Comparison of the effectiveness of Gingival unit transfer and free Gingival graft in the management of localized Gingival recession - A systematic review

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ABSTRACT

Background: Gingival Recession (GR) is defined as the displacement of the soft tissue margin apical to the cementoenamel junction which can lead to root exposure and hypersensitivity. Treatment of GR has become an important therapeutic issue due to the increasing number of cosmetic requests from patients. Several techniques exist for the management of GR that include Sub-Epithelial Connective Tissue Graft (SECTG), Pedicle Graft (lateral and coronal), and Free Gingival Graft (FGG) and more. FGG is a non-submerged grafting procedure carried out for the management of recession defects. However, FGG has limitations like aesthetic mismatch and bulky appearance. A relatively newer modification of FGG was introduced by Allen in 2004 wherein a palatal graft including the marginal gingiva and interdental tissue was used as donor tissue for recession coverage. This review aims to study and compare the use of Gingival Unit Graft/Transfer (GUG/GUT) (palatal graft including the marginal gingiva and papillae) and FGG in the management of GR.
Materials and Methods: Randomized Clinical Trials, Non-Randomized Controlled Clinical Trials for the treatment of Miller Class I,II, and III of GRs by GUG with FGG were identified. Data sources included electronic databases and hand-searched journals. The primary outcome variables were complete root coverage, mean root coverage, vertical recession depth. The secondary outcome variables were keratinized tissue width gain, clinical attachment level and probing depth.
Results: Three Randomized Control Trials (RCTs) met the inclusion criteria and were evaluated in this systematic review. Both techniques showed significant improvement in clinical parameters. GUG procedure resulted in a greater percentage of sites achieving complete root coverage and vertical recession depth reduction when compared to FGG group in all the studies. Two studies reported significantly greater mean root coverage in GUG group compared to FGG group. GUG procedure revealed statistically significant greater gain in keratinized tissue width when compared to FGG group in all the studies.
Conclusion: Because of the limited number of selected studies, no conclusive statement could be made regarding the advantage of the GUG technique over FGG. However, the percentage of sites with complete root coverage obtained in the GUG technique is higher than FGG. More RCTs with aesthetic and patient satisfaction-related parameters are needed to provide definite evidence.

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1. Introduction

1.1. Rationale

Gingival Recession (GR) is characterized by an apical shift of the gingival margin with variable levels of root surface exposure in the oral cavity.[1] It may be generalized or localized without or with loss of attached gingival tissue and is a considerable issue influencing mid-aged and older people.[1] GR is regularly caused by different variables, including, periodontal illness, mechanical injury, faulty occlusal interrelationships, thin periodontal biotype, and tooth location.[2] The denuded root is often related to aesthetic concerns, root hypersensitivity, mechanical root wear, root caries, and hardships to accomplish ideal plaque control.[3] An insufficient mucogingival complex can also result in localized inflammation inclining to GR advancement.[1] These issues trigger patients to look for appropriate treatment. Multiple surgical and nonsurgical approaches are available for the management of gingival recession. No treatment is required when GR is insignificant i.e. thick gingival phenotype, favourable plaque control, non-influencing aesthetic dissatisfaction, no dentinal hypersensitivity or root caries. Marked recession deformities are to be handled by treatment modalities suggested to achieve root coverage.[4–6] The periodontal plastic surgeries are essentially performed to re-establish the structure and role of teeth and its related gingival complex.[7] However, tissue vasculature is generally ignored in most periodontal plastic surgeries which is of utmost concern and hence should be considered as the fundamental factor that determines the outcome of a chosen procedure. It is to be thus understood that the key achievement in periodontal plastic procedure lies in working in synchrony with tissues and vasculature.[1]

Free Gingival Graft (FGG)[8] is the most commonly performed mucogingival surgery and is utilized effectively in the management of inadequate keratinized tissue and to enable root surface coverage.[9] Primary root coverage which can be seen immediately after grafting is due to existing vessels of a graft that gradually synchronize with the recipient bed over a long period of time to establish a firm circulation.[10] The most generally utilized donor site alteration to get an effective root coverage with non-submerged grafts is to expand graft thickness, trying to keep up with its viability in an avascular condition.[11,18] However, a significant disadvantage of FGG is the scar tissue formed because of tissue bulkiness, unfavourable colour match, and a tyre patch appearance.[12,13]

Allen and Cohen[14] in 2004 presented a novel modification in the existing FGG technique known as "Gingival Unit Graft/transfer'' (GUG/GUT). This procedure includes harvesting of a palatal graft along with the marginal gingiva and interdental papillae. The rationale of this novel modification is that the supracrestal gingiva is a naturally occurring free tissue that when functioning on an avascular tooth surface helps in quick vascular re-circulation and post operative tissue viability thereby achieving an excellent colour blend. Thus, GUT has displayed predictable defect coverage and superior aesthetics.

