Evaluation of Subepithelial Connective Tissue Graft Versus Acellular Dermal Matrix with Modified Coronally Advanced Tunnel Technique in Treatment of Multiple Gingival Recessions: A Randomized, Parallel-Design Clinical Trial

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The addition of grafting material to the tunnel procedure has yielded more stable outcomes than the tunnel procedure alone, but currently there is no available evidence about the most effective grafting material. This study compared two grafting materials—subepithelial connective tissue graft (SCTG) and acellular dermal matrix (ADM)—with the modified coronally advanced tunnel technique (MCAT) in the management of multiple adjacent gingival recessions (MAGR). Patients (n = 24) with recession type 1 MAGR sites were randomly allocated to treatment with ADM+MCAT (test group) or SCTG+MCAT (control group). The clinical parameters were recorded at baseline (before treatment) and 9 months postsurgery and included gingival recession depth (GRD), gingival recession width (GRW), gingival thickness (GT), keratinized tissue width (KTW), probing pocket depth (PPD), clinical attachment level (CAL), and percentage of root coverage. Patient esthetic satisfaction and postoperative pain were recorded using a visual analogue scale (VAS). After 9 months, significant reductions in GRD (2.10 ± 0.64 mm; 2.23 ± 0.68 mm) and GRW (2.41 ± 1.19 mm; 2.41 ± 1.94 mm), increases in GT (0.53 ± 0.41 mm; 0.94 ± 0.52 mm), and gains in CAL (2.46 ± 1.94 mm; 2.47 ± 1.28 mm) were recorded in the test and control groups, respectively. However, the control group showed more KTW gain (P = .0003) and increased GT (P = .002) than the test group. Patient satisfaction with esthetic outcome 9 months after treatment did not differ between test (VAS score: 8.24 ± 0.43) and control (VAS score: 8.24 ± 0.65) groups (P = .99). The use of ADM may represent an alternative to SCTG when used in conjunction with MCAT.

Gingival recession is defined as the apical displacement of the gingival margin with exposure of the root surface. This condition often creates an esthetic problem, dentin hypersensitivity, difficulty in performing oral hygiene, and increased incidence of root caries and noncaries lesions such as abrasion and erosion. The prevalence, extent, and severity of gingival recessions were reported to increase with age. At least one site with 1 mm or more of gingival recession has been detected in 40% of young adults and up to 88% of older adults. The clinical goals of root coverage procedures include complete root coverage (CRC), meaning a location of the gingival margin slightly coronal to the cementoenamel junction (CEJ) with no residual probing depth and no detectable inflammation, achieving a successful esthetic outcome. CRC is more commonly achieved following treatment of localized recession defects, and it is unpredictable following treatment of multiple adjacent gingival recession (MAGR) defects. These defects present wide areas of exposed roots with variable recession depths and may be associated with limited vestibular depths and muscle attachments as well as other anatomical challenges.

According to a systematic review, there was evidence for the effectiveness of coronally advanced...
flap (CAF), its combination with connective tissue graft, modified CAF, and the tunnel procedure with connective tissue graft in the management of MAGR defects.

Tunneling flap procedures have been developed from the simple envelope flap with connective tissue graft described by Raetzke7 for localized recessions. In the management of MAGRs, the technique evolved from separate envelopes on adjacent defects8 to a continuous soft tissue buccal tunnel.9 A further modification added by Azzi et al in 200210 was the elevation of the interproximal papillae to promote coronal displacement of the entire gingivopapillary complex. In 2007, Zuhr et al11 introduced a microsurgical technique. The modified coronally advanced tunnel (MCAT) presented by Aroca et al12,13 involves a mucosal tunnel that extends well beyond the mucogingival junction and the inter- dental papillae to promote passive, tension-free coronal mobilization. The tunnel technique is a minimally invasive procedure that offers several advantages, such as the absence of vertical incisions, which improves vascularity of the flap and the connective tissue graft; good color match with adjacent tissues; and an enhanced esthetic outcome.14

