologic follow-up. Maiorana C, Sigurta D, Miranda A, Garlini G, Santoro F. Int J Oral Maxillofac Implants 2006; 21(3): 426-432.

Sinus augmentation utilizing anorganic bovine bone (Bio-Oss) with absorbable and nonabsorbable membranes placed over the lateral window: histomorphometric and clinical analyses. Wallace SS, Froum SJ, Cho SC, Elian N, Monteiro D, Kim BS, Tarnow DP. Int J Periodontics Restorative Dent 2005; 25: 551-559. Systematic review of survival rates for implants placed in the grafted maxillary sinus Del Fabbro M, Testori T, Francetti L, Weinstein R. Int J Periodontics Restorative Dent. 2004; 24: 565-77.

Histomorphometric analysis of natural bone mineral for maxillary sinus augmentation John HD, Wenz B. Int J Oral Maxillofac Implants 2004; 19: 199-207

Effect of maxillary sinus augmentation on the survival of endosseous dental implants. A systematic review Wallace SS, Froum SJ Ann Periodontol 2003; 8:328-343.

Ten-year follow-up in a maxillary sinus augmentation using anorganic bovine bone (Bio-Oss). A case report with histomorphometric evaluation. Sartori S, Silvestri M,



Forni F, Icaro Cornaglia A, Tesei P, Cattaneo V. Clin Oral Impl Res 2003; 14(3): 369-372

Maxillary sinus grafting with anorganic bovine bone: a clinical report of long-term results Valentini P, Abensur DJ. Int J Oral Maxillofac Implants 2003; 18(4): 556-60.

Deproteinized cancellous bovine bone (Bio-Oss) as bone substitute for sinus floor elevation Tadjoein ES, de Lange GL, Bronckers ALJJ, Lyaruu DM, Burger EH J Clin Periodontol 2003; 30: 261-270.

A Clinical and Histologic Evaluation of Implant Integration in the Posterior Maxilla After Sinus Floor Augmentation with Autogenous Bone, Bovine Hydroxyapatite, or a 20:80 Mixture Hallmann M, Sennerby L, Lundgren S Int J Oral Maxillofac Implants 2002; 17: 635-643.

A Prospective 1-Year Clinical and Radiographic Study of Implants Placed After maxillary Sinus Floor Augmentation With Bovine Hydroxyapatite and Autogenous Bone Hallmann M., Hedin M., Sennerby L., Lundgren S. J Oral Maxillofac Surg 2002; 60: 277-284.

Sinus Floor Elevation Using a Bovine Bone Mineral (Bio-Oss) With or Without the Concomitant Use of a Bilayered Collagen Barrier (Bio-Gide): A Clinical Report of Immediate and Delayed Implant Placement G. Tawil, M. Mawla Int J Oral Maxillofac Impl 2001; 16: 13-21

Treatment of Maxillary Ridge Resorption by Sinus Augmentation with Iliac Cancellous Bone, Anorganic Bovine Bone, and Endosseous Implants: A Clinical and Histologic Report C. Maiorana, M. Redemagni, M. Rabagliati, S. Salina Int J Oral Maxillofac Implants 2000 : 15 : 873-78.

Sinus grafting with porous bone mineral (Bio-Oss®) for implant placement: A study on 15 patients P. Valentini, D. Abensur, B. Wenz, M. Peetz, R. Schenk Int J Periodontics Restorative Dent 2000; 20: 245-53.

Eighteen-Month Radiographic and Histologic Evaluation of Sinus Grafting with Anorganic Bovine Bone in the Chimpanzee B. McAllister, M. Margolin, A. Cogan, D. Buck, J. Hollinger, S.E. Lynch Int J Oral Maxillofac Implants: 1999 ; 14.

Bovine hydroxyapatite for maxillary sinus augmentation: analysis of interfacial bond strength of dental implants using pull-out tests Haas R., Mailath G., Dörtbudak O., Watzek G. Clin Oral Impl Res 1998; 9: 117-122.

Residual Lateral Wall Defects Following Sinus Grafting With Recombinant Human Osteogenic Protein-1 or Bio-Oss® in the Chimpanzee B. McAllister, M. Margolin, A. Cogan, M. Taylor, J. Wollins Int J Periodontics Restorative Dent 1998; 18(3).