Considering the above-mentioned factors, this systematic review is intended to comprehend if GUT has better predictable results with respect to root coverage, increase in keratinized tissue width, and aesthetically acceptable outcomes for the application in Millers Class I, II, and III localized recession deformities compared to FGG.

1.2. Focused question

The proposed focused question prepared following the PICO framework[15] is - Does Gingival Unit Transfer (GUT) have superior outcomes compared to Free Gingival Graft (FGG) in management of Miller's class I, II, and III localized recession defects?

2. Methods

2.1. Study design

This systematic review focusing on the effect of GUT versus FGG for the treatment of Gingival Recession was reported based on the preferred reporting items for Systematic Review guidelines (PRISMA).[16]

2.2. Registration

The protocol was specified and registered with the International Prospective Register of Systematic Reviews (PROSPERO), registration number CRD42021264204.

2.3. Eligibility criteria for study inclusion

- A critical review of the literature was conducted to select pertinent articles published in the literature.
- An electronic search was performed in the MEDLINE (PubMed), SCOPUS, HINARI, EBSCOhost, Google Scholar databases up to December 2021.
- The search covered all human clinical trials conducted from the year 2000 onwards. Retrospective studies, Cross-sectional studies, Case series, and Case reports were excluded.
- PICO framework was applied as follows:
- PARTICIPANTS/POPULATION: Patients with Miller's class I, II, and III localized gingival recession defects
- INTERVENTION/EXPOSURE: Use of Gingival Unit Transfer for management of Miller's class I, II, and III localized gingival recession sites
- Comparator/control: Includes studies with Free Gingival Graft for root coverage procedures
- Outcomes:

  Primary Outcome
  1. Complete Root Coverage (CRC)
  2. Mean Root Coverage (MRC)
  3. Vertical Recession (Distance from the Cementoenamel Junction (CEJ) to the most apical part of the gingival margin)

  Secondary Outcome
  1. Keratinized Tissue Width (KTW): Distance from the most apical part of the gingival margin to the mucogingival junction
  2. Clinical Attachment Level (CAL): Distance from the CEJ to the base of the sulcus
  3. Probing Depth (PD): Distance from the most apical part of the gingival margin to the base of the sulcus
  4. Recession Width: Width of exposed root 1 mm apical to the CEJ

  Time: At least 6 months follow-up

2.4. Information sources and search strategy

Search strategies were designed and a search in electronic databases was performed which included MEDLINE(PubMed), Scopus, HINARI, Google Scholar, EBSCOhost, and manual search using university library resources. Articles in English were preferred. Four high impact periodontal journals namely Journal of Clinical Periodontology, Journal of Periodontology, Journal of Periodontal Research, and International Journal of Periodontics and Restorative Dentistry were identified as important to this review and their databases were searched manually to ensure that relevant literature is not overlooked. These databases were looked up to December 2021 utilizing the search strategies. All cross-reference lists of the chosen articles were screened for extra literature that could meet the qualification criteria (Table .1).

The literature search strategy in the PubMed database was performed using the following terms:

(("Gingival unit transfer) OR (gingival unit graft) OR (GUT)OR

Table 1

Summary of search terms used for literature extraction and number of hits in database.

