

CASE REPORT

Reclaiming the Lost Bastion for Successful Implant Therapy: A Case Series

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ABSTRACT

Introduction: Periimplantitis is defined as an inflammatory process affecting the tissues around an osseointegrated implant in function, resulting in loss of supporting bone and, if allowed to progress, can result in loss of the implant. The frequency of periimplantitis ranging between 28 and 56% had been reported. To date, there is little evidence to indicate the most effective method of treatment for periimplantitis. This case series describes a regenerative treatment for restoration of bone and reduction of probing depth (PD) around a periimplantitis-affected implant.

Materials and methods: After nonsurgical therapy, three patients underwent complete debridement and decontamination followed by usage of various combinations of regenerative materials to correct the defects, i.e., osseograft, healiguide, and platelet-rich fibrin (PRF). Implant surface modification was done with laser. Clinical and X-ray parameters were recorded at baseline and 6 months follow-up.

Results: A 6 months follow-up showed that the periimplant tissues were healthy and stable. Radiographic examination revealed the matured bone fill. No progression of bone loss was detected.

Conclusion: Elucidation of factors of importance for peri-implant tissue destruction should make it easier to predict which patient or implant is at risk for peri-implant complications during maintenance and retention of implants. Complete debridement and decontamination are crucial in treating periimplantitis and still remain the "gold standard."

Keywords: Healiguide, Osseograft, Periimplantitis, Platelet-rich fibrin.

How to cite this article: Jaiswal R, Mahantesha S, Ashwini S. Reclaiming the Lost Bastion for Successful Implant Therapy: A Case Series. *Int J Oral Implantol Clin Res* 2016;7(1):10-16.

Source of support: Nil

Conflict of interest: None

INTRODUCTION

Dental rehabilitation techniques have come to offer highly predictable results. Hence, it has been armored with one

or more elements to be included in the wide range of therapeutic alternatives for totally or partially edentulous patients. However, some complications have been described in relation to such treatments, the progressive loss of alveolar bone perhaps being the most salient.

Bone destruction may proceed without any notable signs of mobility until osseointegration is completely lost. Microbial colonization of the dental implants and infection of the peri-implant tissues can cause peri-implant bone destruction and may lead to implant failure.

Periimplantitis is defined as an inflammatory process affecting the tissues around an osseointegrated implant in function, resulting in loss of supporting bone.¹ The term "peri-implant mucositis" has been proposed for reversible inflammations of the soft tissues surrounding implants in function.² Similar to the etiology of periodontitis, dental plaque and biofilm are regarded as the primary causes of periimplantitis.³ Some parameters, such as age, poor oral hygiene, absence of keratinized tissue, and overloading are also considered as possible periimplantitis etiological factors.⁴⁻⁶ Besides, diabetes, bone metabolic diseases, and genetic changes have been linked with it.⁷

The frequency of periimplantitis ranging between 28 and 56% had been reported in previous studies.⁸ With the increased popularity of implants among patients and in clinical practice as well, the incidence of periimplantitis has also increased simultaneously. This has ultimately led to the need for effective and predictable treatment options.

Based on the severity and extent of the disease, treatment modalities have been broadly classified as conservative and surgical approaches. Conservative therapy includes manual treatment, drug therapy, laser therapy, photodynamic therapy, while surgical therapy encompasses resective, and regenerative approaches.⁹ Though various alternatives have evolved as treatment modalities, studies have proved them to be only an adjunct, with resective and regenerative therapy still being the gold standard.^{3,5}

Laser therapy has minor beneficial effects and results are not stable after 6 months and, thus, a need to repeat laser therapy has been reported.¹⁰ On the contrary, surgical approaches demonstrate relative efficacy in the management of periimplantitis.^{3-5,11,12} Open debridement, surface decontamination, and regenerative procedures may resolve periimplantitis and promote bone fill.^{3,4,11} Peri-implant defect fill using a bone substitute with or

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Fig. 1: Preoperative photograph (case 1)