Maxillary sinus augmentation using different grafting materials and dental implants in monkeys- Part I. Evaluation of anorganic bovine-derived bone matrix Hürzeler M.B., Quiñones C.R., Kirsch A., Gloker C., Schüpbach P., Strub J.R., Caffesse R.G. Clin Oral Impl Res 1997; 8: 476-486.

Maxillary Sinus Floor Elevation for Implant Placement With Demineralized Freeze-Dried Bone and Bovine Bone (Bio-Oss®): A clinical study of 20 patients P. Valentini,

D. Abensur Int J Periodontics Restorative Dent 1997; 17.

Bone apposition onto oral implants in the sinus area filled with different grafting materials Wetzel A.C., Stich H., Caffesse R.G. Clin Oral Impl Res 1995; 6: 155-163.

[to top](#) **5. GTR and GBR - Benefit of Membrane**

#### **a Intra-bony defects**

Clinical and radiographic outcomes of the modified minimally invasive surgical technique with and without regenerative materials: a randomized-controlled trial in intra-bony defects. Cortellini P, Tonetti MS. J Clin Periodontol. 2011 Apr;38(4):365-73.

Treatment of Class II molar furcation involvement: meta-analyses of reentry results. Kinaia BM, Steiger J, Neely AL, Shah M, Bholia M. J Periodontol. 2011 Mar;82(3):413-28

Long-term follow-up on soft and hard tissue levels following guided bone regeneration treatment in combination with a xenogeneic filling material: a 5-year prospective clinical study. Dahlin C, Simion M, Hatano N. Clin Implant Dent Relat Res. 2010 Dec;12(4):263-70.

Five-year results of a prospective, randomized, controlled study evaluating treatment of intrabony defects with a natural bone mineral and GTR. Sculean A, Schwarz F, Chiantella GC, Donos N, Arweiler NB, Brex M, Becker J. J Clin Periodontol 2007, 34, 72 -77.

Effects of combined treatment with porous bovine inorganic bone grafts and bilayer porcine collagen membrane on refractory one-wall intrabony defects. Sakata J, Abe H, Ohazama A, Okubo K, Nagashima C, Suzuki M, Hasegawa K. Int J Periodontics Restorative Dent 2006; 26: 161-169

Healing of intra-bony defects following treatment with a composite bovine-derived xenograft (Bio-Oss Collagen) in combination with a collagen membrane (Bio-Gide Perio) Sculean A, Chiantella GC, Windisch P, Arweiler NB, Brex M, Gera I. J Clin Periodontol 2005; 32: 720-724.

Clinical outcomes following treatment of human intrabony defects with GTR/bone replacement material or access flap alone. Tonetti MS, Cortellini P, Lang NP, Suvan JE, Adriaens P, Dubravec D, Fonzar A, Fourmoussis I, Rasperini G, Rossi R, Silvestri M, Topoll H, Walkamm B, Zybutz M. J Clin Periodontol 2004; 31(9): 770-6.

Healing of intrabony defects following treatment with a bovine-derived xenograft and collagen membrane Sculean A, Berakdar M, Chiantella GC, Donos N, Arweiler NB, Brex M. J Clin Periodontol 2003; 30:73-80

Effect of Porous Xenographic Bone Graft with Collagen Barrier Membrane on Periodontal Regeneration Yamada S., Shima N., Kitamura H., Sugito H. Int J Periodontics Restorative Dent 2002; 22(4):389-397.

Periodontal Regeneration with an Autogenous Bone-Bio-Oss Composite Graft and a



Bio-Gide Membrane M. Camelo, M. Nevins, S. Lynch, R. Schenk, M. Simion, Myron Nevins Int J of Periodontics & Restorative Dentistry 2001; 21.

A controlled re-entry study on the effectiveness of bovine porous bone mineral used in combination with a collagen membrane of porcine origin in the treatment of intrabony defects in humans. PM Camargo, V. Lekovic, M. Weinländer, M. Nedic, N. Vasilic, LE Wolinsky, EB Kenney J Clin Periodontol 2000; 27.