The addition of a subepithelial connective tissue graft (SCTG) is an essential component of the MCAT procedure, as it promotes flap stability and adaptation over the root surface during healing. While grafting autogenous connective tissue ensures predictability, it requires two operating fields in both the donor and recipient sites.15 Thus, it is associated with increased patient morbidity, prolonged surgical time, and the possibility for postoperative complications such as bleeding, numbness, and sensibility changes in the donor area.16,17 In addition, patients may also object to the increased tissue thickness achieved with SCTG.18 To overcome these problems, other grafting materials that would minimize patient morbidity while still obtaining the consistent results of autogenous soft tissue graft have been tested. Acellular dermal matrix (ADM) has been introduced as an alternative to SCTG in periodontal plastic surgery.19 ADM is an allograft that is chemically processed to remove all epidermal and dermal cells but preserve the remaining bioactive dermal matrix. ADM works like an autogenous graft by providing a bioactive matrix consisting of collagen, elastin, blood vessel channels, and bioactive proteins that support natural revascularization, cell repopulation, and tissue remodeling.20

The effectiveness of a tunnel in the treatment of gingival recession defects was corroborated in a systemic review and meta-analysis conducted by Tavelli et al.21 The tunnel technique with different grafting materials produced an overall mean recession coverage of 82.8% for single gingival recession defects and 87.9% for multiple defects. The mean CRC reached 47.2% and 57.5% for single and multiple defects, respectively. The addition of grafting material to the tunnel procedure is recommended, but currently there is no available evidence about the most effective grafting material.21 Thus, this randomized clinical trial (RCT) was conducted to compare two grafting materials (SCTG and ADM) with the MCAT procedure in management of MAGR defects.

Material and Methods

Study Design

This study was designed as a parallel group randomized controlled clinical trial. It included two groups treating MAGR defects: the test group involved MCAT and ADM, and the control group involved MCAT and SCTG. The study protocol was approved by the Ethics Committee of Scientific Research, Faculty of Dentistry, Cairo University (approved October 2016). All patients signed a written consent form and agreed to participate.

Sample Size Calculation

The sample size calculation was based on the mean recession reduction following application of the two treatment modalities in patients with MAGR defects. In a previous study, the response within each subject group was normally distributed with a standard deviation of 0.46.22 If the true difference between the test and control groups was a mean normality distribution of 0.6, 10 subjects would be needed in each group to reject the null hypothesis that the population means of the test and control groups are equal, with probability (power) set at 0.8. The Type I error
probability associated with this null hypothesis test is 0.05. The number was increased to 12 subjects in each group to compensate for dropouts.

**Participants**

Patients were recruited from the outpatient clinic of the Department of Periodontology at Cairo University according to the study’s inclusion and exclusion criteria.

Patients were selected according to the following inclusion criteria: (1) The presence of facial maxillary or mandibular MAGRs (at least two adjacent defects) classified as recession type 1 (RT1) with no loss of interproximal attachment (interproximal CEJ was clinically not detectable at both mesial and distal aspects of the tooth)\(^2^3\); (2) aged between 18 and 60 years; and (3) having full-mouth Plaque Index (PI) and bleeding on probing (BOP) scores < 15%.

Subsequently, patients were not eligible for the study if they met any of the following exclusion criteria: (1) Current or former smoking habit; (2) current pregnancy; (3) having any systemic condition or taking medication that may interfere with periodontal health or wound healing; and (4) having received periodontal therapy or surgery in the treatment area within 6 months prior to the study. Additionally, teeth with gingival recession and cervical caries, noncaries cervical lesions, cervical restorations, or malalignment were not included in the present study.

**Randomization**

Patients were randomly assigned into either test or control groups (ratio of 1:1) according to computer-generated random numbers.

**Examiner Calibration**

Clinical parameters were performed and recorded at baseline (before treatment) and after 9 months, performed by an examiner who was blinded to the surgical treatment (A.R.). Examiner calibration included measurements of clinical parameters in 15 patients with MAGR defects who were not included in the study. The measurements were repeated after 48 hours. The examiner was considered calibrated if they achieved measurement reproducibility in more than 90% of cases.

**Outcomes**

**Clinical outcomes**

The following clinical parameters were recorded at baseline and after 9 months using UNC-15 periodontal probe. Gingival recession depth (GRD) was recorded at the midbuccal aspect, from the CEJ to the gingival margin. Gingival recession width (GRW) was measured as a linear distance from the mesial to the distal extension of the gingival margin at the CEJ. Keratinized tissue width (KTW) represented the distance from the mucogingival junction (MGJ; identified by the roll technique) to the free gingival margin. Gingival tissue thickness (GT) used an endodontic file 2 mm apical to the gingival margin and measured down to bone. Probing depth (PD) was measured at the midbuccal aspect from the gingival margin to the base of the gingival sulcus. The clinical attachment level (CAL) was measured at the midbuccal aspect from the CEJ to the gingival sulcus base. In addition, the percentage of defect coverage was calculated as follows: \((\text{baseline GRD} - \text{9-month GRD}) / \text{baseline GRD} \times 100\).

