Root Coverage in Molar Recession: Report of 50 Consecutive Cases Treated with Subepithelial Connective Tissue Grafts

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**Background:** The purpose of this study was to evaluate root coverage of molar recession defects.

**Methods:** Fifty patients with a molar recession defect on one molar were treated with a subepithelial connective tissue graft. The procedure was performed as previously reported.

**Results:** Complete root coverage was obtained in 29 of the 50 defects (58%). A mean root coverage of 91.1% was obtained. There was a statistically significant decrease in recession depth (4.4 mm to 0.5 mm), increase in quantity of keratinized tissue (0.9 mm to 3.1 mm), decrease in probing depth (3.0 mm to 2.3 mm), and decrease in attachment level loss (7.4 mm to 2.8 mm).

**Conclusion:** The subepithelial connective tissue graft is an effective method to obtain root coverage of recession defects on molars. J Periodontol 2003; 74:703-708.

**KEY WORDS**
Connective tissue/surgery; gingival recession/surgery; grafts, connective tissue; grafts, gingival; grafts, soft tissue; surgical flaps; tooth root/surgery.

Root coverage procedures became accepted as predictable procedures when Miller demonstrated high success rates with a thick autogenous masticatory graft (free gingival graft). His studies changed the mindset of the periodontal community to accept that predictable root coverage was possible with a single surgical procedure. However, the procedure was not without problems. The esthetics were usually not ideal, and the donor area could create problems. In an attempt to address these problems, Raetzke and Langer and Langer proposed techniques to be used with free connective tissue grafts. These techniques addressed problems with the free gingival graft, and the results were still predictable. Additionally, the esthetics were significantly better, and the donor area problems were reduced. Others have added different variations utilizing a connective tissue graft and an overlaying pedicle graft or pouch. In addition to using connective tissue grafts, other predictable root coverage techniques have been developed using guided tissue regeneration, pedicle grafts, and acellular dermal matrix grafts.

The documentation and evidence for using a connective tissue graft with a pedicle graft (subepithelial connective tissue graft) have continued to increase. However, there is little documentation concerning the use of subepithelial grafts to treat recession defects on molars. Harris reported a mean root coverage of 90% on 2 maxillary molars and complete root coverage on 1 mandibular molar in his study examining 100 recession defects treated with a connective tissue and partial-thickness double pedicle graft. The mean root coverage for these 3 molar recession defects was 93.3%. Bruno included photographs of a successfully treated molar recession defect in his article examining the use of a subepithelial connective tissue graft to obtain root coverage. The results were esthetic, and complete root coverage was obtained. However, no data were provided on the number of molars treated or the mean root coverage. Harris reported a case of a palatal recession defect on a molar where 84.6% of the exposed root was covered with a subepithelial connective tissue graft.

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Case Series

The need to treat molar recession defects could certainly be debated. Some would argue that esthetics would never be a consideration when considering treating molar recession defects. However, this is not always the case. Depending on the smile, an exposed maxillary first molar root could be an esthetic concern for a patient. Exposed molar roots are subject to all the same functional problems as non-molars. Additionally, molars have furcations that may become exposed and create functional problems that could be difficult to manage. Therefore, there are situations where root coverage of molar recession defects may be indicated and desirable. Unfortunately, there is a limited amount of information concerning the treatment of molar recession defects. The goal of this study was to examine the use of a subepithelial graft to obtain root coverage of molar recession defects.

MATERIALS AND METHODS

This study evaluated 50 consecutively treated patients treated with a subepithelial graft to obtain root coverage of molar recession defects. Patients were included in the group solely by when they presented for treatment and if they met the following criteria. All patients had 1 molar recession defect at least 3 mm deep. The defect was a Miller14 Class I or Class II defect. Furcation involvement was not greater than Class I, based on the classification described by Hamp et al.15 There were no medical complications to surgical periodontal therapy. Only 1 molar recession defect was treated per patient. Each patient provided 1 site for evaluation. The group included 18 maxillary first molars, 3 maxillary second molars, 28 mandibular first molars, and 1 mandibular second molar. The mean age of patients was 45.7 years (range, 21 to 79 years; standard deviation (SD), 13.3 years). There were 35 female and 15 male patients.

