



CASE STUDY

ADVANCED PERIODONTAL SURGERIES- REPORT OF 2 CASES WITH ONE YEAR FOLLOW-UP

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ABSTRACT

Advanced periodontal surgeries are amelioration of conventional periodontal surgeries. Advanced periodontal surgeries emphasizes on different regenerative procedures to reconstruct lost hard and soft tissue. It employs combination of 2 or more different surgical procedure, modification in incision & suturing techniques, exploit different materials, and interdisciplinary approach for favorable treatment outcome. This case report illustrating 2 cases with one year follow-up period which had been treated by utilizing principles of advanced periodontal surgeries. First case describes interdisciplinary approach for management of adjacent defect namely: Sieberts class III ridge defect and periapical cyst. Second case is management of palatal perforation associated with large periradicular cyst.

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INTRODUCTION

Periodontal surgery is an essential part of modern periodontal therapy. The focus of periodontal surgical procedure has shifted over past three decades from a terminology/ physiology based on resection (loss) to regeneration (gain). This leap from resection to regeneration narrates progression in periodontal surgeries from the last century to current scenario. The ultimate goal of periodontal surgery is to regenerate lost periodontal tissue to restore normal function, esthetics, phonetics and increase life-expectancy of teeth. This can be done by selection of appropriate surgical techniques and modifying the routine techniques as per cases. Following case series comprises of two unusual cases which have been managed by interdisciplinary approach.

Case 1:

A 38-year-old female patient reported to the Department of Periodontology, with missing right maxillary central incisor and recurrent discharge of pus in relation to maxillary left lateral incisor since the last 4 months. Her medical history did not reveal any systemic disease. There was a history of accident 4 months back after which her maxillary right central

incisor was extracted due to increased mobility. Dental history also revealed root canal treatment followed by Porcelain Fused to Metal crown with maxillary left lateral incisor, 3 months back. But patient complained of pus discharge from labial aspect of maxillary left lateral incisor one month after Root Canal Treatment. Presently, clinical and radiographic examinations revealed a Seibert's Class-III alveolar ridge defect (Seibert, 1983) in the edentulous region. Periodontal pocket of 7 mm was present on mesial aspect of maxillary left central incisor adjacent to edentulous area. Radio-graphic evaluation also revealed large periapical radiolucency at the apex of root canal treated maxillary left lateral incisor suggestive of periapical cyst/ granuloma. After complete evaluation of history, clinical condition, radiographic investigations, ridge augmentation using demineralised freeze dried bone allograft (DFDBA) + amnion membrane (AM) of the defective area in the maxillary alveolar ridge followed by conventional Fixed Partial Denture (FPD) to improve the esthetics & for management of periapical cyst apicoectomy with root end filling using Mineral Trioxide Aggregate (MTA) was planned. All the possible treatment options were discussed with the patient & she gave consent for the above procedure in one surgical appointment.

Surgical procedure

After administration of local anesthesia, a submarginal incision was given using a No. 15 scalpel blade extending from the

