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Guided biofilm therapy before recession type 2 coverage: Case report

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ABSTRACT

Recession Type 2 defects are challenging because interproximal attachment loss reduces the predictability of complete root coverage. This case report describes the integration of a structured Guided Biofilm Therapy protocol into presurgical and supportive care for a 26-year-old male smoker with a Recession Type 2 defect at tooth 41 after unsuccessful orthodontic treatment. At baseline, the plaque index was 93% and bleeding on probing was 36%. Tobacco-cessation counselling, individualised oral-hygiene instruction, biofilm disclosure, air polishing, and site-specific instrumentation were provided over three preparatory visits. Before surgery, the plaque index and bleeding on probing had decreased to 7% and 4%, respectively. The defect was then treated with a laterally closed tunnel and a palatal subepithelial connective tissue graft. At 6 months, the plaque index was 11% and bleeding on probing was 5%; at 12 months, the corresponding values were 7% and 5%. Complete clinical root coverage was maintained at both follow-ups, and serial radiographs showed changes suggestive of increased interproximal bone fill. The favourable outcome followed a combined program of risk-factor control, professional biofilm management, surgery, and maintenance; the independent effect of Guided Biofilm Therapy cannot be determined from a single case. Standardised controlled studies are required to clarify its adjunctive value in periodontal plastic surgery.

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1. INTRODUCTION

Gingival recession is an apical displacement of the gingival margin that may be associated with dentine hypersensitivity, root-surface exposure, esthetic concern, and difficulty with plaque control. The 2018 classification emphasises the depth of recession, interproximal clinical attachment level, gingival phenotype, and root surface condition when diagnosing and planning treatment (Cortellini & Bissada, 2018). In the Cairo system, a Recession Type 2 (RT2) defect has interproximal clinical attachment loss that is less than or equal to the buccal attachment loss (Cairo et al., 2011). This interproximal loss makes complete root coverage less predictable than in defects without interproximal attachment loss (Cairo, 2014; 2017).

Evidence nevertheless indicates that complete coverage can be achieved in selected RT2 defects. A randomised trial of multiple Class III recessions reported complete coverage in 38% of

treated defects. In contrast, a later systematic review found that carefully selected Miller Class III or RT2 sites may obtain complete coverage, although estimates were heterogeneous and certainty remained limited (Aroca et al., 2010; Fernández-Jiménez et al., 2021). Autogenous connective tissue grafting remains the most evidence-based soft-tissue approach, while tunnel procedures may preserve papillary integrity and graft vascularisation (Chambrone & Tatakis, 2015; Tavelli et al., 2018; Tonetti et al., 2014; Zucchelli & Mounssif, 2015). For deep isolated mandibular recessions, the laterally closed tunnel has been described as a tension-free method that avoids vertical releasing incisions (Sculean & Allen, 2018).

Surgical predictability also depends on control of modifiable risk factors and inflammation. Smoking is associated with less favourable root-coverage outcomes, and inadequate plaque control may compromise early healing and long-term stability (Chambrone et al., 2009). Interproximal attachment level is the principal anatomical limit; recession dimensions, phenotype, tooth position, flap and graft stability, smoking, inflammation, and adherence also affect root-coverage outcomes (Cairo et al., 2011; Cairo, 2014; Chambrone et al., 2009; Fernández-Jiménez et al., 2021). Guided Biofilm Therapy (GBT) is a structured professional biofilm-management sequence that combines disclosure, patient instruction, low-abrasive air polishing, and selective power-driven or hand instrumentation (Shrivastava et al., 2021). Current trials suggest that GBT can improve biofilm visualisation and treatment efficiency, but it has not consistently demonstrated superiority over conventional instrumentation for primary periodontal outcomes (Cyris et al., 2024; Liu et al., 2024; Mensi et al., 2020; Yein et al., 2026). Available GBT evidence concerns nonsurgical therapy or maintenance; to our knowledge, its incremental effect on presurgical readiness or RT2 root coverage has not been tested. The clinical novelty is the longitudinal integration of disclosure-guided GBT with a laterally closed tunnel and connective tissue graft across the presurgical and maintenance phases; this documents the workflow, not efficacy.

