Int. J. Odontostomat.,
19(4):411-417, 2025.

The Use of Dentifrice-Associated Boosters in the Reduction of Dentin Hypersensitivity: Case Series

El Uso de Potenciadores Asociados a Dentífricos en la Reducción de la Hipersensibilidad Dentinaria: Serie de Casos

Maria Carolina Candosin-Sementille[1]; Mariana Souza-Calefi[1]; Fabiano Vieira-Vilhena[2]; Adriana Campos Passanesi-Sant'Ana[1]; Carla Andreotti-Damante[1] & Mariana Schutzer Ragghianti-Zangrando[1]

CANDOSIN-SEMENTILLE, M.C.; SOUZA-CALEFI, M.; VIEIRA-VILHENA, F.; PASSANESI-SANT'ANA, A.C.; ANDREOTTI-DAMANTE, C. & RAGGHIANTI-ZANGRANDO, M.S. The use of dentifrice-associated boosters in the reduction of dentin hypersensitivity: case series. *Int. J. Odontostomat., 19(4)*:411-417, 2025.

ABSTRACT: Dentin hypersensitivity (DHS) is a frequent clinical condition in dental practice, characterized by a short, sharp pain elicited by thermal, tactile, evaporative, osmotic, or chemical stimuli. Management strategies for DHS encompass both in-office procedures and at-home care. Although numerous agents primarily dentifrices are available for clinical use, no definitive gold-standard treatment has been established. This case series aimed to assess the effectiveness of dentifrices formulated with REFIX technology, used in conjunction with a booster, in reducing DHS. Patients were evaluated using the air sensitivity scale described by Schiff *et al.* (1994) and visual analog scales (VAS) across seven time points: baseline; after scaling and root planing; following professional prophylaxis with the agent; and after 1, 2, 4, and 8 weeks of at-home use. A significant reduction in DHS was observed in all participants, as reflected by both examiner assessments and patient-reported outcomes. Mild fluctuations in symptom severity occurred, particularly among individuals with difficulty modifying contributing habits. Nevertheless, all patients demonstrated a substantial decrease in DHS after eight weeks of treatment.

KEY WORDS: dentin; dentin desensitizing agents; dentin hypersensitivity; dentifrices; periodontics.

INTRODUCTION

Dentin hypersensitivity (DHS) is one of the most prevalent complaints encountered in routine dental practice. It is defined as a short, sharp pain originating from exposed dentin in response to non-noxious stimuli typically thermal, evaporative, tactile, osmotic, or chemical in nature that cannot be attributed to any other dental pathology or condition (Holland *et al*., 1997; Liu *et al*., 2020).

Although dentin hypersensitivity (DHS) is widely recognized as a significant clinical concern, its exact etiology has not yet been fully clarified. The most widely accepted explanation is the hydrodynamic theory proposed by Brännström (1964). This theory posits that environmental, mechanical, thermal, or chemical stimuli induce fluid movement within the dentinal tubules. Such movement activates the nerve fiber terminals located at the tubule openings, resulting in a brief, sharp pain response. Importantly, the hydrodynamic theory emphasizes that different types of stimuli can elicit similar sensory reactions.

Therefore, DHS is closely linked to dentin exposure particularly the presence of open dentinal tubules and to the heightened responsiveness of pulpal nerve fibers to external environmental stimuli. Dentin exposure may result from physical, chemical, pathological, biological, or developmental factors that produce damage or defects in the dental or periodontal structures. Gingival recession is a major predisposing condition, as it leads to the exposure of cervical and root dentin. Additional factors such as aging, soft-tissue dehiscence, and traumatic toothbrushing can also contribute to the apical displacement of the gingival margin, thereby exposing dentin and increasing the risk of DHS development (West *et al*., 2015; Liu *et al*., 2020).

[1] Bauru School of Dentistry University of São Paulo (FOB-USP), Alameda Dr. Octávio Pinheiro Brisolla, Vila Universitária, Bauru SP, Brasil
[2] Trials Research and Development, Rua Maria Benedita de Oliveira, Residencial Villaggio II, Bauru SP, Brasil.

