# Treatment of Moderate to Severe Buccal Gingival Recession Defects with Placental Allografts

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*A multicenter prospective consecutive case series study was conducted to evaluate the effectiveness of placental allografts to correct moderate to severe buccogingival recession defects. Nineteen healthy patients, 13 women and 6 men, ranging in age from 29 to 63 years, with 43 maxillary and mandibular gingival recession defects of > 4 mm deep were included. Clinical examination at multiple postsurgery time points revealed healthy maturation of gingival tissues with normal color and texture matched to adjacent soft tissue areas. Complete root coverage was not achieved in all cases in this proof of principle evaluation. Severe buccal bone loss had occurred in most of the selected cases, which may have negatively influenced the results. Nonetheless, it was possible to achieve root coverage and demonstrate gain in clinical attachment level and height of keratinized tissue when placental allograft was used. Future randomized clinical trials are needed to further explore the potential of placental allografts for treatment of localized gingival recession defects.*
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Marginal tissue recession apical to the cementoenamel junction (CEJ) with exposure of the root surface is a common feature in populations with high standards of oral hygiene as well as in populations with poor oral hygiene.[1–9] In populations maintaining high standards of oral hygiene, loss of attachment and marginal tissue recessions are predominantly found on buccal surfaces.[3,4,10] Daprile et al reported a significant increase in the total number of gingival recessions on buccal surfaces in their 5-year longitudinal study in a dental student population.[8] In a 10-year longitudinal study evaluating gingival recession among dentists, Matas et al reported an increase in mean number of gingival recessions per person and mean recession height.[9]

Etiologic factors associated with marginal tissue recessions are traumatic toothbrushing techniques, tooth malposition, alveolar bone dehiscences, periodontal disease, inadequate gingival dimensions, high muscle attachment and frenum pull, and iatrogenic factors related to restorative and periodontal treatments.[11] Thus, elimination of etiologic factors as well as therapeutic actions must be undertaken to address the problem.[12]

Multiple periodontal plastic surgical procedures are documented in the literature for the treatment of gingival recession defects. The

indications for root coverage procedures are for esthetic demands, root hypersensitivity, management of shallow root caries lesions, and cervical abrasions.[11] Treatment outcomes of successful root coverage procedures include shallow probing depth, clinical attachment gain, and gingival height increase. An average of 68% to 91% of root coverage may be expected depending on treatment procedures (rotational flaps, coronally advanced flap, guided tissue regeneration, connective tissue graft, or free gingival graft).[11]

Recently, a second generation of the placental allograft (BioXclude, Snoasis Medical), a processed, dehydrated, and sterilized graft composed of allograft amnion and chorion tissue (300 μm), was introduced. Several case reports have described its use in guided tissue regeneration and guided bone regeneration procedures.[13–17] The purpose of this investigation was to evaluate the effectiveness of placental allografts in treating moderate to severe buccogingival recession defects.

## Materials and methods

Nineteen healthy patients, 13 women and 6 men, ranging from 29 to 63 years of age, with 43 maxillary and mandibular gingival recession defects of > 4 mm deep were included in this prospective consecutive case series study. The informed consent was reviewed with each patient at a separate consultation appointment, and they signed a consent form based on the Helsinki Declaration of 1975, as revised in 2000. Patients with significant medical conditions and smokers were excluded from the study. Participating patients presented with either single or multiple contiguous maxillary or mandibular gingival recession defects.

### *Clinical examination*

All study patients had to meet specific inclusion and exclusion criteria to be eligible for the study. At the initial visit defect sites were examined and photographed, and defect measurements were recorded. Necessary intraoral radiographs were taken at baseline to rule out underlying periodontal disease. The following clinical parameters were recorded for each patient: facial probing depth (PD), gingival recession depth (RD) and width (RW), clinical attachment level (CAL), height of keratinized tissue from the free gingival margin to the mucogingival margin (KTW), buccal bone level from the CEJ to the bone crest (BL), and plaque and gingival indices. Postsurgery examinations were conducted until week 24. Final clinical parameter measurements except BL were obtained at week 24.

### *Surgical procedure*

Prior to surgery, all patients received oral hygiene instructions and full-mouth prophylaxis and were appointed for surgery only after demonstrating adequate supragingival plaque control. At surgery, following local anesthesia (2% xylocaine with 1:100,000 epinephrine), the exposed root portion was scaled with hand instruments (Fig 1a). At the recession site, oblique submarginal incisions in the interdental areas were performed in addition to intrasulcular incisions at adjacent teeth with the recession defects (Fig 1b). A buccal split-thickness flap was elevated, and a horizontal releasing incision placed in the periosteum at the base of the soft tissue flap ensured tension-free coronal advancement (Fig 1c). A placental allograft (BioXclude) was then adapted to the exposed root surface, and the buccal flap was coronally advanced with minimal to no tension and secured with multiple 6-0 PTFE sutures (OMNIA) (Figs 1d and 1e).

