

Use of acellular dermal matrix graft in the treatment of gingival recessions: a case report

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Case presentation in which a 12-years-old boy presented with two large gingival recessions on the maxillary central incisors, secondary to a lateral luxation. In the surgical procedure, an acellular dermal matrix graft (ADMG) was placed as a substitute for a free gingival graft. Twelve months later, complete root coverage was achieved, showing that ADMG, a biomaterial recently developed for mucogingival surgery, can be successfully used in the treatment of gingival recessions in pediatric patients.
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INTRODUCTION

Tooth trauma is frequently high in teenagers, and according to Glendor *et al.*, the incidence corresponds to 1.3% of individuals ranging from birth to 19 years of age, each year. Most of these injuries occur in males, and the maxillary incisors are the most commonly affected teeth, involving both function and esthetics and requiring multidisciplinary assistance to provide proper diagnosis, adequate primary care and subsequent treatment that can lead to success.

In the present report, emphasis is given to the occurrence of gingival recessions secondary to trauma, which is not a common finding. The American Academy of Periodontology defines gingival recession as an apical displacement of the gingival marginal tissues, and the treatment involves root coverage and/or gingival augmentation procedures. Root coverage is indicated to improve esthetics, and is based in a coronal displacement of the flap associated or not to a grafting procedure.

Gingival augmentation techniques demand the use of a graft, not only to stop the progression of the recession, but also to modify the gingival architecture around the teeth in order to facilitate plaque control. Free gingival grafts are often used, and as a consequence, demands an additional surgical area, which limits the amount of material available, and moreover, the newly formed tissue tends to maintain the original characteristics, which is different in texture and color when compared to the tissues adjacent to the receptor site. Free gingival grafts, although a predictable procedure has an unsatisfactory esthetic outcome, not to mention the added morbidity of a second surgical site.

The acellular dermal matrix graft (ADMG-Alloderm®, LifeCell Corporation, Woodlands, TX, USA.) was introduced as a substitute for the free gingival grafts, is derived from human skin from which the cells are removed, and is considered to be a non-immunogenic material that exhibits undamaged collagen and elastin fibers and does not induce an inflammatory response in the host tissues. Healing after the adaptation of an ADMG occurs by repopulation and revascularization, rather than granulation, avoiding scarring, and has been used in medicine for the treatment of burn patients and patients with soft tissue defects. In Periodontology, the ADMG has been used in the treatment of gingival recessions, as well as for increasing gingival thickness in edentulous areas. Thus, the purpose of this report is to present a case in which ADMG was used as a substitute for the autogenous gingival graft, in the treatment of a gingival recession secondary to trauma in a 12-year old boy.

CASE REPORT

A twelve-year-old boy was referred from a pediatric dentist for periodontal evaluation and treatment.

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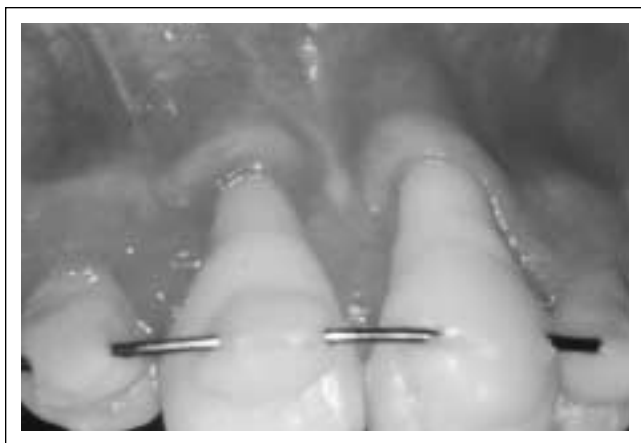


Figure 1. Preoperative recessions on the maxillary central incisors (8 months after the accident).

