BULLETIN OF STOMATOLOGY AND MAXILLOFACIAL SURGERY
Volume 21, Issue 5

DOI: 10.58240/1829006X-2025.21.5-248

CASE REPORT

PRECISION IN PERIODONTICS CUSTOMIZED TREATMENT PLANNING IN MULTI-TOOTH PERIODONTAL REHABILITATION- A CASE REPORT

Shafiyah M[1], Vishalatchl L[2], Lubna Firdose A[3], Ranjith Mari [4]
[1]POST GRADUATE DEPARTMENT OF PERIODONTOLOGY, SREE BALAJI DENTAL COLLEGE AND HOSPITAL,INDIA Email Id: fiyahmubarak1998@gmail.com
[2]POST GRADUATE DEPARTMENT OF PERIODONTOLOGY, SRI VENKATESHWARA DENTAL COLLEGE AND HOSPITAL INDIA, EMAIL ID: Vishalatchi2000@gmail.com
[3]POST GRADUATE DEPARTMENT OF PERIODONTOLOGY, SRI VENKATESHWARA DENTAL COLLEGE AND HOSPITAL INDIA,EMAIL ID: Lubna.firdose3@gmail.com
[4]SENIOR LECTURER DEPARTMENT OF PERIODONTOLOGY, SREE BALAJI DENTAL COLLEGE AND HOSPITAL INDIA, EMAIL ID: ranjithsarvesh@gmail.com
***Corresponding Author:** Shafiyah M, POST GRADUATE DEPARTMENT OF PERIODONTOLOGY, SREE BALAJI DENTAL COLLEGE AND HOSPITAL,INDIA Email Id: fiyahmubarak1998@gmail.com
Received: *May 15. 2025;* ***Accepted:*** *Jun 15, 2025;* ***Published:*** *Jun.30,2025*

The primary goal of periodontitis treatment is to eliminate the causes, reduce modifiable risk factors and bring about periodontal regeneration. The treatment of Periodontitis requires a customized treatment plan for multiple tooth periodontal rehabilitation. Choice of appropriate treatment strategy improves the overall success rate of procedures and improvement in the periodontal status of the patient. The present case report describes a 23-year-old male patient requiring a customized treatment plan formulated for multiple tooth periodontal rehabilitation.

***Keywords*:** Periodontitis, Periodontal rehabilitation, Mucogingival surgery, Periodontal plastic surgery, Gingival recession, Root coverage, Periodontal regeneration

1.INTRODUCTION

In the recent decades, there has been a tremendous upgradation of the treatment strategies for multiple recession defects. Surgical procedures of the mucogingival complex aim at correcting defects in the morphology, position, or enhance the dental gingival junction, since defects in the morphology of the gingival and alveolar mucosa can accelerate the course of periodontal disease, Customized Planning in Multi-Tooth Periodontal Rehabilitation"or interfere with the successful outcome of periodontal treatment.[1,2]

The term ‘Periodontal Plastic Surgery’ was initially suggested by Miller in 1993. In modern periodontology it is becoming an acceptable and reliable treatment strategy which denotes “surgical procedures performed to prevent or correct anatomic, developmental, traumatic or disease-induced defects of the gingiva, alveolar mucosa or bone”. This definition includes different techniques for gingival augmentation, root coverage, soft-tissue augmentation at dental implants, crown-lengthening procedure, gingival preservation at teeth with ectopic eruption, removal of aberrant frena, prevention of ridge collapse and expansion of the edentulous ridge. [3-5]

The present case report is on such treatment procedure involving a customized treatment plan for multiple teeth's periodontal rehabilitation.

CASE REPORT

The primary complaint of a 23-year-old man who came to the Department of Periodontics and Implantology was widespread sensitivity in the lower front tooth region as well as the upper right and left tooth regions.

Patient gave a history of sensitivity in the upper right and left back tooth region for the past 3 months. Patient also complains of bleeding on brushing and food impaction of the upper left teeth region. Patient’s medical history was non contributory.

On extraoral examination, the patient’s face was grossly symmetrical, temporomandibular joint jaw movements were bilaterally synchronous, and regional lymphadenopathy was absent. On intra-oral examination, There was generalized diffuse gingival enlargement in both the jaws,with rolled out margins and blunt interdental papilla,loss of stippling, and change in the color and texture of the gingiva. Generalized Diffuse erythema was present on the marginal gingiva with a smooth shiny surface.

