

## Restore Structure and Relieve Hypersensitivity: A White Paper on ReminGel™

### Introduction

Dentin hypersensitivity affects a significant portion of the population, often resulting from exposed dentinal tubules due to erosion, abrasion, or caries. Traditional treatments include fluoride-based agents but concerns over fluorosis and biocompatibility have led to the exploration of alternatives such as hydroxyapatite (HAp) and calcium phosphate-based compounds. ReminGel represents a fluoride-free solution designed to restore enamel structure and relieve hypersensitivity through a multi-ion delivery system.

### Composition and Mechanism of Action

ReminGel contains:

- **Hydroxyapatite (HAp):** A biomimetic mineral that binds to damaged enamel and fills microscopic gaps (*Naim & Sen, 2025; Li et al., 2008*).
- **Hydroxyapatite precursors (Monetite and Brushite):** Promote faster nucleation and deeper mineralization (*Cabrejos-Azama, J, et al., 2014; Boanini et al., 2022; Tang, H., et al. 2021*).
- **Free calcium, phosphate, and potassium ions:** Penetrate dentinal tubules and facilitate remineralization and nerve desensitization (*da Silva et al., 2023; Orchardson & Gillam, 2000*).

ReminGel operates across a wide pH range, enabling remineralization even in acidic oral environments. Potassium ions diffuse into dentinal tubules, reducing nerve excitability, thereby alleviating sensitivity.

### Verification and Validation Evidence from ReminGel

- **Laser Confocal Microscopy Analysis:** Two-dimensional laser confocal microscopy of demineralized hydroxyapatite discs treated with ReminGel revealed prominent surface peaks, indicating the formation of a new hydroxyapatite layer (*VistaApex Solutions, Internal, Data on file*).
- **Dentin Tubule Occlusion Study:** After seven 15-minute applications of ReminGel, exposed dentin tubules were fully occluded, effectively blocking fluid movement to provide significant relief from dentinal hypersensitivity (*VistaApex Solutions, Internal, Data on file*). Studies show that the remineralization agents in ReminGel, specifically hydroxyapatite precursor compounds promote deep mineral deposition, enhance acid resistance, and provide long-lasting relief from dentinal hypersensitivity (*Adawy & Diaz, 2022; Cabrejos-Azama, J, et al., 2014; Boanini et al., 2022*).



## Clinical Evidence from ReminGel

White spot lesion and dentin hypersensitivity case studies demonstrate significant enamel restoration and dentinal tubule occlusion following consistent use of ReminGel. In particular, white spot lesions located near the gum line responded well to treatment when ReminGel was delivered using a tray with a peripheral seal from PerioProtect®, which ensured prolonged contact and targeted application. The tray's sealed design helps retain the gel in place, allowing the remineralization agents to remain in contact with the tooth surface for optimal absorption and effectiveness.

In clinical cases of hypersensitivity, patients who used ReminGel in the PerioProtect tray daily for 15 minutes reported significant relief from sensitivity within one week and almost total resolution of sensitivity by day 21. The effects have sustained for up to six months and showed signs of becoming permanent, with no recurrence reported during follow-up evaluations.

## Biocompatibility of ReminGel

ReminGel is FDA 510(k) cleared, confirming that it has successfully met all required biocompatibility standards in accordance with ISO 10993 (Biological Evaluation of Medical Devices) and ISO 7405 (Evaluation of Biocompatibility of Dental Devices).

## Supporting Literature

- **Hydroxyapatite-Based Remineralization:** Hydroxyapatite has shown comparable efficacy to fluoride in caries prevention and superior performance in managing hypersensitivity and molar–incisor hypomineralization (MIH). It is especially beneficial for children and individuals at risk of fluoride overexposure (*Naim & Sen, 2025*).
- **Hydroxyapatite Precursors: Monetite and Brushite:** Monetite and brushite, key precursors to hydroxyapatite, have demonstrated effective dentinal tubule occlusion and remineralization. Their incorporation into oral care formulations enhances acid resistance and promotes deeper mineral deposition, contributing to long-term sensitivity relief. These compounds also play a critical role in the nucleation process of hydroxyapatite, initiating mineral formation from amorphous calcium phosphate phases under controlled pH conditions. Brushite nucleates rapidly at lower pH, while monetite forms through thermal dehydration and contributes to sustained mineralization (*Dosen & Giese, 2011; Cama et al., 2013*).
- **Potassium Ions in Desensitization:** Potassium salts, such as potassium nitrate, are effective in reducing dentin hypersensitivity by depolarizing nerve endings. Clinical trials confirm their efficacy in both toothpaste and mouthwash formulations (*da Silva et al., 2023; Orchardson & Gillam, 2000*).

## Discussion

ReminGel leverages a synergistic combination of remineralizing and desensitizing agents. Its ability to occlude dentinal tubules and restore enamel structure without fluoride positions it as a promising alternative in restorative and therapeutic dentistry. The integration of hydroxyapatite and calcium phosphate compounds aligns with current trends in biomimetic dental care.

When paired with an enamel matrix regeneration treatment, ReminGel may enhance overall remineralization outcomes by supporting both surface and subsurface repair.

Deep delivery of ReminGel with the PerioProtect Tray provides sustained contact on the tooth and exposed root surfaces and along the gumline.

## Conclusion

ReminGel offers a clinically validated, biocompatible solution for managing hypersensitivity and promoting remineralization. Supported by peer-reviewed evidence, its multi-ion composition and delivery system make it a valuable addition to modern dental therapeutics.

## References

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