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Dr. Maya Sanjiv Indurkar
Department of Periodontology, Maharashtra University of Health Sciences, Maharashtra, India

Dr. Soma Sindhuja K
Department of Periodontology, Maharashtra University of Health Sciences, Maharashtra, India

Dr. Swathy Krishna J
Department of Periodontology, Maharashtra University of Health Sciences, Maharashtra, India

Dr. Aishwarya Khachane
Department of Periodontology, Maharashtra University of Health Sciences, Maharashtra, India

Dr. Ashok Bhansali
Department of Periodontology, Maharashtra University of Health Sciences, Maharashtra, India

Corresponding Author:
Dr. Maya Sanjiv Indurkar
Department of Periodontology, Maharashtra University of Health Sciences, Maharashtra, India

Gingival recession management using free gingival Graft in mandibular anterior region: A case series

Dr. Maya Sanjiv Indurkar, Dr. Soma Sindhuja K, Dr. Swathy Krishna J, Dr. Aishwarya Khachane and Dr. Ashok Bhansali

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Abstract
Gingival recession, which is the apical displacement of the gingival margin that leads to the root exposure, can be brought on by periodontal disease, traumatising tooth brushing habit, and a number of other predisposing factors. Procedures for root coverage are advised to improve aesthetics, lessen sensitivity, and enhance plaque control. The free gingival graft is one of the widely utilised therapeutic technique for achieving root coverage and augmenting the width of attached gingiva. The current case series explains the treatment of gingival recession by using a free gingival graft in the mandibular anterior region.

Keywords: Gingival recession, free gingival graft, root coverage, sensitivity

Introduction
The root surface exposure as a result of apical migration of the gingival margin beyond the cementoenamel junction is known as gingival recession [1]. Poor oral hygiene, periodontitis, mechanical trauma from overbrushing, thin alveolar bone, a thin band of attached gingiva, malpositioned teeth, strong and long muscle attachments, occlusal trauma, masochistic habits, iatrogenic factors, secondary factors like age, and systemic diseases are all contributors to gingival recession [2].
Root coverage is an essential component of cosmetic and periodontal treatment as gingival recession becomes a more prevalent problem. Root sensitivity and aesthetic or cosmetic demands are the primary indications for root coverage. Another rationale for root coverage is to alter the gingival biotype of the marginal soft tissue to aid with plaque control.
Even though other graft materials, such as acellular dermal matrices or collagen matrices, biologic agents, and other commercially available products, can be used for root coverage procedures and for enhancing soft tissue around teeth, free gingival graft and connective tissue graft remains the best treatment option, both being autogenous soft tissue grafts [3].

Free gingival graft
The introduction of the free gingival graft (FGG) in 1963 by Bjorn *et al*. has shown to be effective in improving attached gingiva and halting the progression of gingival recession. When there is no suitable donor tissue nearby the recession area or when a thicker gingival phenotype is desired, a free gingival graft of masticatory mucosa is usually chosen.
Free gingival grafting should be considered for situations of progressive recession, root sensitivity, stabilisation of the gingiva prior to orthodontic treatment, facilitation of oral hygiene maintenance by increasing the zone of attached gingiva, and for improvement of shallow vestibular depth. The contraindications of FGG includes inadequate volume of tissue at donor site, in cases where the blood supply of the grafted area is affected when the mesiodistal width of the denuded root is larger than the interproximal blood supply, and in aesthetic zones, which are not recommended due to colour mismatch occurring between the surrounding gingiva and the grafted zone [4].

Autogenous soft tissue grafts can be obtained from various locations, including the gingival donor site, hard palate, maxillary tuberosity and the edentulous regions. Hard palate is the most commonly preferred donor site as it provides adequate volume of tissue, is surgically accessible, and shares the same histological components as periodontal keratinized mucosa.