There was generalized bleeding on probing present in both jaws. Gingival recession was noted in 43,41,31,33. The probing depth was found to be more than 5 mm in most of the posterior tooth region. Furthermore, shallow vestibule of 3 mm in relation to 14,15,16

was recorded using University of North Carolina-15 (UNC-15) periodontal probe. (Figure 1)

Figure 1. Intraoral picture depicting gingival inflammation; (A): picture depicting gingival inflammation in the anterior region; (B): depicting gingival inflammation in the posterior region on the right side; and (C): picture depicting gingival inflammation in the posterior region on the left side.(E,F,G) Intra oral picture after scaling Orthopanthomography reveals depicted a generalized moderate to severe interdental alveolar bone loss. (Figure 5) The diagnosis of generalised periodontitis was made.

Figure 5,(A) Pre operative orthopantomogram showing bone loss in the maxilla and mandible (B)Post op orthopantomogram showing reduction of probing depth

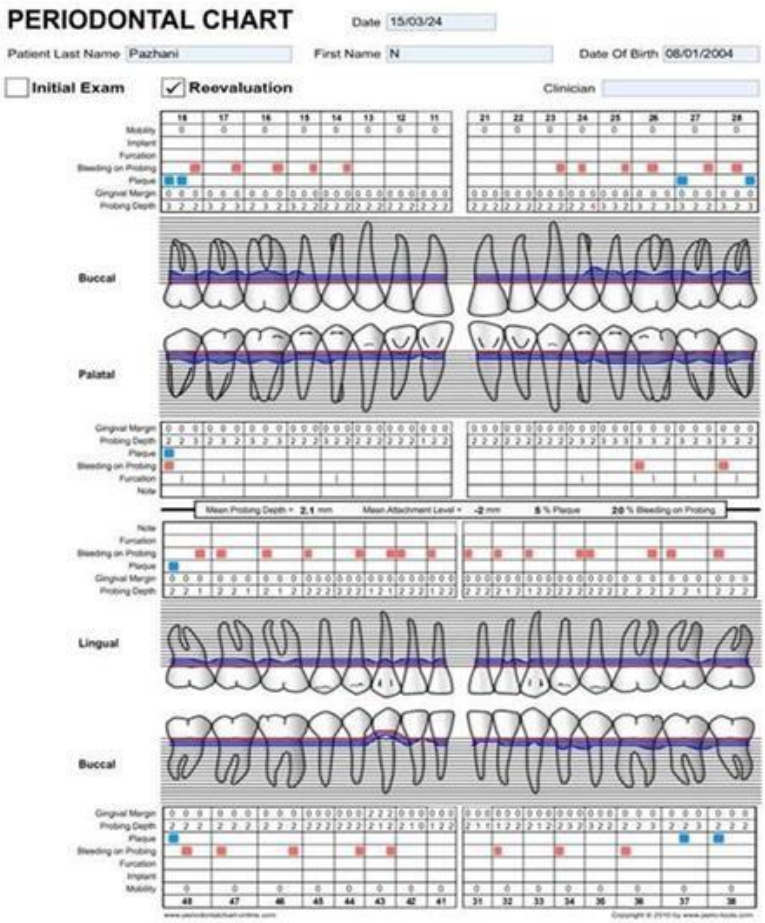

Figure 6 A. Preoperative periodontal chart

Initial periodontal therapy (IPT), and regenerative periodontal surgery as well as endodontic procedures was planned for the treatment. The patient received IPT including oral hygiene instructions, scaling and root planing using both hand and ultrasonic instruments. Patient was recalled after 2 weeks for flap surgery. Quadrant wise treatment was done i.e. The flap surgeries were performed in separate sessions for each quadrant. The patient was explained about the treatment procedure and written informed consent was obtained before the start of the treatment.