Patients were instructed not to brush the treated area but to use chlorhexidine (0.12%) mouthrinse twice daily the first 2 weeks. Following this period patients were instructed in a brushing technique that avoided apically directed toothbrush trauma (Fig 1f).

### *Statistical analysis*

For each clinical measurement, descriptive statistics such as mean and standard deviation were obtained. Quantitative differences between baseline and 24 weeks after the surgery were assessed by the Wilcoxon signed rank test with continuity correction given ties. All statistics were performed using the R software package Stats. *P* values < .05 were considered statistically significant.

**Fig 1a** *A 49-year-old man presented with a complaint about an ongoing gingival recession problem in the maxillary left canine region.*

**Fig 1b** *Oblique submarginal incisions in the interdental areas were made as part of the recipient site preparation.*

**Fig 1c** *A buccal split-thickness flap was elevated to expose the root surface.*

**Fig 1d** *A placental allograft was adapted to the exposed root surface.*

**Fig 1e** *The buccal flap was coronally advanced with minimal to no tension.*

**Fig 1f** *A 6-month follow-up examination revealed an incomplete but noteworthy amount of root coverage on the maxillary left canine.*

**Fig 2a** *A 41-year-old woman presented with gingival recession on the maxillary left canine that was sensitive and unesthetic.*

**Fig 2b** *A buccal split-thickness flap was elevated to expose the root surface.*

**Fig 2c** *A 6-month follow-up examination revealed complete coverage of exposed root surface.*

## Results

### *Clinical examinations*

Clinical examination at multiple postsurgery time points allowed early soft tissue wound healing assessments (Figs 2 to 6). Immediate postoperative swelling, inflammation, and discomfort were minimal and continued to improve during all progressive time points. None of the surgical sites experienced postoperative infection. Gingival color and texture blended well with adjacent soft tissue areas.


**Fig 3** *Clinical views at baseline (a) and after 6 months of healing (b) show that good root coverage was obtained and maintained for both mandibular right premolars.*

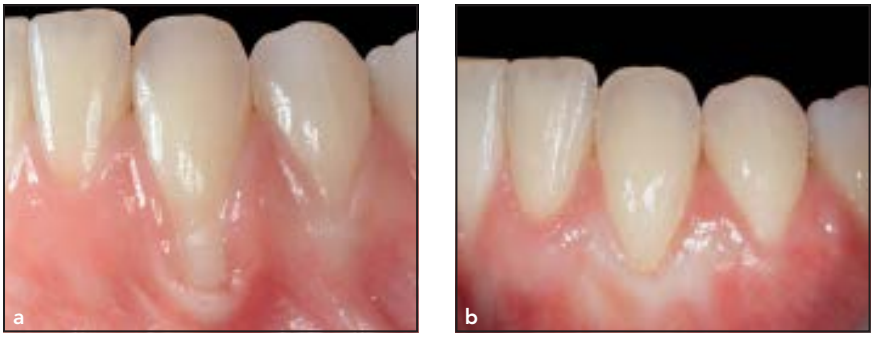


**Fig 4** *Clinical views at baseline (a) and after 6 months of healing (b) show that the result of treatment for a very deep and severe mandibular left canine gingival recession defect was maintained up to the 6-month evaluation period.*

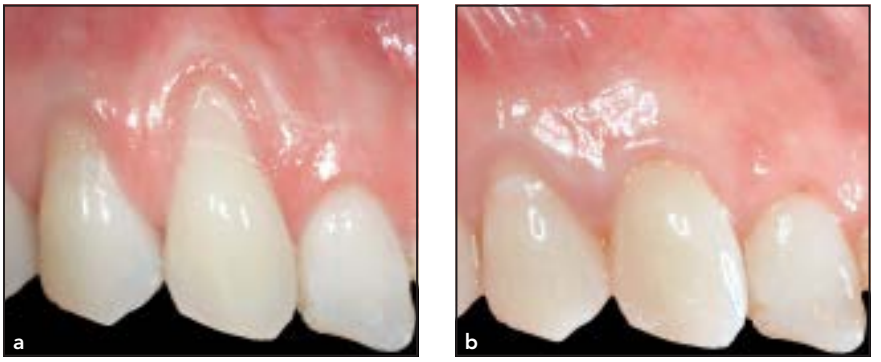


**Fig 5** *Clinical views at baseline (a) and after 6 months of healing (b) show that complete root coverage was obtained on the maxillary left canine.*