The following steps are involved in the free gingival graft (FGG) procedure

- Preparation of recipient bed, that is tension free from muscle attachment.
- Harvesting the graft of necessary size from the palate
- Suturing the harvested graft and stabilizing onto the prepared recipient bed.
- A surgical plate may be used to cover the palatal wound and the sutured graft is covered with dry aluminium foil and periodontal dressing.

Case 1

A 40-year-old female patient presented to the department of periodontology with the chief complaint of receding gums in lower front jaw region since one year. Patient's past medical history was non-contributory. The patient's dental history revealed that oral hygiene maintenance was unsatisfactory due to constraints in toothbrush placement, which led to plaque buildup.

A thorough periodontal examination was performed, including measurements of gingival recession, probing depth, clinical attachment level, and keratinized tissue. A UNC-15 periodontal probe was used to measure all the clinical parameters.

Dental findings noted were the presence of gingival recession in tooth #31, 41 along with aberrant frenum and inadequate width of attached gingiva. Root canal treatment was performed one month before with relation to #42. Intra oral periapical radiograph of lower anterior region revealed horizontal bone loss in the interdental region extending till the junction of coronal and middle-third of the root of 31,32,41,42. Diagnosis of Miller's Class III gingival recession in relation to 31 and 41 was given, as there was presence of alveolar bone loss along with soft tissue recession.

Treatment of gingival recession

Phase I therapy included scaling, debridement of root surface, and occlusal adjustments. Re-evaluation was performed after phase I therapy. Following re-evaluation phase, periodontal plastic surgical procedure which includes frenectomy and a free gingival graft was planned in tooth #31, 41 to correct gingival recession and to generate a sufficient zone of attached gingiva.

Preparation of the recipient bed: The surgical procedure was performed under lignocaine with 1:80,000 adrenaline. Bilateral mental nerve block and supra periosteal infiltration was given in 31, 41 region.

On either side of the recession of #31 and 41, at the level of the cementoenamel junction, a horizontal incision was given that extended 3mm. At the distal ends of the horizontal incisions, 3 to 4 mm apical to the mucogingival line, and reaching into the alveolar mucosa, vertical incisions were created. The recipient site had a trapezoidal form as a result of the oblique and divergent incisions. Sharp dissection was performed within the borders of the incision, de-epithelialized and lower labial frenectomy was also performed. Using a (5-0) vicryl suture, the apical mucosal border is sutured to the periosteum. The root surface exposed was debrided using a curette and then meticulously rinsed with saline.

Preparation of the donor site: The required amount of donor tissue was precisely identified using a tin foil template. A free gingival graft harvesting procedure was done in the premolar region of the palate. Initially superficial outline for the incision was given by placing the tinfoil template using no. 15 blade. Incision was given at about 3 mm from the palatal gingival margin to prevent the recession on the adjacent teeth. The graft was lifted and separated via the incision while the scalpel blade being parallel to the tissue. Any fatty or glandular tissue that might remain in the acquired graft was inspected. A smooth and uniform graft thickness, which was around 2mm, was also measured.

Suturing of the graft: The graft was adapted on to the recipient bed and sutured with Holbrook-Oschenbein suturing technique using (5-0) vicryl sutures. The first suture is a horizontal "graft stretching" suture, to counteract the primary contraction and open the blood vessels within the graft. The second suture is a circumferential suture, which holds the graft against the denuded areas. The third suture, the interdental concavity suture, prevents dead space formation in the interradicular concavities or depressions. To protect the surgical site after suturing, a foil and periodontal dressing were used. A Hawley's retainer was provided to protect the palatal wound.

Post-operative instructions: The patient was told not to brush their teeth in that area for two weeks after surgery. Antibiotics and analgesics were prescribed, as well as 0.12% chlorhexidine mouthwash twice daily was given for two weeks.

Post-operative evaluation: Periodontal dressing as well as sutures were removed 14 days post-surgery, and the area was irrigated well with sterile saline. Healing at donor site and also the recipient site was found to be satisfactory. Both the recipient site and the donor site were fully healed and the intended results were attained at the one-month follow-up.