SEARCH STATEGY	No. Articles	Article In hit	Article selected
Google Scholar			
Gingival unit transfer	29,100	7	3
gingival unit transfer and free gingival graft	17,800	7	3
Scopus			
Gingival AND unit AND transfer AND free AND Gingival AND graft	2	2	
PubMed			
("Gingival unit transfer) OR (gingival unit graft) OR (GUT) OR (GUG"))AND free gingival graft [All Fields] OR non submerged graft [All Fields] OR free [All Fields] AND ("gingiva" [mesh Terms] OR "gingiva" [All Fields] OR "gingival" [All Fields]) AND ("transplants" [mesh Terms] OR "transplants" [All Fields] OR "graft" [All Fields])AND ("Gingival Recession" [Mesh]) AND "Gingival Recession" [Majr]	33	3	2
(("Gingival unit transfer) OR (gingival unit graft) OR (GUT) OR (GUG"))AND free gingival graft [All Fields] OR non submerged graft [All Fields] OR free [All Fields] AND ("gingiva" [mesh Terms] OR "gingiva" [All Fields] OR "gingival" [All Fields]) AND ("transplants" [mesh Terms] OR "transplants" [All Fields] OR "graft" [All Fields])AND ("Gingival Recession" [Mesh]) AND "Gingival Recession" [Majr]			
(("Gingival unit transfer) OR (gingival unit graft) OR (GUT) OR (GUG"))AND free gingival graft [All Fields] OR non submerged graft [All Fields] OR free [All Fields] AND ("gingiva" [mesh Terms] OR "gingiva" [All Fields] OR "gingival" [All Fields]) AND ("transplants" [mesh Terms] OR "transplants" [All Fields] OR "graft" [All Fields])AND (("Gingival Recession" [Mesh]) AND "Gingival Recession" [Majr]) AND "Gingival Recession" [Mesh:noexp]			
[("Gingival unit transfer") AND ("free gingival graft")AND ("gingival recession")AND ("vertical recession" OR "keratinized tissue width" OR "clinical attachment level" OR "probing depth" OR "recession width" OR "aesthetic visual analogue")]			
(("Gingival unit transfer")AND ("Free gingival graft")AND ("gingival recession"))			
(("Gingival unit graft") AND ("Free gingival graft") AND ("gingival atrophy"))			
(("Gingival unit transfer") AND ("non submerged graft")AND ("gingival recession"))			
(("Gingival unit graft") AND ("non submerged graft") AND ("gingival atrophy"))			

(GUG"))AND free gingival graft [All Fields] OR non submerged graft [All Fields] OR free [All Fields] AND ("gingiva" [mesh Terms] OR "gingiva" [All Fields] OR "gingival" [All Fields]) AND ("transplants" [mesh Terms] OR "transplants" [All Fields] OR "graft" [All Fields])AND ("Gingival Recession" [Mesh]) AND "Gingival Recession" [Majr].

(("Gingival unit transfer) OR (gingival unit graft) OR (GUT)OR (GUG"))AND free gingival graft [All Fields] OR non submerged graft [All Fields] OR free [All Fields] AND ("gingiva" [mesh Terms] OR "gingiva" [All Fields] OR "gingival" [All Fields]) AND ("transplants" [mesh Terms] OR "transplants" [All Fields] OR "graft" [All Fields])AND (("Gingival Recession" [Mesh]) AND "Gingival Recession" [Majr]) AND "Gingival Recession" [Mesh:noexp].

[("Gingival unit transfer") AND ("free gingival graft")AND ("gingival recession")AND ("vertical recession" OR "keratinized tissue width" OR "clinical attachment level" OR "probing depth" OR "recession width" OR "aesthetic visual analogue")]

(("Gingival unit transfer")AND ("free gingival graft")AND ("gingival recession"))

(("gingival unit graft") AND ("free gingival graft") AND ("gingival atrophy"))

(("gingival unit transfer") AND ("non submerged graft")AND ("gingival recession"))

(("gingival unit graft") AND ("non submerged graft") AND ("gingival atrophy"))

2.5. Data item

1. Complete Root Coverage (CRC)
2. Mean Root Coverage (MRC)
3. Vertical Recession: Distance from the CEJ to the most apical part of the gingival margin
4. Keratinized Tissue Width: Distance from the most apical part of the gingival margin to the mucogingival junction
5. Clinical Attachment Level: Distance from the CEJ to the base of the sulcus
6. Probing Depth: Distance from the most apical part of the gingival margin to the base of the sulcus
7. Recession Width: Width of exposed root 1 mm apical to the CEJ

2.6. Selection of studies and data synthesis

The study selection process was according to PRISMA guidelines.[16] Two independent reviewers (C.J and S.S) screened the titles and abstracts initially, obtained through the described search strategy and then full text articles were analyzed to decide whether the studies met the inclusion criteria. The screening was performed as per the criteria: Randomized Clinical Trials (RCT)/Non Randomised Controlled Clinical Trials and required parameters in clinical outcomes. Disagreement between reviewers was resolved through discussion.

