

Nano-Silver in Mucogingival Surgery:

Accelerated Healing Following Frenectomy with Multident Gel

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Focus

Early inflammatory changes, gingival tenderness post-scaling
Reduced bleeding and faster epithelial recovery
Illustrates how nano-silver promotes gingival resilience even in routine cleaning procedures



Profile

Dr. Bharat Joshi, MDS in Periodontology & Oral Implantology, is a Reader at MMCD SR, Haryana, with over 5 years of academic experience and 16 years into dentistry. He has 20 national and international publications and serves as Editor for Athena Publications and Archives of Dental Research. A former Assistant Editor for the Indian Journal of Case Reports, he also reviews for JCIH. **Dr. Joshi** has presented award-winning research at international conferences in Italy and London and previously worked as a Pharmacovigilance Scientist at Parexel India for over 2 years.



Abstract

Frenectomy procedures carry a risk of postoperative soft-tissue trauma, edema, and mild discomfort, with healing influenced by microbial contamination and mechanical irritation from lip movement. This single-case report evaluates the adjunctive use of *Multident Gel* following conventional labial frenectomy in a 38-year-old male patient. Standard surgical management was followed by topical nano-silver gel application twice daily for seven days. Clinical assessment demonstrated rapid reduction in inflammation, minimal postoperative pain, and near-complete mucosal epithelization within one week. These outcomes are consistent with experimental and clinical evidence demonstrating that silver nanoparticles provide broad-spectrum antimicrobial activity, modulate inflammatory responses, and support wound-healing processes at the cellular level.





Clinical Context

Labial frenectomy exposes peri-mucosal connective tissue to a saliva-rich environment with a high microbial burden, predisposing the surgical site to delayed epithelial closure. While conventional antiseptics such as chlorhexidine provide effective antimicrobial coverage, their use has been associated with epithelial irritation and limited biological support for tissue regeneration. In contrast, nano-silver formulations enable controlled ionic silver release, combining potent antimicrobial activity with favorable biological interactions in wound environments. Experimental models have shown that silver nanoparticles can attenuate inflammatory signaling through down-regulation of key pro-inflammatory cytokines, including TNF- α and IL-1 β , thereby supporting faster resolution of postoperative inflammation ^(1,2). Additionally, nano-silver has demonstrated compatibility with fibroblasts and keratinocytes at therapeutic concentrations, creating a wound milieu conducive to rapid healing. ^(3,4)

Case 1

Male, 38 years

Diagnosis

High-tension maxillary labial frenum associated with midline diastema

Procedure

Conventional scalpel frenectomy performed under local anesthesia, followed by simple interrupted sutures

Post-treatment care

Topical application of *Multident Gel* twice daily for 7 days, alongside routine oral hygiene instructions



Clinical Observations

Days

1-2

Mild postoperative edema observed, resolving without bleeding, necrosis, or fibrin slough

Days

5

Surgical site demonstrated advanced epithelization with smooth wound margins and progressive color integration with adjacent mucosa

Days

7

Complete mucosal closure achieved; tissue appeared supple with minimal scarring and no reported pain or functional limitation

Photographic Sequence:

Pre-operative → Day 3 → Day 7, illustrating progressive epithelial maturation and soft-tissue integration.



Figure 1. Pre-operative view High-tension maxillary labial frenum associated with midline diastema



Figure 2. Immediate post-frenectomy view Surgical site following conventional scalpel frenectomy with clean wound margins.



Figure 3. Immediate post-suturing view Frenectomy site following suturing, showing stable wound approximation and controlled hemostasis.



Figure 4. Early healing phase (Day 5) Surgical site demonstrating advanced epithelization with healthy tissue appearance and minimal inflammation.



Discussion & Expert Comment

The favorable healing trajectory observed in this case is supported by foundational wound-healing literature on silver nanoparticles. Preclinical studies have demonstrated that nano-silver can suppress excessive inflammatory responses through modulation of cytokines such as TNF- α and IL-1 β , contributing to reduced edema and improved wound stability during early healing phases^(1,2). At the cellular level, silver nanoparticles have been shown to support fibroblast viability and enhance keratinocyte migration when delivered at controlled concentrations, mechanisms that underpin rapid re-epithelization and scar minimization^(3,4).

In comparative contexts, silver-based wound care formulations have demonstrated healing compatibility equal to or superior to conventional antiseptics, with favorable epithelial tolerance and reduced surface irritation^(5,6). These properties are particularly relevant in mobile mucogingival regions, where mechanical stress and salivary contamination can compromise healing. The absence of sustained postoperative pain beyond 72 hours and esthetic soft-tissue integration by Day 7 in the present case underscore the clinical utility of nano-silver gel as an effective adjunct in minor oral surgical procedures.



Mechanism Summary

Mechanism	Evidence-Supported Effect	Clinical Outcome
Antimicrobial	Broad-spectrum activity against biofilm-forming oral bacteria	Reduced risk of secondary infection
Anti-inflammatory	Down-regulation of TNF- α and IL-1 β in wound models ^(1,2)	Faster resolution of pain and edema
Wound-healing support	Maintains fibroblast viability and promotes keratinocyte migration ^(3,4)	Accelerated epithelization and minimal scarring

Key Takeaways

1. Adjunctive nano-silver gel use can shorten the postoperative healing period following frenectomy to approximately 7 days.
2. Nano-silver provides simultaneous antimicrobial protection and biologically favorable wound-healing support.
3. High patient comfort and favorable esthetic outcomes can be achieved in mucogingival surgical sites.



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References

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