

Vestibuloplasty with a three-dimensional collagen matrix: a case study

The importance of peri-implant soft tissue: widening the zone of attached gingiva

Dr Jonas Lorenz, Professor Robert Sader, Professor Shahram Ghanaati

Literature

1. Brito C, Tenenbaum HC, Wong BKC, Schmitt C, Nogueira-Filho G (2014) Is keratinized mucosa indispensable to maintain peri-implant health? A systematic review of the literature. *J Biomed Mater Res B Appl Biomater* 102(3):643–650
2. Lin GH, Chan HL, Wang HL (2013) The significance of keratinized mucosa on implant health: a systematic review. *J Periodontol* 84(12):1755–1767
3. Buyukozdemir Askin S, Berker E, Akincibay H, Uysal S, Erman B, Tezcan I (2015) Necessity of keratinized tissues for dental implants: a clinical, immunological, and radiographic study. *Clin Implant Dent Relat Res* 17(1):1–12
4. Reddy VK, Parthasarathy H, Lochana P (2013) Evaluating the clinical and esthetic outcome of apically positioned flap technique in augmentation of keratinized gingiva around dental implants. *Contemp Clin Dent* 4(3):319–324
5. Basegmez C, Karabuda ZC, Demirel K, Yalcin S (2013) The comparison of acellular dermal matrix allografts with free gingival grafts in the augmentation of peri-implant attached mucosa: a randomised controlled trial. *Eur J Oral Implantol* 6(2):145–152
6. Herford AS, Tandon R, Pivetti L, Cicci M (2015) Pedicled lingual flap to provide keratinized tissue regeneration over dental implants: a description of the technique and a case report. *J Oral Implantol* 41(2):196–199
7. Schmitt CM, Tudor C, Kiener K, Wehrhan F, Schmitt J, Eitner S, Agaimy A, Schlegel KA (2013) Vestibuloplasty: porcine collagen matrix versus free gingival graft: a clinical and histologic study. *J Periodontol* 84(7):914–923
8. De Santis D, Cucchi A, de Gemmis A, Nocini Pier F (2012) New collagen matrix to avoid the reduction of keratinized tissue during guided bone regeneration in postextraction sites. *J Craniofac Surg* 23(3):186–189
9. Park SH, Wang HL (2012) Pouch roll technique for implant soft tissue augmentation: a variation of the modified roll technique. *Int J Periodontics Restorative Dent* 32(3):116–121
10. Park JB (2006) Increasing the width of keratinized mucosa around endosseous implant using acellular dermal matrix allograft. *Implant Dent* 15(3):275–281
11. Mohammadi M, Mofid R, Shokrgozar MA (2011) Peri-implant soft tissue management through use of cultured gingival graft: a case report. *Acta Med Iran* 49(5):319–324
12. Lee KH, Kim BO, Jang HS (2010) Clinical evaluation of a collagen matrix to enhance the width of keratinized gingiva around dental implants. *J Periodontal Implant Sci* 40(2):96–101
13. Zucchelli G, Mele M, Stefanini M, Mazzotti C, Marzadori M, Montebugnoli L, de Sanctis M (2010) Patient morbidity and root coverage outcome after subepithelial connective tissue and de-epithelialized grafts: a comparative randomized-controlled clinical trial. *J Clin Periodontol* 37(8):728–738
14. Ghanaati S, Schlee M, Webber MJ, Willershausen I, Barbeck M, Balic E, Görlach C, Stupp SI, Sader R, Kirkpatrick CJ (2011) Evaluation of the tissue reaction to a new bilayered collagen matrix in vivo and its translation to the clinic. *Biomed Mater* 6(1):015010

