



Clinical case

## Root Coverage with Tunnelling Technique Combined with Subepithelial Connective Tissue Graft

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### ABSTRACT

**Introduction:** In daily practice, it is very common to observe gingival recessions, either single or multiple. Not all of them are discomforting to the patient. In some patients, these recessions can cause various problems such as dentin hypersensitivity, root caries, non-cariou cervical lesions, and dental aesthetic degradation. In cases where a surgical procedure is indicated, it is important to evaluate the multiple techniques that can be carried out. **Objective:** To present the results obtained with the tunnel technique and grafting of connective tissue in Type 1 gingival recessions. **Case presentation:** According to the periodontal check-up, Type 1 gingival recessions were observed in some teeth in the first and second quadrants; for this reason, the patient presented dental hypersensitivity. Therefore, it was decided to perform root coverage and the technique

of choice was tunneling combined with subepithelial connective tissue graft, to obtain a good amount of inserted gingiva and to present ample papillae. This technique is considered a predictable procedure for single and multiple recession defects. Surgery was performed separately, in the first and second quadrant. For both surgeries the donor site was the palatal area. Satisfactory results were obtained, achieving 90% root coverage and a considerable decrease in hypersensitivity. **Conclusions:** Determining the correct surgical technique is essential to obtain good clinical results, and this tunneling technique proved to be effective for root coverage of Type 1 gingival recessions and to achieve good aesthetic results, considering that it is a predictable technique, especially when there are wide interdental papillae. This technique allows a good blood supply to the connective tissue graft and can be successfully performed in multiple gingival recessions.

**Keywords:** gingival recession, connective tissue graft, tunneling technique, root coverage, Type 1 recession.

## INTRODUCTION

Gingival recession is defined as the displacement of the apical gingival margin to the cement-enamel junction of a tooth or the platform of a dental implant<sup>1</sup>. Several epidemiological studies have shown that gingival recession is a common finding in daily clinical practice<sup>2-6</sup>. The prevalence ranges between 40% and 100% depending on the population and analysis methods. Gingival recession defects can be localised or generalised and can be located on labial, lingual and/or interproximal tooth surfaces. Exposure of the root surface due to gingival recession is frequently associated with dental hypersensitivity, root caries, non-cariou cervical lesions, poor plaque control and decreased esthetics<sup>1,7</sup>.

Common aetiological factors of gingival recession are: chronic mechanical trauma due to tooth brushing, iatrogenic damage due to poor restorations, and repeated scaling and root planing<sup>8,9</sup>. These mucogingival deformities (gingival recession) are treated through periodontal plastic surgery, which deals with regenerative procedures designed to restore form, function and improve dental aesthetics<sup>10</sup>. In accordance with the surgical technique, Allen created a partial-thickness supraperiosteal envelope to treat multiple adjacent gingival recession defects. In this approach, he incised the corresponding dental papillae to allow greater coronal movement of the flap<sup>11</sup>. Zabalegui *et al.*, later gave it the "tunnel" approach<sup>12</sup>. Interestingly, at that point no attempt at coronal advancement of the over-envelope was described, resulting in the coverage of a recession defect that depended solely on the exposed part of the connective tissue graft. In addition to the different names suggested for this technique, additional modifications to the tunnel approach have been proposed. Zuhr *et al.*, introduced a microsurgical approach while designing new instruments<sup>13</sup>. The "Modified Coronally Advanced Tunnel Technique" proposed by Aroca *et al.*, includes a full-thickness flap elevation that carefully separates the entire interproximal papillae from the bone and placement of sutures to composite points in the contact areas of the teeth to prevent the flap from collapsing during healing<sup>14,15</sup>. The technique preserves the interdental papilla, accelerates initial wound healing, and also applies less traction<sup>10</sup>.

It is often difficult to perform the tunnelling technique for root coverage and soft tissue augmentation in the anterior mandibular region where there is superficial recession and thin, soft tissue, particularly when accompanied by prominent roots and alveolar deficiencies<sup>16</sup>.

## CLINICAL CASE PRESENTATION

A 28-year-old male patient presented for periodontal consultation. On taking his medical history, he did not report having any systemic disease and reported attending a consultation because he had dental hypersensitivity, mainly when consuming very cold foods. During periodontal revision, multiple Type 1 gingival recessions were observed in the maxilla, which, according to the classification system for gingival recession as proposed by Guttiganur *et al.*<sup>8</sup>, is a gingival recession without loss of interproximal attachment. The interproximal cement-enamel junction is not clinically detectable in the tooth<sup>8</sup>.