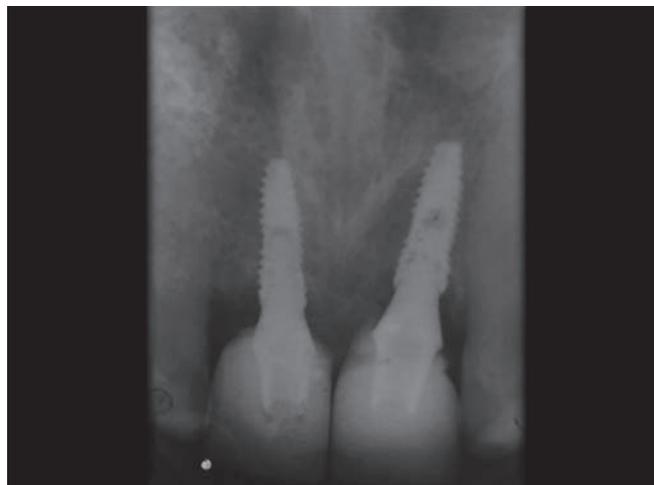


Fig. 2: Preoperative radiograph (case 1)

without a membrane technique for treating periimplantitis was found to be maintained over 3 years.¹³

To enhance the level of patient expectations and compliance, it is of special interest to determine whether it is possible to maintain the affected implant by bone grafting techniques and bone regenerative procedures and rebuild the previously lost implant tissues. Therefore, the aim of this case series is to present the surgical improvement of periimplantitis, with a 6 months follow-up. Complete debridement and decontamination followed by usage of various combinations of regenerative materials was performed to correct the defects. Favorable treatment results along with oral hygiene maintenance and regular follow-ups ensured long-term stability in these cases.

CASE REPORTS

Case 1

A 60-year-old male patient reported to the Department of Periodontology, MS Ramaiah Dental College and Hospital, Bengaluru, complaining of mobility, swelling, and persistent discomfort in relation to (i.r.t) the upper front teeth region. He gave the history of undergoing placement of the implant 1 year back in the same region and it had been in function before his visit. No abnormal habits were present. His clinical findings revealed inflammation i.r.t 21, grade I mobility, probing depth (PD) of 8 mm i.r.t mesial aspect, and 5 mm i.r.t distal aspect associated with bleeding on probing (Fig. 1). Radiographic examination showed radiolucency around the mesial and distal aspects of the implant (Fig. 2).

The patient was informed that the existing periimplantitis might result in further bony destruction, gingival recession, and implant loss. Potential risks and benefits of treatment options were discussed with the patient, and surgical debridement followed by guided bone regeneration (GBR) at 21 was scheduled. Informed consent was taken.

Surgical Debridement, Decontamination, and GBR

The patient was prescribed amoxicillin (500 mg, three times a day for 1 week) starting 1 day preoperatively. Intraoperatively, since the prosthesis was grade I mobile (21), splinting was performed with respect to 11,21,22 with a stainless steel wire using composite to stabilize it during the procedure. The area was locally anesthetized with infraorbital and nasopalatine nerve block after which an intracrevicular incision was given. Following this, a full-thickness mucoperiosteal flap was raised to expose the bony defects at implant 21. The granulation tissue was removed with a stainless steel hand instrument, and a thorough mechanical debridement was done. Subsequently, a bovine-derived xenograft (Bio-Oss) was placed (Figs 3 and 4). The site was ultimately sutured with 3-0 black silk and a Coe-Pak was placed (Fig. 5).

The patient was encouraged to maintain oral hygiene well. Thereafter, regular toothbrushing was encouraged. Besides, the patient was asked to rinse with 0.12%



Fig. 3: Incision and reflection



Fig. 4: Graft placement



Fig. 5: Suturing

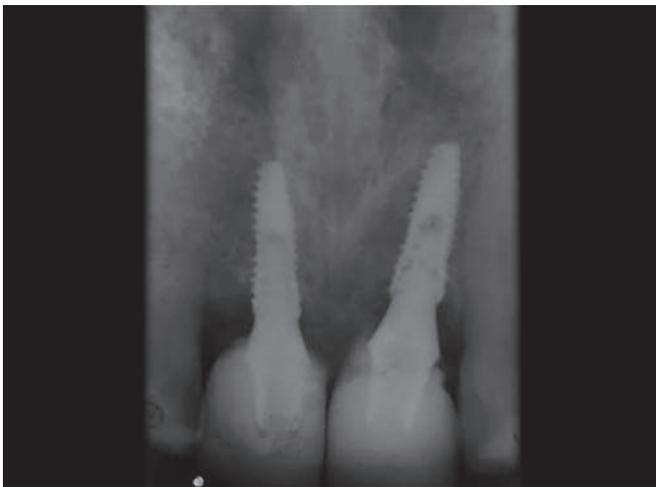


Fig. 6: Postoperative radiograph (case 1)



Fig. 7: Preoperative photograph (case 2)

chlorhexidine during the first 6 weeks after surgery. The postoperative radiograph demonstrated the radiopacity of the bone grafting material.