**Patient-related outcomes**

Patient esthetic satisfaction was recorded at the 9-month follow-up using a visual analogue scale (VAS) on a 10-cm line, scored as follows: 0 = extremely unsatisfied; 1–3 = unsatisfied; 4–6 = neutral; 7–9 = satisfied; and 10 = extremely satisfied.\(^2^4\)

Postoperative pain was recorded every day for 14 days after surgical intervention using a VAS on a 10-cm line, scored as follows: 0 = no pain; 1–3 = mild pain; 4–6 = moderate pain; and 7–10 = severe excruciating pain.\(^2^5\)

**Surgical Intervention**

In the present study, MAGR defects were treated by the MCAT technique according to Aroca et al.\(^1^2\) either with ADM (Puros Dermis Allograft Tissue Matrix, Zimmer Biomet), which was used in the test group (Figs 1 and 2), or with SCTG harvested from the palate, which was used in the control group (Figs 3 and 4). Exposed root surfaces were planed using Gracey curettes.
Contact point composite stops were placed to support the suspensory sutures for coronal positioning of the tunnel.

An intrasulcular incision through each recession area was made using a 15C blade (or microsurgical blades, in cases with narrow teeth) without damaging the interdental papilla, and mucoperiosteal flap dissection was performed with a tunnel elevator instrument and extended under each papilla until the MGJ was reached. The mucoperiosteal dissection was extended beyond the MGJ and under each papilla so that the flap could be moved in a coronal direction without tension. Using a Gracey curette, muscle fibers and any remaining collagen bundles on the inner aspect of the flap’s alveolar mucosa were cut, taking extreme care to avoid flap perforation.
The SCTG was immediately harvested after tunnel preparation using the single-incision technique. The harvested graft was trimmed using a no. 15 blade, achieving an optimal thickness of 1 to 1.5 mm. After the graft was taken, pressure was applied to the donor site with gauze soaked in saline, and the site was sutured using a 4-0 silk suture.

The ADM was rehydrated in a saline bowl according to the manufacturer’s instructions, then trimmed to the required mesiodistal extension of the tunnel with an apico-coronal height of 6 to 7 mm from the CEJ. It was placed with the bottom side of the membrane angled toward the tooth.

The SCTG and ADM were pulled into the tunnel by means of mattress sutures and fixed mesially and distally using 5-0 polyglycolic acid suture material and Castroviejo.
Perma Sharp Needle Holder (Hu-Friedy). Finally, the tunnel was advanced coronally to the CEJ by means of suspended sutures with 5.0 nonresorbable polypropylene sutures placed above the contact point in order to completely cover the graft (Figs 1 and 3).

**Postoperative Protocol**

Postoperatively, oral analgesics (600 mg ibuprofen [Brufen], tds) were prescribed to the patients for the first 3 days and then as needed. A systemic antibiotic also was prescribed (500 mg amoxicillin, tds) for 1 week to prevent postsurgical infection. Patients were instructed to rinse with chlorhexidine (0.12%) oral rinse twice daily for 2 weeks. Patients were instructed to avoid brushing in the operated area until suture removal at 2 weeks. After 10 to 14 days, the sutures were removed, and the patients were instructed to use the chlorhexidine mouth rinse for another 2 weeks. After 1 month, the patients were instructed to gently brush the operated area with a soft toothbrush using the roll technique. All patients were recalled after 1, 3, 6, and 9 months.

**Statistical Analysis**

Quantitative data were explored for normality using Kolmogorov-Smirnov tests and were presented as mean and SDs and medians. GRD, GRW, GT, and percentage of root coverage presented non-normal (nonparametric) distributions, while KTW, PD, CAL, and patient satisfaction exhibited normal (parametric) distributions. The parameters with normal distribution were analyzed using paired-sample t test and Student t test for intragroup and intergroup comparisons, respectively. The parameters that showed non-normal distribution were analyzed using Wilcoxon sign test and Mann-Whitney U test for intragroup and intergroup comparisons, respectively. The changes in pain scores were analyzed by one-way analysis of variance (ANOVA) of repeated measures followed by Bonferroni post hoc test when the ANOVA test was significant. The significance level was set at $P \leq .05$ for all tests. Statistical analysis was performed using SPSS version 25 for Windows (IBM).