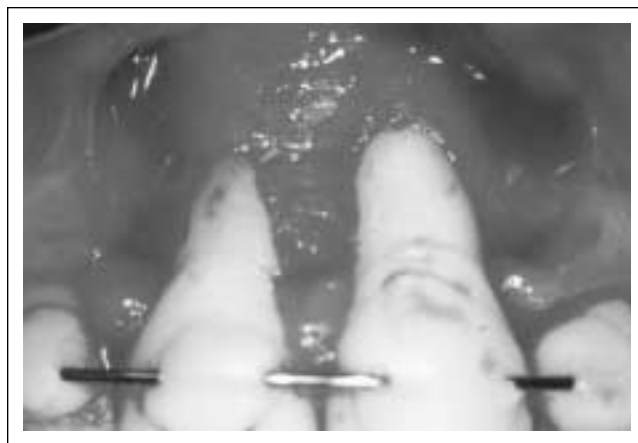


Figure 2. The partial thickness flap raised, showing the alveolar bone loss.

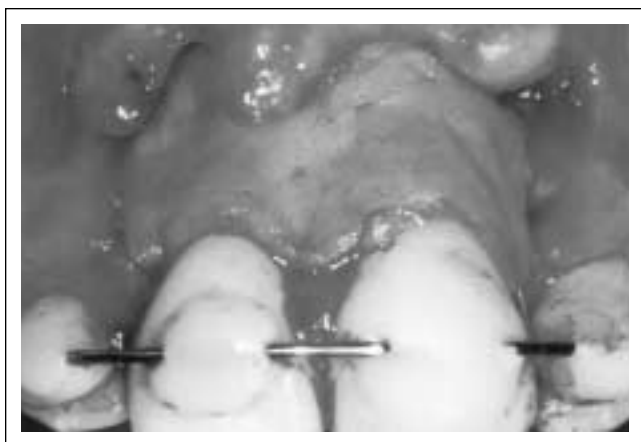


Figure 3. ADMG trimmed to the shape and size of the surgical bed and sutured in place with a resorbable suture.

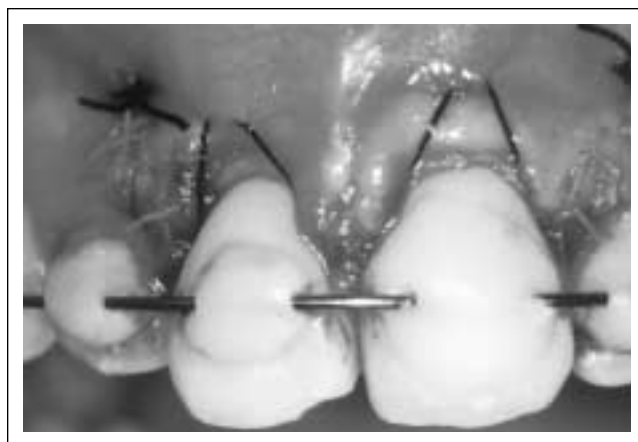


Figure 4. Flap is coronally positioned and sutured to cover the ADMG.

Parents reported those eight months earlier, the patient suffered a bicycle accident followed by a period of unconsciousness. The pediatrician reported no further systemic complications, and the pediatric dentist identified the occurrence of soft tissue wounds involving nose, lips (internally and externally) and adjacent areas; lateral luxation of the maxillary central incisors with fracture of the correspondent buccal alveolar bone; and a crown fracture on the right maxillary incisor involving enamel and dentin. Immediate treatment consisted of reduction of the bone fracture and repositioning of the teeth, followed by extracoronary splinting from cuspid to cuspid with an orthodontic wire and acrylic resin, and suture of the lacerated tissues. Endodontic treatment of both involved teeth was initiated through the use of calcium hydroxide paste as an intracanal medication.

At the first periodontal visit (Figure 1), eight months after the accident, the main complaint was the presence of two large recessions at the buccal surfaces of the traumatized teeth. Patient was in good general health, probing depths were equal or lower than 3mm, and

both biofilm and bleeding index were higher than 20%. Recessions were classified as Miller Class II, and extended beyond the mucogingival junction with no tissue loss in the interdental area. Treatment plan included oral hygiene instruction, scaling and root planing, and a surgical procedure to promote gingival augmentation and root coverage of the buccal surfaces of both maxillary incisors.