Fig 1: Intraoral periapical radiograph showing bone loss involved with relation to 31, 32, 41, 42.

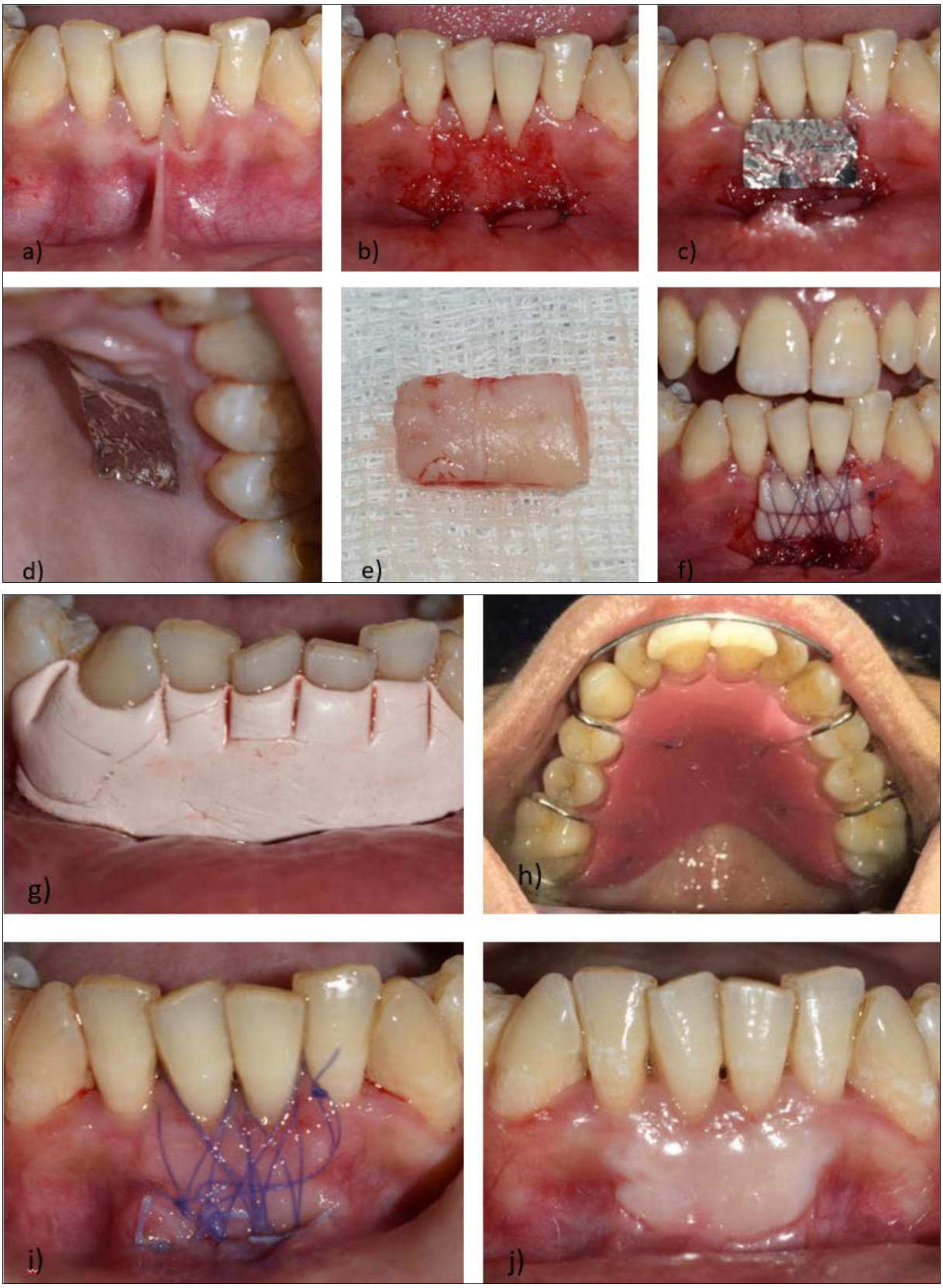

Fig 2: a) Pre-operative image showing recession with 31 and 41. b) Preparation of recipient bed along with lower labial frenectomy. c) Tin foil template to measure the extent of graft to be harvested. d) Tin foil over the palate to mark the incisions. e) Free gingival graft harvested from the palate. f) Graft adapted and sutured to the recipient bed. g) Tin foil and coe-pak over the graft. h) Hawley's appliance given to stabilize the palatal wound. i) Post-operative follow up on 14th day. j) Follow up after 10 months.

Case 2

A male patient aged 21 years was referred from the department of orthodontics for management of recession with lower front region of the jaw. Clinical examination revealed the diagnosis of Miller's Class I gingival recession in relation to #31 and 41, where the tooth was malposed and the extent of gingival recession was 2mm and 5mm apicocoronally and 2mm and 3mm mesiodistally with respect to 31 and 41. There was also insufficient width of attached gingiva in relation to 31 and 41. So a free gingival graft procedure was planned and performed (Fig 3).

