Effect of Various Materials on Dentin Permeability for the Treatment of Dentin Hypersensitivity

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Abstract

Purpose: In recent years, the number of patients with transient dentin hypersensitivity to cold water and abrasion pain without dental caries has been increasing. In the treatment of dentin hypersensitivity, the first choice is frequently the topical application of medicament due to its simplicity and immediate effect. A wide range of products with different action mechanisms are available for clinical use. The present study focused on dentin desensitizers and their dentinal tubular solubility. The dentin permeability inhibition ratio was measured using a model of hypersensitive dentin. In addition, the influence of post-application preservation conditions on serial changes in the permeability inhibition ratio was evaluated.

Methods: Dentin discs were prepared from extracted molar teeth for use as hypersensitivity model specimens. The specimens were applied to a device based on Pashley et al., with modifications, and the pulpal pressure was determined to be 25 mmHg. After applying four different dentin desensitizer products, Gluma Desensitizer (GL), Super Seal (SS), MS Coat One (MO), Nanoseal (NS), Teethmate Desensitizer (TD) and Shield Force Plus (SP), the specimens were stored in distilled water (DW group) or artificial saliva (AS group) for 24 h and for one week, and the dentin permeability was measured.

Results: In the DW group of all dentin desensitizers, the dentin permeability inhibition ratio one week after application decreased or showed a serial decrease in comparison with that immediately after application. In the AS group of SS, MO, NS and TD, the ratio one week after application increased or showed a serial increase in comparison with that immediately after application. In the AS group of GL and SP, the ratio one week after application showed a serial decrease in comparison with that immediately after application.

Conclusion: When the specimens were stored in distilled water, all dentin desensitizers showed a decrease in the sealability of the dentinal tubules. When the specimens were stored in artificial saliva imitating the human introral cavity, dentin desensitizers Super Seal, MS Coat one, Nanoseal and Teethmate Desensitizer showed a serial increase in the sealability of the dentinal tubules, suggesting a bioactive action.

Key words: Dentin hypersensitivity, Sealability, Model of hypersensitive dentin