2.7. Risk of bias assessment

Two review authors (C.J and S.S) independently assessed the risk of bias in the included trials for seven domains plus an additional domain[17]-Version 2 of the Cochrane risk-of-bias tool for randomized trials (RoB 2).

- Random sequence generation (selection bias);
- Allocation concealment (selection bias);
- Blinding of participants and personnel (performance bias);
- Blinding (outcome assessment) (detection bias);
- Incomplete outcome data (attrition bias);
- Selective outcome reporting (reporting bias);
- Risk of bias specific to cluster-randomized trials;
- Other biases

We categorised the overall risk of bias of individual studies. Studies were categorised as being at low, high, or unclear risk of bias according to the following criteria:

- Low risk of bias (plausible bias unlikely to seriously alter the results) if all domains were at low risk of bias;
- High risk of bias (plausible bias that seriously weakens confidence in the results) if one or more domains were at high risk of bias; or
- Unclear risk of bias (plausible bias that raises some doubt about the results) if one or more domains were at unclear risk of bias.

'Risk Of Bias' tables for each included study were prepared and a

'Risk Of Bias' summary graph was generated.

3. Results

3.1. Selection of studies

After entering the search strategy, preliminary screening was done. The primary screening comprised a cumulative of 29,140 articles, of which 7 articles were distinguished through the title and removal of duplicates. All these 7 articles were screened and finally, 3 out of 7 were considered appropriate for the review (Fig. 1).

3.2. Data synthesis

Full reports were obtained for all the studies that were considered eligible for inclusion in the review. Discrepancies and doubts were resolved in the first instance through data check and discussions. Eligible studies underwent data extraction and validity assessment. Predesigned extraction forms were developed to retrieve and assess essential information such as title, authors, year, study design, duration of the study, length of the observation period, and reported clinical outcomes. Data synthesis was performed through organizing data in an evidence table, and a descriptive summary was created to determine study characteristics, study quality, and results. Any disagreements were resolved by discussion (Table 2).

3.3. Study design and patient features

The age of the participants ranges from 18 to 50 years with a follow-up period of 6–8 months. All studies compared GUG with FGG for the treatment of localized Miller's class I, II, III GR.

3.4. Sites, recession, and defect characteristics

All studies include Miller's Class I, II, and III GR. Three studies involved mandibular incisor teeth,[18,19] canines[20] and premolars[19] with vertical recession depth ≥2 mm.

3.5. Type of interventions

Gingival Recession were surgically treated by GUG (palatal tissue with marginal gingiva and interdental papilla) or conventional FGG
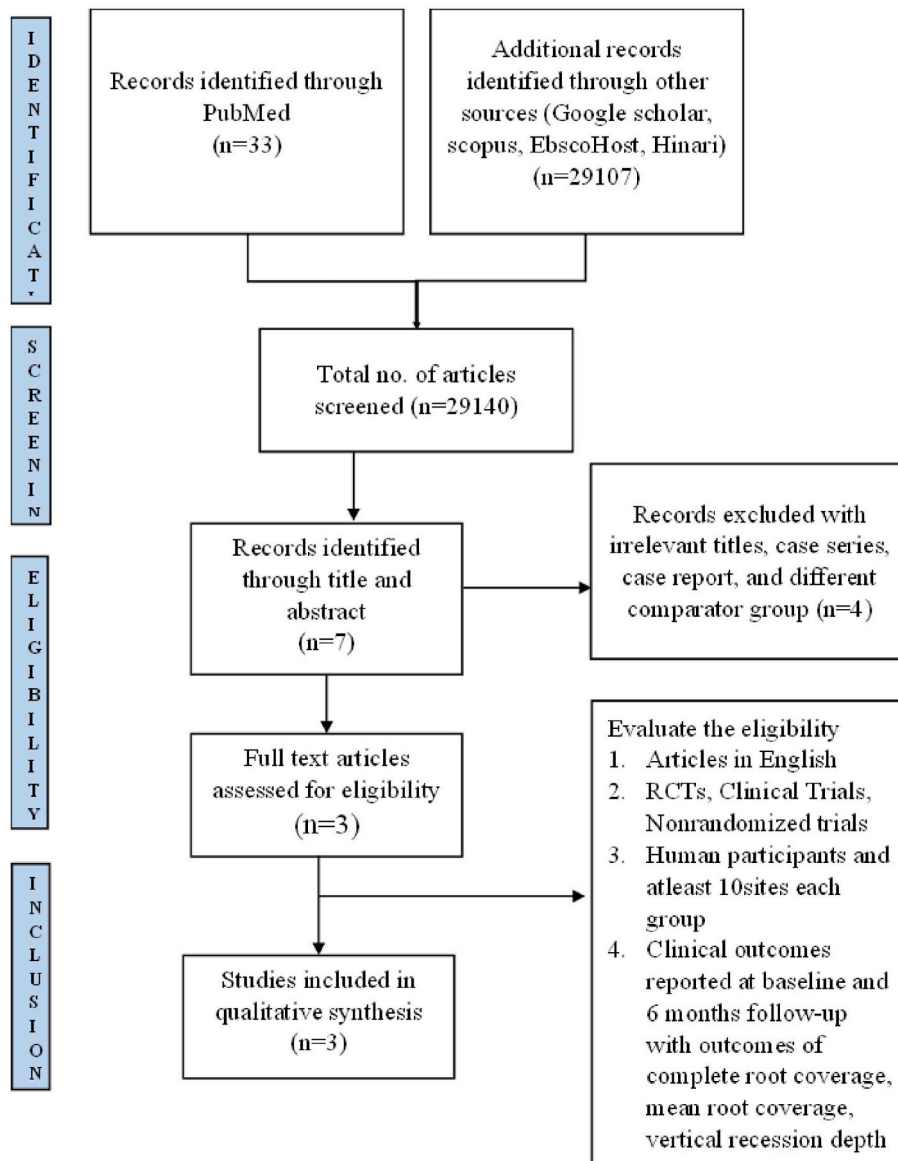