15. Sanz M, Lorenzo R, Aranda JJ, Martin C, Orsini M (2009) 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. *J Clin Periodontol* 36(10):868–876
16. Cardaropoli D, Tamagnone L, Roffredo A, Gaveglio L (2012) Treatment of gingival recession defects using coronally advanced flap with a porcine collagen matrix compared to coronally advanced flap with connective tissue graft: a randomized controlled clinical trial. *J Periodontol* 83(3):321–328
17. Buser D, Brägger U, Lang NP, Nyman S (1990) Regeneration and enlargement of jaw bone using guided tissue regeneration. *Clin Oral Implants Res* 1(1):22–32.
18. Chappuis V, Rahman L, Buser R, Janner S, Belser U, Buser D (2018) Effectiveness of Contour Augmentation with Guided Bone Regeneration: 10-Year Results. *J Dent Res* 97(3):266–274
19. Armstrong DG, Jude EB (2002) The role of matrix metalloproteinases in wound healing. *J Am Podiatr Med Assoc* 92(1):12–18
20. Fuchs S, Ghanaati S, Orth C, Barbeck M, Kolbe M, Hofmann A, Eblenkamp M, Gomes M, Reis RL, Kirkpatrick CJ (2009) Contribution of outgrowth endothelial cells from human peripheral blood on in vivo vascularization of bone tissue engineered constructs based on starch polycaprolactone scaffolds. *Biomaterials* 30(4):526–534
21. Fuchs S, Jiang X, Schmidt H, Dohle E, Ghanaati S, Orth C, Hofmann A, Motta A, Migliaresi C, Kirkpatrick CJ (2009) Dynamic processes involved in the pre-vascularization of silk fibroin constructs for bone regeneration using outgrowth endothelial cells. *Biomaterials* 30(7):1329–1338
22. Schenk RK, Buser D, Hardwick WR, Dahlin C (1994) Healing pattern of bone regeneration in membrane-protected defects: a histologic study in the canine mandible. *Int J Oral Maxillofac Implants* 9(1):13–29
23. Rocchietta I, Schupbach P, Ghezzi C, Maschera E, Simion M (2012) Soft tissue integration of a porcine collagen membrane: an experimental study in pigs. *Int J Periodontics Restorative Dent* 32(1):34–40
24. Ghanaati S (2012) Non-cross-linked porcine-based collagen I-III membranes do not require high vascularization rates for their integration within the implantation bed: a paradigm shift. *Acta Biomater* 8(8):3061–3072
25. Barbeck M, Lorenz J, Kubesch A, Booms P, Boehm N, Choukroun J, Sader R, Kirkpatrick CJ, Ghanaati S (2014b) Porcine dermis-derived collagen membranes induce implantation bed vascularization via multinucleated giant cells: a physiological reaction? *J Oral Implantol* 141230090404007
26. Barbeck M, Lorenz J, Grosse Holthaus M, Raetscho N, Kubesch A, Booms P, Sader R, Kirkpatrick CJ, Ghanaati S (2014a) Porcine dermis and pericardium-based, non cross-linked materials induce multinucleated giant cells after their in vivo implantation: A physiological reaction? *J Oral Implantol* 141208072802005
27. Thoma DS, Benic GI, Zwahlen M, Hämmerle CHF, Jung RE (2009) A systematic review assessing soft tissue augmentation techniques. *Clin Oral Implants Res* 20:146–165
28. Oates TW, Robinson M, Gunsolley JC (2003) Surgical therapies for the treatment of gingival recession. A systematic review. *Ann Periodontol Am Acad Periodontol* 8(1):303–320
29. Nevins M, Nevins ML, Kim SW, Schupbach P, Kim DM (2011) The use of mucograft collagen matrix to augment the zone of keratinized tissue around teeth: a pilot study. *Int J Periodontics Restorative Dent* 31(4):367–373
30. McGuire MK, Scheyer ET (2014) Randomized, controlled clinical trial to evaluate a xenogeneic collagen matrix as an alternative to free gingival grafting for oral soft tissue augmentation. *J Periodontol* 85(10):1333–1341
31. Schmitt CM, Moest T, Lutz R, Wehrhan F, Neukam FW, Schlegel KA (2015) Long-term outcomes after vestibuloplasty with a porcine collagen matrix (Mucograft) versus the free gingival graft: a comparative prospective clinical trial. *Clin Oral Implants Res*
32. Urban IA, Lozada JL, Nagy K, Sanz M (2015) Treatment of severe mucogingival defects with a combination of strip gingival grafts and a xenogeneic collagen matrix: a prospective case series study. *Int J Periodontics Restorative Dent* 35(3):345–353
33. Lorenz J, Blume M, Barbeck M, Teiler A, Kirkpatrick CJ, Sader RA, Ghanaati S (2017) Expansion of the peri-implant attached gingiva with a three-dimensional collagen matrix in head and neck cancer patients-results from a prospective clinical and histological study. *Clin Oral Investig* 21(4):1103–1111.