mesial aspect of left central incisor to mesial aspect of canine. Submarginal incision was chosen for esthetic purpose to prevent exposure of PFM margin postoperatively. Two vertical releasing incisions were made to gain access to the apex of the root. By using a blunt dissection, a full thickness flap was raised. Labially the bony window was enlarged, and thorough curettage of periapical area was carried out. Root end resection followed by retrograde filling using MTA was done. Partial Suturing on distal side was completed. For augmentation of localized ridge defect, a crevicular incision was given on the mesial aspect of left central incisor which continued as a crestal incision over the edentulous span till the mesial aspect of maxillary right lateral incisor, splitting its mesial papilla. Two vertical realizing incisions were also given. Upon elevation of full thickness mucoperiosteal flap, large vertical ridge defect measuring 5mm in width and 13mm in depth was noticed. Measurement of defect was made from a horizontal line taken at the CEJ of maxillary left central incisor. In addition, there was loss of the crestal height (7 mm) on mesial and buccal aspect of maxillary left central incisor. After complete debridement, a series of cortical perforations were performed using a round bur under saline irrigation to promote migration of hematopoietic cells into the wound space. Demineralized freeze-dried irradiated bone allograft; average particle size (500 μ), (Tata Memorial Hospital Tissue Bank, Mumbai) was directly compacted into the ridge defect. After placement of bone allograft, freeze-dried irradiated amnion membrane of size 3x3sq.cm was placed. (Tata Memorial Hospital Tissue Bank, Mumbai). After coming in contact with blood at the surgical site, AM quickly hydrates and was then adapted with hand instruments. AM was extended >3mm beyond defect borders. The mucoperiosteal flap was approximated with interrupted sutures. Periodontal pack was applied on the surgical area. Patient was reexamined after 24 hr and no post surgical complications were revealed. Periodontal pack & sutures were removed after one week. Upon follow up examination, at the end of first week there was absence of pus discharge. The labio-palatal contours and height of the alveolar ridge were now acceptable to place an esthetic FPD.

The current case, describes two adjacent defects -Siebert's Class III alveolar ridge defect (Seibert, 1983) with maxillary right central incisor region and periapical cyst with maxillary left lateral incisor, making this a complex case to treat. Studies have shown good results for treatment of infrabony defect with bone grafts and amnion membrane. (Dan *et al.*, 2013) Hence it was decided to use DFDBA+ AM for ridge augmentation. This is the first report, which uses DFDBA+AM for ridge augmentation. Placental allografts have been used in medicine for over 100 years. Their initial use can be traced back to early 1990s in skin wound applications and have been later used in ophthalmologic surgeries as well. Use of placental allografts in dentistry is a more recent development, with the first commercially available product being released in 2008. (Dan *et al.*, 2013) The currently available dental form of placental allograft is composed of cryopreserved, dehydrated amnion laminate. AMs possess a variety of proteins that provide a bioactive matrix to facilitate wound healing, including collagen types I, III, IV, V, and VI; 6 laminin-5; platelet-derived growth factor-a (PDGF-a); PDGF-b, fibroblast growth factor; and transforming growth factor. In addition to providing a bioactive matrix, studies have shown placental barriers to have antibacterial properties (Stock *et al.*, 2007) and to reduce

inflammation via inhibition of macrophages and polymorphonuclear neutrophils. (Kim *et al.*, 2000) Advantage of AM is it is extremely thin (300 μ), self adhering, requires no suture for fixation & no precise trimming for adaptation. DFDBA has the potential for osteoinduction with more expression of bone morphogenetic protein (BMP) & has shown excellent result in regenerative therapy. (Urist, 1965; Urist and Strates, 1971; Schwartz *et al.*, 1998) In this case Post operative results after 1 year showed completely filled buccal ridge concavity making it esthetically acceptable for a fixed prosthesis. The radiographs with maxillary left lateral incisor also revealed reduction in radiolucency in the periapical area, suggestive of repair in that region. MTA was chosen as a root end filling material by virtue of its properties such as low toxicity, biocompatibility, antibacterial action, reduced microleakage and favourable response to osteoblast. Two different procedure for two different indications can be combined successfully to produce remarkable result.