Fig. 1. Study identification flow chart according to preferred reporting items, n = Number of articles.

Table 2

Characteristic of studies.

Title	Author (Year)	Study design	Sample size	Type of intervention and comparison	Follow-up (timepoint)	Complete Root Coverage	Mean Root Coverage	Vertical Recession (mm)	Keratinized Tissue Width (mm)	Clinical Attachment Level(mm)	Probing Depth (mm)	Recession Width (mm)
Treatment of Localized Gingival Recessions using Gingival Unit Grafts: A Randomized Controlled Clinical Trial	Kuru et al., 2013	RCT	17 patients with Class I to II recession defects on mandibular anterior teeth	Gingival Unit Transfer and Free Gingival Graft	Baseline, 3months, 8months	50% sites achieved complete root coverage in GUG and 0% in FGG	91.62% GUG 68.97% FGG	3.50 ± 0.53 (Baseline GUG) 0.94 ± 0.72 (GUG 3 months) 0.31 ± 0.44 (GUG 8 months) 3.55 ± 0.88 (Baseline FGG) 1.33 ± 0.36 (FGG 3 months) 1.16 ± 0.79 (FGG 8 months)	1.43 ± 0.62 (BaselineGUG) 7.12 ± 0.58 (8 months GUG) 1.72 ± 0.83Baseline FGG) 5.94 ± 1.18 (8months FGG)	4.75 ± 0.70BaselineGUG) 1.12 ± 0.44 (8 months GUG) 4.88 ± 0.78(Baseline FGG) 2.27 ± 0.79 (8months FGG)	1.25 ± 0.46 (BaselineGUG) 0.81 ± 0.25 (8 months GUG) 1.33 ± 0.50(Baseline FGG) 1.16 ± 0.79 (8months FGG)	
Gingival Unit Graft Versus Free Gingival Graft for Treatment of Gingival Recession: A Randomized Controlled Clinical Trial	Jenabian et al., 2016	RCT	9patients, 18 bilateral localized recessions of Miller class I and II	Gingival Unit Transfer and Free Gingival Graft	Baseline, 1month, 3months, 6 months	11% sites achieved complete root coverage in GUG and 0% in FGG	60.52% GUG 45.52% FGG	4.11 ± 1.63 (BaselineGUG) 2.72 ± 1.09 (1 months GUG) 2.38 ± 1.29 (3 months GUG) 1.83 ± 1.47 (6 months GUG) 3.72 ± 1.46 (Baseline FGG) 2.83 ± 0.93 (1 month FGG) 2.61 ± 1.08 (3monthFGG) 2.00 ± 1.11 (6 months FGG)	2.44 ± 1.52 (BaselineGUG) 5.94 ± 1.07 (1 months GUG) 5.33 ± 1.03 (3 months GUG) 5.05 ± 1.01 (6 months GUG) 2.16 ± 1.47 (Baseline FGG) 5.38 ± 1.43 (1 month FGG) 4.83 ± 1.52 (3monthFGG) 4.38 ± 1.36 (6 months FGG)	5.33 ± 1.85 (BaselineGUG) 3.72 ± 0.83 (1 months GUG) 3.50 ± 1.14 (3 months GUG) 2.66 ± 1.56 (6 months GUG) 5.05 ± 1.66(Baseline FGG) 3.72 ± 1.00 (1 month FGG) 3.72 ± 1.12 (3monthFGG) 3.00 ± 1.17 (6 months FGG)	1.22 ± 083 (BaselineGUG) 1.00 ± 0.50 (1 months GUG) 1.11 ± 0.33 (3 months GUG) 0.83 ± 0.25 (6 months GUG) 1.44 ± 0.28 (Baseline FGG) 0.77 ± 0.08 (1 month FGG) 1.11 ± 0.11 (3monthFGG) 1.00 ± 0.08 (6 months FGG)	3.00 ± 1.19 (BaselineGUG) 2.50 ± 0.82 (1 months GUG) 2.11 ± 0.82 (3 months GUG) 1.94 ± 0.72 (6 months GUG) 3.16 ± 1.54 (Baseline FGG) 2.50 ± 1.17 (1 month FGG) 2.66 ± 1.19 (3monthFGG) 2.44 ± 1.21 (6 months FGG)