The Clinical Evaluation of Periodontal Surgery with Porous Bone Graft Material (Bio-Oss®) and Collagen Membrane (Bio-Gide®) A. Ohazama, H. Kitamura, M. Suzuki, S. Yamada, K. Hasegawa Journal of the Japanese Society of Periodontology, 41, 1999.

Reconstruction of anatomically complicated periodontal defects using a bioresorbable GTR barrier supported by bone mineral. A 6-month follow-up study of 6 cases D. Lundgren, C. Slotte J Clinical Periodontol 1999; 26.

Clinical, Radiographic, and Histologic Evaluation of Human Periodontal Defects Treated with Bio-Oss® and Bio-Gide® M. Camelo, M.L. Nevins, R.K. Schenk, M. Simion, G. Rasperini, S.E. Lynch, M. Nevins Int J Periodontics Restorative Dent 1998; 18(4).

## **b Furcation**

Treatment of Class II molar furcation involvement: meta-analyses of reentry results. Kinaia BM, Steiger J, Neely AL, Shah M, Bhola M. J Periodontol. 2011;82(3):413-28.

A clinical evaluation of anorganic bovine bone graft plus 10% collagen with or without a barrier in the treatment of class II furcation defects. Reddy KP, Nayak DG, Uppoor AS J Contemp Dent Pract. 2006 ,7: 60-70.

## **c Peri-implant defects**

Long-term follow-up on soft and hard tissue levels following guided bone regeneration treatment in combination with a xenogeneic filling material: a 5-year prospective clinical study. Dahlin C, Simion M, Hatano N. Clin Implant Dent Relat Res. 2010 Dec;12(4):263-70.

Use of a new cross-linked collagen membrane for the treatment of dehiscence-type defects at titanium implants: a prospective, randomized-controlled double-blinded clinical multicenter study Becker, J., B. Al-Nawas, et al. Clin Oral Implants Res. 2009; doi: 10.1111/j.1600-0501.2008.01689.x

Two-year clinical results following treatment of peri-implantitis lesions using a nanocrystalline hydroxyapatite or a natural bone mineral in combination with a collagen membrane Schwarz F, Sculean A, et al. J Clin Periodontol, 2008; 35(1): 80-7.

Healing of intrabony peri-implantitis defects following application of a nanocrystalline

hydroxyapatite (Ostim) or a bovine-derived xenograft (Bio-Oss) in combination with a collagen membrane (Bio-Gide). A case series. Schwarz F, Bieling K, Latz T, Nuesry E, Becker J. *J Clin Periodontol*, 2006; 33(7): 491-499 Long-term Results of Implants Treated with Guided Bone Regeneration: A 5-year Prospective Study N. Zitzmann, P. Schärer, C. Marinello *Int J of Oral & Maxillofac Implants* 2001; 16(3).

Single stage surgery combining transmucosal implant placement with guided bone regeneration and bioresorbable materials Hämmerle CH, Lang NP *Clin Impl Res* 2001; 21.

The combined use of bioresorbable membranes and xenografts or autografts in the treatment of bone defects around implants - A study in beagle dogs Hockers T, Abensur D, Valentini P, Legrand R, Hämmerle CHF *Clin Oral Impl Res* 1999; 10.

The effect of a deproteinized bovine bone mineral (Bio-Oss®) on bone regeneration around titanium dental implants Hämmerle CHF, Chiantella GC, Karring T., Lang NP *Clin Oral Impl Res* 1998; 9.

Evaluation of a new bioresorbable barrier to facilitate guided bone regeneration around exposed implant threads . An experimental study in the monkey. M.B. Hürzeler, R.J. Kohal, J. Naghshbandi, L.F. Mota, J. Conradt, D. Hutmacher, R.G. Caffesse *Int J Oral Maxillofac Surg* 1998 ; 27.

Resorbable Versus Nonresorbable Membranes in Combination with Bio-Oss for Guided Bone Regeneration N. Zitzmann, R. Naef, P. Schärer *Int J Oral Maxillofac Implants* 1997 ; 12.