Received: 2025-04-22 Accepted: 2025-09-01

In patients with DHS, the affected teeth become highly responsive to environmental stimuli, often producing acute pain that interferes with daily activities such as eating, drinking, speaking, and toothbrushing (Liu *et al*., 2020). Given this impact, several studies have examined the relationship between DHS and oral health–related quality of life, showing that successful management of the condition can significantly improve patients' quality of life (Bekes & Hirsch, 2013; Douglas-de-Oliveira *et al*., 2017).

Over the years, both at-home and professional treatment modalities have been proposed for DHS, including lasers, ionic agents, dentin sealants, root-coverage procedures, occlusive agents, and desensitizing agents. However, no single gold-standard therapy has yet been established (da Rosa *et al*., 2013; West *et al*., 2015). Regardless of the material selected to alleviate DHS symptoms, several factors must be considered to ensure therapeutic success. These include the physical properties of the material, its susceptibility to microleakage, and its long-term durability. Ideally, the material should withstand acidic challenges (from dietary sources), resist mechanical removal from toothbrushing, and avoid dissolution in saliva. Additionally, an effective desensitizing agent should be easy to apply, safe, fast-acting, and capable of producing a sustained therapeutic effect (Grossman, 1935; West *et al*., 2015; Ramli *et al*., 2022).

Given that dentifrices are the most widely used oral hygiene products, they represent one of the most accessible and practical approaches for managing DHS (Rösing *et al*., 2009). Recently, REFIX technology has been introduced, consisting of a dentifrice containing fluoride combined with phosphates and silica. This formulation promotes the formation of silicon-enriched hydroxyapatite, which becomes deeply incorporated into the hydroxyapatite matrix and into open dentinal tubules (Vilhena *et al*., 2020;2021a,b).

A contemporary concept known as biomimetic remineralization has emerged, referring to strategies that mimic the natural mineralization processes of dental tissues through formulations enriched with boosters or enhancers (Tomaz *et al*., 2020; Vilhena *et al*., 2020). These boosters have been incorporated into toothpaste formulations to enhance fluoride effectiveness and accelerate remineralization. They facilitate the incorporation of calcium and phosphate into demineralized dental structures, promoting mineral gain through bioactive components based on hydroxyapatite and calcium phosphates (Cochrane *et al*., 2010). Within this context, DHS targeted products containing boosters appear to promote mineral deposition at the openings of dentinal tubules, offering an effective and safe remineralization approach for DHS management (Vilhena *et al*., 2023).

Therefore, the aim of the present case series was to describe four clinical cases of DHS management using dentifrices containing REFIX technology in combination with a booster.

MATERIAL AND METHOD

The present case series describes the management of four patients diagnosed with DHS using two gels a crystallizer and a booster (Fig. 1). Two patients were treated with a fluoride containing gel formulated with REFIX technology in combination with the booster (Cases 1 and 2), while the remaining two patients received a non-fluoride dentifrice containing REFIX technology along with the booster (Cases 3 and 4).

Fig. 1. Crystallizer and booster gel

Fig. 2. Thermal test - Stimulus through the air jet of the triple syringe

DHS was evaluated using an air-blast test delivered with a triple syringe (Fig. 2). The thermal stimulus was applied for one second at approximately one centimeter from the sensitive tooth surface. Adjacent teeth were shielded by the examiner to ensure that only the target surface was exposed during assessment. Each patient underwent two evaluations: one performed by the examiner and another self-reported by the patient. Four teeth were assessed per patient, selected according to the individual's reported DHS symptoms.

The examiner evaluated each tooth surface using the air-sensitivity scale proposed by Schiff *et al*. (1994). On this scale, higher scores indicate greater levels of tooth sensitivity. The scoring criteria were defined as follows:

0 = The patient does not respond to the air stimulus.
1 = The patient responds to the air stimulus but does not request discontinuation.
2 = The patient responds to the air stimulus and requests discontinuation or withdraws from thestimulus.
3 = The patient responds to the air stimulus, perceives it as painful, and requires discontinuation

The second assessment was performed by the patients using a visual analog scale (VAS). The VAS ranges from 0 to 100, where 0 indicates the absence of pain and 100 represents the most intense pain imaginable. Immediately after the air stimulus, each patient completed the scale according to their perceived DHS. All data were recorded in detail using standardized clinical forms (Fig. 3). The parameters used to quantify the degree of DHS were evaluated at the following time points:

T1: Immediately before the scaling and root planning (SRP) procedure.
T2: Immediately after scaling (Fig. 4).
T3: After prophylaxis using the two dental gels, mixed in equal proportions and applied to the dental surface with a Robinson brush (Fig. 5).
T4, T5, T6, and T7: At 1, 2, 4, and 8 weeks, respectively, following SRP, during which patients used both gels at home.