Comparison of free gingival graft and gingival unit graft for treatment of gingival recession: A Randomized Controlled Clinical Trial	Sriwil et al., 2020	RCT	30 bilateral localized recessions of Miller class I and II	Gingival Unit Transfer and Free Gingival Graft	Baseline, 1month, 3months, 6 months	13% sites achieved complete root coverage in GUG and 0% in FGG	92.74 ± 8.81% in GUG 66.94 ± 11.43% in the FGG	3.42 ± 0.67 (BaselineGUG) 1.54 ± 0.56 (1 months GUG) 0.27 ± 0.20 (6 monthsGUG) 3.50 ± 0.68(Baseline FGG) 2.19 ± 0.43 (1months FGG) 1.15 ± 0.43 (6 months FGG)	2.44 ± 0.78 (BaselineGUG) 8.23 ± 0.86 (1 months GUG) 6.27 ± 0.67 (6 monthsGUG) 2.54 ± 0.75(Baseline FGG) 7.38 ± 0.62 (1months FGG) 5.62 ± 0.74 (6 months FGG)	4.85 ± 0.99 (BaselineGUG) 2.38 ± 0.55 (1 months GUG) 0.85 ± 0.83 (6 monthsGUG) 4.77 ± 1.01(Baseline FGG) 3.25 ± 0.67 (1months FGG) 2.15 ± 0.24 (6 months FGG)	2.04 ± 0.83 (BaselineGUG) 1.04 ± 0.43 (1 months GUG) 1.04 ± 0.43 (6 monthsGUG) 2.23 ± 0.73(Baseline FGG) 1.81 ± 0.63 (1months FGG) 1 ± 0.35 (6 months FGG)	

(palatal tissue only) for all included clinical trials. Randomization was done in computer-assisted randomization,[18] card and envelope method,[19] and cone randomization method.[20] Clinical assessments were evaluated at.

- Baseline and 8th month[18] and
- Baseline and 6th month[19,20]

3.6. Quality assessment

The result of bias assessment of the included studies are presented (Fig. 2). All the three studies presented with low risk of bias. Random sequence generation and allocation concealment were clearly mentioned in three studies.[18–20] Blinding was performed in the included studies (double blinding).[18–20] Furthermore, complete outcome data were given in all the three studies (CRC, MRC, Vertical Recession Depth).[18–20] All the studies reported adherence to the CONSORT statement recommendations as it could bring these studies to an uncertain risk of bias.[18–20]

3.7. Outcomes measured

3.7.1. Primary outcomes

3.7.1.1. Complete Root Coverage. All the 3 studies reported significant complete root coverage in GUG group (50%,[18] 11%,[19] and 13%[20]). However, none reported complete root coverage in the FGG group.