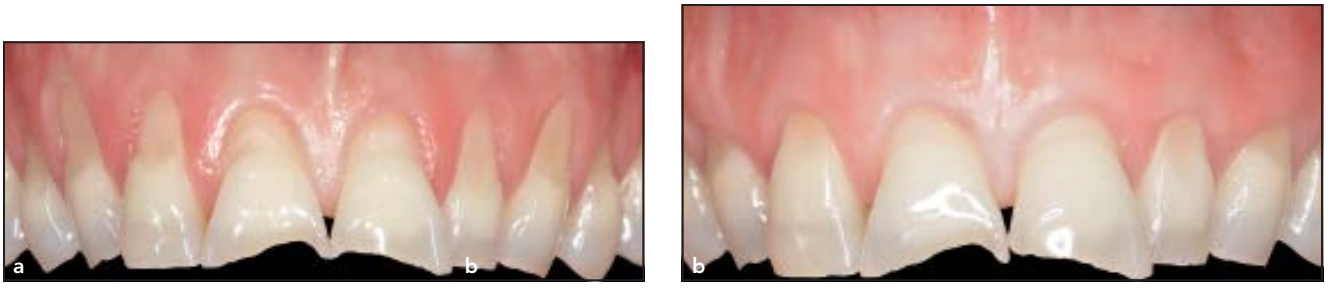


**Fig 6** *Clinical views at baseline (a) and after 6 months of healing (b) show that decent root coverage was obtained on maxillary anterior teeth.*

### *Clinical parameters*

Several clinical parameters were measured at baseline and again at week 24 in this prospective consecutive case series study (Table 1). Mean PD was similar at both time points, with no significant difference between baseline (1.60 ± 0.54 mm) and week 24 (1.60 ± 0.82 mm). The mean BL for all teeth at baseline was 6.48 ± 1.72 mm (range: 4 mm to 10 mm) at the time of surgery.

The mean RD change from baseline to week 24 was statistically

**Table 1** Clinical measurements obtained at baseline and 24 weeks

| | Recession | Recession width | CAL | Probing depth | Keratinized tissue |
|---|---|---|---|---|---|
| Baseline (mm) | 4.51 (1.44) | 4.05 (1.05) | 6.12 (1.75) | 1.60 (0.54) | 1.58 (1.12) |
| 6 mo (mm) | 1.86 (0.94) | 3.00 (1.65) | 3.47 (1.28) | 1.60 (0.82) | 2.44 (1.01) |
| Δ (mm) | 2.65 (1.53) | 1.05 (1.23) | 2.65 (1.57) | 0.00 (0.93) | 0.86 (1.21) |
| Δ (%) | 55.81 (25.26) | 28.12 (37.12) | 41.50 (17.93) | −10.08 (60.76) | NA |
| *P* (Δ at 6 mo) | < .001 | < .001 | < .001 | 1 | < .001 |

All values are shown as mean (standard deviation). CAL = clinical attachment level.

**Table 2** Clinical measurements obtained at baseline and 24 weeks comparing sites in anterior (n = 23; 53%) vs posterior teeth (n = 20; 47%)

| | Recession | | Recession width | | CAL | | Probing depth | | Keratinized tissue | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Ant | Post | Ant | Post | Ant | Post | Ant | Post | Ant | Post |
| Baseline (mm) | 4.61 (1.73) | 4.40 (1.05) | 4.13 (0.97) | 3.95 (1.15) | 6.13 (2.12) | 6.10 (1.25) | 1.52 (0.59) | 1.70 (0.47) | 1.65 (1.11) | 1.50 (1.15) |
| 6 mo (mm) | 1.65 (0.88) | 2.10 (0.97) | 2.65 (1.85) | 3.40 (1.31) | 3.48 (1.38) | 3.45 (1.19) | 1.83 (0.94) | 1.35 (0.59) | 2.57 (0.90) | 2.30 (1.13) |
| Δ (mm) | 2.96 (1.66) | 2.30 (1.30) | 1.48 (1.31) | 0.55 (0.94) | 2.65 (1.77) | 2.65 (1.35) | -0.30 (0.97) | 0.35 (0.75) | 0.91 (1.38) | 0.80 (1.01) |
| Δ (%) | 61.00 (24.26) | 49.83 (25.66) | 40.87 (39.96) | 13.46 (27.81) | 40.70 (18.66) | 42.41 (17.50) | -29.71 (64.54) | 12.50 (48.33) | NA | NA |
| *P* (Δ at 6 mo) | < .001 | < .001 | < .001 | .02 | < .001 | < .001 | .16 | .06 | .009 | .005 |
| *P* ant vs post | .16 | | .01 | | .76 | | .02 | | .82 | |

All values are shown as mean (standard deviation). Ant = anterior; Post = posterior; CAL = clinical attachment level.

significant, decreasing from 4.51 ± 1.44 mm to 1.86 ± 0.94 mm (mean improvement of 2.65 + 1.53 mm; $P < .001$). The mean RW change from baseline to week 24 was statistically significant, decreasing from 4.05 ± 1.04 mm to 3.00 ± 1.65 mm (mean improvement of 1.05 ± 1.23; $P < .001$). As a result of the improvement in recession depth, the mean root coverage at week 24 was 56%.