After the SRP and prophylaxis procedures, each patient received a kit containing a toothbrush, dental floss, and two gels the crystallizer gel and the booster. Patients were given verbal instructions on oral hygiene, including flossing and brushing at least twice daily for one minute each time, using equal amounts of both gels applied to the toothbrush.

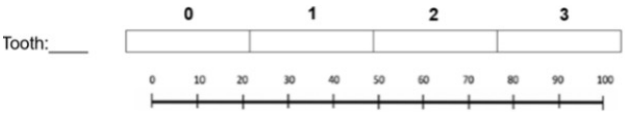

Fig. 3. Template for recording Schiff scale and VAS.


Fig. 4. Scaling and root planing procedure.


Fig. 5. Prophylaxis with the two dental gels, mixed in equal parts.


Fig. 6. Patient (Case 3) with active periodontal disease and a history of smoking.

RESULTS

Case 1: A 43-year-old female patient, with no systemic diseases, a non-smoker, and exhibiting a high level of oral hygiene, presented with a chief complaint of generalized DHS, with more pronounced pain on the right side of both the maxillary and mandibular arches. The air-sensitivity scale described by Schiff *et al*. (1994) and the VAS were applied to teeth 13, 16, 46, and 47 (Table I).

The patient adhered to the treatment protocol using both gels (fluoride based REFIX and the booster). Across all evaluation time points, she exhibited a marked reduction in sensitivity, as reflected in both the VAS scores and the Schiff *et al*. scale. This improvement became progressively more evident with continued use of the products during follow-up visits. The patient also reported an enhancement in her quality of life, particularly when eating. She noted that prior to treatment she was unable to consume ice cream due to DHS, but following the use of the gels, she was able to eat it without experiencing pain.

Case 2: A 26-year-old male patient, with no systemic diseases, a non-smoker, and maintaining a high standard of oral hygiene, presented with a complaint of DHS in the maxillary premolars, triggered during both eating and toothbrushing. Clinical examination revealed bilateral gingival recession in the premolar region, associated with early-stage non-carious cervical lesions (NCCLs). The air-sensitivity scale (Schiff *et al*., 1994) and the VAS were applied to teeth 14, 15, 24, and 25 (Table II).

In this case, the patient showed a reduction in DHS immediately after prophylaxis with the two gels (fluoride REFIX + booster). However, during the at-home phase of the treatment, he reported fluctuations in sensitivity during toothbrushing, particularly during the first week of use (T4). By the end of the follow-up period, a decrease in DHS was observed when compared with baseline values.

Table I. Schiff and VAS values for teeth 13, 16, 46, and 47 at different times

Case 1								
		T1	**T2**	**T3**	**T4**	**T5**	**T6**	**T7**
Tooth 13	**Schiff**	3	3	3	1	1	1	1
	VAS	100	100	100	30	10	10	10
		T1	**T2**	**T3**	**T4**	**T5**	**T6**	**T7**
Tooth 16	**Schiff**	3	3	3	2	2	1	1
	VAS	100	100	100	60	40	20	20
		T1	**T2**	**T3**	**T4**	**T5**	**T6**	**T7**
Tooth 46	**Schiff**	2	2	1	0	0	0	0
	VAS	60	60	50	0	0	0	0
		T1	**T2**	**T3**	**T4**	**T5**	**T6**	**T7**
Tooth 47	**Schiff**	3	3	2	2	1	1	1
	VAS	70	70	60	70	30	30	20

Table II. Schiff and VAS values for teeth 14, 15, 24, and 25 at different times.