**Results**

The test group (ADM+MCAT) comprised 12 patients (10 women, 2 men) with a mean age of 42 ± 6 years, and the control group (SCTG+MCAT) comprised 12 patients in (9 women, 3 men) with a mean age of 39 ± 8 years. The test group included 34 RT1 recession defects, while the control group included 35 RT1 recession defects. The defects were located in maxillary and mandibular anterior and posterior regions. In the test group, 14 defects were in the maxilla (12 premolars and 2 molars) and 20 defects were in the mandible (8 incisors, 2 canines, 8 premolars, and 2 molars). In the control group, 10 defects were in the maxilla (7 premolars and 3 molars) and 25 defects were in the mandible (20 incisors and 5 premolars). All patients completed the study and attended all recall visits. No adverse events related to either treatment modality were recorded.

There were no significant differences between the two groups at baseline with respect to GRD, GT, KTW, CAL, and PD, but the control group exhibited higher GRW ($P = .01$; Table 1). At 9 months, GRW was still higher in the control group ($P = .03$). In both groups, significant reductions in GRD and GRW, increases in GT, and gains in CAL were recorded 9 months after treatment (Table 1). The control group showed a more significant gain in KTW (control: 1.15 ± 1.16 mm; test: 0.21 ± 0.84 mm) and increase in GT (control: 0.94 ± 0.52 mm; test: 0.53 ± 0.41 mm). However, GRD reduction, PD changes, and CAL gain did not differ between groups (Table 2).

The pain recorded in the first postsurgical day and 2, 3, and 4 days postsurgery was significantly higher in the control group than the test group. Within each group, the pain recorded during the first 3 days was significantly higher than at 4, 5, 6, 7, and 8 days postsurgery (Fig 5). Patient satisfaction with esthetic outcomes at 9 months posttreatment did not differ between test and control groups (8.24 ± 0.43 and 8.24 ± 0.65, respectively; $P = .99$).

**Discussion**

Treatment of MAGR defects represents a challenge to the clinician,
especially with increasing esthetic demands presented by patients. In the present RCT, the technique adopted to treat MAGR defects was Aroca et al’s modified tunnel technique (MCAT). Performing the tunnel technique without vertical incisions, papillae incisions, or coronal tunnel advancement ensures better blood supply to the marginal tissues and grafts during healing, enhancing the esthetic outcomes. The application of SCTG is an integral component of the tunnel procedure and is the gold standard, but

Table 1 Clinical Parameters Evaluated at Baseline and 9 Months

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Interval</th>
<th>ADM+MCAT (Test)</th>
<th>SCTG+MCAT (Control)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>GRD, mm</td>
<td>Baseline</td>
<td>2.87 ± 0.31 (3)a</td>
<td>2.76 ± 0.89 (3)a</td>
<td>.13</td>
</tr>
<tr>
<td></td>
<td>9 mo</td>
<td>0.76 ± 0.65 (1)b</td>
<td>0.53 ± 0.48 (0.5)b</td>
<td>.06</td>
</tr>
<tr>
<td>GRW, mm</td>
<td>Baseline</td>
<td>3.28 ± 1.44 (3)a</td>
<td>4 ± 1.48 (3)a</td>
<td>.01*</td>
</tr>
<tr>
<td></td>
<td>9 mo</td>
<td>0.87 ± 0.70 (1)b</td>
<td>1.59 ± 1.96 (0.5)b</td>
<td>.03</td>
</tr>
<tr>
<td>GT, mm</td>
<td>Baseline</td>
<td>1.10 ± 0.20 (1)a</td>
<td>1.33 ± 0.54 (1)a</td>
<td>.09</td>
</tr>
<tr>
<td></td>
<td>9 mo</td>
<td>1.65 ± 0.39 (1.75)b</td>
<td>2.26 ± 0.63 (2)b</td>
<td>.0001*</td>
</tr>
<tr>
<td>KTW, mm</td>
<td>Baseline</td>
<td>3.03 ± 0.72 (3)a</td>
<td>2.65 ± 0.92 (3)a</td>
<td>.06</td>
</tr>
<tr>
<td></td>
<td>9 mo</td>
<td>3.12 ± 0.69 (3)a</td>
<td>3.82 ± 1.3 (3)b</td>
<td>.0003*</td>
</tr>
<tr>
<td>CAL, mm</td>
<td>Baseline</td>
<td>4.28 ± 0.67 (4)a</td>
<td>4 ± 0.85 (4)a</td>
<td>.13</td>
</tr>
<tr>
<td></td>
<td>9 mo</td>
<td>1.82 ± 1.57 (2)</td>
<td>1.53 ± 1.65 (1)b</td>
<td>.45</td>
</tr>
<tr>
<td>PD, mm</td>
<td>Baseline</td>
<td>1.35 ± 0.60 (1)a</td>
<td>1.32 ± 0.64 (1)a</td>
<td>.84</td>
</tr>
<tr>
<td></td>
<td>9 mo</td>
<td>1.15 ± 0.99 (1)a</td>
<td>1.15 ± 1.18 (1)a</td>
<td>.99</td>
</tr>
</tbody>
</table>

