

Key Words: QrayPen Fluorescence imaging Residual dentin caries Chlorhexidine digluconate Red fluorescence (ΔR) Cavity disinfection.

<https://doi.org/10.1016/j.identj.2025.104548>

CA6395

Combined Periodontal-Restorative Therapy For Mandibular Second Molar Distocervical Caries

Bin Liu ^{*,1}, Zhikai Lin ², Yifan Wu ², Yufeng Xie ¹

¹ Shanghai Stomatological Hospital & School of Stomatology, Fudan University, Shanghai, China; ² Shanghai Ninth People's Hospital, Shanghai Jiao Tong University School of Medicine, Shanghai, China

Introduction: Distocervical caries in mandibular second molars induced by impacted third molars present significant therapeutic challenges due to limited access. This report introduces a novel 5-year follow-up of combined therapy for such case, establishing its clinical validity.

Case description: A 37-year-old female presented with persistent sensitivity in tooth 37 following composite resin filling after the extraction of the impacted left mandibular third molar. Clinical/radiographic evaluations revealed subgingival defective filling, extensive caries, and marginal gap. Treatment included: 1. Full-thickness flap elevation for lesion exposure 2. Dental operative microscope-assisted removal of defective filling and caries excavation 3. Composite resin restoration using adhesive technique 4. Flap repositioning and suturing Five-year follow-up confirmed intact restoration, normal periodontal status, and no radiographic recurrence.

Discussion: Key advantages of this approach: 1. Surgical exposure improved visualization and precision for subgingival caries management 2. Preservation of distal marginal ridge maintained tooth structural integrity 3. Adhesive restoration combined with periodontal care ensured long-term success.

Conclusion/clinical significance: Combined periodontal-restorative therapy offers an alternative to extraction for mandibular second molar distocervical caries induced by impacted mandibular third molars. The technique preserves tooth function while minimizing invasive procedures, making it particularly suitable for younger patients.

Key Words: distal cervical caries, mandibular second molar, combined therapy, tooth impaction, mandibular third molar.

<https://doi.org/10.1016/j.identj.2025.104549>

CA5397

Innovative Restorative Protocol For Irreversible Pulpitis: A 3-Year Study

Zachary Pan ^{*,1}, Thomas Pan ²

¹ Private Practice, Windsor, Ontario, Canada; ² Private practice, Windsor, Ontario, Canada

Introduction: This study presents the "Pulpitis Restorative Protocol" (PRP), a novel approach for managing deep caries

with reversible pulpitis (RP) and symptomatic irreversible pulpitis (IP) using standard restorative materials. PRP offers a high success rate and minimal post-operative pain, providing a more conservative and simpler IP treatment alternative to endodontic treatment.

Case description: This prospective case series treated 25 patients with PRP (15 IP, 10 RP), with follow-up from 3 to 36 months (5 cases 3-11 months, 12 cases 12-23 months and 8 cases 24-36 months). Clinical success was achieved in 13 of 15 IP cases and 9 of 10 RP cases. At 24 hours post-treatment, all patients—and 92% on the same night—reported little or no pain without analgesics

Discussion: PRP employs a combination of glutaraldehyde and resin-modified glass ionomer (RMGI) in an alkaline environment which may activates glutaraldehyde's protein cross-link activity to sterilize dental cavity, denature the bacterial toxin and inflammatory factors, exert its apoptosis effect on necrotic pulp tissue adjacent to caries to eliminate pulp inflammation and accomplish pain relief.

Conclusion/clinical significance: PRP is a simple, affordable alternative for managing symptomatic IP, especially in emergency or rural settings with limited endodontic access. Applicable to both RP and IP, it offers rapid pain relief, reducing the need for analgesics and the risk of narcotic misuse. PRP may also prevent post-restorative pain in deep caries or serve as a temporary measure. Its effectiveness and broad potential warrant further validation through randomized clinical trials

Key Words: Irreversible pulpitis, restorative protocol, pain control, reversible pulpitis.

<https://doi.org/10.1016/j.identj.2025.104550>

CA5036

Silver Diamine Fluoride: Caries Arrest And Aesthetic Smile Rehabilitation

Maxstein M. Abuzaid ^{*,1}, Chun Hung Chu ¹

¹ University of Hong Kong, Hong Kong, Hong Kong SAR, China

Introduction: Silver diamine fluoride (SDF), a minimally invasive topical agent, has gained recognition for its capacity to arrest dental caries. Emerging evidence supports SDF's role in bridging preventive and restorative dentistry, aligning with the global shift toward minimally invasive, patient-centered care.

Case description: A 34-year-old male with a high caries risk index—exacerbated by chronic tobacco use and drug addiction—presented with multiple active cavitated lesions across anterior and posterior teeth, seeking a comprehensive smile rehabilitation to regain employability and psychosocial confidence. Given his complex medical history and limited initial capacity for extensive restorative care, silver diamine fluoride (SDF) was prioritized as a first-line therapy to arrest caries progression. Over three monthly applications, SDF's antimicrobial and remineralizing properties stabilized lesions. Interim glass ionomer restorations were placed in esthetically sensitive zones to restore function while managing aesthetic compromises. Following six months of caries arrest, smoking cessation support, and improved oral hygiene compliance,

definitive composite veneers were fabricated for anterior teeth.