Case 2								
		T1	**T2**	**T3**	**T4**	**T5**	**T6**	**T7**
Tooth 14	**Schiff**	2	2	2	2	2	1	1
	VAS	60	50	40	60	70	40	40
		T1	**T2**	**T3**	**T4**	**T5**	**T6**	**T7**
Tooth 15	**Schiff**	2	2	2	2	2	2	1
	VAS	70	80	50	70	70	60	50
		T1	**T2**	**T3**	**T4**	**T5**	**T6**	**T7**
Tooth 24	**Schiff**	2	2	1	0	1	0	0
	VAS	40	40	30	20	30	0	10
		T1	**T2**	**T3**	**T4**	**T5**	**T6**	**T7**
Tooth 25	**Schiff**	2	2	2	2	1	2	1
	VAS	80	80	60	60	30	60	40

Case 3: A 57-year-old female patient, a smoker with active periodontal disease, reported pronounced DHS in the maxillary canine and mandibular premolars (Figure 6). Clinical examination revealed the presence of plaque and calculus, as well as generalized horizontal bone loss associated with periodontal disease. The air-sensitivity scale (Schiff *et al*., 1994) and the VAS were applied to teeth 13, 34, 35, and 45 (Table III). In addition to her periodontal condition and smoking habit, the patient reported excessive consumption of soda. During the treatment protocol with the two gels (non-fluoride REFIX + booster), fluctuations in sensitivity scores were observed. At two weeks (T5) of at-home product use, an exacerbation of DHS symptoms occurred, followed by progressive improvement with continued treatment.

Case 4: A 56-year-old female patient, with no systemic diseases, a non-smoker, and presenting with active periodontal disease, complained of generalized sensitivity, with pronounced pain in the maxillary and mandibular incisors. Clinical examination revealed plaque and calculus accumulation, as well as generalized horizontal bone loss associated with periodontal disease. The patient reported having to modify her speech articulation due to severe sensitivity. The air-sensitivity scale (Schiff *et al*., 1994) and the VAS were applied to teeth 11, 12, 21, and 22 (Table IV).

In this case, the patient exhibited a reduction in DHS immediately after prophylaxis with the two gels (non-fluoride REFIX + booster). During the at-home phase of treatment, she reported gradual improvement in DHS symptoms during brushing, eating, and speaking. By the end of the follow-up period, thepatient demonstrated a significant reduction in DHS and reported noticeable improvements in her quality of life.

Table III. Schiff and VAS values for teeth 13, 34, 35, and 45 at different times.

Case 3								
		T1	**T2**	**T3**	**T4**	**T5**	**T6**	**T7**
Tooth 13	**Schiff**	1	2	1	0	1	1	1
	VAS	45	70	20	0	20	20	10
		T1	**T2**	**T3**	**T4**	**T5**	**T6**	**T7**
Tooth 34	**Schiff**	1	1	0	0	0	0	0
	VAS	40	30	0	0	15	0	0
		T1	**T2**	**T3**	**T4**	**T5**	**T6**	**T7**
Tooth 35	**Schiff**	2	2	1	1	3	2	2
	VAS	60	60	45	60	100	70	60
		T1	**T2**	**T3**	**T4**	**T5**	**T6**	**T7**
Tooth 45	**Schiff**	1	1	1	1	2	1	1
	VAS	30	20	20	35	60	20	20

Table IV. Schiff and VAS values for teeth 11, 12, 21, and 22 at different times.

Case 4								
		T1	**T2**	**T3**	**T4**	**T5**	**T6**	**T7**
Tooth 11	**Schiff**	2	2	1	1	1	0	0
	VAS	100	100	70	60	60	40	20
		T1	**T2**	**T3**	**T4**	**T5**	**T6**	**T7**
Tooth 12	**Schiff**	3	2	2	1	0	0	0
	VAS	80	90	60	50	45	20	15
		T1	**T2**	**T3**	**T4**	**T5**	**T6**	**T7**
Tooth 21	**Schiff**	3	3	1	1	1	0	0
	VAS	90	90	80	60	45	30	10
		T1	**T2**	**T3**	**T4**	**T5**	**T6**	**T7**
Tooth 22	**Schiff**	3	2	3	1	0	0	0
	VAS	60	60	50	30	30	20	0

DISCUSSION

The aim of this case series was to describe the treatment of patients diagnosed with dentin hypersensitivity (DHS) using fluoride and non-fluoride gels in combination with a booster. The findings showed a marked reduction in DHS, confirmed through both professional assessment and patient self-reports.