Clinical measurements were recorded by the author with a standard Williams-style probe. All measurements were rounded to the nearest 0.5 mm. The following measurements were recorded: recession depth (RD, measured at the deepest recession area from the cemento-enamel junction to the tissue margin), probing depth (measured at the same point as the recession depth), and width of keratinized tissue (measured at the same point as the recession depth). The attachment level was calculated by combining the probing depth and recession depth measurements.

The surgical procedures were performed as previously described.4,9,11,16 Preoperative photographs were taken (Figs. 1A and 2A). Anesthesia was administered, and the exposed root surface was root planed and treated with tetracycline (125 mg tetracycline/1 cc of saline). Incisions were placed to create the recipient bed and the pedicle (Figs. 1B and 2B). A partial-thickness pedicle was elevated by sharp dissection (Figs. 1C and 2C). The goal was to design the pedicle flap so it would cover as much of the connective tissue graft as possible, without tension on the pedicle. A double pedicle was used in 11 cases. In these cases, the pedicles were joined with 5-0 gut or chromic gut sutures (Fig. 1D). A coronally positioned pedicle was used in 39 cases. A 1.5 mm thick connective tissue graft was obtained from the palate with a scalpel with parallel blades,9 as previously described.9,11 The epithelial border was removed and discarded. The connective tissue graft was sutured over the defect with 5-0 or 6-0 gut or chromic gut sutures (Figs. 1E and 2D). The pedicle flap (either double pedicle or coronally positioned pedicle) was sutured over the connective tissue graft with 5-0 gut or chromic gut sutures (Figs. 1F and 2E). Isobutyl cyanoacrylate† and a periodontal dressing§ were applied. Verbal and written postoperative instructions were given. Unless contraindicated, all patients were placed on ibuprofen and chlorhexidine rinse, and given a narcotic preparation prescription to be taken if needed. All surgeries were performed by the author.

Patients were seen at 1 to 2 weeks postoperatively for removal of dressings. Additional postoperative appointments were at 4 to 6 weeks and 3 months postoperatively (Figs. 1G and 2F). At all postoperative appointments, the areas were deplaqued and oral hygiene instructions were given. Patients used the chlorhexidine rinse for 4 to 6 weeks and returned to normal oral hygiene procedures as soon as the tissues had healed.

Final clinical measurements were recorded at 3 months postoperatively. These were the same measurements as those recorded prior to surgery. Once again, all measurements were performed by the author.

Data Management

The initial and final clinical measurements were compared with a paired t test.17 The percentage of root coverage was calculated as follows:

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\text{Percentage of Root Coverage} = \left( \frac{\text{initial RD} - \text{final RD}}{\text{initial RD}} \right) \times 100
\]

† Harris Double Blade Graft Knife, H & H Company, Ontario, CA.
‡ IsoDent, Ellman International, Hewlett, NY.
§ Barricaid, Dentsply, L.D. Caulk Division, Mifflord, DE.
Figure 1.
A. Preoperative, tooth #30. B. Incisions (note that #29 is a pontic). C. Reflection of partial-thickness pedicle. D. Double pedicles joined with 5-0 gut sutures. No vertical incisions were used to treat this case. E. Connective tissue graft sutured over defect. F. Double pedicles sutured over connective tissue graft. G. Postoperative 3 months, tooth #30.
Subepithelial Connective Tissue Grafts for Recession

Figure 2.
A. Preoperative, tooth #30. B. Incisions. C. Reflection of partial-thickness pedicle. D. Connective tissue graft sutured over defect. E. Coronally positioned pedicles sutured over connective tissue graft. Note that the connective tissue graft was not completely covered by the pedicle. F. Postoperative 3 months, tooth #30.
A computer spreadsheet\(^1\) was used for the calculations. A \( P \) value was reported for all calculations of \( t \). Any \( P < 0.01000 \) was considered to be statistically significant. A post hoc power analysis was performed with a computer program for size determination\(^\dagger\) if any of the \( t \) tests were not statistically significant.

**RESULTS**

The mean root coverage for the 50 defects was 91.4\% (range, 58.3\% to 100\%; SD, 11.6\%). Complete root coverage was obtained in 29 (58\%) of the defects. The remaining recession was 0.5 mm in 7 cases, 1.0 mm in 6 cases, 1.5 mm in 5 cases, 2.0 mm in 2 cases, and 2.5 mm in 1 case. The change in recession depth (4.4 mm to 0.5 mm), width of keratinized tissue (0.9 mm to 3.1 mm), probing depth (3.0 mm to 2.3 mm), and attachment levels (7.4 mm to 2.8 mm) were all statistically significant (Table 1). A power analysis was not performed, since all \( t \) tests were statistically significant.