Definitive Restoration and Follow-up

A 6 months follow-up showed that the peri-implant tissues were healthy and stable. Radiographic examination revealed the matured bone fill i.r.t both mesial and distal aspects (Fig. 6). The surgical treatment ceased the progression of periimplantitis and established a maintainable environment for oral hygiene. However, good plaque elimination and regular follow-ups are crucial for long-term implant stability.

Case 2

Another male patient 40 years of age reported to the department complaining of swelling and bleeding i.r.t lower left back teeth region. He also gave the history of placement of implant in the same area 1½ years back. His

intraoral finding revealed inflammation i.r.t 36 and a PD of 5 mm associated with bleeding on probing (Fig. 7). Radiographically, a reasonable amount of bone loss was appreciated in the marginal area of 36 (Fig. 8).

The patient was informed about the progressive bony destruction and gingival recession, and ultimately implant loss. Potential risks and benefits of treatment options were discussed with the patient, and surgical debridement followed by GBR at 36 was scheduled. Informed consent was taken.

Surgical Debridement, Decontamination, and GBR

The patient was prescribed amoxicillin (500 mg, three times a day for 1 week) starting 1 day preoperatively. All the standard treatment protocols as for the previous case were followed. That is, a full thickness mucoperiosteal flap was elevated after local anesthesia and intracrevicular incision. The granulation tissue was removed with a stainless steel hand instrument. Following this procedure,

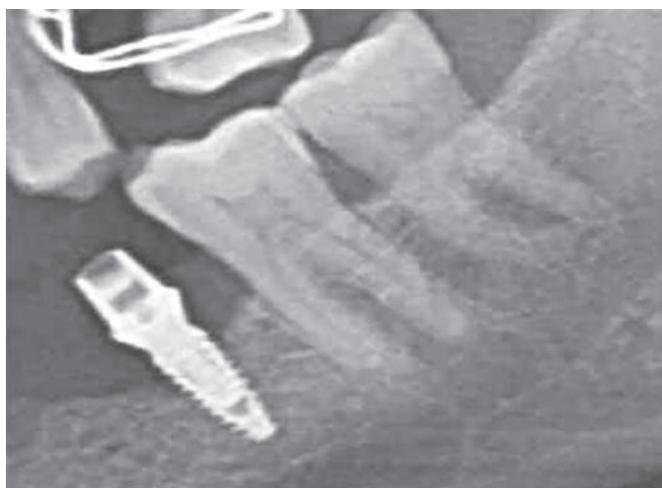


Fig. 8: Preoperative radiograph (case 2)



Fig. 9: Postoperative radiograph (case 2)



Fig. 10: Preoperative photograph (case 3)



Fig. 11: Preoperative radiograph (case 3)

a bone graft was placed. Finally, a resorbable collagen membrane (healiguide) was utilized to differentiate cell growth. Ultimately, a suture and Coe-Pak were placed.

All the similar postoperative instructions were given to encourage proper oral hygiene.

Definitive Restoration and Follow-up

A 6 months follow-up in this case also showed that the peri-implant tissues were healthy and stable. Radiographically, a considerable amount of bone fill was observed in the crestal area of 36 (Fig. 9). Significant improvement was seen with cessation of periimplantitis, and a maintainable environment for oral hygiene was obtained. However, good plaque elimination and regular follow-ups are important for long-term implant stability.

Case 3

A 45-year-old male patient reported to the Department of Periodontology, MS Ramaiah Dental College and Hospital, Bengaluru, complaining of swelling and bleeding i.r.t

upper left back teeth region with the history of placement of an implant 1 year back. His intraoral findings disclosed inflammation i.r.t 16, with a PD of 5 mm associated with bleeding on probing (Figs 10 and 11).

Patient was informed about the potential risks and benefits of treatment. A detailed informed consent was obtained. Following this procedure, the treatment was carried out.

Surgical Debridement, Decontamination, and GBR

The patient was prescribed amoxicillin (500 mg, three times a day for 1 week) starting 1 day preoperatively. All the standard treatment protocols as for both the previous cases were followed, along with the additional placement of platelet-rich fibrin (PRF) following the placement of bone graft. Ultimately, the site was closed with a suture and Coe-Pak.