Values are presented as mean ± SD (median). Different symbols in a group represent a significant difference (P < .05). P values for GRD, GRW, and GT were calculated with Mann-Whitney U test. P values for KTW, CAL, and PD were calculated with two-sample t test.

*Statistically significant difference (P < .05).

Table 2 Comparison of Changes from Baseline to 9 Months Between Groups for All Measurements

<table>
<thead>
<tr>
<th>Parameter</th>
<th>ADM+MCAT (Test)</th>
<th>SCTG+MCAT (Control)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rec depth reduction, mm</td>
<td>2.10 ± 0.64 (2)</td>
<td>2.23 ± 0.68 (2)</td>
<td>.27*</td>
</tr>
<tr>
<td>Rec width reduction, mm</td>
<td>2.41 ± 1.19 (2.5)</td>
<td>2.41 ± 1.94 (1.5)</td>
<td>.64*</td>
</tr>
<tr>
<td>GT change, mm</td>
<td>0.53 ± 0.41 (0.5)</td>
<td>0.94 ± 0.52 (1)</td>
<td>.002*</td>
</tr>
<tr>
<td>KTW change, mm</td>
<td>0.21 ± 0.84 (0)</td>
<td>1.15 ± 1.16 (1)</td>
<td>.0003</td>
</tr>
<tr>
<td>CAL gain, mm</td>
<td>2.46 ± 1.94 (2)</td>
<td>2.47 ± 1.28 (3)</td>
<td>.84</td>
</tr>
<tr>
<td>PD reduction, mm</td>
<td>0.21 ± 1.39 (0)</td>
<td>0.18 ± 1.44 (0.5)</td>
<td>.93</td>
</tr>
<tr>
<td>Defect coverage, %</td>
<td>72.72 ± 23.36 (66.6)</td>
<td>82.62 ± 16.30 (80)</td>
<td>.046*</td>
</tr>
<tr>
<td>Patient satisfaction, VAS score</td>
<td>8.24 ± 0.43 (7.9)</td>
<td>8.24 ± 0.65 (7.8)</td>
<td>.8</td>
</tr>
</tbody>
</table>

Values are presented as mean ± SD (median). Patient esthetic satisfaction was recorded at the 9-month follow-up using a VAS on a 10-cm line, scored as follows: 0 = extremely unsatisfied; 1–3 = unsatisfied; 4–6 = neutral; 7–9 = satisfied; and 10 = extremely satisfied.24 P values for recession reductions (depth and width), GT change, and percentage of defect coverage were calculated with Mann-Whitney U test. P values for KTW change, CAL change, PD reduction, and patient satisfaction were calculated with two-sample t test.

*Statistically significant difference (P < .05).
it may be compromised by a lack of adequate donor palatal tissue and possible postoperative morbidity. Different connective tissue substitutes have been added to tunneling procedures.\textsuperscript{13,27,28} One of these substitutes is the ADM allograft, which showed promising results when used in combination with CAF in the treatment of MAGR defects.\textsuperscript{29,30,31} A recent systematic review emphasized the limited evidence available regarding the graft material that is most suitable for addition to the tunnel procedure.\textsuperscript{21} In the literature, few studies have evaluated the clinical outcomes of the tunnel procedure with ADM in the management of MAGR defects.\textsuperscript{19,31,32}