Case 2: A 27-year-old male patient reported to the department of endodontics with a chief complaint of discoloration of upper front teeth since past 7 years and persistent palatal perforation since past 2 years. There was a history of trauma 7 yrs ago in relation to upper anteriors which led to discoloration of teeth. Patient also experienced recurrent draining sinuses on labial as well as palatal aspect with respect to maxillary left central & lateral incisors since past 2 yrs. Healing with scar was seen with labial sinus tracts, however palatal sinus tract did not resolve since then causing food accumulation, putrefaction and bad breath. There was no associated pain and swelling in relation to palatal perforation. Patient gave history of some kind of surgery performed in a private clinic for the same area 6 months back but could not provide the details of the same. Intraoral examination revealed the presence of 7mm palatal sinus opening 3cm away from maxillary left lateral incisor and at 8mm distance from mid-palatine raphe. Due to its root position, periapical lesion associated with maxillary lateral incisor usually drains palatally. (Feherenbach and Herring, 1997) No Active pus drainage through the stoma of the sinus tracts and proliferation of the mucosal epithelium were evident. He did not report any symptoms of nasal regurgitation suggestive of no oro-nasal/ oro-antral communication. Upon clinical examination, discoloration of maxillary left central & lateral incisors observed and access of these teeth were found open. A periapical radiograph disclosed the presence of an unilocular, well defined radiolucency measuring 1.5 x 1.2mm involving maxillary left incisors and canine. Occlusal view of maxilla revealed periapical radiolucency involving left maxillary anteriors & an open apex in relation to maxillary left lateral incisor. For further radiographic evaluation, Cone beam Computed tomography was performed. The images showed well defined, unilocular, oval radiolucent structure measuring 11.38x11.45x11.87mm in relation to maxillary left anteriors. The three dimension images showed complete loss of buccal as well as palatal cortical plate over maxillary left incisors and canine. Based on radiographic and clinical observation, diagnosis of radicular cyst with persistent sinus with maxillary left incisors and canine was confirmed. The treatment plan included root canal therapy with respect to maxillary left incisors and canine. Surgical phase was planned in two stages. In the first stage, palatal rotational pedicle flap for coverage of palatal perforation was planned and surgical management of the cyst was employed in 2nd stage which included cyst enucleation and apicectomy in relation to maxillary left incisors and canine.

In our cases

	Different surgical procedures performed	Material used	Branches involved
Case 1	Ridge augmentation, apicoectomy	DFDBA, Amnion membrane, MTA	Periodontics, endodontics, prosthodontics
Case 2	Palatal rotational flap, Cyst enucleation, apicoectomy	DFDBA, Amnion membrane, MTA, gelfoam	Periodontics, Endodontics Oral medicine and radiology



Fig 1: Seibert Class III ridge defect with 7mm of recession on mesial aspect of 21. Note the labial concavity on edentulous area



Fig. 2. Occlusal view of ridge defect



Fig.3. Labial sinus opening with 22



Fig. 4. Trapezoidal flap with Submarginal incision



Fig. 5. Mucoperiosteal flap raised



Fig. 6. Note the Periapical cyst with 22. Root end resection followed by retrograde filling using MTA was done



Fig.7. Trapezoidal flap raised for adjacent ridge defect. Notice proximal bone loss with 21. Recipient site preparation done by Decortication of bone



Fig.8. DFDBA bone graft is sandwiched between amnion membrane



Fig.9. Suturing completed

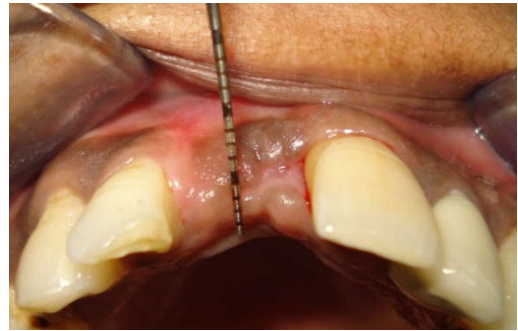


Fig. 10. 2 months post-operative: occlusal view



Fig.11. 2months post-operatively note augmented edentulous span



Fig.12. Prosthesis completed





Fig.13. Pre-operative radiograph of ridge defect



Fig. 14. 1 year post operative radiograph



Fig. 15. Pre-operative radiograph of periapical



Fig. 16. 1 year post-operative radiograph cyst



Fig. 17. Pre operative frontal view shows discoloration of 21,22 & scar from previous labial sinus tracts seen



Fig. 18. Persistent palatal sinus lined by epithelium



Fig. 19. Periapical and occlusal view showing well defined oval shape radiolucency with 21,22,23