2. RESEARCH METHOD

A 26-year-old man who smoked presented with localised gingival recession at the mandibular right central incisor (FDI tooth 41) and a history of orthodontic treatment reported as unsuccessful. Clinical examination identified interproximal clinical attachment loss that did not exceed the buccal attachment loss; the defect was therefore classified as Cairo RT2 (Cairo et al., 2011). At baseline, the recorded plaque index (PI) was 93% and bleeding on probing (BOP) was 36%, indicating poor plaque control and generalised gingival inflammation. Baseline clinical and radiographic findings were documented (Figure 1). The case was selected for its isolated RT2 defect, modifiable presurgical risks, completion of staged care, and complete 12-month clinical, photographic, and radiographic records. As a single nonconsecutive case, it cannot establish representativeness or effectiveness.

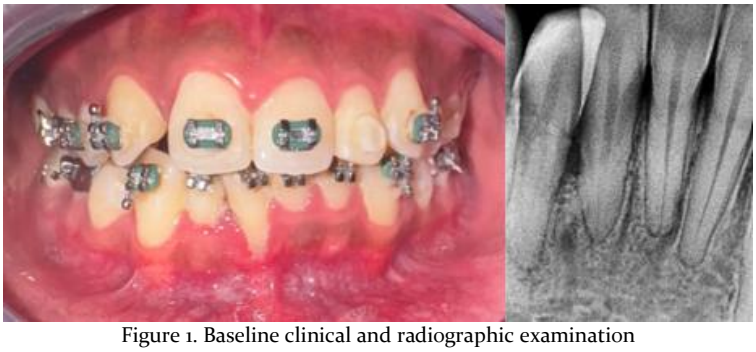

Figure 1. Baseline clinical and radiographic examination

The preparatory phase comprised tobacco-cessation counselling, individualised oral hygiene instruction, and three professional biofilm management visits. At each visit, disclosed biofilm was used to guide patient instruction and professional removal. Low-abrasive air polishing was used for nonmineralized deposits, followed by site-specific ultrasonic or hand instrumentation where

clinically indicated. Air polishing was treated as an adjunct for biofilm disruption and not as a substitute for calculus removal. Plaque control and gingival bleeding were reassessed, and home care instructions were reinforced at each visit (Figures 2–4). After the third visit, PI had decreased to 7% and BOP to 4%, and surgery was scheduled. After three visits, surgery was scheduled at PI 7%, BOP 4%, reduced clinical inflammation, and demonstrated home care; tobacco cessation had been advised and was later self-reported. These patient-specific indicators are not validated universal GBT thresholds.

Figure 2. First nonsurgical instrumentation visit using the Guided Biofilm Therapy protocol

Figure 3. Second nonsurgical instrumentation visit using the Guided Biofilm Therapy protocol

Figure 4. Third nonsurgical instrumentation visit using the Guided Biofilm Therapy protocol.

The recession was treated with the laterally closed tunnel technique described by Sculean and Allen (2018). Intrasulcular access and split-full-split tunnel preparation permitted passive lateral approximation of the soft-tissue margins without vertical releasing incisions. A subepithelial connective tissue graft measuring approximately 10 mm in length and 1.7 mm in thickness was harvested from the palate using a trapdoor approach (Edel, 1974). The graft was positioned beneath the tunnel and stabilised at the cementoenamel junction; the recipient margins were then closed laterally without tension (Figure 5).