Experimental	Comparator	Outcome	Unique ID	D1a	D1b	D2	D3	D4	D5	Overall
Gingival Unit Transfer	Free Gingival Graft	complete root coverage,mean root coverage,vertical recession depth	kuru (2013)	+	+	+	+	+	+	+
Gingival Unit Transfer	Free Gingival Graft	complete root coverage,mean root coverage,vertical recession depth	Jenabian (2016)	+	+	+	+	+	+	+
Gingival Unit Transfer	Free Gingival Graft	complete root coverage,mean root coverage,vertical recession depth	Sriwil (2020)	+	+	+	+	+	+	+

+ Low risk

! Some concerns

- High risk

D1a   Randomisation process

D1b   Timing of identification or recruitment of participants

D2   Deviations from the intended interventions

D3   Missing outcome data

D4   Measurement of the outcome

D5   Selection of the reported result

Fig. 2. Risk of bias summary.

3.7.1.2. Mean Root Coverage. Mean root coverage reported by Kuru et al., 2013[18] was 91.62% in GUG group while it was 68.97% in FGG group at 8 months, Jenabian et al., 2016[19] reported 60.52% in GUG group compared to 45.52% in FGG group at 6 months, and Sriwil et al., 2020[20] reported 92.74 ± 8.81% in GUG group while it was 66.94 ± 11.43% in FGG group at 6 months.

3.7.1.3. Vertical Recession Depth. Kuru et al., 2013[18] observed a reduction in vertical recession depth in GUG group (3.50 mm–0.31 mm) and FGG group (3.55–1.16 mm) at the 8th month, Jenabian et al., 2016[19] observed a reduction in vertical recession depth in GUG group (4.11 mm–1.83 mm) and FGG group (3.72–2.00 mm) at the 6th month and Sriwil et al., 2020[20] observed a reduction in vertical recession depth in GUG group (3.42–0.27 mm) and FGG group (3.50–1.15 mm) at the 6th month.

3.7.2. Secondary outcomes

3.7.2.1. Clinical attachment level (CAL). Post-surgical CAL gain observed by Kuru et al., 2013[18] in GUG group (4.75 mm–1.12 mm) and FGG group (4.88 mm–2.27 mm) from baseline to 8th month; Jenabian et al., 2016[19] reported a post-surgical CAL gain in GUG (5.33–2.66 mm) and FGG group (5.05–3.00 mm) from baseline to 6th month; (iii)Sriwil et al., 2020[20] reported a post-surgical CAL gain in GUG group (4.85–0.85 mm) and FGG group (4.77–2.15 mm) from baseline to 6th month.

3.7.2.2. Keratinized tissue width. Kuru et al., 2013[18] observed KTW increase in the GUG group (1.43–7.12 mm) and FGG group (1.72–5.94 mm) from baseline to 8th month. Jenabian et al., 2016[19] observed KTW gain in the GUG group (2.44–5.94 mm in 1st-month post-surgical which further decreased to 5.05 mm in 6th month) and the FGG group (2.16–5.38 mm in 1st month which decreased to 4.83 mm in 3rd month and remained same until 6th month). Sriwil et al., 2020[20] observed KTW gain in GUG group (2.44–8.23 mm) in 1st month that decreased to 6.27 mm at 6th month and FGG side revealed similar pattern with the 1-month increase from 2.54 to 7.38 mm that decreased to 5.62 mm at 6th month.

3.7.2.3. Probing depth. A Probing depth (PD) reduction was observed by Kuru et al., 2013[18] in GUG group (1.25–0.81 mm) and FGG group (1.33–1.16 mm) from baseline to 8th month and Jenabian et al., 2016[19] observed a PD reduction in GUG group (1.22–0.8 mm) and FGG group (1.44–1.00 mm) from baseline to 6th month and Sriwil et al.,. 2020[20] observed a PD reduction in GUG group (2.04–1.04 mm) and FGG group (2.23 to 1 mm).

3.7.2.4. Recession width. This outcome was measured by Jenabian et al., 2016[19] in the GUG group that reduced from 3.00 to 1.94 mm. The FGG group also exhibited a reduction from 2.50 to 2.44 mm from baseline to 6th month.

3.7.3. Ancillary parameters

3.7.3.1. Aesthetic visual analog scale. Jenabian et al., 2016[19] observed that gingival unit graft produced significantly higher aesthetic satisfaction at one, three, and six months after the surgery than the free gingival graft group.