All the similar postoperative instructions were given to encourage proper oral hygiene.

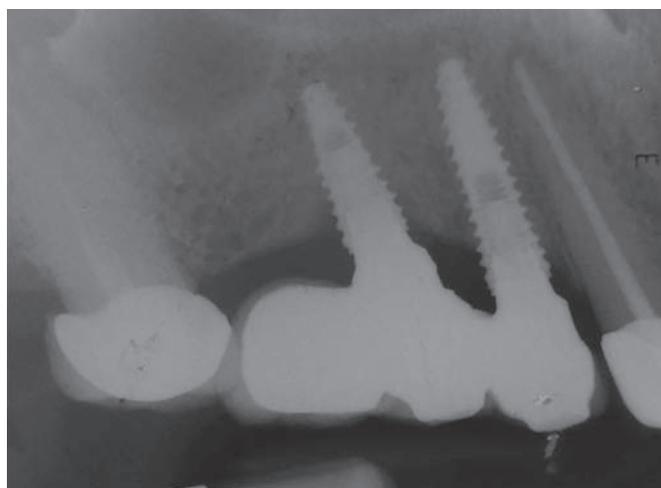


Fig. 12: Postoperative radiograph (case 3)

Definitive Restoration and Follow-up

A 6 months follow-up showed comparatively stable results. Radiographically, a fair amount of bone fill was observed in the crestal area of 16 (Fig. 12). The progression of periimplantitis was seen to halt. However, maintenance of good plaque control and regular follow-ups are inevitable for long-term implant stability.

DISCUSSION

Periimplantitis is an inflammatory reaction with the loss of supporting bone in the tissues surrounding a functioning implant.¹

Periimplantitis in this case might be attributed to bacterial invasion, which could be worsened by the unfavorable implant positioning, improper management of tissues at the implant sites, lack of oral hygiene, and irregular check-up visits.

Furthermore, extensive inflammation without proper intervention was presumed to exacerbate the bony destruction surrounding the implants.

Patients with a history of periodontitis show an increased risk for peri-implant disease compared with nonperiodontitis patients.¹⁴ Implants placed in patients suffering from aggressive periodontitis had a tendency for greater crestal bone-level changes and probing pocket depth.¹⁵ The FEA studies show that occlusal load is concentrated at the implant marginal bone. Excessive stress can cause microfracture within bone and eventual bone loss.¹⁶ However, occlusal examination revealed no heavier or premature contacts on the implant-supported bridge, which excluded the possibility of overloading.

Nonsurgical debridement may not be adequate for removing bacterial load from implant surfaces with peri-implant pockets ≥ 5 mm.^{5,17} In this case, open flap debridement and decontamination were performed to completely remove the granulation tissue and condition the affected

implant surfaces respectively. Due to the fact that therapy with conventional curettes is capable of modifying the implant surface and roughening the surface, it has been recommended that the material of the tip should be softer than titanium.^{18,19} It is possible to reduce bleeding on probing scores by cleaning with piezoelectric scalers as well as with hand instruments, and no differences have been found between these methods concerning reduction of bleeding on probing, plaque index, and PDs after at least 6 months. Therefore, the extent of mechanical debridement was reported to be more essential than the material selected.^{20,21}

The surgical therapy combines the concepts of the already-mentioned nonsurgical therapy with those of resective and/or regenerative procedures. The indication for the appropriate treatment strategy has been demonstrated in patient studies leading to the development of the "cumulative interceptive supportive therapy" concept.^{2,22,23} Intervention should be performed if PDs exceed 5 mm or are progressive as well as under occurrence of local inflammation signs.²⁴

The combined surgical resective/regenerative therapy of moderate-to-advanced periimplantitis defects has demonstrated more predictable clinical improvements than a regenerative approach alone.²⁵ The combination of natural bone mineral and collagen membrane in GBR seemed to correlate with greater improvements in probing pocket depth and clinical attachment level.²⁶

The application of bone substitutes can be efficacious for the treatment of periimplantitis lesions.^{5,12} Schwarz et al²⁷ applied GBR in periimplantitis defects under non-submerged healing and obtained clinically significant improvements. In a similar study with 4 years follow-up, the combination of natural bone mineral and collagen membrane in GBR seemed to correlate with greater improvements in probing pocket depth and clinical attachment level.²⁶

In these cases, xenograft was used for regeneration of bone. It was reported that xenograft with a slow resorption property facilitates space creation and maintenance.²⁸ In another study, bovine-derived xenogenic material was compared with autogenous bone as filling material for infracrestal defects.