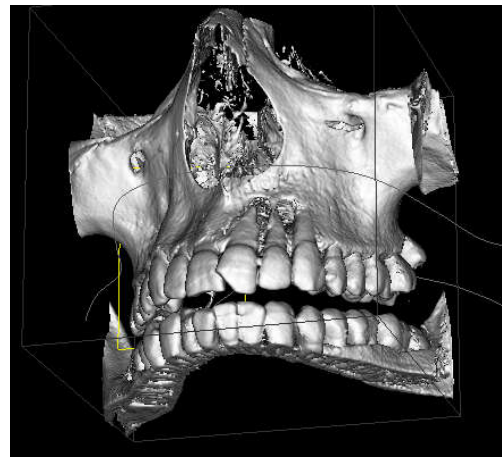


Fig. 22. 3D view shows loss of buccal cortical plate with 21,22,23. Oval bony lesion involving above mentioned teeth



Fig. 20. Axial view of CBCT showing palatal sinus tract. Loss of palatal bone from apical third of root. No involvement of nasal floor is seen

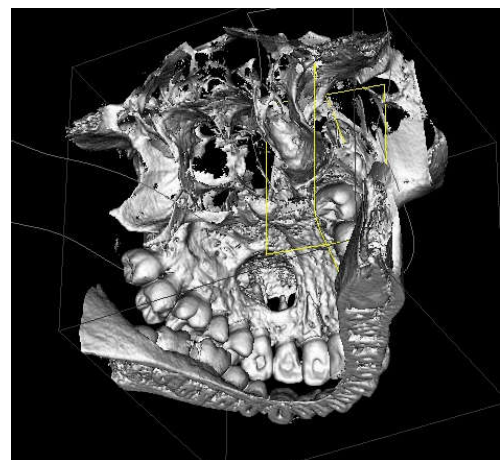


Fig.23. Palatal view large, round defect communicating to buccal side

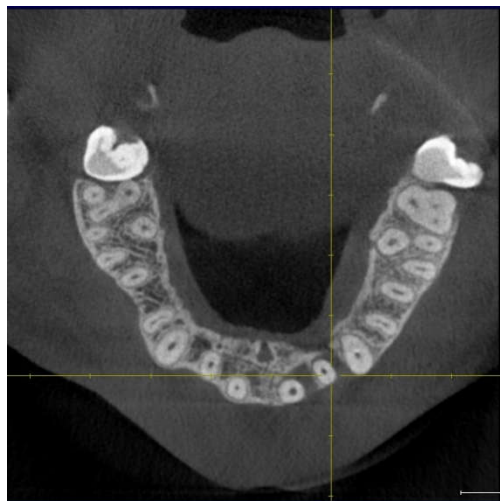


Fig. 21. Transverse view showing loss of buccal as well as palatal plate with 21,22,23



Fig. 24. Palatal incision

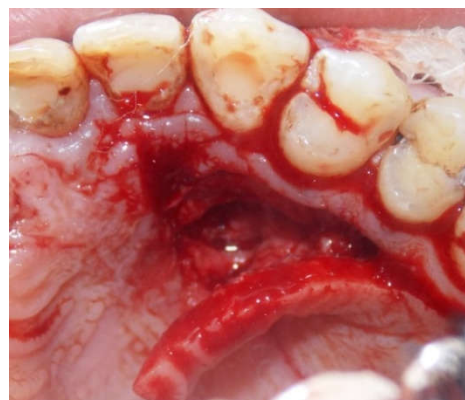


Fig. 25. Partial thickness flap was raised

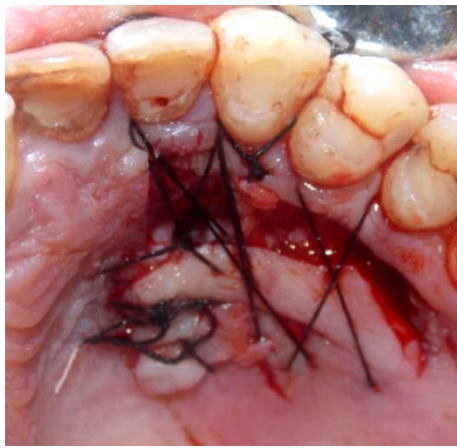


Fig. 26. Palatal rotational flap secured with sutures. Raw surface was filled with gelfoam