Bone Regeneration around Implants: a Clinical Study with a New Resorbable Membrane Hürzeler M.B., Weng D., Hutmacher D. *Deutsche Zahnärztliche Zeitschrift*, 1996; 51(5).

Immediate or delayed immediate implantation versus late implantation when using the principles of guided bone regeneration N. Zitzmann, R. Naef, P. Schüpbach, P. Schärer *Acta Med Dent Helv* 1996; 1(10).

#### **d Others**

Effect of bovine bone and collagen membranes on healing of mandibular bone blocks: a prospective randomized controlled study. Cordaro L, Torsello F, Morcavallo S, di Torresanto VM *Clin Oral Implants Res*. 2011 Feb 11

The effect of enamel matrix derivative (Emdogain) on bone formation: a systematic review.. Rathe, F., Junker R, et al. *Tissue Eng Part B Rev* 2009; 15(3):215-24.

Efficacy of guided tissue regeneration in the management of through-and-through lesions following surgical endodontics: a preliminary study Taschieri S, Del Fabbro M, Testori T, Saita M, Weinstein R. *Int J Periodontics Restorative Dent*, 2008; 28(3): 265-271.

Treatment of Angular Bone Defects with a Composite Bone Grafting Material in Combination with a Collagen Membrane Zitzmann N, Rateitschak-Plüss E, Marinello

C. J Periodontol 2003; 74: 687-694.

[to top](#)

## **6. Peri-Implantitis**

Surgical regenerative treatment of peri-implantitis lesions using a nanocrystalline hydroxyapatite or a natural bone mineral in combination with a collagen membrane: a four-year clinical follow-up report. Schwarz, F., N. Sahm, et al. J Clin Periodontol 2009; 36(9): 807-14.

The efficacy of interventions to treat peri-implantitis: a Cochrane systematic review of randomised controlled clinical trials Esposito M, Grusovin MG, Coulthard P, Worthington HV. Eur J Oral Implantol 2008; 1(2): 111-125.

Two-year clinical results following treatment of peri-implantitis lesions using a nanocrystalline hydroxyapatite or a natural bone mineral in combination with a collagen membrane Schwarz F, Sculean A, et al. J Clin Periodontol 2008; 35(1): 80-7.

Healing of intrabony peri-implantitis defects following application of a nanocrystalline hydroxyapatite (Ostim) or a bovine-derived xenograft (Bio-Oss) in combination with a collagen membrane (Bio-Gide). A case series. Schwarz F, Bieling K, Latz T, Nuesry E, Becker J. J Clin Periodontol 2006; 33(7): 491-499.

[to top](#)

## **7. Periodontitis**

Prevention of mandibular third molar extraction-associated periodontal defects: a comparative study Sammartino, G., M. Tia, et al. J Periodontol 2009; 80(3): 389-96.

Long-term Clinical Outcome after Reconstruction of Periodontal Defects using a Bovine-Derived Xenograft: a Retrospective Cohort Study Tietmann C, Bröseler F. Perio 2006; 3: 79-86.

Enamel matrix proteins and bovine porous bone mineral in the treatment of intrabony defects: a comparative controlled clinical trial Zucchelli G, Amore C, Montebugnoli L, De Sanctis M. J Periodontol 2003; 74: 1725-1735 Treatment of Angular Bone Defects with a Composite Bone Grafting Material in Combination with a Collagen Membrane Zitzmann N, Rateitschak-Plüss E, Marinello C. J Periodontol 2003; 74: 687-694.

Clinical and histologic evaluation of human intrabony defects treated with an enamel matrix protein derivative combined with a bovine-derived xenograft. Sculean A, Windisch P, Keglevich T, Chiantella GC, Gera I, Donos N. Int J Periodontics

Restorative Dent 2003; 23: 47-55.

Evaluation of Periodontal Regeneration Following Grafting Intrabony Defects with Bio-Oss Collagen: A Human Histologic Report Nevins ML, Camelo M, Lynch SE, Schenk RK, Nevins M Int J Periodontics Restorative Dent 2003; 23:9-17.