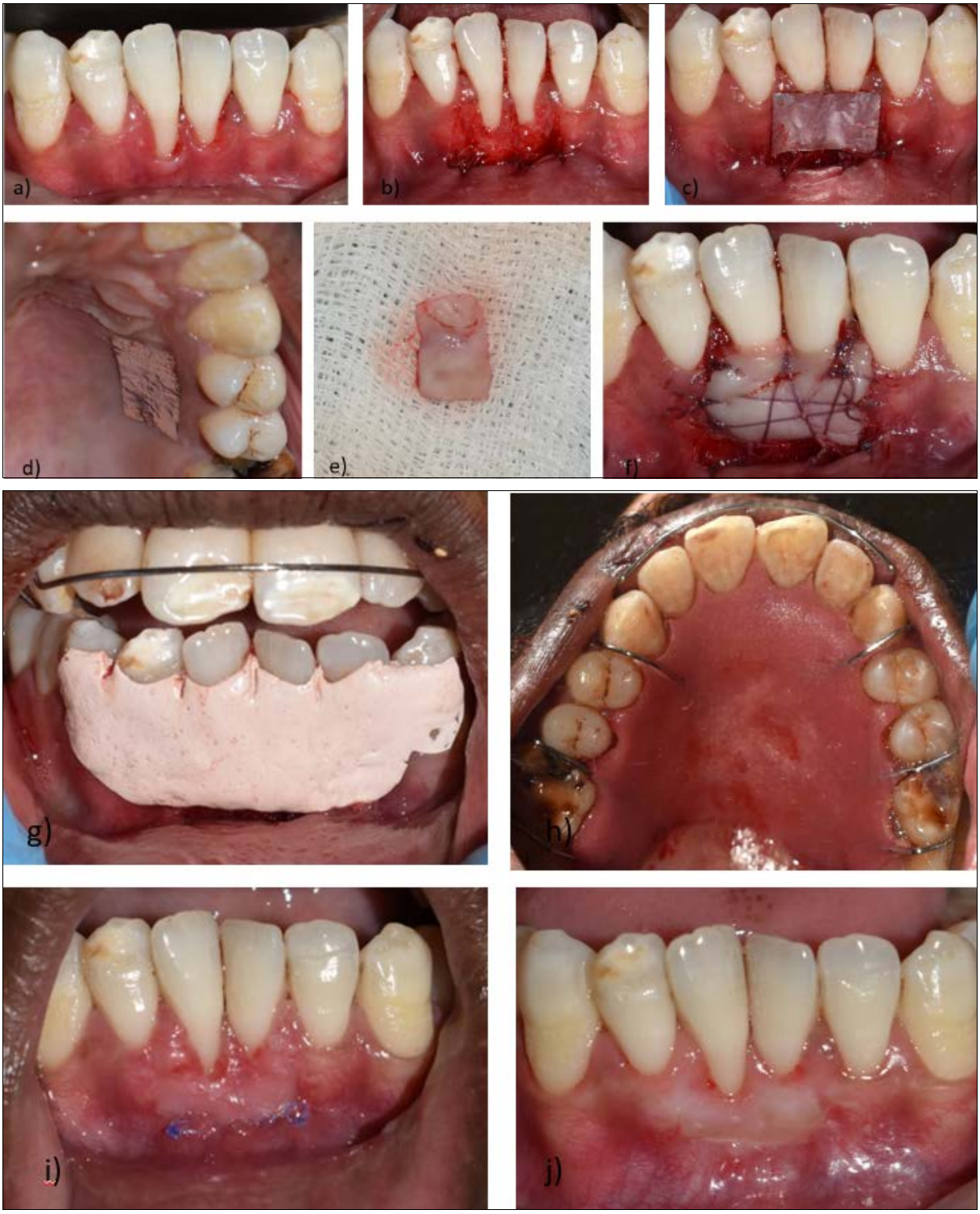

Fig 3: a) Pre-operative image showing recession with 31 and 41. b) Preparation of recipient bed. c) Tin foil template to measure the extent of graft to be harvested. d) Tin foil over the palate to mark the incisions. e) Free gingival graft harvested from the palate. f) Graft adapted and sutured to the recipient bed. g) Tin foil and coe-pak over the graft. h) acrylic plate given to stabilize the palatal wound. i) Post-operative follow up on 14th day. j) Follow up after 3 months.

Case 3

A female patient aged 22 years was referred from the department of orthodontics for management of recession with lower front region of the jaw. Clinical examination revealed the diagnosis to be Miller's Class I gingival recession with relation to #31 which was 4 mm in height apicocoronally and 2 mm in width mesiodistally. There was a coronal frenum attachment and insufficient width of attached gingiva in relation to 31. Technique of free gingival graft was performed in this case (Fig 4).