Patients also noted that symptom improvement continued to increase with ongoing product use during follow-up visits. Furthermore, descriptive observations indicated a substantial enhancement in patients' quality of life. The non-fluoride gel (REFIX) combined with the booster demonstrated a clinical effect comparable to that of the fluoride-based formulation, suggesting that the efficacy of the technology is not dependent on fluoride. Finally, this case series emphasized that persistence of deleterious habits can negatively influence treatment outcomes

There are various treatment options available for dentin hypersensitivity (DHS) aimed at reducing symptoms and improving patient comfort and quality of life. However, before recommending any therapeutic approach, it is essential to identify and address the etiological factors to prevent the persistence or recurrence of DHS. Modifying deleterious habits and controlling contributing factors are fundamental to achieving and maintaining the positive outcomes obtained with treatment (Holland *et al*., 1997). In this context, reducing the consumption of citrus fruits, sodas, energy drinks, wine, and acidic sauces, among others, is crucial. Case 3 illustrates the detrimental impact on DHS management when the habit of soda consumption is maintained. Additionally, the patient is a smoker, a condition known to exacerbate the progression of periodontal disease (Figueredo *et al*., 2021).

Treatment options for DHS include both home care and in office strategies, such as desensitizing toothpastes, protective varnishes, potassium oxalate and calcium phosphate agents, arginine-based formulations, and low-level laser therapy. In specific situations, periodontal surgery or even prosthetic rehabilitation may be required, and a combination of these approaches is often used to achieve the desired clinical outcomes (Pereira-Cavalcante *et al*., 2019). These therapeutic modalities not only relieve immediate symptoms but also contribute to long-term improvements in oral health.

DHS is an increasingly common condition, and despite recent advances, a definitive cure remains elusive. There is still no consensus regarding which chemical or physical agent provides the most effective long-term results (Hu *et al*., 2018). This condition has a significant impact on quality of life, particularly affecting social interactions, dietary habits, and the ability to maintain adequate dental biofilm control especially in patients with periodontal disease.

Home treatments are generally easy and convenient, and toothpastes remain the most widely recommended option. According to Rösing *et al*. (2009), the incorporation of desensitizing agents into dentifrices aims to facilitate the management of DHS, as these products are used daily by the general population. Dentifrices represent a non-invasive, commercially available, and cost-effective treatment modality. Two distinct mechanisms of action are involved in reducing or controlling DHS. The first targets the interruption of nerve impulse transmission through agents such as potassium salts (potassium citrate, potassium nitrate, and potassium chloride), which depolarize nerve fibers and reduce their excitability to external stimuli. The second seeks to partially or completely occlude dentinal tubules using oxalates, sodium fluoride, arginine, or resin-based adhesives (Elias-Boneta *et al*., 2013; Hu *et al*., 2013). Together, these approaches offer different strategies to alleviate DHS, allowing the selection of products tailored to individual patient needs.

The clinical system used in this case series consisted of two dental gels a crystallizer and a booster. When applied sequentially, these gels form an enamel like layer composed of hydroxyapatite enriched with silicon on the dental surface, producing a marked occlusive effect. The system contains an additional calcium source designed to accelerate the formation of this new mineral layer, contributing to increased surface smoothness. The resulting layer exhibits the same composition and comparable quality to natural enamel (Hu *et al*., 2018; Vilhena *et al*., 2020).

Therefore, the combination of REFIX with a booster represents a promising therapeutic approach for managing DHS, particularly when accompanied by appropriate control of deleterious habits by the patient.

CONCLUSION

Based on the findings of this case series and acknowledging the inherent limitations of this study design, the evaluations indicated that treatment with desensitizing agents associated with boosters effectively reduced DHS. However, modifying deleterious habits remains essential for achieving and sustaining these outcomes. Future randomized controlled clinical trials are needed to further assess the efficacy of combining desensitizing agents with boosters and to validate these preliminary observations.

ACKNOWLEDGMENTS. Authors would like to thank the support of the Coordination for the improvement of higher education personnel, code 001.