There was only one unscheduled postoperative appointment, due to the patient’s concern about facial discoloration and mild swelling. These symptoms resolved with time. Pain was described as minimal for all patients. A secondary procedure to obtain more root coverage was offered to all patients in whom complete root coverage was not initially achieved. One patient had a coronally positioned pedicle after the study was completed to obtain more root coverage. The final esthetics were judged, by the patient and clinician, as good to excellent in all cases. All patients indicated they were satisfied with the results.

**DISCUSSION**

It was possible to obtain a statistically significant, as well as clinically significant, amount of root coverage of these molar recession defects. The mean root coverage (91.1\%) and percentage of complete root coverage (58\%, 29 out of 50) compare well with the results reported by others.\(^5,6\) The 1996 World Workshop reported a mean root coverage of 89.3\% for connective tissue grafts in the studies evaluated.\(^5\) In a review of root coverage procedures, Bouchard et al.\(^6\) reported that “mean root coverages of 70\% to 80\% seem most common. Complete root coverages have been achieved in about 50\% of the treated defects.”\(^6\) It is not known how many molars were included in these studies.

The importance of an adequate bulk of tissue, or possibly keratinized tissue over a molar surface, is not known. At the least, it would offer all of the advantages one would expect on non-molar teeth. Additionally, there is a potential benefit in obtaining increased soft tissue over an area with a furcation. This may prevent the development of furcation involvement; however, further long-term study in this area is needed.

Based on the work by Harris\(^18\) and Bruno and Bowers,\(^19\) there is the potential for regeneration (new bone, periodontal ligament, and cementum) to occur. Depending on the amount of regeneration, this could be another reason to use subepithelial grafts on molars. However, this question can be addressed only with human histology and is beyond the scope of this study.

The improvement in clinical attachment levels from an attachment loss of 7.4 mm to 2.8 mm represents a 4.6 mm mean attachment gain, which was statistically significant. Numerically, these changes are impressive; however, it is not known whether they have any clinical significance.

The major problem associated with this study is that it was completed in private practice. There were no blinded evaluations, pressure-sensitive probes, acrylic stents for fixed reference points, examiner calibrations, or long-term follow-up, which may have affected the results of this study.

The results presented here demonstrate that predictable and esthetic root coverage of molar recession defects is possible. Long-term studies will be needed to determine the stability of the results. Based

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**Table 1.**

<table>
<thead>
<tr>
<th></th>
<th>Preop. Mean</th>
<th>Preop. Range</th>
<th>Preop. SD</th>
<th>Postop. Mean</th>
<th>Postop. Range</th>
<th>Postop. SD</th>
<th>( p^* )</th>
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<tr>
<td>Recession</td>
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<td>3.0-10.0</td>
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<td>0.5</td>
<td>0-2.5</td>
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<tr>
<td>Keratinized tissue</td>
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<td>0-4.5</td>
<td>1.1</td>
<td>3.1</td>
<td>1.0-6.5</td>
<td>1.1</td>
<td>&lt;0.00001</td>
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<tr>
<td>Probing depth</td>
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<td>2.0-4.5</td>
<td>0.4</td>
<td>2.3</td>
<td>1.0-3.0</td>
<td>0.7</td>
<td>&lt;0.00001</td>
</tr>
<tr>
<td>Attachment level</td>
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<td>5.5-13.0</td>
<td>1.6</td>
<td>2.8</td>
<td>1.0-5.0</td>
<td>1.1</td>
<td>&lt;0.00001</td>
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* Based on \( t \) test.
on this study, it can be concluded that the subepithelial connective tissue graft is an effective technique to treat molar recession defects.

ACKNOWLEDGMENTS

I would like to thank Linda Harris, my wife, for her never-ending help and support. Additionally, I would like to thank Christopher Harris, Laura Harris Miller, Richard Miller, Lillian Riehl, Theresa Downs, Sara Gardner, and Diane Cotter for their help with the data collection and the writing of the manuscript. The double-blade scalpel, Harris Double Blade Graft Knife, used in this study was designed and developed by the author. I would also like to thank the H & H Company, Ontario, California for manufacturing and providing the double-blade scalpel and several other instruments used in this study.

REFERENCES