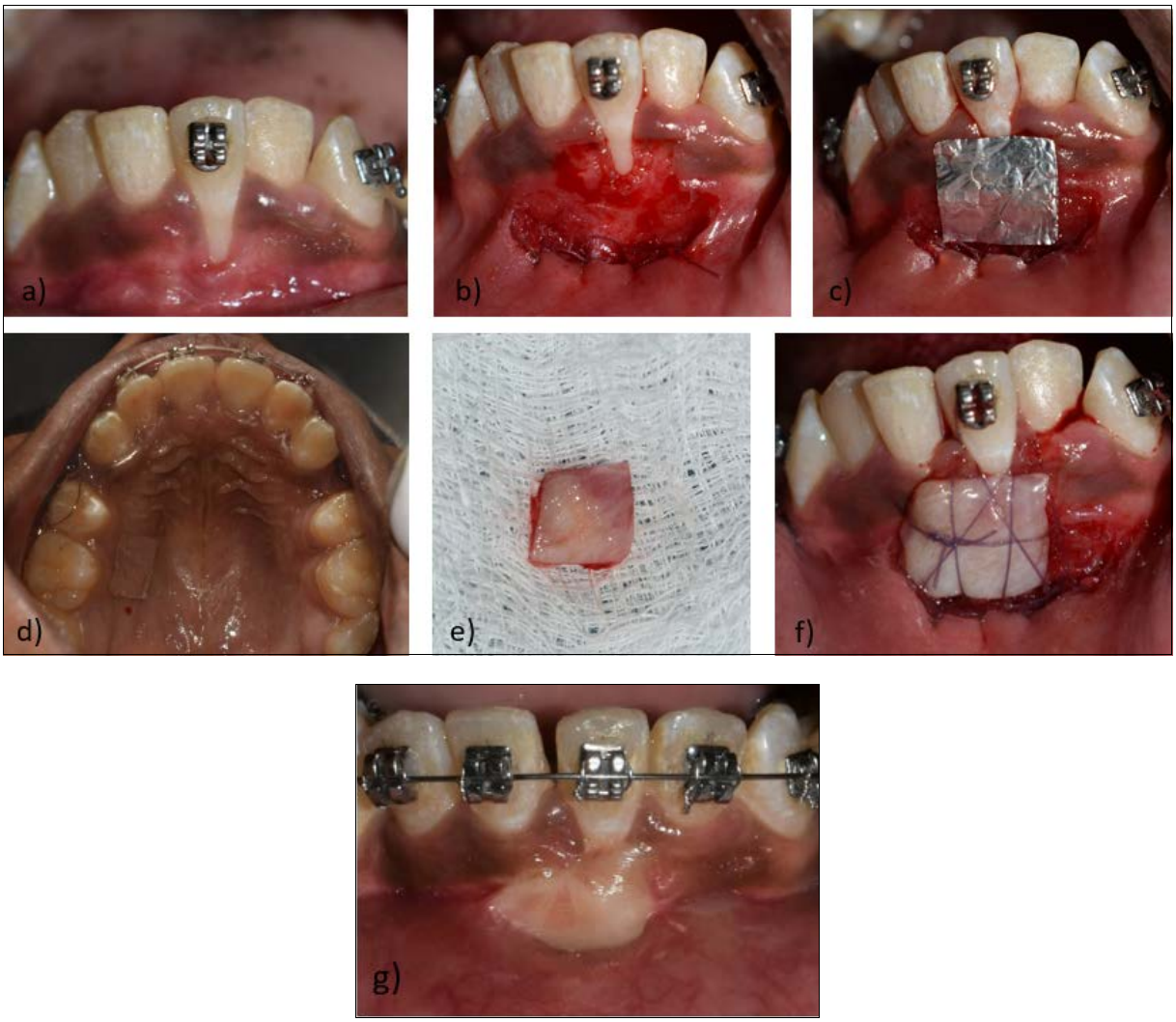

Fig 4: a) Pre-operative image showing recession with respect to 31. b) Recipient bed preparation with frenectomy performed. c) Tin foil template to measure the extent of graft to be harvested. d) Incision in the palate for the extent to be harvested. e) Free gingival graft from the palate. f) Graft adapted and sutured to the recipient bed. g) Follow up after 6 months.

Case 4

A 23 year old female reported to the department with the esthetic concern over receding gums with respect to a lower