Comparative Clinical Evaluation of Trapezoidal, Envelope, and Tunnel Type Coronally Advanced Flap in the Treatment of Gingival Recession: A Network Meta-Analysis of Randomized Clinical Trials

This study evaluated the efficacy of trapezoidal coronally advanced flap (tCAF), envelope coronally advanced flap (eCAF), and coronally advanced tunnel flap (TUN) in treating gingival recession (GR) through a network meta-analysis. Eligible articles from the PubMed, Embase, and Cochrane Library databases published up to September 2020 were selected to identify randomized controlled trials (RCTs) on tCAF, eCAF, and TUN treatments. Sample size, treatment time, and outcome measures including complete root coverage (CRC), root coverage esthetic score (RES), and other data were extracted from the article, and integrated analysis was conducted. In total, 10 RCTs met the inclusion criteria, involving 310 patients. Direct meta-analysis showed no significant differences in CRC among the three surgical methods; A significant difference was seen for RES, with TUN worse than tCAF (weighted mean difference: –0.73; 95% CI: –1.44, –0.02; P = .045). The network meta-analysis showed no statistical significance in the cross-comparison of tCAF, eCAF, and TUN. However, eCAF had the most significant effect on improving CRC (SUCRA = 69.2) and RES (SUCRA = 85.0). eCAF has the best prognosis in the treatment of GR, followed by tCAF and TUN. This may influence the surgeon’s treatment choice, as eCAF may be more effective in root coverage procedures.

Gingival recession (GR) is frequently detected in adults and has a tendency to worsen with age. It can negatively impact esthetics, plaque control, and cause hypersensitivity. Furthermore, the exposed root surfaces are susceptible to root caries and noncarious cervical lesion development. In patients with good oral hygiene, longitudinal evidence indicates that untreated GR defects tend to increase in depth over time.

At present, mucogingival approaches have been considered effective methods to treat GR. For a long time, traditional coronally advanced flap (CAF) combined with connective tissue graft (CTG) and/or enamel matrix protein derivative, or acellular dermal matrix (ADM), has been the preferred treatment for GR. The traditional CAF is a trapezoidal flap design, which includes two vertical releasing incisions combined with partial-, full-, or mixed-thickness elevation. However, vertical incisions may reduce blood supply to the gingival flap and increase the likelihood of postoperative scarring. In order to reduce the flap’s interference to the blood supply and improve the esthetic effect, a variety of flaps without vertical incisions have been designed and applied, such as coronally advanced tunnel flap (TUN) and envelope coronally advanced flap (eCAF).
Raetzke was the first to use an envelope flap technique for covering isolated GRs, creating a partial-thickness “envelope” that allowed for CTG insertion. Later, Allen modified this approach by creating a partial-thickness supraperiosteal envelope to treat multiple adjacent GR defects. In this approach, the corresponding dental papillae were undermined to allow for more coronal flap movement.

The coronally advanced TUN approach was first proposed by Aroca et al. It comprises a full-thickness flap elevation that carefully separates the entire interproximal papillae from bone and places sutures suspended from composite stops at teeth contact points to prevent the flap from collapsing during healing. The positive esthetic outcomes are attributed to the flap elevation, which does not dissect the papillae or require vertical releasing incisions.

At present, there is no comprehensive literature analysis of the efficacy of trapezoidal CAF (tCAF), eCAF, and TUN in treating GR. Therefore, the present study aimed to conduct a systematic review of randomized controlled clinical trials (RCTs) to evaluate the efficacy of eCAF, tCAF, and TUN in the treatment of Miller Class I and II GRs. A network meta-analysis model was used to summarize quantitative data from the included RCTs.

Materials and Methods

A protocol has been registered at the International Prospective Register of Systematic Reviews (no. CRD42020210668). The content of this article was consistent with the protocol.

Criteria for Considering Studies for this Review

Only RCTs in the English language with at least a 3-month follow-up were considered for inclusion and were organized by the PICO (patient, intervention, comparison, outcomes) method, according to the following points:

- Patients: Those with a clinical diagnosis of a GR defect who were surgically treated by root coverage procedures.
- Interventions: The considered surgical procedures for the treatment of single GRs comprised tCAF, eCAF, and TUN.
- Comparison: Any possible comparisons between the included surgical procedures, excluding variations of the same technique, with at least 3 months of follow-up were investigated.
- Outcome measures: The primary measure was an esthetic assessment of root coverage outcomes using a well-defined patient assessment and standardized clinical assessment. Esthetic evaluations using empirical or unclear methods were not considered. The following outcome measures were considered: complete root coverage (CRC); root coverage esthetic score (RES); recession reduction (RecRed); keratinized tissue width (KTW) gain; and root coverage (RC).

