SCIENCE FLASH
EMD, CTG, rhPDGF EFFICACY COMPARISON

Scientific Source

Study Objectives & Design

**McGuire 2003**
- Objective: To compare the efficacy of the following treatments in recession defects
  (i) EMD and CAF to
  (ii) CTG and CAF
- Randomized, controlled, single-centre, split-mouth study
- 20 patients
- Miller Class II buccal gingival recession ≥4mm deep and width ≥3 in contralateral quadrants of the same jaw
- Parameters measured at baseline, 6, 9, & 12 months
- 4 teeth were extracted and examined histologically at 6 months
- Primary efficacy parameter: Recession depth
- Secondary efficacy parameter: CAL, PDR, keratinized tissue width, gingival height, root coverage percentage, esthetic satisfaction, perception of pain & discomfort etc.

**McGuire 2009**
- Objective: To compare the efficacy of the following treatments in recession defects
  (i) β-TCP + rhPDGF and CAF to
  (ii) CTG and CAF in treating recession defects
- Randomized, controlled, single-centre, split-mouth study
- 30 patients
- Miller Class II buccal gingival recession ≥3mm deep and ≥3mm wide in contralateral quadrants of the same jaw
- Parameters measured at 6 months
- En bloc resections were examined histologically and with micro-CT after 9 months
- Primary efficacy parameter: Recession depth
- Secondary efficacy parameter: CAL, PDR, PD, keratinized tissue height, root coverage percentage, esthetic satisfaction, perception of pain & discomfort etc.

Results

**Average Root Coverage (% after 12 months)**

<table>
<thead>
<tr>
<th></th>
<th>Connective Tissue Graft (CTG)</th>
<th>Emdogain (EMD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CTG</td>
<td>93.8</td>
<td>95.1</td>
</tr>
<tr>
<td>P</td>
<td>0.82</td>
<td></td>
</tr>
<tr>
<td></td>
<td>No significant difference</td>
<td></td>
</tr>
</tbody>
</table>

**Average Root Coverage (% after 6 months)**

<table>
<thead>
<tr>
<th></th>
<th>Connective Tissue Graft (CTG)</th>
<th>rhPDGF</th>
</tr>
</thead>
<tbody>
<tr>
<td>CTG</td>
<td>98.6</td>
<td></td>
</tr>
<tr>
<td>P</td>
<td>0.013</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Statistically significant</td>
<td></td>
</tr>
</tbody>
</table>

- Addition of EMD to CAF resulted in similar root coverage compared to CTG
- Addition of β-TCP + rhPDGF and CAF resulted in less root coverage compared to CTG

Study Result Summary

<table>
<thead>
<tr>
<th></th>
<th>CTG</th>
<th>EMD</th>
<th>rhPDGF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Root coverage comparable to CTG</td>
<td>n/a</td>
<td>√</td>
<td>-</td>
</tr>
<tr>
<td>NO collagen dressing required</td>
<td>√</td>
<td>√</td>
<td>-</td>
</tr>
<tr>
<td>NO secondary gingivoplasty required</td>
<td>-</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>NO morbidity from donor site</td>
<td>-</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>NO potential clinical difficulties from donor site</td>
<td>-</td>
<td>√</td>
<td>√</td>
</tr>
</tbody>
</table>
ABSTRACT


**Background:** The objective of this study was to compare the clinical efficacy of enamel matrix derivative placed under a coronally advanced flap to subepithelial connective tissue placed under a coronally advanced flap in patients with recession type defects.

**Methods:** Twenty patients with incisors or premolars presenting with a facial recession of ≥4 mm in contralateral quadrants of the same jaw were treated; 17 patients completed the study. One tooth in each patient was randomized to receive either a coronally advanced flap with a subepithelial connective tissue graft (control) or a coronally advanced flap with EMD (test). Clinical parameters measured at baseline and at 6, 9, and 12 months included amount of recession; width at the coronal extent of the gingival effect; width of keratinised tissue; probing depth; clinical attachment level; inflammation score; plaque score; plaque index; alveolar bone level; tissue texture and color; and patient perception of pain, bleeding, swelling, and sensitivity.