Clinical Comparison of an Enamel Matrix Derivative Used Alone or in Combination With a Bovine-Derived Xenograft for the Treatment of Periodontal Osseous Defects in Humans Velasquez-Plata D, Scheyer E, Mellonig JT J Periodontol 2002; 73: 433-440.

A clinical comparison of a bovine-derived xenograft used alone and in combination with enamel matrix derivative for the treatment of periodontal osseous defects in humans. Scheyer ET, Velasquez-Plata D, Brunsvold MA, Lasho DJ, Mellonig JT. J Periodontol 2002; 73(4): 423-432.

Clinical Evaluation of an Enamel Matrix Protein Derivative (Emdogain) Combined with a Bovine-Derived Xenograft (Bio-Oss) for the Treatment of Intrabony Periodontal Defects in Humans Sculean A., Chiantella G., Windisch P., Gera I., Reich E. Int J Periodontics Restorative Dent 2002; 22(3): 259-267.

Periodontal Regeneration with an Autogenous Bone-Bio-Oss Composite Graft and a Bio-Gide Membrane M. Camelo, M. Nevins, S. Lynch, R. Schenk, M. Simion, Myron Nevins Int J of Periodontics & Restorative Dentistry 2001;21.

A Comparison Between Enamel Matrix Proteins Used Alone or in Combination With bovine Porous Bone Mineral in the Treatment of Intrabony Periodontal Defects in Humans V. Lekovic, P. Camargo, M. Weinländer, M. Nedic., Z. Aleksic, EB Kenney J Periodontol 2000; 71.

Human Histologic Evaluation of a Bovine-Derived Bone Xenograft in the Treatment of Periodontal Osseous Defects J.T. Mellonig Int J Periodontics Restorative Dent 2000; 20.

The Clinical Evaluation of Periodontal Surgery with Porous Bone Graft Material (Bio-Oss®) and Collagen Membrane (Bio-Gide®) A. Ohazama, H. Kitamura, M. Suzuki, S. Yamada, K. Hasegawa Journal of the Japanese Society of Periodontology 1999; 41.

Clinical evaluation of Bio-Oss®: a bovine-derived xenograft for the treatment of periodontal osseous defects in humans CR Richardson, JT Mellonig, MA Brunsvold, HAT McDonnell, DL Cochran J Clinical Periodontol, 1999; 26.

## to top **8. Soft-tissue regeneration**

Evaluation of the tissue reaction to a new bilayered collagen matrix in vivo and its translation to the clinic. Ghanaati S, Schlee M, Webber MJ, Willershausen I, Barbeck M, Balic E, Görlach C, Stupp SI, Sader RA, Kirkpatrick CJ. Biomed Mater. 2011;6(1) Local tolerance and efficiency of two prototype collagen matrices to increase the width of keratinized tissue. Jung RE, Hürzeler MB, Thoma DS, Khraisat A, Hämmerle CH. J Clin Periodontol 2011;38(2):173-9.

Use of a Porcine Collagen Matrix as an Alternative to Autogenous Tissue for Grafting Oral Soft Tissue Defects. Herford A. S., L. Akin et al. J Oral Maxillofac Surg, 2010; 68(7):1463-1470.

Xenogeneic Collagen Matrix with Coronally Advanced Flap compared to Connective Tissue with Coronally Advanced Flap for the Treatment of Dehiscence-Type Recession Defects. McGuire M.K. and E.T. Scheyer J Periodontol 2010; 81.

Clinical evaluation of a new collagen matrix (Mucograft prototype) to enhance the width of keratinized tissue in patients with fixed prosthetic restorations: a randomized prospective clinical trial. Sanz, M., R. Lorenzo, et al. J Clin Periodontol 2009; 36(10): 868-76.

Treatment of gingival recession with coronally advanced flap procedures: a systematic review Cairo, F., U. Pagliaro, et al. J Clin Periodontol 2008; 35(8 Suppl): 136-62.

### to top **9. Geistlich Bio-Oss® Characteristics**

The effect of deproteinized bovine bone on osteoblast growth factors and proinflammatory cytokine production. Amerio P, Vianale G, Reale M, Muraro R, Tulli A, Piattelli A. Clin Oral Implants Res 2010;21(6):650-5.