The identification of RCTs to be included or considered in the present network meta-analysis was conducted via detailed search strategies. The Embase, PubMed, and Cochrane databases were searched for articles published up to September 2020 (searches were performed on September 1, 2020).

The Embase search strategy was as follows:

1. ‘gingiva disease’/exp
2. ‘gingival recession’:ab,ti
3. ‘gingival recessions’:ab,ti
4. ‘recession, gingival’:ab,ti
5. ‘recessions, gingival’:ab,ti
6. ‘gingival atrophy’:ab,ti
7. ‘gingival atrophies’:ab,ti
8. ‘atrophy of gingiva’:ab,ti
9. ‘gingiva atrophies’:ab,ti
10. ‘gingiva atrophy’:ab,ti
11. #1 OR #2 OR #3 OR #4 OR #5 OR #6 OR #7 OR #8 OR #9 OR #10
12. ‘trapezoidal flap’:ab,ti
13. ‘envelope flap’:ab,ti
14. ‘tunnel flap’:ab,ti
15. #12 OR #13 OR #14
16. #11 AND #15

The National Library of Medicine (MEDLINE by PubMed) search strategy was as follows:

("Gingival Recession" [Mesh]) OR ((((((((Gingival Recessions [Title/Abstract]) OR (Recession, Gingival [Title/Abstract])) OR (Recessions, Gingival [Title/Abstract])) OR (Gingival Atrophy [Title/Abstract])) OR (Gingiva Atrophies [Title/Abstract])) OR (Gingiva Atrophy [Title/Abstract]))) OR ("Gingival Recession" [Mesh]))
Fig 1 Flow diagram in PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) format of the screening and selection process.

Records identified through database searches:
- Embase: n = 18
- PubMed: n = 10
- Cochrane Library: n = 101

Records screened after duplicates removed: n = 108

Full-text articles assessed for eligibility: n = 27

Studies included in qualitative synthesis and meta-analysis: n = 10

Full-text articles excluded: n = 17
- No clinical outcomes (n = 11)
- Data from a previous article (n = 2)
- No data of included outcomes (n = 2)
- Triangle-flap design (n = 1)
- Not in English (n = 1)

(Gingival Atrophies [Title/Abstract])) OR (Atrophy of Gingiva [Title/Abstract])) OR (Gingiva Atrophies [Title/Abstract])) OR (Gingiva Atrophy [Title/Abstract])) AND ((“trapezoidal flap” [All Fields]) OR (“envelope flap” [All Fields]) OR (“tunnel flap” [All Fields]))

The Cochrane Central Register of Controlled Trials (Clinical Trials) search strategy was as follows:

1. MeSH descriptor: [Gingival Recession] explode all trees
2. (Gingival Recessions):ti,ab,kw
3. (Recession, Gingival):ti,ab,kw
4. (Recessions, Gingival):ti,ab,kw
5. (Gingival Atrophy):ti,ab,kw
6. (Gingiva Atrophies):ti,ab,kw
7. (Atrophy of Gingiva):ti,ab,kw
8. (Gingiva Atrophies):ti,ab,kw
9. (Gingiva Atrophies):ti,ab,kw
10. #1 OR #2 OR #3 OR #4 OR #5 OR #6 OR #7 OR #8 OR #9
11. (trapezoidal flap):ti,ab,kw
12. (envelope flap):ti,ab,kw
13. (tunnel flap):ti,ab,kw
14. #11 OR #12 OR #13
15. #10 AND #14

The identification and selection of studies was performed by two independent investigators (Z.Z. and Z.L.) who screened the titles, abstracts, and full texts of the articles. Disagreement between the two reviewers was solved by discussion with the attendance of another author (J.C.). At this point, data were independently extracted and entered into a computer by two review authors (Z.Z. and Z.L.) using specifically designed data-collection forms. Patient characteristics, treatments, clinical outcomes, and study quality were systematically documented. When clinical data on one or more of the outcome variables were not published/reported in the original article, the authors of the RCT in question were contacted and kindly asked to send their raw (unpublished) data for inclusion in the statistical model. In case of missing data or if the authors did not answer, RCTs were considered ineligible for inclusion in the present meta-analysis.