A statistically significant difference in mean CAL between baseline (6.12 ± 1.75 mm) and week 24 (3.46 ± 1.28 mm), with a mean improvement of 2.65 ± 1.57 mm, was noted ($P < .001$). A statistically significant difference was also noted for KTW change (0.86 ± 1.21 mm, $P < .001$).

The root coverage success rate on anterior teeth versus posterior teeth and maxillary versus mandibular teeth was compared (Tables 2 and 3). A statistically significant reduction in RW in the anterior teeth ($P = .01$) and gain in CAL in the mandibular arch ($P = .003$) were found.

## Discussion

Placental allografts are composed of immunoprivileged tissues possessing antibacterial properties and that provide a protein-enriched matrix to facilitate cell migration.[18] These allografts contain over 55 biologic factors, extracellular matrix protein, interleukins, and tissue inhibitors of metalloproteinase known to play a role in wound healing and reducing inflammation.[19–21] These grafts have been used as a

**Table 3** **Clinical measurements obtained at baseline and 24 weeks comparing sites in maxilla (n = 32; 74%) vs mandible (n = 11; 26%)**

| | Recession | | Recession width | | CAL | | Probing depth | | Keratinized tissue | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Max | Mand | Max | Mand | Max | Mand | Max | Mand | Max | Mand |
| Baseline (mm) | 4.38 (1.60) | 4.91 (0.70) | 4.12 (1.10) | 3.82 (0.87) | 5.91 (1.89) | 6.73 (1.10) | 1.53 (0.51) | 1.82 (0.60) | 1.75 (1.11) | 1.09 (1.04) |
| 6 mo (mm) | 1.91 (1.03) | 1.73 (0.65) | 2.94 (1.83) | 3.18 (0.98) | 3.59 (1.41) | 3.09 (0.70) | 1.69 (0.90) | 1.36 (0.50) | 2.66 (0.87) | 1.82 (1.17) |
| Δ (mm) | 2.47 (1.70) | 3.18 (0.60) | 1.19 (1.23) | 0.64 (1.21) | 2.31 (1.57) | 3.64 (1.12) | -0.16 (0.88) | 0.45 (0.93) | 0.91 (1.30) | 0.73 (0.90) |
| Δ (%) | 52.59 (28.00) | 65.15 (10.97) | 33.20 (38.72) | 13.33 (28.56) | 37.37 (18.18) | 53.51 (10.64) | -17.19 (60.39) | 10.61 (59.76) | NA | NA |
| *P* (Δ at 6 mo) | < .001 | .003 | < .001 | .13 | < .001 | .003 | .32 | .15 | .001 | .05 |
| *P* max vs mand | .11 | | .16 | | .003 | | .07 | | .66 | |

All values are shown as mean (standard deviation). Max = maxillary; Mand = mandibular; CAL = clinical attachment level.

barrier membrane in guided tissue regeneration and guided bone regeneration procedures.[13–16,22,23] This is a first prospective consecutive clinical study conducted to examine the possibility of achieving root coverage using a placental allograft.

Of the 43 teeth treated, 11 were mandibular teeth. The percentage of root coverage for mandibular teeth was 65%, while for maxillary teeth it was 53%. The percentage of root coverage for the posterior teeth (premolar to molar) was 50%, while for the anterior teeth it was 61%. Although complete root coverage was not achieved in many cases, the placental allograft is a viable alternative option for root coverage procedure in cases where there is a lack of autogenous connective tissue available to treat gingival recession defects. The mean buccal bone level from the CEJ to the bone crest for all teeth at baseline was 6.48 ± 1.72 mm (range: 4 mm to 10 mm) and is significant evidence of attachment loss.

These cases will be observed for a longer period to determine whether creeping attachment phenomenon can occur.

## Conclusions

This proof of principle multicenter study demonstrated that it is possible to correct gingival recession for teeth that have had moderate to severe buccal bone loss. Reduction in gingival depth and width and gain in CAL and height of keratinized tissue resulted from the placental allograft treatment. The lack of controls limits these findings. Future randomized controlled clinical trials are needed to further explore the potential of placental allografts for treatment of localized gingival recession defects.

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