Right Maxillary arch

In the right maxillary arch, Periodontal flap surgery along with amniotic membrane graft and laser assisted vestibuloplasty was planned. Amniotic membrane graft was chosen for this quadrant, as it fulfills the mechanical concept of guided tissue regeneration demonstrating enhanced gingival wound healing properties and reduced scarring. [6]

Vestibuloplasty was planned as inadequate vestibular depth causes deficiency in width of keratinised gingiva which ultimately results in poor plaque control and difficulty in maintenance. Though several methods are used for achieving vestibuloplasty, in the present case lasers were used. Lasers offer several advantages such as minimal bleeding, faster healing, better visualisation, and minimal requirement of anaesthesia over conventional scalpel excision. [7]

Laser protective eyewear was worn by the operator, patient, and assistant. Surgical area was prepared with adequate anesthesia using 2% lignocaine hydrochloride containing adrenaline 1:200,000 was administered. The vestibuloplasty was then carried out to increase the width of the attached gingiva. Irrigated again with saline solution. Diode laser (Biolase™) emitting 940 nm wavelength was used for vestibuloplasty. It was adjusted at 1.5 watt power, pulsed contact mode, continuous pulse duration, and pulse interval of 1.00 ms. The incision was carried out at vestibule area using fibre optic laser tip of 300 µm diameter in a brushing stroke. The procedure was painless with minimal bleeding, reduced intraoperative time. (Fig 2D)

In the same sitting, crevicular incisions were made from mesial #13 to distal #17 using scalpel no.15. A full-thickness flap is opened by using the periosteal elevator until the mucobuccal fold is seen (Fig. 2A).

The operating area is irrigated with saline solution. The processed dehydrated amniotic membrane (Amnio-care dry amniotic membrane, Biocover Laboratories, Karnal, Haryana, India) was placed onto the exposed root surface and proximal bone.(Fig 2B) Upon placement, the processed dehydrated amnion allograft became hydrated and self-adhered to the exposed root and proximal bone, then the flap is coronally approximated (Fig 2C) and sutured with the sling suture (Fig. 2E).

The patient was prescribed systemic analgesics and antibiotics consisting of 500 mg of paracetamol every 6 h and 500 mg of amoxicillin every 12h for 5 days. The patient was instructed to continue his oral hygiene maintanance, except in the operated area, in which tooth brushing was done very gently using an extra soft bristle tooth brush after surgery and plaque control was maintained by means of gentle topical applications of chlorhexidine gluconate in saturated cotton swabs twice a day. The sutures were removed 1week after the surgery.

In the follow up period, there was an improvement in the gingival recession, increased width of keratinized gingiva and decrease in probing depth. (Figure 2 F,G,H,I,J)

Figure 2. Treatment in maxillary right quadrant; **(A).** Full-thickness flap raised in maxillary right quadrant; **(B).** Placement of amniotic membrane graft and coronally positioning of the flap**, (C).** Approximation of the flap **(D)** Laser assisted vestibuloplasty performed in relation to 14,15,26. **(E)** Sutures placed **(F)** Follow up of maxillary right quadrant at 2nd post-op week **(G, H)** At 1st post-op month (Reduction of the Probing depth and Increased width of keratinized tissue) **(I, J)** Follow up of maxillary right quadrant at 6month post op (Reduction of the Probing depth and Increased width of keratinized tissue)

Left Maxillary arch

In the second quadrant, a probing depth of 7 mm was noted in relation to 24,25. (Figure 5) Mucograft with periodontal flap surgery was planned in relation to 24,25. The Mucograft® is a three-dimensional collagen matrix that is an excellent soft-as well as hard tissue regeneration biomaterial. The mucograft's porosity allows for a greater penetration of mesenchymal cells into the transplanted area. Hence mucograft was the choice for grafting in relation to 24, and 25. [8]

Under local anesthesia, a full thickness mucoperiosteal flap was elevated using the periosteal elevator until the mucobuccal fold. Intrabony defect was seen in relation to 25 after complete debridement and removal of granulation tissue. Geistlich Mucograft® was placed on the connective tissue bed and was stabilized by periosteal sutures.Then the flap is positioned coronally and sutured with the sling suture (Fig.3).
Antibiotics and analgesics were prescribed for 5 days, and the patient was recalled after two week for suture removal. In the follow up period, there was an decrease in probing depth. (Fig3H)

Figure 3. Treatment for upper left arch; (A) flap elevation and visualization of the intrabony defects; (B) probing depth of 7 mm in relation to 24 and 25 (C) Mucograft used in the study; (D)Flap reflected debridment and granulation tissue removed (E) Placement of mucograft in the site (F) Stabilisation of mucograft with periosteal sutures; and (G) Suturing done (H)Follow up of maxillary left quadrant; at 2nd post-op week. At 6 month post op