Results

Search Results

The Embase, PubMed, and Cochrane Library databases yielded

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results for 10, 101, and 18 articles published, respectively. Ten articles were included after full-text reading. Detailed steps are presented in Fig 1. In these 10 articles, a total of 310 patients were followed up for 4 to 24 months, and all of the articles were RCTs. Basic information included in the literature is presented in Appendix Table 1.14–22 The results of the literature quality evaluation (based on the Cochrane handbook) are summarized in Fig 2.

### Analysis Results

The results of the analysis include: the continuous outcome variables (RC, RecRed, KTW gain, and RES) and the dichotomous outcome variable (CRC). The ranking of treatment efficacy by variable is shown in Table 1.

#### CRC

Both direct meta-analysis and network meta-analysis showed that there was no statistically significant difference in CRC among tCAF, eCAF, and TUN (Tables 2 and 3). The ranking of CRC treatment efficacy was as follows: tCAF > eCAF > TUN (Table 1).

#### RC

The direct meta-analysis showed that tCAF was more effective than TUN for RC, and the weighted mean difference (WMD) between the TUN and tCAF group was −9.37 (95% confidence interval [CI]: −19.99, −1.75), the difference was statistically significant (P = .016). However, there was no statistically significant difference between TUN and eCAF (Table 4).

The network meta-analysis showed that there was no statistically significant difference in RC among tCAF, eCAF, and TUN treatments (Table 5). The ranking of RC treatment efficacy was as follows: tCAF > eCAF > TUN (Table 1).

#### RecRed

The direct meta-analysis showed that tCAF was more effective than TUN for RecRed, and the WMD between the TUN and tCAF group was −0.465 (95% CI: −0.760, −0.170; P = .002), while there was no statistically significant difference between TUN and eCAF (Table 6).

### Table 1 SUCRA of the Three Treatments According to Different Outcomes

<table>
<thead>
<tr>
<th>Treatment</th>
<th>CRC</th>
<th>RC</th>
<th>RecRed</th>
<th>KTW gain</th>
<th>RES</th>
</tr>
</thead>
<tbody>
<tr>
<td>tCAF</td>
<td>58.6</td>
<td>57.9</td>
<td>64.7</td>
<td>85.5</td>
<td>47.2</td>
</tr>
<tr>
<td>eCAF</td>
<td>61.1</td>
<td>51.8</td>
<td>59.0</td>
<td>15.6</td>
<td>60.2</td>
</tr>
<tr>
<td>TUN</td>
<td>40.3</td>
<td>40.3</td>
<td>27.4</td>
<td>48.9</td>
<td>42.7</td>
</tr>
</tbody>
</table>

SUCRA = surface under the cumulative ranking; CRC = complete root coverage; RC = root coverage; RecRed = recession reduction; KTW = keratinized tissue width; RES = root coverage esthetic score.
The network meta-analysis showed that tCAF had an advantage in RecRed compared with TUN, and the WMD was –0.36 (95% CI: –0.63, –0.08; \(P < .05\)). There was no significant difference between other groups (Table 7). The ranking of RecRed treatment efficacy was as follows: tCAF > eCAF > TUN (Table 1).

**KTW gain**
The two articles comparing TUN and eCAF showed considerable heterogeneity (\(I^2 = 82.7\%\)) using the random-effects model. The efficacy
of tCAF and TUN in KTW gain was compared. ADM and CTG grafts were used as subgroups for subgroup analysis, and it was found that the ADM group had statistical significance, with a WMD value of –0.32 (95% CI :–0.57, –0.08; \( P = .010 \)), and tCAF was superior to TUN (Fig 3).

The network meta-analysis showed that there was no statistically significant difference among tCAF, eCAF, and TUN (Table 8). The ranking of KTW gain treatment efficacy was as follows: tCAF > TUN > eCAF (Table 1).

**RES**

The direct meta-analysis showed that there was no statistically significant difference among tCAF and TUN (Table 9). For RES, only one article compared tCAF with eCAF, and two compared eCAF with TUN. The network meta-analysis showed that there was no statistically significant difference among tCAF, eCAF, and TUN (Table 10). The ranking of RES treatment efficacy was as follows: eCAF > tCAF > TUN (Table 1).

