Overview of gingival recession

The recent advancement in root coverage procedures is the use of platelet concentrates aid in better tissue healing and repair. One such platelet concentrate discovered recently is the concentrated growth factor (CGF). This report of two cases demonstrates the use of a novel tunnel-envelope technique that achieved optimal results in treating adjacent multiple recession defects with the use of CGF as an adjunctive agent in one of the cases.

**Introduction**

One of the greatest challenges in treating adjacent multiple gingival recessions is to complete the treatment in a single stage. Numerous surgical techniques that include pedicle and free soft tissue grafting procedures, have been applied to correct gingival recession defects with varying degrees of success. Over the years, techniques to treat multiple gingival recessions have undergone major evolution, from the envelope technique reported by Raetzke in 1985, the subperiosteal envelope technique demonstrated by Allen, the tunnel technique created by Zabalegui et al and its modification by Azzi and coworkers, to the relatively recent modification of the tunnel technique called the VISTA (Vestibular Incision Subperiosteal Tunnel Access) technique as proposed by Zadeh HH in 2011. Correspondingly, the use of orthodontic buttons by Ozcelik et al in 2011 to secure the flap in the coronal most position, showed promising results.

In order to simplify these approaches, the present technique in the following cases describes a modification using the combination of an envelope-tunnel along with the use of composite stops.

The recent advancement in root coverage procedures is the use of platelet concentrates like platelet-rich plasma (PRP) or platelet-rich fibrin (PRF) as an adjunctive agent to accelerate wound healing and repair. One such platelet concentrate is the concentrated growth factor (CGF), that was first developed by Sohn et al in 2009. CGF is known to contain a larger, denser and richer fibrin matrix of growth factors (GFs) and may have a better regenerative capacity than the other platelet concentrates. Therefore, due to its high versatility, one case demonstrates the use of CGF as an adjunct to the novel technique.

**Case Reports**

**Case 1**

A twenty-two year old systemically healthy female patient reported to the department of periodontology with a chief complaint of sensitivity in the upper front tooth region. A thorough case history was taken and a clinical examination revealed Miller's Class I recession in the maxillary anterior teeth [Figure 1]. The pre-operative clinical parameters such as recession depth (RD), probing depth (PD) and clinical attachment level (CAL) were recorded [Table 1].

**Surgical procedure**

The maxillary anterior teeth were anaesthetized using buccal infiltration containing 2% Lidocaine and 1:80,000 adrenaline. Using a 15-blade, sulcular incisions were made 2-3 mm short of the tip of the papillae following the curvature of the receded gingival margin. The incisions were made with an undermining motion such that a tunnel was created with the papillae intact. A periodontal probe was used to confirm that the tunnel was free of any points were the tooth was etched and bonded, advancing the flap as coronally as possible, thereby covering the recession defects. At this point, the suture ends were cured using light cure (LC)-composite, by creating composite stops [Figure 2]. Periodontal dressing was then placed over the surgical site. The patient was instructed not to brush on the surgical site until sutures were removed. An analgesic (Aceclofenac 100mg + Paracetamol 500mg) was prescribed twice a day for three days. The patient was recalled fourteen days after the surgical procedure and the sutures were removed [Figure 3].

**Table 1: Pre-operative clinical parameters for Case 1**

<table>
<thead>
<tr>
<th>PARAMETERS</th>
<th>13</th>
<th>12</th>
<th>11</th>
<th>21</th>
<th>22</th>
<th>23</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recession depth (RD) (in mm)</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Probing depth (PD) (in mm)</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Clinical attachment level (CAL) (in mm)</td>
<td>6</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>6</td>
<td>4</td>
</tr>
</tbody>
</table>

**Figure 1: Case 1 – Pre-operative clinical view**

**Figure 2: Case 1 – Flap coronally advanced and secured using sutures with composites**

**Figure 3: Case 1 – One week post-surgery showing the incision lines**

Acknowledgments

Dr. Nashra Kareem
Senior Lecturer, Meenakshi Ammal Dental College and Hospital, Chennai.

Dr. Jaideep Mahendra
Professor, Meenakshi Ammal Dental College and Hospital, Chennai. *Corresponding Author

Dr. Rahul Visvanathan
Senior Lecturer, Meenakshi Ammal Dental College and Hospital, Chennai.
Case 2
A forty-five year old systemically healthy male patient reported to the department of periodontology with a chief complaint of sensitivity in his teeth and receding gums in the upper front tooth region. Clinical examination revealed Miller's Class I recession in the maxillary anterior teeth [Figure 4]. The pre-operative clinical parameters were recorded [Table 2].

Treatment plan: Following thorough scaling and root planing one-week prior to the surgical procedure, the envelope-tunnel technique was used as in case 1 with the incorporation of CGF along with it.