Fig. 29. Full thickness flap was raised, notice resemblance of defect with CBCT image. Apicectomy was performed

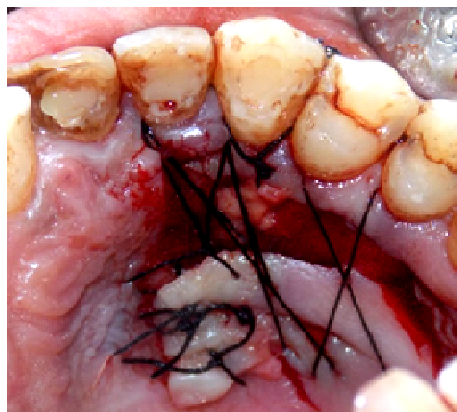


Fig. 27. Healing after 1year



Fig. 30. Defect was filled with DFDBA bone graft + amnion membrane



Fig. 28. Crevicular incision with two vertical incision given



Fig. 31. Suturing completed

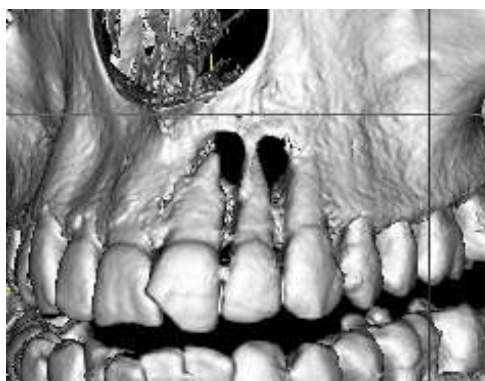




Fig. 32. Post one year follow-up



Fig. 33. Radiographs after one year

Treatment options for discoloration in relation to maxillary left incisors included walking bleach followed by a composite build up or a full coverage restoration. In the first stage of surgery the palatal sinus tract was closed using a palatal rotational pedicle flap (partial thickness flap) taken from a site immediately adjacent to the perforation. Sinus tract was de-epithelialised. The flap was then rotated over palatal perforation, approximated and then sutured into place over the sinus. Gelfoam cubes were placed on the raw donor site and secured with sutures. The surgery was planned in two appointments considering a possible communication between periapical lesion and palatal perforation and a need for bone augmentation. The second stage of surgery was executed after complete healing of palatal surgical site. For surgical enucleation of the cyst, a buccal approach was adopted and a

full thickness flap was raised from mesial line angle of maxillary right central incisor to mesial line angle of maxillary left first premolar. Large bony lesion was revealed involving apices of maxillary left incisors. Following the careful curettage of the granulation tissue, root resection was performed with maxillary left incisors and canine. MTA root end filling was placed as a sealing material. The area of resorption was filled with DFDBA medium particle size ($<1000\mu$), (Tata Memorial Hospital Tissue Bank, Mumbai) which was sandwiched between two amnion membranes of size $3 \times 3 \text{sq.cm}$. (Tata Memorial Hospital Tissue Bank, Mumbai). Then the flap was closed with interrupted sutures. The postoperative period was uneventful. The patient was free of symptoms and had no complaints in the next 4-month follow-up period. Complete closure of the palatal sinus was observed with no residual morbidity at the surgical site. Radiographic examination of radicular cyst with maxillary left incisors and canine also showed signs of healing. Sinus tract is defined as a channel leading from an enclosed area of inflammation to an epithelial surface. The sinus tract is a strong motive that forces the patient to seek dental treatment, and closure of the tract after a debridement appointment is an excellent indication of healing, which is equally obvious and impressive to the patient as well. Generally odontogenic sinus tracts heal with proper endodontic treatment, but in this case surgical interventions were required due to persistent sinus tract even after proper endodontic treatment. Radicular cysts are the most common (52%–68%) cystic lesions affecting the jaw. (Nair, 1998) They are commonly found at the apices of involved teeth and sometimes lateral to accessory root canals. During a 6 months follow up visit, eminent healing of the palatal sinus was achieved by the use of appropriate surgical technique. Use of distinctive combination of DFDBA with amnion membrane for management of radicular cyst also helped in achieving excellent results.