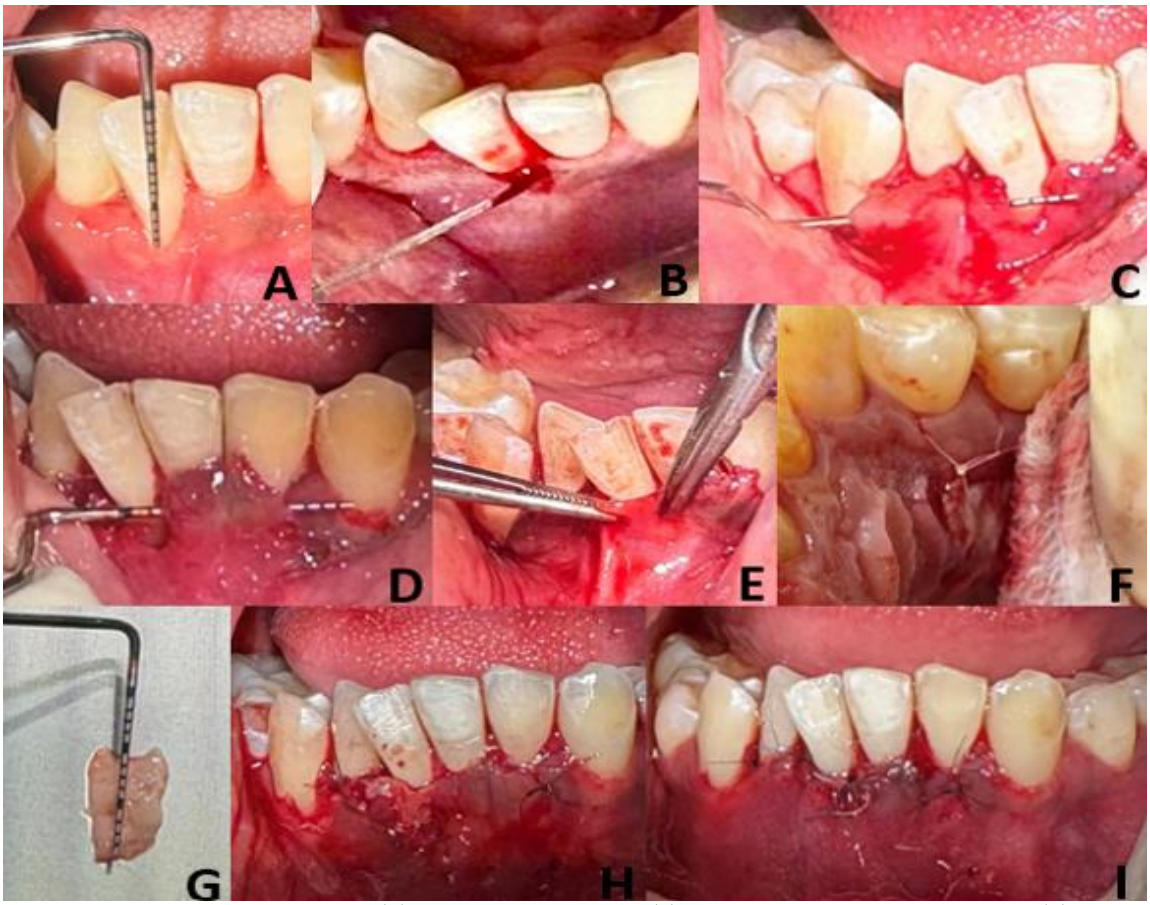

Figure 5. Surgical sequence at tooth 41: (A) preoperative assessment; (B) slightly beveled intrasulcular incision; (C) mesial tunnel preparation; (D) distal tunnel preparation; (E) passive mobility of the soft-tissue margins; (F) palatal subepithelial connective tissue graft (SCTG) harvested with a trapdoor approach; (G) SCTG measuring approximately 10 mm in length and 1.7 mm in thickness; (H) graft stabilized at the cementoenamel junction with a sling suture; and (I) tension-free lateral closure over the graft

Clinical review was performed after 21 days and at 6 and 12 months. PI and BOP were recorded at the 6- and 12-month examinations. Root coverage was evaluated clinically, and serial periapical radiographs were used for descriptive comparison of the interproximal bone image. No histologic assessment or standardised radiographic densitometry was undertaken.

3. RESULTS AND DISCUSSION

Healing at the 21-day review was clinically uneventful after suture removal (Figure 6). The patient reported cessation of tobacco use and maintained low plaque and bleeding scores during follow-up. At 6 months, PI was 11%, and BOP was 5%; at 12 months, PI was 7%, and BOP was 5%. Complete clinical root coverage remained evident at both examinations (Figures 7 and 8). Serial radiographs showed changes suggestive of increased interproximal bone fill. Because the radiographs were not quantitatively standardised and no histologic evaluation was performed, these images do not establish periodontal regeneration.

Figure 6. Clinical appearance 21 days after surgery, following suture removal

Figure 7. Clinical appearance 6 months after surgery

Figure 8. Clinical appearance 12 months after surgery

The outcome is clinically noteworthy because RT2 defects have reduced predictability of coverage. Interproximal attachment loss constrains the maximum coronal level that the soft-tissue margin can predictably attain, and outcomes vary with defect anatomy, gingival phenotype, tooth position, flap tension, graft stability, plaque control, and smoking exposure (Cairo et al., 2011; Cairo, 2014; Fernández-Jiménez et al., 2021). Plausible contributors were interproximal loss no greater than buccal loss, tension-free closure, stable cementoenamel junction-level positioning of the 1.7-mm graft, low PI and BOP, reported cessation and maintenance; one case could not rank their effects.