Human osteoclast formation and activity on a xenogenous bone mineral. Perrotti, V., B. M. Nicholls, et al. J Biomed Mater Res A 2009; 90(1): 238-46.

Histologic and elemental microanalytical study of anorganic bovine bone substitution following sinus floor augmentation in humans Traini T, Degidi M, Sammons R, Stanley P, Piattelli A. J Periodontol, 2008; 79(7): 232-240.

A histological and histomorphometric evaluation of inorganic bovine bone retrieved 9 years after a sinus augmentation procedure. Traini T, Valentini P, Iezzi G, Piattelli A. J Periodontol 2007, 78, 955 - 961.

Acceleration of de novo bone formation following application of autogenous bone to particulated anorganic bovine material in vivo. Thorwarth M, Schlegel KA, Wehrhan F, Srour S, Schultze-Mosgau S. Oral Surg Oral Med Oral Pathol Oral Radiol Endod 2006; 101(3): 309-316

Microvessel density and vascular endothelial growth factor expression in sinus augmentation using Bio-Oss. Degidi M, Artese L, Rubini C, Perrotti V, Iezzi G, Piattelli A. Oral Dis 2006; 12(5): 469-475.

Genetic effects of anorganic bovine bone (Bio-Oss) on osteoblast-like MG63 cells. Carinci F, Piattelli A, Degidi M, Palmieri A, Perrotti V, Scapoli L, Martinelli M, Laino G, Pezzetti F. Arch Oral Biol, 2006; 51: 154-163.

Maxillary Sinus Augmentation with Bio-Oss particles: A Light, Scanning, and Transmission Electron Microscopy Study in Man Orsini G, Traini T, Scarano A, Degidi M, Perrotti V, Piccirilli M, Piattelli A. J Biomed Mater Res 2005 Part B : Appl Biomater 74B :448-457.

Histomorphometric analysis of natural bone mineral for maxillary sinus augmentation John HD, Wenz B Int J Oral Maxillofac Implants 2004; 19: 199-207.

Ten-year follow-up in a maxillary sinus augmentation using anorganic bovine bone (Bio-Oss). A case report with histomorphometric evaluation. Sartori S, Silvestri M, Forni F, Icaro Cornaglia A, Tesesi P, Cattaneo V. Clin Oral Impl Res 2003; 14(3): 369-372

The ultrastructure of anorganic bovine bone and selected synthetic hydroxyapatite used as bone graft substitute materials Benezra Rosen V., Hobbs L.W., Spector M. Biomaterials 2002; 22: 921-928.

Orthodontic movement in bone defects augmented with Bio-Oss® - An experimental study in dogs MG Araujo, D. Carmagnola, T. Berglundh, B. Lindhe J Clin Periodontol 2001; 28.

Three-dimensional cultivation of human osteoblast-like cells on highly porous natural bone mineral Y. Açil, H. Terheyden, A. Dunsche, B. Fleiner, S. Jepsen J Biomed Mater Res 2000; 52.

Analysis of the size of the specific surface area of bone regeneration materials by gas adsorption G. Weibrich, R. Trettin, S.H. Gnoth, H. Götz, H. Duschner, W. Wagner Mund Kiefer Gesichts Chir 2000; 156.

Bone Reactions to Anorganic Bovine Bone (Bio-Oss®) Used in Sinus Augmentation Procedures: A Histologic Long-Term Report of 20 Cases in Humans M. Piatelli, GA Favero, A. Scarano, G. Orsini, A. Piatelli Int J Oral Maxillofac Implants 1999 ; 14(6).

Tissue Reaction and Material Characteristics of four Bone Substitutes Jensen S.S., Merete A., Pinholt E.M., Hjørting-Hansen E., Melsen F., Ruyter E. Int J Oral Maxillofac Implants 1996 ; 11: 55-66.

[to top](#)

## **10. Geistlich Bio-Gide® Characteristics**

Functional assay, expression of growth factors and proteins modulating bone-arrangement in human osteoblasts seeded on an anorganic bovine bone biomaterial. Trubiani O, Fulle S, Traini T, Paludi M, la Rovere R, Orciani M, Caputi S, Piattelli A. Eur Cell Mater 2010;20:72-83.