Right mandibular arch

In the fourth quadrant, a gingival recession of 8 mm was noted in relation to 43. Mucograft with coronally advanced flap surgery was planned in relation to 42,43,33 the main aim is to increase the width of attached gingiva even when recession coverage is not fully obtained. Under local anesthesia, a full thickness mucoperiosteal flap and Geistlich Mucograft® was placed on the connective tissue bed and was stabilized by periosteal sutures. Then the flap is positioned coronally and sutured with the sling suture (Fig 4).
Antibiotics and analgesics were prescribed for 5 days, and the patient was recalled after a week for suture removal. In the follow up period, there was an improvement in the root coverage. (Fig 4E)

Figure 4. Treatment for mandibular right arch; (A) flap elevation and visualization of the intrabony defects; (B) Mucograft used in the study; (C) placement of Mucograft and stabilisation of Mucograft with periosteal sutures; and (D) Suturing done (E) Follow up of mandibular right arch quadrant; at 2nd post-op week; (B). At 6 month post op.

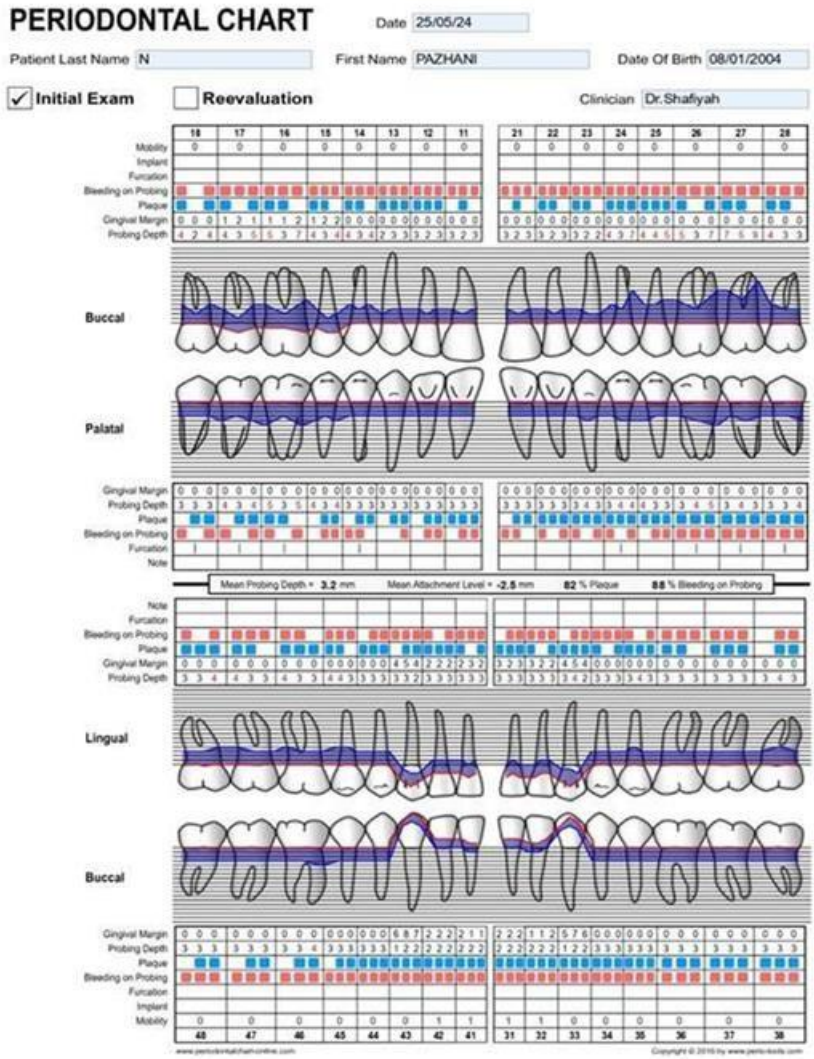

Figure 6B. Postoperative periodontal chart after 6 months

DISCUSSION

Periodontal disease is a most common chronic disease of the oral cavity and thereby is the major public health issue globally. [4,5] Periodontitis is a multifactorial disease with a complex interplay of host immune system and periodontal pathogens. [9] Though bacteria is considered as the prime cause of periodontal disease, the individual's inflammatory response as well as other modifying and predisposing factors ultimately determine the clinical presentation and outcome. [10] Disease progression is influenced by environmental and genetic factors that are unique to each person. [11] Thereby, this condition comprises a wide spectrum of conditions ranging from mild gingivitis to severe periodontitis. 12