On the day of the surgery, after administration of local anesthesia, an intracrevicular incision was made through the bottom of the crevice, and hexagonal relaxing incisions were performed on the distal surfaces of the maxillary incisors as described by Langer and Langer. In sequence, a split thickness flap was reflected by sharp dissection as close to the periosteum as possible, beyond the mucogingival junction, and was extended until the partial-thickness flap could be passively positioned over the defects without tension (Figure 2). Following flap elevation, the exposed root surfaces were scaled and planed with hand and rotary instruments and conditioned for decontamination with 24% ethylenediaminetetraacetic acid (EDTA), neutral pH, in 3% car-



Figure 5. Postoperative view of the healing after 2 weeks.



Figure 6. Healing 12 months after surgery, with complete root coverage and normal gingival architecture.

bopol gel, for two minutes, followed by abundant sterile saline irrigation and continuous aspiration, for complete removal of the EDTA gel. The ADMG was aseptically rehydrated in saline solution, according to manufacturer's instructions, trimmed to its proper size, placed in position and secured with sling sutures using 5.0 resorbable sutures (Figure 3). After graft placement, firm pressure was applied with a sterile moist gauze for three minutes to allow adherence and adaptation of the graft to recipient bed. The flap was then coronally positioned until the ADMG was completely covered and sutured with 4.0 silk sutures (Figure 4).

Twice daily rinses with 0.12% chlorhexidine digluconate solution were recommended for three weeks postoperatively. A periodontal dressing was applied over the area, replaced after seven days, and at the 14th day, both periodontal dressing and sutures were removed (Figure 5). Weekly postoperative prophylaxes were done during the first month and monthly from then on. Four months after the surgical procedures the root canals were permanently obturated and crowns were cemented with composite resin by the pediatric dentist.

RESULTS AND DISCUSSION

The healing process was uneventful, the patient experienced minimal discomfort and light edema persisted for four weeks. The ADMG was clinically incorporated into the tissues after two months. And after three months the newly formed gingiva was firmly attached and difficult to distinguish from the surrounding tissues. After twelve months of evaluation, the soft tissue graft was highly successful both functionally and esthetically, with complete root coverage (Figure 6). Results were acceptable to the patient, his parents and clinicians.

In the present report, the occurrence of the buccal marginal tissue recessions could be explained by an inflammatory process resultant from the trauma, to the

patient's deficient plaque control and to the long period of tooth immobilization. According to Oikarinen *et al.* the duration of immobilization is the most important factor in determining unfavorable prognosis after luxation injuries, mostly because of bacterial deposition and the limitation of the masticatory stimuli, which interferes in the healing process and facilitates marginal bone loss.

Several techniques have been described for the treatment of gingival recessions, most frequently these procedures involve the use of autogenous gingival grafts, and recently, ADMG is been employed as an alternative. Haeri and Parsell compared the use of ADMG to an autogenous graft for gingival augmentation, and no statistical differences were found concerning recession reduction, clinical attachment gain, and probing depth reduction. Novaes Jr. *et al.*⁸ also reported no statistically significant differences between sites treated with ADMG in comparison to sites treated with subepithelial connective tissue grafts.

In the present case, complete root coverage was achieved in both gingival recessions. This result is in accordance with data obtained by Harris²⁰ (mean root coverage of 96.2%) and Aichelmann-Reidy *et al.* (mean root coverage of 83.4%), which also employed ADMG associated to a coronally positioned flap. Clinical success, in this case, could be due to the availability of a satisfactory blood supply for graft healing, to the integrity of the adjacent periodontal tissues, and complete coverage of the ADMG by a thick coronally positioned flap. This is in accordance with the findings of Pini-Prato *et al.* that reported the importance of raising thick flaps to optimize gingival recession reduction. Additionally, the rigid oral hygiene routine was essential to support this result.

Histological analysis have shown that after a six months post-operative period the ADMG becomes part of the surrounding tissues.^{20,21} Favorable prognosis

registered with the use of ADMG are supported by longitudinal studies in which the occurrence of the creeping attachment phenomenon was observed which is the postoperative migration of the gingival margin in a coronal direction. These observations may suggest that it is possible to maintain longitudinally the stability of the results achieved with the ADMG graft.

CONCLUSIONS

Within the limitations of this report, it was concluded that ADMG can be successfully used as a substitute for autogenous gingival grafts in cases of multiple gingival recessions in pediatric patients, providing longitudinal functional and esthetical root coverage and gingival augmentation.