As he did not have periodontal disease, the first appointment consisted of modifying oral hygiene habits, since it was evident that the trauma caused by tooth brushing in the patient was the aetiological agent of the gingival recessions. Before starting the surgical procedure in the second appointment, the intraoral area was disinfected using mouthwashes with 0.12% chlorhexidine gluconate for 1 minute and the extraoral region was cleaned with povidone-iodine solution. The first surgery was in quadrant 1, teeth 12-14 were anaesthetised with the supraperiosteal technique via vestibular and palatal (Figure 1. A-B). Subsequently, partial thickness intrasulcular incisions were made with a No. 15c scalpel blade, creating a deep envelope in each recession and extending beyond the mucogingival junction in order to allow the flap to move coronally, thus keeping the interdental papillae intact. With these uniform incisions and a single intention, a tunnel was created (Figure 1. C-D). From the palatal area of the right maxillary premolars and first molar, maintaining a distance of approximately 3 mm from the gingival margin of these teeth, a graft of subepithelial connective tissue was taken. The adipose tissue was removed from the graft with the help of S14 scissors to obtain a thin graft of approximately 1.5-2 mm and easy to manipulate for placement, and it was kept hydrated in saline solution. Cross-shaped "X" sutures with 5-0 Polyglycolic Acid were placed at the donor site (Figure 1. E).

The graft was then passed through the tunnel with the help of a P20 periosteal elevator and tunnellers, passing it very carefully to keep the insertion of the interdental papillae intact. Coronal displacement of the flap was performed, combining single isolated sutures with coronal suspensory and X-shaped sutures, for which 5-0 Polyglycolic Acid suture was used (Figure 1. F). For patient comfort, a periodontal dressing (Coe-Pak) was placed on both surgical sites. Postoperative medication consisted of 1 tablet of naproxen sodium 550 mg every six hours for three days, application of cold compress on the cheek and mouthwashes with 0.12% chlorhexidine gluconate (15 ml, 2 times a day, for two weeks). This same surgical procedure was repeated for the second quadrant of teeth 21 to 24, in which there were Type 1 gingival recessions (Figure 2. A-E).

The patient reported pain in the palatal area and inflammation in the cheek area. After each procedure, periodic check-ups were carried out at 2, 3 and 6 weeks. In the third week, the sutures were removed. The last check-up was 4 months later, when the patient was discharged. In the first quadrant, better coverage was obtained for tooth 13 (Figure 1. G-H). In the second quadrant, uniform root coverage was obtained in all the teeth involved (Figure 2. F-G). Regarding root coverage, the results were satisfactory both aesthetically and functionally, because the patient manifested a considerable decrease in dental hypersensitivity.