The common features of periodontitis include gingival inflammation, clinical attachment loss, radiographic evidence of alveolar bone loss, sites with deep probing depths, mobility, bleeding upon probing and pathologic migration. [13,14] The goal of periodontitis treatment is to eliminate the causes and reduce modifiable risk factors. Initial non-surgical periodontal therapy primarily consists of scaling and root planing and oral hygiene maintenance.[15] Surgical management of periodontitis is preferred in cases unresponsive to non-surgical periodontal therapy and in severe cases.[16]

In the present case, mucogingival deformity caused by inadequate attached gingiva was seen in relation to the 14,15,16. Literature reveals that the presence of 2 mm or more of attached gingiva is considered necessary to maintain gingival health. [17] The presence of a thick keratinized gingival coating acts as a protective barrier against mastication pressures, as well as heat and chemical stressors. [8] Lang and Loe [17] reported that a significantly higher gingival index was noted for teeth with <2 mm of attached gingiva compared to those with at least 2 mm of attached gingiva.

To improve the mucogingival deformity caused by inadequate attached gingiva, laser assisted vestibuloplasty was performed in the present study. Vestibuloplasty is a mucogingival procedure that aims at surgical modification of gingiva-mucous membrane relationships including deepening of vestibular trough, altering position of frenulum or muscle attachments, and widening of zone of attached gingiva.[18] Soft tissue laser provides a predictable outcomes in periodontal therapy. [19]

The advantages of laser application are relatively bloodless surgery, minimal swelling, scarring and coagulation, no need for suturing, reduction in surgical time and less or no post surgical pain. Also, the laser instantly disinfects the surgical wound as well as allowing a non contact type of operative procedure and therefore no mechanical trauma to the tissue. [20,21] Nonetheless, reports have revealed a definite and clean wound was caused by laser and it eventually healed with secondary intention and no scar formation compared to scalpel incisions. This is may be due to the minimal degree of wound contraction following laser irradiation which occurs through induction and formation of smaller number of myofibroblasts and collagen. [22-24]

In the present case, Mucograft and amniotic membrane graft was used. The choice of graft was mainly based on the evidence based on the literature and the clinical presentation of a patient.

In recent years, Placenta-derived bioabsorbable membranes such as amnion and chorion have gained popularity in periodontal regeneration. Their unique application in periodontal treatment is mainly due to the presence of natural growth factors and collagen layers that are rich in type I, IV, V, and VI collagens.[25] It also contains laminin-5, plays a role in the cellular adhesion of gingival cells. Amnion membrane is a thin, tough, and transparent membrane that closely mimics the basement membrane of human oral mucosa with self-adherence and good aesthetic properties and appears to be smooth, shiny, and easily manageable. [26]

Literature reveals that Amnion membrane is an excellent choice as a graft in the treatment of gingival recession [25,32], furcation defects [26], and intrabony defects [27,28]. Especially, favourable results in covering the gingival recessions and in increasing the thickness of the attached gingiva [29,30]. Despite these advantages and promising role in periodontal regeneration, it has few limitations including operator skill requirement, risk of contamination, fragility, and technique-sensitivity.[31]

Another graft material used in the present case was Mucograft. It is a resorbable commercially available three-dimensional (3D) matrix that is designed specifically for soft tissue regeneration in the oral cavity. [33] It is a matrix of pure type I and III porcine collagen. [34]

Rokn et al.[34] conducted a randomized control trial to compare Mucograft® and FGG in augmenting the keratinized tissue around the teeth. It was found that the Mucograft® was superior when compared to FGG in terms of gain in keratinized tissue, less pain, less surgical chair time, and better aesthetics. Navya et al [8] reported that the Mucograft® was a feasible treatment option for soft-tissue augmentation. Bevilacqua et al [35] reported that Mucograft is an effective grafting material for increasing the thickness of the peri-implant mucosa and in the gaining of keratinized gingiva.