anterior tooth. Millers class III recession was seen with respect to 41, with 3 mm horizontal and 9 mm vertical dimensions. Radiographic examination showed interdental bone loss up to coronal 1/3rd of the root. The recession extended beyond the mucogingival junction leaving no attached gingiva apical to the recession, so the decision of free gingival graft was taken into consideration in this case (Fig 6).

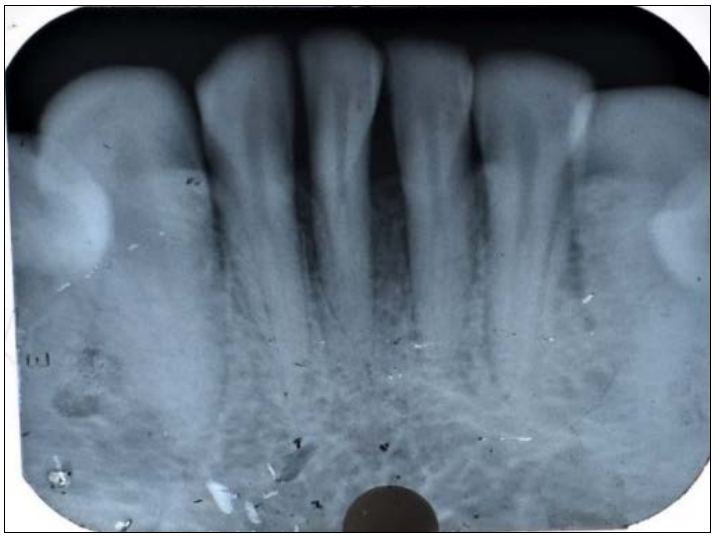

Fig 5: Intraoral periapical radiograph showing bone loss involved with relation to 31, 41