REFERENCES

1. Glendor U, Halling A, Andersson L *et al*. Incidence of traumatic tooth injuries in children and adolescents in the county of Vastmanland, Sweden. *Swed Dent J* 20: 15-28, 1996.
2. Crona-Larsson G, Nören JG. Luxation injuries to permanent teeth: a retrospective study of etiological factors. *Endod Dent Traumatol* 5: 176-179, 1989.
3. Blatz MB. Comprehensive treatment of traumatic fracture and luxation injuries in the anterior permanent dentition. *Prac Proced Aesthet Dent* 13: 273-279, 2001.
4. The American Academy of Periodontology: Consensus report. Mucogingival therapy. *Ann Periodontol* 1: 702-706, 1996.
5. Reagan BJ, Madden MD, Huo JH *et al*. Analysis of cellular and decellular allogeneic dermal grafts for the treatment of full-thickness wounds in a porcine model. *Critical Care* 43: 458-466, 1997.
6. Rhee PH, Friedman CG, Ridge JA *et al*. The use of processed allograft dermal matrix for intraoral resurfacing. An alternative to split-thickness skin grafts. *Arch Otolaryngol Head Neck Surg* 124: 1201-1204, 1998.
7. Wainwright DJ. Use of an acellular allograft dermal matrix (AlloDerm) in the management of full-thickness burns. *Burns* 21: 243-248, 1995.
8. Novaes Jr. AB, Grisi DC, Molina GO *et al*. Comparative 6-month clinical study of a subepithelial connective tissue graft and acellular dermal matrix for the treatment of gingival recession. *J Periodontol* 72: 1477-1484, 2001.
9. Batista Jr. EL, Batista FC, Novaes Jr. AB. Management of soft tissue ridge deformities with acellular dermal matrix. Clinical approach and outcome after 6 months of treatment. *J Periodontol* 72: 265-273, 2001.
10. Miller Jr. P. A classification of marginal tissue recession. *Int J Period Rest Dent* 2: 9-13, 1985.
11. Langer B, Langer L. Subepithelial connective tissue great technique for root coverage. *J Periodontol* 56: 715-720, 1985.
12. Miyashin M, Kato J, Takagi Y. Tissue reactions after experimental luxation injuries in immature rat teeth. *Endod Dent Traumatol* 7: 26-35, 1991.
13. Novaes AB, Ruben MP, Kon S, Goldman HM, Novaes Jr. AB. The development of the periodontal cleft. A clinical and histopathologic study. *J Periodontol* 46: 701-709, 1975.
14. Oikarinen K, Gundlach KKL, Pfeifer G. Late complications of luxation injuries to teeth. *Endod Dent Traumatol* 3: 296-303, 1987.
15. Mandel U, Viidik A. Effect of splinting on the mechanical and histological properties of the healing periodontal ligament in the vervet monkey (*Cercopithecus aethiops*). *Archs Oral Biol* 34: 209-217, 1989.
16. Haeri A, Parsell D. Creeping attachment: autogenous graft vs dermal matrix allograft. *Compendium* 21: 725-730, 2000.
17. Aichelmann-Reidy MA, Yukna RA, Mayer ET. An acellular dermal matrix used for root coverage. *J Periodontol* 70: 223, 1999.
18. Pini-Prato G, Baldi C, Pagliano U. Coronally advanced flap procedure for root coverage. Treatment of root surface: root planing versus polishing. *J Periodontol* 70: 1064-1076, 1999.
19. Baldi C, Pini-Prato G, Pagliano U *et al*. Coronally advanced flap procedure for root coverage. Is flap thickness a relevant predictor to achieve root coverage? A 19-case series. *J Periodontol* 70: 1077-1084, 1999.
20. Harris RJ. Root coverage with a connective tissue with partial thickness double pedicle graft and an acellular dermal matrix graft: a clinical and histological evaluation of a case report. *J Periodontol*, 69:1305-1311, 1998.
21. Tal H. Subgingival acellular dermal matrix allograft for the treatment of gingival recession: a case report. *J Periodontol*, 70:1118-1124, 1999.