CANDOSIN-SEMENTILLE, M.C.; SOUZA-CALEFI, M.; VIEIRA-VILHENA, F.; PASSANESI-SANT'ANA, A.C.; ANDREOTTI-DAMANTE, C. & RAGGHIANTI-ZANGRANDO, M.S. El uso de potenciadores asociados a dentífricos en la reducción de la hipersensibilidad dentinaria: serie de casos. *Int. J. Odontostomat., 19(4)*:411-417, 2025

RESUMEN: La hipersensibilidad dentinaria (HSD) es una condición clínica frecuente en la práctica odontológica, caracterizada por un dolor breve y agudo desencadenado por estímulos térmicos, táctiles, evaporativos, osmóticos o químicos. Las estrategias para el manejo de la HSD abarcan tanto procedimientos realizados en la consulta como cuidados domiciliarios. Aunque existen numerosos agentes disponibles principalmente dentífricos aún no se ha establecido un tratamiento estándar de referencia. Esta serie de casos tuvo como objetivo evaluar la eficacia de dentífricos formulados con la tecnología REFIX, utilizados en combinación con un booster, para la reducción de la HSD. Los pacientes fueron evaluados mediante la escala de sensibilidad al aire descrita por Schiff *et al*. (1994) y mediante escalas visuales análogas (EVA) en siete momentos: línea basal; después del raspado y alisado radicular; tras la profilaxis profesional con el agente; y después de 1, 2, 4 y 8 semanas de uso domiciliario. Se observó una reducción significativa de la HSD en todos los participantes, tanto según la evaluación del examinador como a partir de los reportes de los propios pacientes. Se registraron ligeras fluctuaciones en la severidad de los síntomas, particularmente en individuos con dificultades para modificar hábitos contribuyentes. No obstante, todos los pacientes mostraron una disminución sustancial de la HSD después de ocho semanas de tratamiento.

PALABRAS CLAVE: dentina; agentes desensibilizantes dentinarios; hipersensibilidad dentinaria; dentífricos; periodoncia.

REFERENCES

Bekes, K. & Hirsch, C. What is known about the influence of dentine hypersensitivity on oral health-related quality of life? *Clin. Oral Investig., 17(1)*:45-51, 2013.

Brannstrom, M. The hydrodynamic theory of dentinal pain: Sensation in preparations, caries, and the dentinal crack syndrome. *J. Endod., 12(10)*:453-7, 1986.

Pereira-Cavalcante, S.; Garcia de Souza-Júnior, V. & Coelho-Dias, P. C. Efetividade de diferentes tipos de tratamento no controle da hipersensibilidade dentinária cervical. *Rev. Uningá, 56(7)*:68-79, 2019.

Cochrane, N. J.; Cai, F.; Huq, N. L.; Burrow, M. F. & Reynolds, E. C. New approaches to enhanced remineralization of tooth enamel. *J. Dent. Res., 89(11)*:1187-97, 2010.

da Rosa, W. L.; Lund, R. G.; Piva, E. & da Silva, A. F. The effectiveness of current dentin desensitizing agents used to treat dental hypersensitivity: a systematic review. *Quintessence Int., 44(7)*:535-46, 2013.

Douglas-de-Oliveira, D. W.; Vitor, G. P.; Silveira, J. O.; Martins, C. C.; Costa, F. O. & Cota, L. O. M. Effect of dentin hypersensitivity treatment on oral health related quality of life – A systematic review and meta-analysis. *J. Dent., 71*:1-8, 2018.

Elias-Boneta, A. R.; Ramirez, K.; Naboa, J.; Mateo, L. R.; Stewart, B.; Panagokos, F. & De Vizio, W. Efficacy in reducing dentine hypersensitivity of a regimen using a toothpaste containing 8% arginine and calcium carbonate, a mouthwash containing 0.8% arginine, pyrophosphate and PVM/MA copolymer and a toothbrush compared to potassium and negative control regimens: an eight-week randomized clinical trial. *J. Dent., 41 (1)*:42-9, 2013.

Figueredo, C. A.; Abdelhay, N.; Figueredo, C. M.; Catunda, R. & Gibson, M. P. The impact of vaping on periodontitis: A systematic review. Clin. Exp. Dent. Res., 7(3):376-84, 2021.

Grossman, L. I. A systematic method for the treatment of hypersensitive dentin. *J. Am. Dent. Assoc., 22(4)*:592-602, 1935.