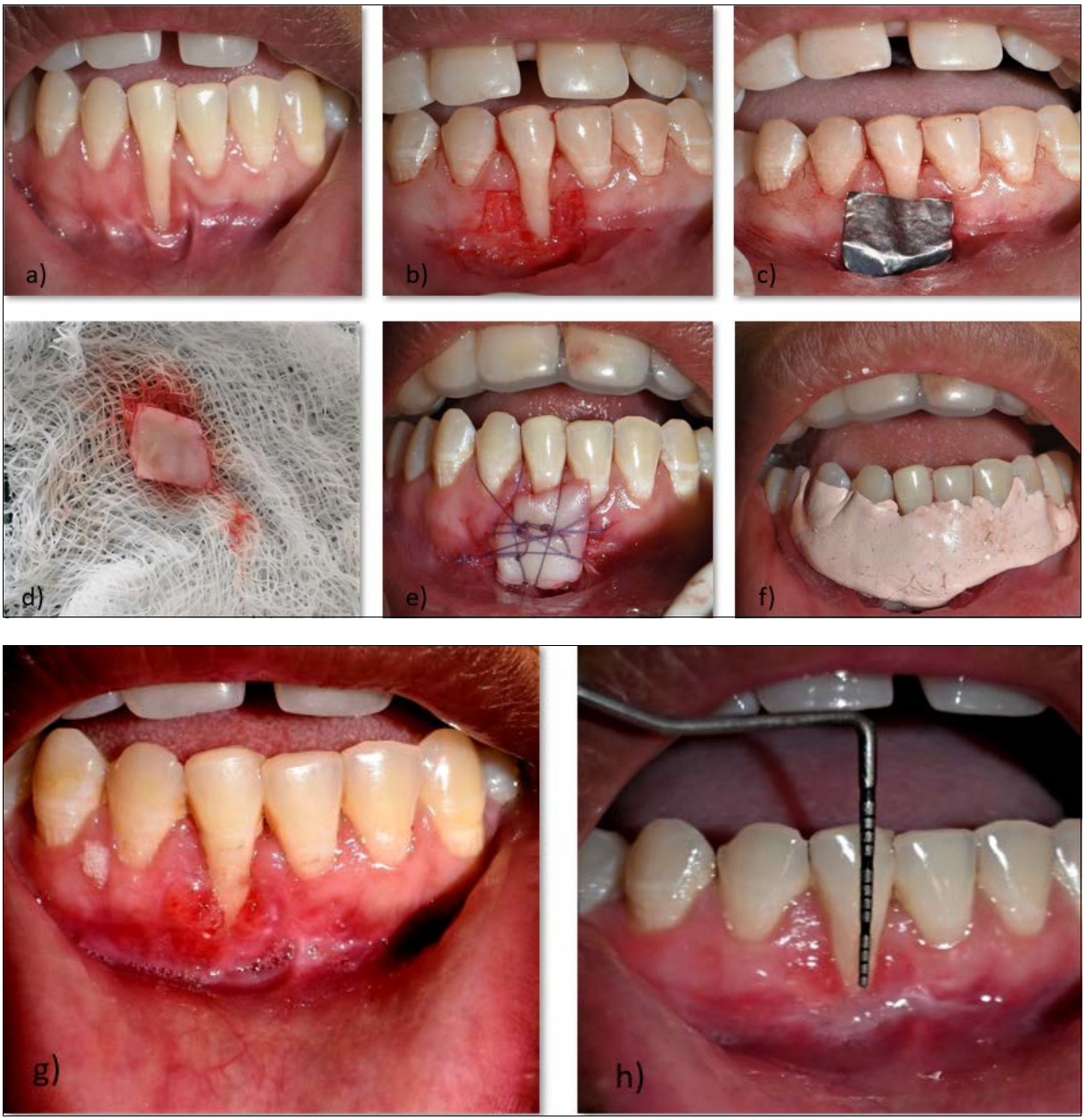

Fig 6: a) Pre-operative image showing recession with respect to 41. b) Recipient bed preparation with lower labial frenectomy performed. c) Tin foil template to measure the extent of graft to be harvested. d) Free gingival graft taken from the palate. e) Graft adapted and sutured to the recipient site. f) Tin foil and coe-pak over the graft and Essix appliance with palatal coverage was given in upper arch. g) Post-operative follow up on 14th day. h) Follow up after 1 month.

Discussion

Palatal soft-tissue graft harvesting was invented in the late 1960s, to obtain free gingival grafts that left the donor site to heal by secondary intention. Hemostasis, inflammatory, granulation, and maturation are the four phases that the palatal wound goes through to heal when soft tissue is harvested. Plasma diffusion and revascularization from the part of the graft that persist on the connective tissue bed around the dehiscence are necessary for a free soft tissue graft to survive after it has been positioned on a denuded root surface.

The use of a thick graft and the preparation of an adequate vascular bed around the dehiscence are the two additional considerations for the graft survival adapted on the root [5]. The graft must be harvested with a thickness of 1 to 1.5 mm in order for it to survive. It must be thin enough to allow fluid from the recipient site to diffuse through it. A too thin graft could necrose and expose the recipient site. Additionally, when a graft is overly thick, the peripheral layer is at risk because the extra tissue isolates it from blood flow and nutrients. Additionally, thicker grafts lead to larger wounds at the donor site.

According to Sullivan and Atkins (1968), when a graft is adapted over a recession, some "bridging" can be expected. Bridging is a healing event that takes place when collateral circulation is established from nearby vascular borders of the recipient bed [6].