Effect of two bioabsorbable barrier membranes on bone regeneration of standardized defects in calvarial bone: a comparative histomorphometric study in pigs. Bornstein, M. M., G. Heynen, et al. J Periodontol 2009; 80(8): 1289-99.

Immunohistochemical characterization of guided bone regeneration at a dehiscence-type defect using different barrier membranes: an experimental study in dogs. Schwarz, F., D. Rothamel, et al. Clin Oral Implants Res 2008; 19(4): 402-15.

Cross-linked and non-cross-linked collagen barrier membranes disintegrate following



surgical exposure to the oral environment: a histological study in the cat Tal H, Kozlovsky A, Artzi Z, Nemcovsky CE, Moses O. Clin Oral Implants Res 2008; 19: 760-766.

Angiogenesis pattern of native and cross-linked collagen membranes: an immunohistochemical study in the rat. Schwarz, F., D. Rothamel, et al. Clin Oral Implants Res 2006; 17(4): 403-9.

Membrane durability and tissue response of different bioresorbable barrier membranes: a histologic study in the rabbit calvarium Von Arx T, Broggini N, Storgard S, Bornstein M, Schenk R, Buser D Int J Oral & Maxillofacial Impl 2005; 20: 843-853

Biodegradation of differently cross-linked collagen membranes: an experimental study in the rat Rothamel D, Schwarz F, Sager M, herten M, Sculean A, Becker J. Clin Oral Impl Res 2005; 16: 369-378.

Biocompatibility of various collagen membranes in cultures of human PDL fibroblasts and human osteoblast-like cells Rothamel D, Schwarz F, Sculean A, Herten M, Scherbaum W, Becker J. Clin Oral Impl Res 2004; 15: 443-449.

Compatibility of resorbable and nonresorbable guided tissue regeneration membranes in cultures of primary human periodontal ligament fibroblasts and human osteoblast-like cells B. Alpar, G. Leyhausen, H. Günay, W. Geurtsen Clin Oral Invest 2000, 4:219-225.

[to top](#)

## **11. Safety**

Analysis of the risk of transmitting bovine spongiform encephalopathy through bone grafts derived from bovine bone B. Wenz, B. Oesch, M. Horst Biomaterials 2001; 22.

[to top](#)

## **12. Comparison with other...**

### **a ...bone substitute materials**

Comparison of a synthetic bone substitute composed of carbonated apatite with an anorganic bovine xenograft in particulate forms in a canine maxillary augmentation model. Kim do K, Lee SJ, Cho TH, Hui P, Kwon MS, Hwang SJ. Clin Oral Implants

Res. 2010 Dec;21(12):1334-44.

Novel ceramic bone replacement material Osbone® in a comparative in vitro study with osteoblasts. Bernhardt A, Lode A, Peters F, Gelinsky M. Clin Oral Implants Res. 2011 Jun;22(6):651-7.

Periodontal regeneration capacity of equine particulate bone in canine alveolar bone defects. Kim TI, Chung CP, Heo MS, Park YJ, Rhee SH. J Periodontal Implant Sci. 2010 Oct;40(5):220-6. Epub 2010 Oct 31.

Surgical regenerative treatment of peri-implantitis lesions using a nanocrystalline hydroxyapatite or a natural bone mineral in combination with a collagen membrane: a four-year clinical follow-up report. Schwarz, F., N. Sahm, et al. J Clin Periodontol 2009; 36(9): 807-14.

Comparative study of biphasic calcium phosphates with different HA/TCP ratios in mandibular bone defects. A long-term histomorphometric study in minipigs Jensen SS, Bornstein MM, Dard M, Bosshardt DD, Buser D. J Biomed Mater Res B Appl Biomater 2009; 90(1):171-81

Histologic and histomorphometric evaluation of two bone substitute materials for bone regeneration: an experimental study in sheep. Paknejad, M., S. Emtiaz, et al. Implant Dent 2008 17(4): 471-9.