4. Discussion

This systematic review was conducted to understand if GUT has superior outcomes compared to FGG in the management[18–22] of Miller's class I, II, and III localized recession defects. It was observed that all the three studies[18–20] included in our study reported a significantly greater percentage of sites exhibiting complete root coverage in the GUG group compared to the FGG group. Two out of three studies[18,20] reported a greater significant mean root coverage in GUG compared to FGG while one study[19] reported no statistically significant difference between GUG and FGG. A statistically significant reduction in vertical recession depth was achieved in the GUG group compared to FGG in all three studies.[18–20] A statistically significant gain in clinical attachment level was observed in GUG compared to FGG group post-surgical evaluations in two[18,19] studies, While no significant gain in CAL was reported by Sriwil et al., 2020[18] between the two GUG group showed a significant gain in KTW when compared to FGG group in all the selected studies.[18–20] No significant reduction in probing depth was reported in both GUG and FGG group in all the three studies.[18–20] Jenabian et al., 2016[19] assessed the healing index, in their study and observed a greater healing and lower level of pain in the GUG group compared to the FGG group. Aesthetic satisfaction was assessed in two[18,19] out of three included studies. Accordingly, Kuru et al., 2013[18] reported no significant difference between the two groups. However, Jenabian et al., 2016[19] reported a higher aesthetic score at 1, 3 and 6 months after surgery for the GUT group. And, also Jenabian et al., 2016[19] assessed the Aesthetic Visual Analog scale, though all the three studies[18–20] however all the studies[18–20] confirm color blending and good aesthetic appearance in the GUG group. Thus GUT can be considered as a treatment choice against FGG in aesthetically challenging areas. The better clinical outcome observed in the GUG group could be due to the reason that success of periodontal plastic surgery lies in the synergy between tissues and its vascular supply. Supracrestal tissue of gingiva, rich in vascularity that naturally survives on avascular root surface.[14] Hence, GUT proves to survive better when placed on a recession defect, increasing the probability of complete root coverage and obtaining a significant mean root coverage compared to Free Gingival Graft. Also, use of beveled incisions and thinner grafts in the GUT technique allows for a greater surface area for a vascular reunion and lesser initial contraction thus increasing the chances of graft survival, a good colour blend, and in turn a better clinical outcome.[14]

All of the three studies[18–20] have mentioned uneventful healing at the recipient site. Also, clinical healing at the gingival unit donor site occurred without any complications, though some discomfort was reported in the harvesting site in both the GUG and FGG groups. This is attributed to the time taken for complete epithelialization at the donor site.[20,23]

It is understood that though CRC is the primary outcome of any root coverage procedure, the colour, texture and mucogingival alignment of the treated site must be considered as the final goal of periodontal plastic procedures. It is to achieve a soft tissue anatomy which is more likely indistinguishable from adjacent tissues. Thus the use of a comprehensive, objective assessment tool like the Root Coverage Esthetic Score (RES)[24] may be considered in further studies. An important finding of this review is that, though the standard measurements such as complete root coverage, vertical recession depth, keratinized tissue width are recorded, the graft thickness which is a key factor affecting grafting procedure is not addressed in any of the studies.

The major limitation faced during this systematic review was the availability of minimal Randomized Control Trials (RCT). Another limitation was the heterogeneity of the outcomes measured. Two of the three studies[18,19] have used sutures, whereas Sriwil et al., 2020[20] used cyanoacrylate tissue adhesive for stabilizing the graft. However, there has been no mention of any difference in healing by the authors. Also, a longer follow-up period after creeping attachment in all the studies would have given better outcome in both the techniques.

A recent study by Yüksek et al., 2021[25] compared the clinical outcome of GUG and SECTG and concluded that GUG can be the treatment of choice when there is a shallow vestibular depth and lack of keratinized tissue width in RT 1 type recession.[26] A cautious interpretation of this finding is that harvesting a GUG is relatively less technique sensitive and can be carried out even if palatal mucosa is thin, providing

an edge for GUG over connective tissue graft. However, this study is not included in our review as the comparator is not a non-submerged graft.

5. Conclusion

This systematic review confirms that both FGG and GUG procedures are associated with consistent recession reduction. However, CRC is considered to be the treatment goal of any root coverage procedure, and GUT technique achieves complete root coverage in a greater percentage of sites and hence could be the technique of choice in the management of Miller's Class 1, II, III recession. Thus, GUT is a consistent, reliable and successful modification of FGG if a site is indicated for root coverage. However, further clinical trials assessing the aesthetic outcome and patient satisfaction are required to support the superior efficacy of the concerned procedure.

Source of support

Conflict of interest

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