**Discussion**

tCAF, eCAF, and TUN are three important surgical techniques for the treatment of GR. There have been some comparative studies on tCAF and TUN, but there are few studies that compare all three techniques. In the present analysis, data from

<table>
<thead>
<tr>
<th>Study ID</th>
<th>WMD (95% CI)</th>
<th>Weight%</th>
</tr>
</thead>
<tbody>
<tr>
<td>tCAF+ADM vs TUN+ADM</td>
<td>-0.22 (-1.07, 0.63)</td>
<td>7.79</td>
</tr>
<tr>
<td>Ozenci et al (2015)(^{18})</td>
<td>-0.38 (-0.68, –0.08)</td>
<td>48.42</td>
</tr>
<tr>
<td>Papageorgakopoulos et al (2008)(^{19})</td>
<td>-0.20 (-0.69, 0.29)</td>
<td>21.92</td>
</tr>
<tr>
<td>Subtotal (( I^2 = 0.0% , \ P = .802 ))</td>
<td>-0.32 (-0.57, –0.08)</td>
<td>78.13</td>
</tr>
<tr>
<td>CAF+CTG vs TUN+CTG</td>
<td>-0.10 (-0.85, 0.65)</td>
<td>9.82</td>
</tr>
<tr>
<td>Neves et al (2019)(^{17})</td>
<td>0.40 (-0.28, 1.08)</td>
<td>12.04</td>
</tr>
<tr>
<td>Santamaria et al (2017)(^{20})</td>
<td>0.18 (-0.33, 0.68)</td>
<td>21.87</td>
</tr>
<tr>
<td>Subtotal (( I^2 = 0.0% , \ P = .333 ))</td>
<td>-0.21 (-0.45, 0.04)</td>
<td>100.00</td>
</tr>
<tr>
<td>Overall (( I^2 = 9.6% , \ P = .352 ))</td>
<td>1.08</td>
<td>1.08</td>
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</table>
 existing RCTs were extracted, and a meta-analysis was used to compare the three surgical techniques. The direct meta-analysis showed that tCAF was more effective than TUN in RecRed and RC, while there was no statistically significant difference in CRC and RES. For KTW gain, subgroup analysis showed that the statistically significant difference was found in the ADM group, and tCAF was superior to TUN, indicating that ADM+tCAF had more advantages in achieving KTW gain than ADM+TUN. This finding was similar to the results of a recent meta-analysis.23–25 Tavelli et al23 also reported that a subgroup analysis of trials utilizing only CTG or ADM revealed significant differences for CRC, both in favor of CAF. The other meta-analysis24 reported the same results in RC and CRC. The reason why tCAF+ADM was more effective than TUN in RC or CRC might be that tCAF has vertical releasing incisions and therefore offers better access and coronal displacement than TUN.18,19,23 Another possible explanation is the fact that TUN is a more technique-sensitive procedure than tCAF. In the present analysis, no significant difference was found between tCAF and TUN in the efficacy of RES, and two other meta-analyses23,25 yielded the same results. Some researchers thought that the graft material had a greater impact on esthetic outcomes than the flap design.25 It is interesting that the present analysis shows that there is no difference between tCAF and TUN in the efficacy of RES, whereas previous studies suggested that vertical releasing incisions could cut off the lateral blood supply to the flap and might result in keloids and papillae scarring.23,26 However, some studies have confirmed that mucosal wounds tend to heal without scar formation, and it is associated with Tenascin-C abundance, fibroblast proliferation, saliva presence, inflammatory

| Table 8 KTW Gain: Network Meta-Analysis |
| Treatment | TUN | eCAF | tCAF |
| TUN | 1 | | |
| eCAF | 0.22 (–0.33, 0.78) | 1 |
| tCAF | –0.17 (–0.56, 0.22) | –0.39 (–0.98, 0.20) | 1 |

Data are presented as weighted mean difference (95% confidence interval).

| Table 9 RES: Meta-Analysis |
| Test | Control | I² | WMD (95% CI) | P |
| TUN | tCAF | 28.2 | –0.73 (–1.44, –0.02) | .045 |

WMD = weighted mean difference; CI = confidence interval.

| Table 10 RES: Network Meta-Analysis |
| Treatment | TUN | eCAF | tCAF |
| TUN | 1 | | |
| eCAF | –0.25 (–1.86, 1.35) | 1 |
| tCAF | –0.05 (–0.99, 0.89) | 0.20 (–1.45, 1.85) | 1 |

Data are presented as weighted mean difference (95% confidence interval).
response, and other factors. In addition, tCAF could obtain better coronal reduction than TUN, which results in better esthetics. Aside from the data that were analyzed statistically, patient-centered outcomes also need to be considered. In one study, TUN+CTG patients reported significantly less pain than tCAF+CTG during the first 7 postoperative days.