Holland, G. R.; Narhi, M. N.; Addy, M.; Gangarosa, L. & Orchardson, R. Guidelines for the design and conduct of clinical trials on dentine hypersensitivity. *J. Clin. Periodontol., 24(11)*:808-13, 1997

Hu, D.; Stewart, B.; Mello, S.; Arvanitidou, L.; Panagokos, F.; De Vizio, W. Zhang, Y. P.; Mateo, L.R. & Yin, W. Efficacy of a mouthwash containing 0.8% arginine, PVM/MA copolymer, pyrophosphates, and 0.05% sodium fluoride compared to a negative control mouthwash on dentin hypersensitivity reduction. *J. Dent., 41(1)*:26-33, 2013.

Hu, M. L.; Zheng, G.; Zhang, Y.-D.; Yan, X.; Li, X.-C. & Lin, H. Effect of desensitizing toothpastes on dentine hypersensitivity: A systematic review and meta-analysis. *J. Dent., 75*:12-21, 2018.

Liu, X. X.; Tenenbaum, H. C.; Wilder, R. S.; Quock, R.; Hewlett, E. R. & Ren, Y.-F. Pathogenesis, diagnosis and management of dentin hypersensitivity: an evidence-based overview for dental practitioners. *BMC Oral Health, 20(1)*:220, 2020.

Ramli, R.; Ghani, N.; Taib, H. & Mat-Baharin, N. H. Successful management of dentin hypersensitivity: A narrative review. Dent. Med. Probl., 59(3):451-60, 2022.

Rösing, C. K.; Fiorini, T.; Liberman, D. N. & Cavagni, J. Dentine hypersensitivity: analysis of self-care products. *Braz. Oral Res., 23(1)*:56-63, 2009.

Schiff, T.; Dotson, M.; Cohen, S.; De Vizio, W.; McCool, J. & Volpe, A. Efficacy of a dentifrice containing potassium nitrate, soluble pyrophosphate, PVM/MA copolymer, and sodium fluoride on dentinal hypersensitivity: a twelve-week clinical study. *J. Clin. Dent., 5*:87-92, 1994.

Tomaz, P. L. S.; Sousa, L. A.; Aguiar, K. F.; Oliveira, T. S.; Matochek, M. H. M.; Polassi, M. R. & D'Alpino, P. H. P. Effects of 1450-ppm fluoride-containing toothpastes associated with boosters on enamel remineralization and surface roughness after cariogenic challenge. *Eur. J. Dent., 14(1)*:161-70, 2020.

Vilhena, F. V.; Polassi, M. R.; Paloco, E. A.; Alonso, R. C.; Guiraldo, R. D. & D'Alpino, P. H. Effectiveness of toothpaste containing REFIX technology against dentin hypersensitivity: A randomized clinical study. *J. Contemp. Dent. Pract., 21(6)*:609-14, 2020.

Vilhena, F. V.; de Oliveira, S. M. L.; Matochek, M. H. M.; Tomaz, P. L. S.; Oliveira, T. S. & D'Alpino, P. H. P. Biomimetic mechanism of action of fluoridated toothpaste containing proprietary REFIX technology on the remineralization and repair of demineralized dental tissues: an in vitro study. *Eur. J. Dent., 15(2)*:236-41, 2021a.

Vilhena, F. V.; Lonni, A. A. S. G. & D'Alpino, P. Silicon-enriched hydroxyapatite formed induced by REFIX-based toothpaste on the enamel surface. *Braz. Dent. Sci., 24(2)*:1-7, 2021b.

Vilhena, F. V.; Grecco, S. D. S.; González, A. H. M. & D'Alpino, P. H. P. Regenerative and protective effects on dental tissues of a fluoride-silicon-rich toothpaste associated with a calcium booster: an in vitro study. *Dent. J. (Basel), 11(6)*:153, 2023.

West, N. X.; Seong, J. & Davies, M. Management of dentine hypersensitivity: Efficacy of professionally and self-administered agents. *J. Clin. Periodontol., 42(16)*:256-302, 2015.

Corresponding author:
Maria Carolina Candosin Sementille
Bauru School of Dentistry
University of São Paulo
BRASIL

E-mail: m.mcarol@usp.br