In the present case, at the second month follow up, we noted excellent results in root coverage, decrease in probing depth and increase in width of keratinized tissue. A customized treatment plan for multiple teeth's periodontal rehabilitation was formulated for this case. This custom made plan has led to better improvement in the periodontal status of the patient.

CONCLUSION

A well-structured treatment plan is essential to ensure optimal outcomes, particularly in the periodontal rehabilitation of multiple teeth. In the present case the patient demonstrated excellent outcomes, including effective root coverage, reduced probing depths, and an increase in the width of keratinized tissue.

DECLARATIONS

Conflicts of interest

The authors declare no conflict of interest.

Funding

This research received no external funding.

Informed Consent Statement

The patient provided an informed consent statement.

Ethical Statement

This case report was conducted in accordance with institutional ethical standards. Written informed consent was obtained from the patient for the publication of this case and accompanying clinical data.

REFERENCES

1. Friedman N. Mucogingival surgery. Tex Dent J 1957: 75: 358–362. 39.
2. The American Academy of Periodontology. Glossary of periodontal terms, 4th edn. Chicago: American Academy of Periodontology, 2001.
3. Wennstrom J. Mucogingival therapy. Ann Periodontol 1996: 1: 671–701.
4. Tonetti MS, Jepsen S, Jin L, Otomo-Corgel J: Impact of the global burden of periodontal diseases on health, nutrition and wellbeing of mankind: a call for global action. J Clin Periodontol. 2017, 44:456-62. 10.1111/jcpe.12732
5. Tonetti MS, Greenwell H, Kornman KS: Staging and grading of periodontitis: framework and proposal of a new classification and case definition. J Clin Periodontol. 2018, 45:S149-61. 10.1111/jcpe.12945
6. Sharma A, Yadav K. Amniotic membrane - A Novel material for the root coverage: A case series. J Indian Soc Periodontol. 2015 Jul-Aug;19(4):444-8. doi: 10.4103/0972-124X.154166.
7. Kalakonda B, Farista S, Koppolu P, Baroudi K, Uppada U, Mishra A, Savarimath A, Lingam AS. Evaluation of Patient Perceptions After Vestibuloplasty Procedure: A Comparison of Diode Laser and Scalpel Techniques. J Clin Diagn Res. 2016 May;10(5):ZC96-ZC100. doi: 10.7860/JCDR/2016/17623.7820. Epub 2016 May 1.
8. Navya PD, Rajasekar A. Management of inadequate width of attached gingiva using mucograft. J Adv Pharm Technol Res. 2022 Nov;13(Suppl 1):S358-S361. doi: 10.4103/japtr.japtr_169_22.
9. Hajishengallis G. Periodontitis: from microbial immune subversion to systemic inflammation. Nat Rev Immunol. 2015 Jan;15(1):30-44. doi: 10.1038/nri3785.
10. Guthmiller JM, Novak KF. Periodontal Diseases. In: Brogden KA, Guthmiller JM, editors. Polymicrobial Diseases. Washington (DC): ASM Press; 2002. Chapter8.Available from:https://www.ncbi.nlm.nih.gov/books/NBK2496/
11. da Silva MK, de Carvalho ACG, Alves EHP, da Silva FRP, Pessoa LDS, Vasconcelos DFP. Genetic Factors and the Risk of Periodontitis Development: Findings from a Systematic Review Composed of 13 Studies of Meta-Analysis with doi: 10.1155/2017/1914073.
12. Kim J, Amar S. Periodontal disease and systemic conditions: a bidirectional relationship. Odontology. 2006 Sep;94(1):10-21. doi: 10.1007/s10266-006-0060-6.
13. Papapanou PN, Sanz M, Buduneli N, et al. Periodontitis: consensus report of workgroup 2 of the 2017 World Workshop on the Classification of Periodontal and Peri-Implant Diseases and Conditions. J Periodontol. 2018;89(Suppl 1):S173–S182. doi: 10.1002/JPER.17-0721.
14. Page RC, Offenbacher S, Schroeder HE, et al. Advances in the pathogenesis of periodontitis: summary of developments, clinical implications and future directions. Periodontol 2000. 1997;14:216–248. doi: 10.1111/j.1600-0757.1997.tb00199.x.
15. Kwon T, Lamster IB, Levin L. Current Concepts in the Management of Periodontitis. Int Dent J. 2021 Dec;71(6):462-476. doi: 10.1111/idj.12630.
16. Shaddox LM, Walker CB. Treating chronic periodontitis: current status, challenges, and future directions. Clin Cosmet Investig Dent. 2010 Aug 11;2:79-91.
17. Lang NP, Löe H. The relationship between the width of keratinized gingiva and gingival health. J Periodontol. 1972;43:623–627. doi: 10.1902/jop.1972.43.10.623.
18. Pirnat S. Versatility of an 810 nm diode laser in dentistry: an overview. J Laser Health Acad. 2007;4(2):1-9.
19. Coleton S. Lasers in surgical periodontics and oral medicine. Dent Clin N Am. 2004;48(4):937-62.
20. Eliades A, Stavrianos C, Kokkas A, Kafas P, Nazaroglou I. 808 nm diode laser in oral surgery: A case report of laser removal of fibroma. Res J Med Sci. 2010;4(3):175–8.
21. Pick RM, Pecaro BC. Use of the CO2 laser in soft tissue dental surgery. Lasers Surg Med. 1987;7:207–13. doi: 10.1002/lsm.1900070213.
22. Azma E, Safavi N. Diode laser application in soft tissue oral surgery. J Lasers Med Sci. 2013 Fall;4(4):206-11.
23. Chomette G, Auriol M, Labrousse F, Vaillant JM. [The effect of CO2 laser radiation on the morphological changes of mucocutaneous wound healing in oral surgery A histoenzymologic and ultrastructural study] Rev Stomatol Chir Maxillofac. 1991;92:1–7.
24. Zeinoun T, Nammour S, Dourov N, Aftimos G, Luomanen M. Myofibroblasts in healing laser excision wounds. Lasers Surg Med. 2001;28(1):74–9. doi: 10.1002/1096-9101(2001)28:1<7
25. Gupta A, Kediege S, Mittal A, Jain K, Gupta S, Chaudhry S. Amnion and Chorion Membranes in