The xenograft provided radiologically more bone fill and decreases in pocket depths, while bleeding on probing and suppuration were observed in both procedures.²⁹ Meanwhile, a membrane can exclude soft tissue, thereby enhancing bone formation.³⁰ The results of studies using a combination of membranes and bone graft materials were superior to those using membranes or bone grafts alone and tend to give the best results.

The PRF is a leukocyte and platelet preparation that concentrates various polypeptide growth factors and,

therefore, has the potential to be used as a regenerative treatment for periodontal as well as peri-implant defects.³¹ Therefore, a combination of PRF and osseograft was used.

Although some therapies have demonstrated beneficial effects in treating periimplantitis, evidence is inadequate to support a specific treatment protocol.^{3,5,17,32} Many factors, such as oral hygiene, occlusion, implant surfaces, hard and soft tissue conditions, patient cooperation, and expectations should be considered before making a treatment plan. Most importantly, the potential risks and benefits of treatment alternatives should be informed and discussed before intervention, which should be evaluated on an individual basis.

CONCLUSION

These cases present varied treatment alternatives, the combination of which can be used for the resolution of periimplantitis with stable treatment outcome. Elucidation of factors of importance for peri-implant tissue destruction should make it easier to predict which patient or implant is at risk for peri-implant complications during maintenance and retention of implants. Complete debridement and decontamination are crucial in treating periimplantitis.

The existing tissue defects required augmentation to provide configurations for easy hygiene maintenance, which, in turn, contributed to long-term implant stability. In addition, patient oral hygiene and a maintenance program should be strictly performed to ensure stability after successful treatment of periimplantitis.