In the direct meta-analysis herein, no statistically significant difference was found between eCAF and tCAF, nor between TUN and eCAF. This may be related to the limited number of RCTs on eCAF and the limited sample size, which requires further verification. However, there are some different results in some RCTs.

Ahmedbeyli et al observed that an eCAF group had a statistically greater probability of CRC than a tCAF group (adjusted odds ratio: 3.76; 95% CI: 0.92, 15.33; \( P < .05 \)), and KTW increased with statistical significance (\( P < .05 \)). In terms of patient-centered outcomes, eCAF+ADM achieved better patient satisfaction than tCAF+ADM. Compared to TUN+CTG, eCAF+CTG was associated with shorter chair time and with a lower incidence of pain and discomfort in early postoperative periods.

In the network meta-analysis, the present results show a statistically significant difference only between TUN and tCAF for RecRed, in favor of tCAF. Ozenci et al reported the same finding.

Based on the current meta-analysis results, tCAF was superior to TUN. The efficacy comparisons between tCAF and eCAF and between TUN and eCAF were not statistically significant. However, combined with the comprehensive analysis of RC, RecRed, RES, and other clinical efficacy indicators (such as chair time, postoperative pain, and clinical experience), the present authors are more inclined to recommend eCAF as the preferred surgical procedure for Miller Class I and II GRs; however, this needs to be confirmed by more clinical trials related to eCAF. For inexperienced surgeons, TUN is not recommended, and tCAF is more recommended.

Limitations of this systematic review include the limited number of articles, which made it hard to draw a test for publication bias. Moreover, most of the included papers compared TUN with tCAF, while few papers compared eCAF with tCAF and TUN with eCAF. There was great heterogeneity in network meta-analysis of KTW gain, which should be taken into account when interpreting the present results; in principle, it may affect the validity of the research conclusion. Therefore, high-quality, large-scale, prospective RCTs—especially those related to eCAF—are still needed to provide a sound, practical conclusion.

Conclusions

tCAF was more effective than TUN in RecRed and RC. eCAF has the most significant effect on improving CRC and RES. For inexperienced surgeons, TUN is not recommended, while tCAF is more recommended. Based on the results of this study, the current published literature, and clinical experience, eCAF is recommended as the preferred treatment for Miller Class I and II GRs.

Acknowledgments

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References


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### Appendix Table 1 General Overview of the Included Studies