the Treatment of Gingival Recession and their Effect on Gingival Biotype: A Clinical and Ultrasonographic Study. Journal of Clinical & Diagnostic Research. 2018 Mar 1;12(3).
26. Mallapragda S, Gupta R, Gupta S, Sharma H, Srivastava S, Raj A. Evaluation of regenerative efficacy of amnion and chorion membrane in treatment of mandibular molar furcation defects: a clinico-radiographic study. The journal of contemporary dental practice. 2024 Feb 1;25(2):160-7.
27. Temraz A, Ghallab NA, Hamdy R, El-Dahab OA. Clinical and radiographic evaluation of amnion chorion membrane and demineralized bone matrix putty allograft for management of periodontal intrabony defects: A randomized clinical trial. Cell and tissue banking. 2019 Mar 15;20:117-28.
28. Hamada Y, Yeh YT, Blanchard SB. Amnion–chorion allograft barrier used on root surface for regenerative procedures: Case report. Clin Adv Periodontics 2020;10(4):195–199. DOI: 10.1002/cap.10125.
29. Shetty, S.S.; Chatterjee, A.; Bose, S. Bilateral multiple recession coverage with platelet-rich fibrin in comparison with amniotic membrane. J. Indian Soc. Periodontol. 2014, 18, 102–106.
30. Rehan M, Khatri M, Bansal M, Puri K, Kumar A. Comparative evaluation of coronally advanced flap using amniotic membrane and platelet-rich fibrin membrane in gingival recession: An 18-month clinical study. Contemporary clinical dentistry. 2018 Apr 1;9(2):188-94.
31. Solomon S-M, Sufaru I-G, Teslaru S, Ghiciuc CM, Stafie CS. Finding the Perfect Membrane: Current Knowledge on Barrier Membranes in Regenerative Procedures: A Descriptive Review. Applied Sciences.2022;12(3):1042. https://doi.org/10.3390/app12031042
32. Singh H, Singh H. Bioactive amnion as a guided tissue regeneration (GTR) membrane for treatment of isolated gingival recession. A case report. Indian Journal of Dentistry. 2013 Jun 1;4(2):110-3.
33. Nevins M, Nevins ML, Kim SW, Schupbach P, Kim DM. The use of mucograft collagen matrix to augment the zone of keratinized tissue around teeth: a pilot study. Int J Periodontics Restorative Dent. 2011. Jul–Aug;31(4):367–73