Different formulations of ADM are available. While the freeze-dried ADM (Alloderm, BioHorizons) is most commonly used, the present study evaluated the solvent-dehydrated form of ADM (Puros Dermis) that was readily available. In a multicenter controlled clinical trial, the solvent-dehydrated ADM was shown to produce clinical outcomes comparable to the freeze-dried form in the management of Miller Class I and II gingival recessions in combination with CAF.\textsuperscript{33}

In the present study, MCAT with ADM had significant reductions in recession depths, up to 2.10 ± 0.64 mm. The clinical study by Ozenci et al\textsuperscript{31} reported a 2.45 ± 0.20–mm reduction in recession depth after 12 months. In the present study, there was no significant difference between the test and control groups. This is in accordance with a systematic review that evaluated studies that compared SCTG and ADM in the treatment of gingival recessions.\textsuperscript{34}

In the present study, the percentage of root coverage achieved with MCAT and SCTG was 82.62% ± 16.30% at 9 months. Aroca et al\textsuperscript{13} reported an average root coverage of 90%, while Azaripour et al\textsuperscript{35} reported an average root coverage of 97.3% using the microsurgical modified tunnel technique to manage localized and generalized gingival recession. In the present study, less mean root coverage was achieved due to the inclusion of both maxillary and mandibular defects. It has been reported that maxillary teeth achieve a higher percentage of root coverage than mandibular teeth.\textsuperscript{32}

The maxillary arch presents more favorable conditions in terms of wider interdental papillary tissues that may influence the amount of vascularization and dimensional stability of the graft. Another explanation could be the presence of lip muscles and a minor vestibular depth in the mandible, and a lack of vertical incisions and intact papilla could make it difficult to coronally mobilize tissues, thus resulting in a lower percentage of root coverage.\textsuperscript{6} In the present study, the percentage of root coverage recorded in the ADM+MCAT...
group (72.72% ± 23.36%) was lower than in the SCTG+MCAT group (P = .04), but the amount agreed with the root coverage reported by Ozenci et al31 (75.72% ± 6.54%) for ADM+MCAT treatment.

Changes in gingival phenotype with respect to GT and KTW represent an important outcome of root coverage procedures. Increasing the GT promotes creeping attachment and stabilizes the soft tissue architecture to protect against gingival recession.36 GT ≥ 1.2 mm may be less prone to an apical shift of the gingival margin in the long term.37 In the present study, the SCTG+MCAT produced a more significant increase in GT than ADM+MCAT (0.94 ± 0.52 mm vs 0.53 ± 0.41 mm, respectively). However, both treatment groups showed significant GT augmentation compared to baseline values. This agrees with several studies that reported increased GT following tunnel procedures involving SCTG.13,35,28 In addition, increased GT has been reported in clinical studies evaluating the tunnel technique with ADM.31,38 Histologic evidence for increased GT after modified CAF with SCTG and ADM was presented by Cummings et al.39

In the present study, the control group treated (SCTG+MCAT) showed more KTW gain than the test group (ADM+MCAT). However, it is important to note that baseline KTW was significantly higher in the ADM group than the SCTG group. The minimal change in KTW in the ADM group may be related to shrinkage of ADM during the healing phase.40 When compared to free gingival graft in gingival tissue augmentation, ADM exhibited considerable shrinkage (56% vs 12%) during 6 months of healing.40

The present study evaluated patient satisfaction with esthetic outcome of root coverage procedures and postsurgical morbidity using a VAS scored from 0 to 10. At the end of the study, patients in both groups reported satisfaction with the esthetic outcome (control: 8.24 ± 0.65; test: 8.24 ± 0.43). This is in accordance with studies that reported patient satisfaction with the esthetic outcome of tunnel with SCTG22,27,35 and tunnel with ADM.20 In the present study, patients in the SCTG group experienced more significant pain in the first 4 postsurgical days compared to patients in the ADM group. This could be related to the palatal wound in the SCTG group. Minimal postoperative pain and discomfort after CAT and ADM were also reported by Modaressi and Wang30 and Ozenci et al.31 In contrast, Cieslik-Wegemund et al27 reported higher pain scores with xenogeneic collagen matrix and MCAT compared to SCTG and MCAT in treatment of MAGR defects.

The results of the present study demonstrated that ADM+MCAT could produce comparable results to SCTG+MCAT in the management of RT1 MAGR defects. However, compared to SCTG+MCAT, enhancing the gingival phenotype (with respect to GT and KTW) may not be predictably achieved with ADM+MCAT.

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