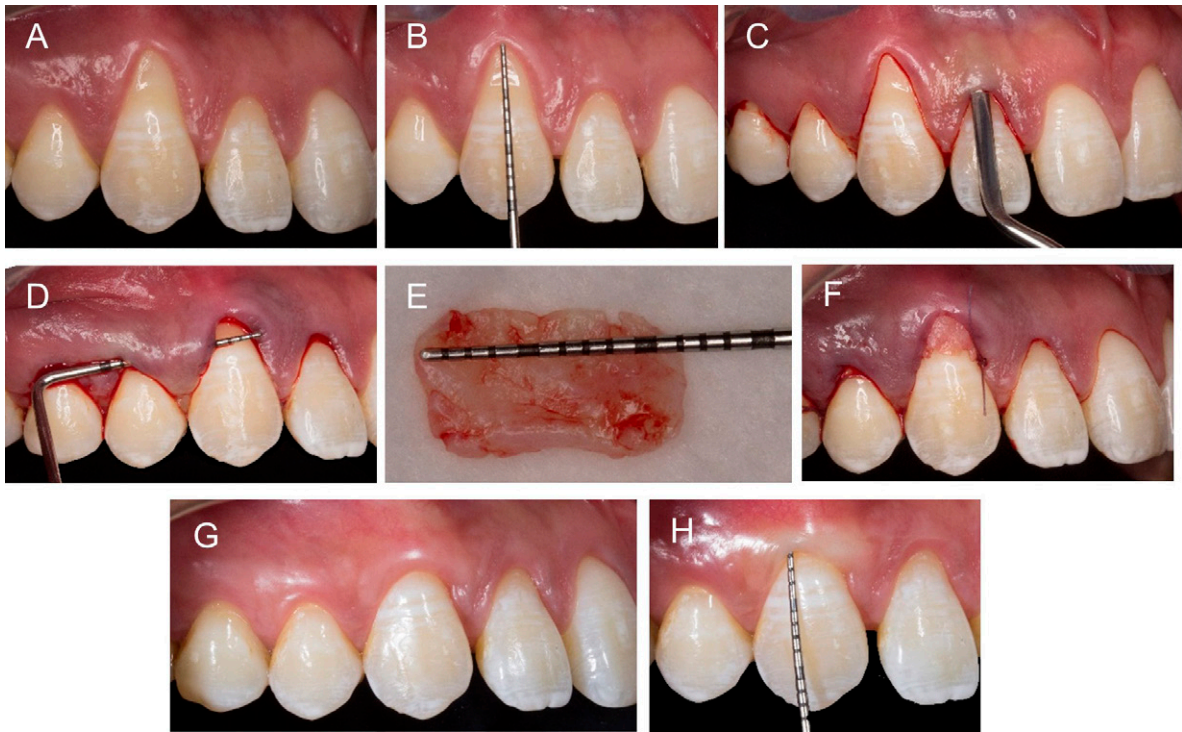


Figure 1. Treatment sequence of the Right side. A. Initial photograph. B. Initial periodontal probing. C. Incisions and preparation of the recipient site. D. Tunnel Presentation. E. Subepithelial connective tissue graft. F. Adaptation of the graft under the tunnel. G. Final photograph at 4 months. H. Final examination.



Figure 2. Treatment sequence of the Left side. A. Initial photograph. B. Incisions and preparation of the receiving site. C. Tunnel Presentation. D. Adaptation of the graft under the tunnel. E. Suture. F. Final photograph at 4 months. G. Final periodontal probing.

## DISCUSSION

The root coverage results were satisfactory when applying the tunnel technique for Type 1 gingival recessions and is supported in the literature as a conservative practice with good aesthetic results. It has excellent blood supply and graft nutrition, rapid healing, and lower postoperative morbidity due to limited flap displacement<sup>17</sup>. The tunnel technique offers advantages over alternative techniques (lateral displacement, double papilla, etc.) but can be difficult to perform in areas where there is minimal recession and thin tissue<sup>16</sup>. In other studies, the coronal displaced flap technique seems to be associated with a higher percentage of complete root coverage compared to the tunnelling technique when the same grafts (connective tissue or acellular dermal matrix) were used in both techniques<sup>14</sup>. In addition, surgical coverage of multiple gingival recessions is also predictable with the coronally advanced flap, and the latter combine with connective tissue grafting, but there are no available data to indicate which and how many gingival recessions should be treated in a complementary manner with connective tissue grafting in order to limit patient morbidity and improve aesthetic outcome<sup>17</sup>.

In the case of connective tissue grafting, in a study by Cairo *et al.*, the procedures showed the greatest overall aesthetic performance for root coverage, correlated with higher patient satisfaction and morbidity<sup>18</sup>, however, graft integration could affect the colour and appearance of soft tissues. In another study by Thalmair *et al.*, in which the tunnel technique was performed, they evaluated the surgery at the beginning and at 6 months later. The depth of the recession, the depth of the pocket while probing, the width of the keratinised tissue and the thickness of the gingival tissue were evaluated, and the results were satisfactory<sup>19</sup>. The treatment of gingival recession with the tunnel technique can produce a favourable clinical result, regardless of the use of plasma rich in growth factors<sup>20</sup>.

In studies in which the porcine dermal collagen matrix was used combined with a modified coronally advanced tunnel technique, they gave satisfactory clinical and aesthetic results, similar to those of the connective tissue graft<sup>21,22</sup>. Current data have not demonstrated an influence of enamel-derived matrix on clinical and immunological parameters related to wound healing after recession coverage surgery, using the modified coronally advanced tunnel technique and subepithelial connective tissue grafting<sup>1,23</sup>.

The clinical results of subperiosteal tunnel access via vestibular incision with connective tissue graft indicate that it could be an effective treatment for localised gingival recession of Miller classes I and II. Likewise, this indicated a decrease in the depth and width of the recession and an increase in the width of the keratinised tissue. Patients had little pain during surgery and two weeks after the healing operation and reported good aesthetic satisfaction<sup>24</sup>.

## CONCLUSIONS

The various techniques of mucogingival procedures allow to gain or, in this case, achieve the root coverage of teeth that have root exposure. To obtain optimal results for the benefit of the patient, it is necessary to determine the Type of gingival recession, develop a good treatment plan and have the appropriate instruments, it is also worth mentioning that the experience of the professional/specialist is essential.

The tunnel technique combined with subepithelial connective tissue grafting provide good results, therefore it should be considered as a treatment in similar cases.

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