Concentrated Growth Factor (CGF) preparation
Before commencing the surgery, CGF was prepared. Intravenous blood was collected in two 10-ml glass-coated plastic tubes without anticoagulant solutions that were then immediately centrifuged using a CGF centrifuge machine with a one-step centrifugation protocol 30sec -acceleration, 2min - 2700 rpm, 4min - 2400 rpm, 4min - 2700 rpm, 3min - 3000 rpm, 36sec – deceleration and stop.\(^8\)

Table 2: Pre-operative clinical parameters for Case 2

<table>
<thead>
<tr>
<th>PARAMETERS</th>
<th>13</th>
<th>12</th>
<th>11</th>
<th>21</th>
<th>22</th>
<th>23</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recession Depth (RD) (in mm)</td>
<td>1</td>
<td>4</td>
<td>4</td>
<td>1</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Probing depth (PD) (in mm)</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Clinical attachment level (CAL) (in mm)</td>
<td>4</td>
<td>6</td>
<td>6</td>
<td>5</td>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>

At the end of the centrifugation, there were four phases or layers namely 1) the upper serum layer 2) the second fibrin buffy coat layer 3) the third layer with growth factors and 4) the lower layer with red blood cells (RBCs).

Surgical procedure
Once coronal advancement of the gingival margin was established using the technique as previously mentioned, the CGF clot was removed from the tube and separated from the RBC layer using surgical scissors. The CGF was then compressed using a gauze piece and a 1 mm thick membrane was obtained which was immediately tucked into the tunnel flap using a periodontal probe such that the membrane extended from the 13 to 11 [Figure 5-7]. Thus, the CGF membrane obtained from one tube was used for 3 teeth each. Similarly, for the adjacent quadrant, the CGF was placed from 23 to 21. The flap was then coronally advanced using 5-0 Vicryl absorbable sutures and composite stops [Figure 8]. Periodontal dressing was then placed over the surgical site. Post-operative instructions were given as mentioned in the previous case. The patient was recalled fourteen days post-operatively for suture removal and followed-up for a period of three months. [Figure 9 and 10].

Results
On evaluating both cases, similar results were noted. Successful root coverage was obtained, the probing depth remained the same and there was a gain in the clinical attachment level in relation to the maxillary anterior teeth [Case 1- Table 3 and Case 2- Table 4]. The patients were satisfied with the esthetics and reported with less sensitivity after the procedure.

Discussion
Despite the varied gingival augmentation approaches that have been demonstrated, choosing the appropriate technique may be challenging. The most common setbacks that clinicians encounter while treating...
multiple recession defects are predictability, maintaining blood supply, the need for two surgical sites, limited quantity of graft available and post-operative complications, with the need to provide care to patients in terms of satisfactory esthetics, less post-operative discomfort and a cost-effective treatment.

Table 3: Post-operative clinical parameters for Case 1

<table>
<thead>
<tr>
<th>PARAMETERS</th>
<th>13</th>
<th>12</th>
<th>11</th>
<th>21</th>
<th>22</th>
<th>23</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recession Depth (RD) (in mm)</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Probing depth (PD) (in mm)</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Clinical attachment level (CAL) (in mm)</td>
<td>4</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

Table 4: Post-operative clinical parameters for Case 2

<table>
<thead>
<tr>
<th>PARAMETERS</th>
<th>13</th>
<th>12</th>
<th>11</th>
<th>21</th>
<th>22</th>
<th>23</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recession Depth (RD) (in mm)</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Probing depth (PD) (in mm)</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Clinical attachment level (CAL) (in mm)</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

The present technique surpasses most of the difficulties especially concerning blood supply, as the papillae remain intact. This technique can also be performed in teeth with isolated recession defects and on mandibular teeth as the flap remains secure with the help of sutures being cured and adherent to the composite stops. Allen et al using the envelope technique along with connective tissue graft reported less surgical trauma. Similarly, Zabalegui et al also showed successful root coverage and adequate healing with the tunnel technique. Our case series combined the use of both the techniques along with and without CGF and reported similar optimal results. However in cases with thin gingival biotype, care should be taken not to perforate the soft tissue while undermining or creating the tunnel.

Furthermore, growth factors play a pivotal role in achieving optimal results in terms of tissue repair. Like other platelet concentrates, CGF increases tissue vascularization and promotes proliferation of fibroblasts, thereby enhancing healing of the soft tissue. The use of CGF showed no significant differences in the second case. However, in future histological examination of CGF would be required to prove its long-term predictability.

Conclusion
The envelope-tunnel technique may be regarded as a minimally invasive approach in treating adjacent multiple recession defects with optimal results. In addition, the use of CGF can also be considered to aid in better healing of the soft tissue. Nevertheless, further studies adopting this technique with a large sample size and longer follow ups are required to prove the efficacy and long-term stability of both, the technique and the use of CGF in future.

References