The second method of acquiring root coverage is via creeping attachment, which takes place between one month to one year due to coronal migration of newly grafted attached gingiva, which was described by Goldman and colleagues in 1964 and Matter (1976, 1980). Creeping attachment happens as the tissue matures over the course of about a year after therapy. Creeping attachment is supported by the recession site being narrow, the presence of interproximal bone at coronal level on the labial surface, the absence of malpositioning of teeth, and effective oral hygiene maintenance [7].

In all the above mentioned cases, free gingival graft effectively worked with recession coverage and augmenting

the attached gingiva, although complete coverage was not possible in few cases due to factors like loss of interdental bone and malposed teeth.

Although palatal harvesting complications are usually not severe, they may have a negative impact on the patient's quality of life and willingness to undergo further surgeries. Hemostatic agents and substances that promote wound healing are widely used to reduce patient morbidity. Tissue adhesives like cyanoacrylate, either alone or in combination with an absorbable collagen sponge, hyaluronic acid, photobiomodulation, platelet concentrate derivatives, and ozone therapy can work better in diminishing patient morbidity after graft harvesting [8].

Conclusion

FGG can be considered as a viable and effective treatment modality when considering the conditions for a successful root coverage. Some of the drawbacks of this surgical technique include palatal site morbidity and colour mismatch that affects aesthetics. Despite the discovery of enhanced root coverage alternatives, the FGG is still a potential and effective surgical technique. In order to achieve adequate root coverage, proper surgical technique of mucogingival surgery is to be selected for the predictability of the procedure.

Declaration of patient consent

Informed consent was obtained from the patient.

Conflict of Interest: Nil

Source of funding: Nil

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