REFERENCES

- Albrektsson, T; Isidor, E. Consensus report of session W. In: Lang NP, Karring T, editors. Proceedings of the first European workshop on periodontology. London: Quintessence; 1994. p. 365-369.
- Mombelli A, Lang NP. The diagnosis and treatment of peri-implantitis. *Periodontol 2000* 1998 Jun;17:63-76.
- Singh P. Understanding peri-implantitis: a strategic review. *J Oral Implantol* 2011 Oct;37(5):622-626.
- Cortes AR, Ferraz P, Tosta M. Influence of etiologic factors in peri-implantitis: literature review and case report. *J Oral Implantol* 2012 Oct;38(5):633-637.
- Kotsovilis S, Karoussis IK, Trianti M, Fourmousis I. Therapy of peri-implantitis: a systematic review. *J Clin Periodontol* 2008 Jul;35(7):621-629.
- Kozlovsky A, Tal H, Laufer BZ, Leshem R, Rohrer MD, Weinreb M, Artzi Z. Impact of implant overloading on the peri-implant bone in inflamed and non-inflamed peri-implant mucosa. *Clin Oral Implants Res* 2007 Oct;18(5):601-610.
- Feloutzis A, Lang NP, Tonetti MS, Bürgin W, Brägger U, Buser D, Duff GW, Kornman KS. IL-1 gene polymorphism and smoking as risk factors for peri-implant bone loss in a well-maintained population. *Clin Oral Implants Res* 2003 Feb;14(1):10-17.
- Lindhe J, Meyle J. Peri-implant diseases: Consensus report of the sixth European workshop on periodontology. *J Clin Periodontol* 2008 Sep;35(Suppl 8):282-285.
- Smeets R, Henningsen A, Jung O, Heiland M, Hammächer C, Stein JM. Definition, etiology, prevention and treatment of peri-implantitis – a review. *Head Face Med* 2014 Sep;10:34.
- Schwarz F, Aoki A, Becker J, Sculean A. Laser application in non-surgical periodontal therapy: a systematic review. *J Clin Periodontol* 2008 Sep;35(Suppl 8):29-44.
- Zitzmann NU, Berglundh T. Definition and prevalence of peri-implant diseases. *J Clin Periodontol* 2008 Sep;35(Suppl 8):286-291.
- Renvert S, Polyzois I, Claffey N. Surgical therapy for the control of peri-implantitis. *Clin Oral Implants Res* 2012 Oct;23(Suppl 6):84-94.
- Roos-Jansåker AM, Lindahl C, Persson GR, Renvert S. Long-term stability of surgical bone regenerative procedures of peri-implantitis lesions in a prospective case-control study over 3 years. *J Clin Periodontol* 2011 Jun;38(6):590-597.
- Lang NP, Berglundh T, Heitz-Mayfield LJ, Pjetursson BE, Salvi GE, Sanz M. Consensus statements and recommended clinical procedures regarding implant survivals and complications. *Int J Oral Maxillofac Implants* 2004;19:150-154.
- Hanggi MP, Hanggi DC, Schoolfield JD, Meyer J, Cochran DL, Hermann JS. Crestal bone changes around titanium implants. Part I: a retrospective radiographic evaluation in humans comparing two non-submerged implant designs with different machined collar lengths. *J Periodontol* 2005 May;76(5):791-802.
- Monje A, Suarez F, Galindo-Moreno P, García-Nogales A, Fu JH, Wang HL. A systematic review on marginal bone loss around short dental implants (<10 mm) for implant-supported fixed prostheses. *Clin Oral Implants Res* 2014 Oct;25(10):1119-1124.
- Graziani F, Figuero E, Herrera D. Systematic review of quality of reporting, outcome measurements and methods to study efficacy of preventive and therapeutic approaches to peri-implant diseases. *J Clin Periodontol* 2012 Feb;39(Suppl 12):224-244.
- Augthun M, Tinschert J, Huber A. *In vitro* studies on the effect of cleaning methods on different implant surfaces. *J Periodontol* 1998 Aug;69(8):857-864.
- Unursaikhan O, Lee JS, Cha JK, Park JC, Jung UW, Kim CS, Cho KS, Choi SH. Comparative evaluation of roughness of titanium surfaces treated by different hygiene instruments. *J Periodontal Implant Sci* 2012 Jun;42(3):88-94.
- Karring ES, Stavropoulos A, Ellegaard B, Karring T. Treatment of peri-implantitis by the Vector system. *Clin Oral Implants Res* 2005 Jun;16(3):288-293.
- Renvert S, Samuelsson E, Lindahl C, Persson GR. Mechanical non-surgical treatment of peri-implantitis: a double-blind randomized longitudinal clinical study I: clinical results. *J Clin Periodontol* 2009 Jul;36(7):604-609.
- Mombelli A. Etiology, diagnosis, and treatment considerations in peri-implantitis. *Curr Opin Periodontol* 1997;4:127-136.
- Lang NP, Berglundh T, Heitz-Mayfield LJ, Pjetursson BE, Salvi GE, Sanz M. Consensus statements and recommended clinical procedures regarding implant survival and complications. *Int J Oral Maxillofac Implants* 2004;19(Suppl):150-154.
- Schmage P. Befundorientiertes Behandlungskonzept bei periimplantären Infektionen. *Parodontol* 2010;21:339-358.
- Schwarz F, Sahm N, Iglhaut G, Becker J. Impact of the method of surface debridement and decontamination on the clinical outcome following combined surgical therapy of peri-implantitis:

- a randomized controlled clinical study. *J Clin Periodontol* 2011 Mar;38(3):276-284.
26. Schwarz F, Sahm N, Bieling K, Becker J. 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. *J Clin Periodontol* 2009 Sep;36(9):807-814.
 27. Schwarz F, Bieling K, Latz T, Nuesry E, Becker J. 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. *J Clin Periodontol* 2006 Jul;33(7):491-499.
 28. Park SH, Wang HL. Mucogingival pouch flap for sandwich bone augmentation: technique and rationale. *Implant Dent* 2005 Dec;14(4):349-354.
 29. Aghazadeh A, Rutger Persson G, Renvert S. A single-centre randomized controlled clinical trial on the adjunct treatment of intra-bony defects with autogenous bone or a xenograft: results after 12 months. *J Clin Periodontol* 2012 Jul;39(7):666-673.
 30. Lee A, Brown D, Wang HL. Sandwich bone augmentation for predictable horizontal bone augmentation. *Implant Dent* 2009 Aug;18(4):282-290.
 31. Lekovic V, Milinkovic I, Aleksic Z, Jankovic S, Stankovic P, Kenney EB, Camargo PM. Platelet-rich fibrin and bovine porous bone mineral vs platelet-rich fibrin in the treatment of intrabony periodontal defects. *J Periodontol Res* 2011 Aug;47(4):409-417.
 32. Bidra AS. No reliable evidence suggesting what is the most effective interventions for treating peri-implantitis. *Evid Based Dent* 2012 Jun;13(2):50-51.