<table>
<thead>
<tr>
<th>Study</th>
<th>Study design, follow-up time</th>
<th>Patients and reces-</th>
<th>Intervention</th>
<th>Periodontal status and smoking habits</th>
<th>Recession type</th>
<th>Location</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ahmedbeyli et al, 2019&lt;sup&gt;15&lt;/sup&gt;</td>
<td>RCT, 12 mo</td>
<td>22 patients, 55 reces-</td>
<td>tCAF+ADM</td>
<td>Healthy, nonsmoking patients</td>
<td>Multiple GRs; Miller Class I and II; recession ≥ 3 mm</td>
<td>Maxilla</td>
<td>CRC RecRed KTW gain</td>
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<tr>
<td></td>
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<td>sions</td>
<td>eCAF+ADM</td>
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<td>RC RES</td>
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<td>RES</td>
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<tr>
<td>Azaripour et al, 2016&lt;sup&gt;1&lt;/sup&gt;</td>
<td>RCT, 12 mo</td>
<td>40 patients, 71 reces-</td>
<td>eCAF+CTG</td>
<td>Healthy or treated, nonsmoking patients</td>
<td>Single and multiple GRs; Miller Class I and II; recession ≥ 1 mm and &lt; 6 mm</td>
<td>Maxilla and mandible (incisor, canine, premolar, molar)</td>
<td>CRC RecRed KTW gain RC</td>
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<td>sions</td>
<td>TUN+CTG</td>
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<td>RES</td>
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<td>Gobbato et al, 2016&lt;sup&gt;16&lt;/sup&gt;</td>
<td>RCT, 12 mo</td>
<td>50 patients, 50 reces-</td>
<td>eCAF+CTG</td>
<td>Healthy, nonsmoking patients</td>
<td>Single and multiple GRs; Miller Class I and II; recession ≥ 1 mm and &lt; 6 mm</td>
<td>Maxilla and mandible (incisor, canine, premolar)</td>
<td>CRC RecRed KTW gain RC</td>
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<tr>
<td>Neves et al, 2019&lt;sup&gt;17&lt;/sup&gt;</td>
<td>RCT, 12 mo</td>
<td>39 patients, 39 reces-</td>
<td>tCAF+CTG</td>
<td>Healthy, nonsmoking patients</td>
<td>Single GRs; Miller Class I and II; probing depth ≤ 3 mm</td>
<td>Maxilla (canine, premolar)</td>
<td>CRC RecRed KTW gain RC</td>
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<td>TUN+CTG</td>
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<td>RES</td>
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<tr>
<td>Ozenci et al, 2015&lt;sup&gt;18&lt;/sup&gt;</td>
<td>RCT, 12 mo</td>
<td>20 patients, 58 reces-</td>
<td>tCAF+ADM</td>
<td>Healthy, nonsmoking patients</td>
<td>Multiple GRs; Miller Class I; recession ≥ 3 mm</td>
<td>Maxilla and mandible (incisor, canine, premolar)</td>
<td>CRC RecRed KTW gain RC</td>
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<td>RES</td>
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<tr>
<td>Papageorgakopoulos et al, 2008&lt;sup&gt;19&lt;/sup&gt;</td>
<td>RCT, 4 mo</td>
<td>24 patients, 24 reces-</td>
<td>tCAF+ADM</td>
<td>Healthy, nonsmoking patients</td>
<td>Single GRs; Miller Class I and II; recession ≥ 3 mm</td>
<td>Maxilla and mandible (incisor, canine, premolar)</td>
<td>CRC RecRed KTW gain RC</td>
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<td>Santamaria et al, 2017&lt;sup&gt;20&lt;/sup&gt;</td>
<td>RCT, 6 mo</td>
<td>42 patients, 42 reces-</td>
<td>tCAF+CTG</td>
<td>Healthy, nonsmoking patients</td>
<td>Single GRs; Miller Class I and II</td>
<td>Maxilla (canine, premolar)</td>
<td>CRC RecRed KTW gain RC</td>
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<tr>
<td></td>
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</tbody>
</table>

ADM = acellular dermal matrix; CRC = complete root coverage; CTG = connective tissue graft; eCAF = envelope coronally advanced flap; EMD = enamel matrix derivative; FMBS = full-mouth bleeding score; FMPs = full-mouth plaque score; GR = gingival recession defect; KTW = keratinized tissue width; N/A = not available; RC = root coverage; RCT = randomized controlled trial; RecRed = recession reduction; RES = root coverage esthetic score; tCAF = trapezoidal coronally advanced flap; TUN = tunnel technique.
## Appendix Table 1 General Overview of the Included Studies (continued)

<table>
<thead>
<tr>
<th>Study</th>
<th>Study design, follow-up time</th>
<th>Patients and reces-sions</th>
<th>Intervention</th>
<th>Periodontal status and smoking habits</th>
<th>Recession type</th>
<th>Location</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tavelli et al, 201921</td>
<td>RCT, 12 mo</td>
<td>19 patients, 67 reces-sions</td>
<td>tCAF+ADM</td>
<td>Healthy or treated, nonsmoking patients FMPS: &lt; 20% FMBS: &lt; 20%</td>
<td>Multiple GRs; Miller Class I and II; recession ≥ 2 mm</td>
<td>Maxilla (incisor, canine, premolar)</td>
<td>CRC KTW gain RC RES</td>
</tr>
<tr>
<td>Tözüm et al, 200522</td>
<td>RCT, 12 mo</td>
<td>31 patients</td>
<td>tCAF+CTG</td>
<td>Healthy, nonsmoking patients</td>
<td>Miller Class I and II</td>
<td>N/A</td>
<td>CRC</td>
</tr>
<tr>
<td>Zuhr et al, 201414</td>
<td>RCT, 12 mo</td>
<td>23 patients, 45 reces-sions</td>
<td>tCAF+EMD</td>
<td>Healthy, nonsmoking patients FMPS: &lt; 25% FMBS: &lt; 25%</td>
<td>Multiple GRs; Miller Class I and II; recession &lt; 5 mm</td>
<td>Maxilla (incisor, canine, premolar)</td>
<td>CRC RecRed KTW gain RC</td>
</tr>
</tbody>
</table>