The GBT sequence was used to disclose residual plaque, reinforce self-care, remove nonmineralized biofilm, and direct instrumentation to sites with deposits. A randomised clinical trial found that disclosure improved the completeness of professional biofilm removal (Mensi et al., 2020). Other randomised studies have reported clinical outcomes broadly comparable to conventional protocols, with potential advantages in treatment time or patient experience rather than consistent gains in probing depth, attachment level, or BOP (Cyris et al., 2024; Jentsch et al., 2020; Mensi et al., 2024; Vouros et al., 2022). A recent systematic review similarly concluded that evidence for superior primary periodontal outcomes remains heterogeneous and of very low certainty (Yein et al., 2026). Accordingly, GBT should be described as a structured adjunct to risk-factor control and professional mechanical plaque removal, not as a replacement for appropriate calculus instrumentation. Low-abrasive powders and slim power-driven tips should be selected according to site anatomy, material compatibility, and safety guidance (Braun et al., 2007; Liu et al., 2024; Shrivastava et al., 2021). GBT's contribution is inseparable because it was not varied against a comparator; tunnel surgery and grafting directly covered the root, while risk control and maintenance changed concurrently. GBT may have supported control of inflammation, but causation cannot be established.

The surgical approach was also consistent with current root-coverage principles. A tension-free tunnel preserves papillary tissues and may support perfusion of an autogenous graft, while the connective tissue graft increases tissue thickness and improves margin stability (Sculean & Allen, 2018; Tavelli et al., 2018; Tonetti et al., 2014). The trapdoor harvest enables primary donor-site closure, although palatal harvesting still carries risks of pain, bleeding, flap necrosis, and delayed healing, all of which require careful anatomic planning and postoperative monitoring (Edel, 1974; Tavelli et al., 2023). The favourable clinical appearance at 12 months is compatible with the documented efficacy of connective-tissue-graft-based procedures, but longer observation is needed to assess stability (Cairo, 2017; Chambrone & Tatakis, 2015; Zucchelli & Mounssif, 2015).

Important limitations should temper interpretation. This was an uncontrolled single case with several simultaneous interventions: smoking-cessation counselling, oral-hygiene instruction, repeated professional biofilm management, surgery, and maintenance. Baseline recession depth and width, probing depth, keratinised-tissue width, gingival thickness, cemento-enamel-junction status, root-coverage esthetic score, and patient-reported outcomes were not available. Smoking exposure was not quantified, and cessation was self-reported. Clinical photographs and radiographs were not described as standardised, and radiographic change cannot demonstrate regeneration. Future reports should also include a formal patient-perspective statement, which was not recorded in this case. They should use calibrated measurements, a standardised photographic protocol, the Root Coverage Esthetic Score, and patient-reported measures (Cairo et al., 2009). Comparative studies are required to test whether adding GBT to otherwise equivalent presurgical and maintenance care improves mucogingival outcomes. Accordingly, the findings are hypothesis-generating; GBT efficacy, superiority, and generalisability cannot be inferred, and selection or measurement effects remain possible. Interpret the comprehensive pathway, not GBT alone.

4. CONCLUSION

In this RT2 case, complete root coverage at 12 months was achieved, with presurgical control of plaque and gingival inflammation, reported smoking cessation, a laterally closed tunnel with a connective tissue graft, and structured maintenance. GBT provided an organised method for disclosure-guided biofilm removal and patient reinforcement, but its independent effect cannot be separated from that of the other interventions. Clinically, control inflammation and smoking, verify self-care, use anatomy-appropriate tension-free connective-tissue-graft surgery, and maintain supportive care. GBT can structure this pathway, but its incremental benefit is unproven. The main contribution is a reproducible perioperative framework that links measurable readiness and GBT-supported maintenance to tunnel surgery and a connective tissue graft in RT2, without causal attribution to GBT. Effectiveness requires an adequately powered multicentre parallel-group

randomised trial with blinded assessment, identical tunnel and connective-tissue-graft surgery and maintenance in both arms, GBT versus conventional biofilm control, and prespecified 12- to 24-month clinical, esthetic, patient-reported, safety, time, and cost outcomes. Patient consent and ethics, the report was prepared in accordance with CARE guidance (Gagnier et al., 2013). Written informed consent was obtained from the patient for treatment and for publication of de-identified clinical information, radiographs, and photographs. Ethics review of the case report was completed in accordance with the requirements of the treating institution. No experimental intervention was undertaken; all treatment formed part of routine clinical care.

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