The amount of newly formed bone in sinus grafting procedures depends on tissue depth as well as the type and residual amount of the grafted material Artzi Z, Kozlovsky A, Nemcovsky CE, Weinreb M. J Clin Periodontol. 2005; 32: 193-199. Comparison of Porous Bone Mineral and Biologically Active Glass in Critical-Sized Defects J.M. Schmitt, D.C. Buck, S.Joh, S.E. Lynch, J.O. Hollinger J Periodontology 1997; 68(11): 1043-53.

## **b ... membranes**

Guided bone regeneration with a synthetic biodegradable membrane: a comparative study in dogs. Jung RE, Kokovic V, Jurisic M, Yaman D, Subramani K, Weber FE. Clin Oral Implants Res. 2011 Aug;22(8):802-7.

Vertical ridge augmentation with autogenous bone grafts 3 years after loading: resorbable barriers versus titanium-reinforced barriers. A randomized controlled clinical trial. Merli M, Lombardini F, Esposito M. Int J Oral Maxillofac Implants. 2010 Jul-Aug;25(4):801-7.

Cellular inflammatory response to porcine collagen membranes. Patino MG, Neiders ME, Andreana S, Noble B, Cohen RE. Periodontal Res. 2003 Oct;38(5):458-64.

Vivosorb((R)) as a barrier membrane in rat mandibular defects. An evaluation with transversal microradiography Hoogeveen, E. J., P. F. Gielkens, et al. Int J Oral Maxillofac Surg 2009 ; doi:10.1016/j.ijom.2009.04.002

Vivosorb, Bio-Gide, and Gore-Tex as barrier membranes in rat mandibular defects: an evaluation by microradiography and micro-CT Gielkens PF, Schortinghuis J, et al.

Clin Oral Implants Res; 2008 19(5): 516-21.

Long-term bio-degradation of cross-linked and non-cross-linked collagen barriers in human guided bone regeneration Tal H, Kozlovsky A, et al. Clin Oral Implants Res, 2008; 19(3): 295-302.

Ossification of a novel crosslinked porcine collagen barrier in guided bone regeneration in dogs. Zubery Y, Goldlust A, Alves A, Nir E. J Periodontol 2007, 78, 112-121.

[to top](#)

### **13. Growth factors and carriers**

Prefabrication of vascularized bone grafts using recombinant human osteogenic protein-1--part 3: dosage of rhOP-1, the use of external and internal scaffolds. Terheyden H, Menzel C, Wang H, Springer IN, Rueger DR, Acil Y. Int J Oral Maxillofac Surg 2004; 33(2): 164-72.

Platelet-Derived Growth Factor Enhancement of a Mineral-Collagen Bone Substitute E.B. Stephan, R. Renjen, S.E. Lynch, R. Dziak J Periodontol 2000; 71.

Recombinant human osteogenic protein 1 in the rat mandibular augmentation model: differences in morphology of the newly formed bone are dependent on the type of carrier H. Terheyden, S. Jepsen, St. Vogeler, M. Tucker, D.C. Rueger Mund Kiefer Gesichtschir 1997; 1: 272-275.

[to top](#)

### **14. PRP and stem cells**

In vivo Comparison of Hard Tissue Regeneration with Human Mesenchymal Stem Cells processed either the FICOLL- or the BMAC-Method. Sauerbier S, Stricker A, Kuschnierz J, Buehler F, Oshima T, Xavier SP, Schmelzeisen R, Gutwald R. Tissue Eng Part C Methods. 2009.

Effect of platelet-rich plasma on the healing of intra-bony defects treated with a natural bone mineral and a collagen membrane. Döri F, Huzar T, Nikolidakis D, Arweiler N.B., Gera I, Sculean A. J Clin Periodontol 2007; 34: 254-261.

The effect of platelet-rich plasma on bone healing around implants placed in bone defects treated with Bio-Oss: a pilot study in the dog tibia. You TM, Choi BH, Li J, et al. Oral Surg Oral Med Oral Pathol Oral Radiol Endod 2007, 103, e8 - e12.

[to top](#)

## **15. Cranio Maxillofacial**

Resorbable collagen membrane in surgical repair of fistula following palatoplasty in nonsyndromic cleft palate. Sader R, Seitz O, Kuttenger J. Int J Oral Maxillofac Surg 2010.

[to top](#)