**Results:** Results for both the test and control groups were similar for all measured clinical parameters with the exception of early healing, self-reported discomfort, and the amount of keratinized tissue obtained. The coronally advanced flap with EMD was superior to the subepithelial connective tissue graft with regard to early healing and patient-reported discomfort, whereas the subepithelial connective tissue graft demonstrated greater amount of keratinized tissue during the 12-month evaluation period. However, both the test and control showed a significant increase in the amount of keratinized tissue at 9 and 12 months compared to baseline. No significant difference in the amount of root coverage was found between the test and control groups (n = 19; p=0.82). On average, a gain of 4.5 mm (range 4 to 8 mm) tissue covering the previously exposed root surfaces was achieved with both treatment groups. The average percentage of root coverage for control and test groups was 93.8% and 95.1%, respectively. One hundred percent root coverage was obtained 89.5% of the time with the coronally advanced flap with EMD and 79% of the time with the subepithelial connective tissue graft.

**Conclusion:** Based on the results of this investigation, the addition of EMD to the coronally advanced flap resulted in root coverage similar to the subepithelial connective tissue graft but without the morbidity and potential clinical difficulties associated with the donor site surgery.


**Background:** The primary aims of this two-part prospective study were: 1) to compare the safety and efficacy of beta-tricalcium phosphate (b-TCP) + 0.3 mg/ml recombinant human platelet-derived growth factor- BB (rhPDGF-BB) with a bioabsorbable collagen wound-healing dressing and CAF to CTG in combination with a CAF in subjects with gingival recession defects using a randomized, controlled, split-mouth design; and 2) to compare, through histologic and microcomputed tomography (micro-CT) examination, the periodontal regenerative potential of these two therapies in surgically created gingival recession defects in restoring missing cementum, periodontal ligament (PDL), and supporting alveolar bone.

**Methods:** In the randomized controlled trial (RCT), 30 patients with Miller Class II buccal gingival recession, ≥3 mm deep and ≥3 mm wide in contralateral quadrants of the same jaw were treated and followed for 6 months. Using a split-mouth design with similar bilateral recession defects, test sites were treated with 0.3 mg/ml rhPDGFBB + b-TCP + bioabsorbable collagen wound-healing dressing; contralateral control sites were treated with a CTG, each in combination with a CAF. In the histologic/micro-CT study segment, recession defects were created in six teeth, each requiring extraction for orthodontic therapy. These defects were created with a recession depth ≤3 mm, the osseous crest 2 to 3 mm apical to the gingival margin, and with 2 to 3 mm of keratinized tissue. The defects were treated with a CTG(control) or rhPDGF-BB + b-TCP + wound-healing dressing (test), plus CAF. Nine months after surgical correction, en bloc resections were obtained and examined histologically and with micro-CT.

**Results:** In the RCT, test and control treatments demonstrated clinically significant improvements from baseline through month 6. Statistically significant results favoring the CTG were found in recession depth reduction (-2.9 ± 0.5 mm, test; -3.3 ± 0.6 mm, control; P = 0.009), root coverage (90.8%, test; 96.6%, control; P = 0.013), and -3.9 – 0.7 mm, control, -3.3 – 1.3 mm, test, recession width reduction (P = 0.035), whereas mid-buccal probing depth (PD) and PD reduction (PDR) reduction favored the test group (1.4 – 0.4 mm, test; 1.8 – 0.1 mm, control; P < 0.001 PD and -0.0 mm test; +0.4 mm control PDR). For all other parameters, the two treatments were statistically equivalent, including increases in keratinized tissue, esthetic results, and subject satisfaction. In the histologic/micro-CT portion, all four sites treated with rhPDGFBB + b-TCP showed evidence of regeneration of cementum, PDL with inserting connective tissue fibers, and supporting alveolar bone, whereas neither CTG-treated site exhibited any signs of periodontal regeneration.

**Conclusion:** CTG and rhPDGF-BB + b-TCP + wound-healing dressing are effective treatment modalities for clinically correcting gingival recession defects. In addition, the current study demonstrated that regeneration of the periodontium in gingival recession defects was possible through a growth factor mediated approach.