DISCUSSION

Previously, periodontal therapy was limited to the prevention, diagnosis and treatment of diseases of the supporting and surrounding tissues of the teeth. Periodontal surgical procedures were typically resective in nature. The goals of these procedures were to debride the roots and increase the cleansibility of the teeth by reducing pocket depths and modifying furcation defects, often via root removal. The value of this form of therapy on the overall retention of teeth is high, and it remains valid as a treatment modality till now. The unfortunate consequences of this mode of therapy include increased root exposure and decreased papillary height due to apical repositioning of the osseous crest and free gingival margin. To overcome these problems, the need for advanced surgical procedures has arisen.

These Advanced periodontal surgeries include

- 1) Combination of 2 or more different surgical procedures, in which conventional periodontal surgery would have produced, compromised results.
- 2) Modification in the incisions, suturing techniques as per the cases.
- 3) Procedures in which novel combination of autogenous and non-autogenous material can be used at the time of surgery.
- 4) Regeneration of lost hard and soft tissue.

- 5) Interdisciplinary approach for exceptional treatment outcome.

A combination of various surgical procedures & materials has been used in the above cases which have shown hard & soft tissue regeneration upon long term follow-up. Hence, these surgeries can be designated as advanced periodontal surgeries. Due to its wide scope, advanced periodontal surgeries can be considered as a different category. Along with periodontal plastic procedure, conventional periodontal surgical procedure, implant procedure- advanced periodontal surgeries needs further exploration.

Conclusion

As the demand for esthetic dental procedure has increased, the dental field has responded with improved techniques and materials to address the demand. Advanced periodontal surgeries along with interdisciplinary intervention has helped in providing a healthy, esthetic and functional dentogingival complex. To conclude, unique combination of various available materials and appropriate modification of routine surgical procedures, favorable outcomes can be achieved.

REFERENCES

Dan J. Holtzclaw and Nicholas J. 2013. Toscano Amnion-Chorion Allograft Barrier Used for Guided Tissue Regeneration Treatment of Periodontal Intra-bony Defects: A Retrospective Observational Report. *Clin Adv Periodontics.*, 3:131-137.

Feherenbach MJ. and Herring SW. 1997. Spread of dental infection. *The Journal of Practical Hygiene.* sep/oct: 13-18.

Kim JS, Kim JC, Na BK, Jeong JM, Song CY. 2000. Amniotic membrane patching promotes healing and inhibits proteinase activity on wound healing following acute corneal alkali burn. *Exp Eye Res.*, 70:329-337.

Nair P. N. R. 1998. "New perspectives on radicular cysts: do they heal?" *International Endodontic Journal*, 31:155-160.

Schwartz Z, Somers A, Mellonig JT, et al. 1998. Addition of human recombinant bone morphogenetic protein-2 to inactive commercial human demineralized freeze-dried bone allograft makes an effective composite bone inductive implant material. *J Periodontol.*, 69:1337-1345.

Seibert JS. 1983. Reconstruction of deformed partially edentulous ridges using full thickness onlay grafts, I: Technique and wound healing. *Compendium*, 4:437-53

Stock SJ, Kelly RW, Riley SC, Calder AA. 2007. Natural antimicrobial production by the amnion. *Am J Obstet Gynecol.*, 196: 255-263, e1-e6.

Urist MR. 1965. Bone: formation by autoinduction. *Science*, 150:893-899.

Urist MR. and Strates BS. 1971. Bone morphogenetic protein. *J Dent Res.*, 50:1392-1406.