Discussion: This phased approach not only halted disease progression but transitioned the patient from urgent biological stabilization to life-changing aesthetic renewal, culminating in restored dental function, a harmonious smile, and renewed self-efficacy, enabling his successful reentry into the workforce.

Conclusion/clinical significance: This case exemplifies the transformative potential of silver diamine fluoride (SDF) within minimally invasive dentistry (MID) frameworks, particularly for high-risk patients. The phased protocol prioritized disease control before aesthetic rehabilitation, aligning with MID's core tenets of preserving tooth structure and adapting to patient readiness.

Key Words: Minimally Invasive Dentistry, Smile Rehabilitation, Silver Diamine Fluoride, Restorative Dentistry.

<https://doi.org/10.1016/j.identj.2025.104551>

3. Dental Treatment & Restorative Dentistry - 3.1 Caries
Original studies – Posters

CA6664

Probiotic Membrane-Encapsulated Antimicrobial Delivery System Against Cariogenic Biofilms

Guo Rongjuan ^{*,1}, Liang Chen ¹

¹Stomatological Hospital of Chongqing Medical University, Chongqing, China

Aim or purpose: Owing to the intraoral environment, conventional antibiotics have a limited residence time in oral biofilms. To overcome this problem, we drew inspiration from cell membrane-coated nanoparticles (CMCNPs) and synthesised LA/TCS@PLGA-NPs by encapsulating triclosan(TCS)-loaded poly(lactic-co-glycolic acid) (PLGA) nanoparticles (TCS@PLGA-NPs) with a *Lactobacillus acidophilus* (LA) outer membrane. The aim of this investigation was to examine how LA/TCS@PLGA-NPs penetrate tri-streptococcal species biofilms and inhibit the cariogenic EPS in these biofilms.

Materials and methods: An anthrone–sulfuric acid colorimetric assay and EPS fluorescence staining were used to evaluate the effects of LA/TCS@PLGA-NPs on the EPSs of biofilms. SEM and CLSM were used to observe the morphology of the biofilms. Additionally, model rats with tri-streptococcal species biofilms were used to validate the effects of LA/TCS@PLGA-NPs in vivo.

Results: The LA/TCS@PLGA-NPs show stable size, zeta potential, and sustained drug release kinetics, adhere to and reside in biofilms and penetrate the inner layer deeply with time. Additionally, the LA/TCS@PLGA-NPs disrupted the structure of biofilms and reduced EPSs, biomass, total protein and dry weight. In vivo, LA/TCS@PLGA-NPs alleviated the degree of caries. The nanoparticles also exhibited favorable safety in vivo.

Conclusions: Overall, this study showed that LA/TCS@PLGA-NPs could inhibit cariogenic biofilms in vitro and caries in vivo, indicating the excellent application potential of LA/TCS@PLGA-NPs for treating oral diseases caused by biofilms.

Key Words: nanoparticles, cariogenic biofilm, caries.

<https://doi.org/10.1016/j.identj.2025.104552>

CA6015

Tin Nanoparticles Suppress *Porphyromonas gingivalis* Biofilm Formation

Cheng Lu ^{*,1}, Wong Hai Ming ²

¹Shenzhen University, Shenzhen, China; ²The University of Hong Kong, Hong Kong, Hong Kong SAR, China

Aim or purpose: This study aimed to evaluate the potential of Titanium Nitride (TiN) nanoparticles, irradiated by near-infrared (NIR) light, as a novel photothermal therapeutic strategy for managing periodontitis caused by *Porphyromonas gingivalis* (*P. gingivalis*). The antibacterial and antibiofilm activities, as well as the biocompatibility of TiN nanoparticles, were assessed to explore their feasibility for clinical applications.

Materials and methods: TiN nanoparticles were synthesized and characterized for their photothermal properties. The antibacterial and antibiofilm effects against *P. gingivalis* were evaluated using colony-forming unit (CFU) assays, scanning electron microscopy (SEM), reactive oxygen species (ROS) detection, ATP level measurements, and crystal violet staining. Biocompatibility was assessed using human dental pulp stem cells (hDPSC) and MC3T3 cells, focusing on cell viability and osteogenic differentiation under NIR irradiation. Statistical analyses were performed to ensure the significance of the findings.

Results: TiN nanoparticles demonstrated significant photothermal antibacterial activity against *P. gingivalis*, achieving over 99% bacterial inactivation under NIR irradiation at low concentrations. ROS production and ATP depletion were identified as key antibacterial mechanisms. Additionally, TiN nanoparticles effectively disrupted *P. gingivalis* biofilms. Biocompatibility tests revealed no significant cytotoxicity, with hDPSC and MC3T3 cells maintaining viability and osteogenic differentiation under experimental conditions.

Conclusions: TiN nanoparticles, activated by NIR irradiation, exhibit excellent antibacterial and antibiofilm properties against *P. gingivalis*, with minimal cytotoxicity and high biocompatibility. These findings suggest that TiN nanoparticles hold promise as a non-invasive and efficient therapeutic agent for managing periodontitis, offering an innovative alternative to conventional treatments.

Key Words: *Porphyromonas gingivalis*, periodontitis, TiN, Nanoparticles.

<https://doi.org/10.1016/j.identj.2025.104553>