

Multident Nano-Silver Hydrogel in Post- Reimplantation Care:

*Enhancing Periodontal Healing
and Infection Control*

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Profile

Dr. Dushyant Pal Singh is a general dental practitioner at **Family Dental Care**, Chittorgarh, with a special focus on **pediatric dental trauma** and emergency care. He follows evidence-based protocols for managing **avulsion** and **dentoalveolar injuries** and is an early adopter of **nano-silver hydrogel** in post-reimplantation management. His expertise in **emergency dental interventions** has established him as a trusted clinician for **traumatic dental injuries** in the region.

Abstract

Traumatic avulsion of permanent anterior teeth is a serious dental emergency in children. This case report describes the successful management of a 7-year-old patient with an **avulsed maxillary permanent central incisor** complicated by delayed presentation and prolonged extraoral time, increasing the risk of **periodontal ligament damage and infection**. Following reimplantation and splinting, **Multident Nano-Silver Hydrogel** was used as a **topical antimicrobial adjunct** during the critical healing phase. At 15-day follow-up, the patient demonstrated **complete resolution of inflammation, absence of infection, and successful periodontal reattachment**, supporting the potential value of nano-silver hydrogel in high-risk avulsion cases where standard protocols may be insufficient.

Clinical Context

Dental avulsion injuries commonly affect **children aged 7–12 years**, most often involving **permanent maxillary central incisors**, and outcomes are highly time-dependent. **Periodontal ligament cell viability** rapidly declines after avulsion, increasing the **risk of resorption, ankylosis, and infection**. Although conventional management includes **reimplantation, splinting, antibiotics, and endodontic care**, effective infection control at the tooth–tissue interface remains challenging. **Nano-silver hydrogels** provide a localized adjunct with sustained **antimicrobial and anti-inflammatory effects, supporting healing** in high-risk avulsion cases.





Case Presentation

Patient

7
YEAR

Male 

Chief Complaint: Complete loss of upper front tooth following playground fall
Relevant History: No prior dental trauma or significant medical history. The maxillary central incisor had fully erupted with complete root development.

Examination & Diagnostic Findings

The patient presented to Family Dental Care with complete avulsion of the right maxillary permanent central incisor following a playground injury and delayed presentation. The avulsed tooth had been stored in suboptimal conditions, resulting in compromised periodontal ligament viability. Clinical examination revealed an intact alveolar socket with associated soft tissue trauma to the labial gingiva and upper lip. The tooth showed a closed root apex, indicating complete root development. The prolonged extraoral time represented a significant prognostic challenge, placing the case at high risk for complications such as infection, inflammatory resorption, and ankylosis.



Figure 1: Day 1 - Initial Presentation showing avulsed tooth and trauma

Treatment Protocol

Emergency Reimplantation Phase:

The avulsed tooth was carefully cleaned with sterile saline to remove contamination while preserving any remaining periodontal ligament fibers. The alveolar socket was irrigated thoroughly and gently curetted to create a fresh bleeding wound surface. The tooth was reimplanted into the socket with careful attention to proper positioning. A semi-rigid splint was fabricated using orthodontic wire and composite resin, bonding the reimplanted tooth to adjacent stable teeth for a planned 2-week stabilization period to allow initial periodontal healing.

Multident Nano-Silver Hydrogel Application:

- **Indication:** High-risk avulsion case with compromised PDL viability and environmental contamination requiring enhanced antimicrobial protection during critical healing phase.
- **Rationale:** Given the unfavourable prognostic factors, systemic antibiotics alone offer limited control at the tooth–tissue interface. Multident was therefore chosen to provide sustained, high-concentration local antimicrobial action at the reimplantation site, while its anti-inflammatory properties help reduce inflammation and support optimal healing.

- **Application Protocol:** After splinting, Multident gel was applied to the tooth, splint, and gingiva, with instructions for three-times-daily use for 14 days to ensure continuous antimicrobial protection.

Adjunctive care included systemic antibiotics and anti-inflammatory medication, confirmation of tetanus prophylaxis, and patient counselling on a soft diet and gentle oral hygiene.



Figure 2: Multident Gel Application - showing product and application technique

Follow-Up & Outcome

**Day 1 -
Day 10**

The patient showed progressive improvement during early healing. Multident gel was applied regularly as advised. The splinted tooth remained stable, and gingival tissues showed healthy healing with reduced inflammation.

Day 10 Assessment: Clinical examination revealed significant healing progress. The gingival tissues appeared healthy with normal colour and texture. The splinted tooth maintained excellent stability with no signs of mobility beyond what would be expected during the healing phase. No signs of infection, purulent discharge, or adverse inflammatory response were observed. The patient remained comfortable with no pain or sensitivity. Compliance with the Multident application protocol was excellent.



Figure 3: Day 10 Follow-up - showing healing progress with splint in place



Figure 4: Day 15 Follow-up - Final outcome showing successful healing and aesthetic result

Day 15-Final Assessment: Comprehensive clinical evaluation demonstrated excellent healing success. The splint was removed as planned after the 2-week stabilization period. The reimplanted tooth showed successful periodontal reattachment with physiologic mobility appropriate for this healing stage. Periodontal tissues were healthy with normal gingival attachment, colour, contour, and sulcus depth, with no signs of infection, pocketing, recession, or bleeding on probing.

Discussion

This case highlights the therapeutic value of Multident Nano-Silver Hydrogel in managing high-risk pediatric avulsion injuries with compromised prognostic factors. The primary challenge in avulsion management is infection control at the tooth-tissue interface, especially when PDL viability is reduced and contamination is present. Multident addressed the limitations of systemic antibiotics by delivering sustained, high-concentration antimicrobial activity directly at the reimplantation site, providing broad-spectrum coverage during the critical healing phase^{1,2}. In addition, the anti-inflammatory action of silver nanoparticles helped reduce cytokine-mediated tissue damage, creating a favourable environment for periodontal healing³. The absence of infection, rapid periodontal reattachment, and successful healing within 15 days underscore the clinical effectiveness of this approach, which was also simple to use and demonstrated excellent patient compliance.

Comparison with Alternative Antimicrobials:

Nano-silver demonstrates superior antimicrobial breadth compared to metronidazole (Metrogyl), with additional anti-inflammatory benefits that metronidazole lacks. Compared to chlorhexidine-widely used for antimicrobial activity-nano-silver hydrogels show superior efficacy with better biocompatibility at therapeutic doses^{2,3}. The hydrogel delivery system provides sustained release and enhanced tissue contact, advantages not available with traditional rinses or medicaments.

Conclusion

This case demonstrates that Multident Nano-Silver Hydrogel is a valuable adjunct in post-reimplantation care for pediatric avulsion injuries. By providing effective local antimicrobial coverage at the tooth-tissue interface, it addresses key limitations of systemic antibiotics and improves outcomes in high-risk cases. The favorable healing achieved despite unfavourable prognostic factors supports its integration into contemporary dental trauma management to help preserve natural dentition and optimize patient outcomes.



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References: 1. Raghav P Khera AK, Bisht S. Comparative evaluation of antimicrobial properties of silver nanoparticles and chlorhexidine mouthwashes. J Clin Orthod Dent. 2023. 2. Hernández-Sierra JF et al. Bactericidal activity of silver nanoparticles on oral biofilms related to periodontal disease. Bioengineering. 2022;14(6):311. 3. Chen S et al. Comparison of antimicrobial and wound-healing effects of silver nanoparticle and chlorhexidine mouthwashes. Clin Oral Invest. 2022.

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