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Adjuvant use of phthalocyanine derivative for calculus control

Caique Andrade Santos, Fabiano Vieira Vilhena, Mariana Schutzer Ragghianti Zangrando

CASE REPORT

A 46-year-old male patient, smoker for approximately 20 years, without systemic disease, use of medications, and painful symptoms complained about the constant accumulation of calculus and stains, mainly on lingual aspect of lower anterior teeth. On clinical examination (Figure 1A), the presence of calculus and stains was detected, especially located on the lingual surface of the lower incisors, also affecting the lower canines.

The patient reported that professional scaling and root planing (SRP) with intervals of two months was necessary to control and remove stains and calculus. He also informed that only one week after SRP session, stains returned to the teeth surface.

Then, the clinical approach included a new SRP session and oral hygiene instructions [1] (Figure 1B) with the adjuvant use of a dental gel containing a phthalocyanine derivative (Phtalox) to perform brushing. Stain and calculus affected by many factors such as type of food taken and type of beverages and also environmental temperature affect and degree of dehydration and climate at time of follow-up and also type of work for the volunteer case.

The patient was instructed to maintain the protocol with the use of the gel for brushing 3 times/day and returned to control. After three months (Figure 2), an adequate plaque control and absence of staining of the lingual area of the lower anterior teeth were observed. Sequentially, after six months (Figure 3), a slight onset of staining and calculus on the teeth was detected, however, clinically less than the initial deposits (Figure 1A).

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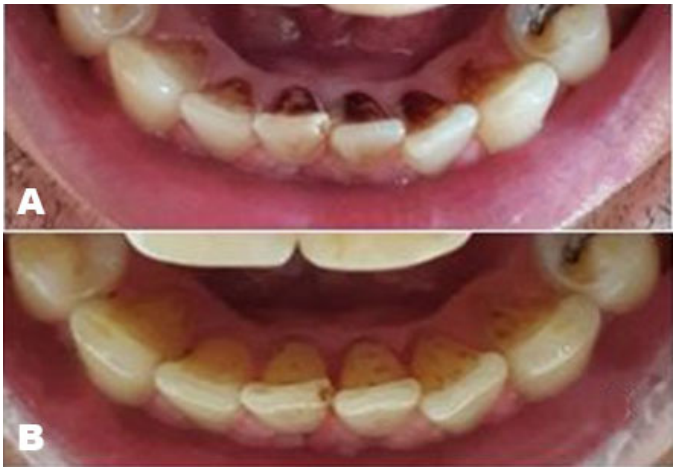

Figure 1: (A) Initial clinical situation; (B) After SRP and oral hygiene instruction.

Figure 2: Clinical situation at three months of follow-up. Adequate control can be observed in the formation of calculus and stain in the period.

Figure 3: Clinical situation at six months of follow-up. A slight onset of staining and calculus was detected in the teeth, less than the initial situation.

According to the patient's report, confirmed by the clinical examination, the amount and frequency of the accumulation of stains and calculus in these periods of evaluation were significantly lower.

DISCUSSION

Periodontal disease is a multifactorial disorder associated with dental biofilm and immune response, characterized by the involvement of periodontal structures such as gingiva, periodontal ligament, cementum, and bone and if left untreated, results in tooth loss. Treatment and effective control of periodontal disease is mainly based on SRP, procedure to remove plaque and subgingival and supragingival calculus to obtain a smooth, clean, hard, and regular root surface. However, plaque and calculus control by the patient, avoiding permanence or re-colonization of microorganisms is necessary to restore and maintain periodontium health [1].

Mature plaque is a good substrate for calculus formation due to the localized accumulation of calcium and phosphate, presence of crystal growth promoters, and presence of calcifying bacteria and bacterial components. Saliva and plaque present inhibitors of the formation of calculus crystals, which are mainly negative charge proteins that impede the deposition of crystals. In addition, protein activities can increase the pH of saliva, inhibiting calculus development. All effective calculus inhibitors have in common the ability to inhibit calcium phosphate nucleation and crystal growth processes, thus transforming into more stable calcium phosphate phases [2].

The use of phthalocyanine derivatives is the subject of different studies of our research group. The outcomes demonstrated antimicrobial [3] and antiviral [4] activity, without cytotoxicity and safe in low concentrations as demonstrated by in vitro studies [4]. In addition, Phtalox compound presented inferior cytotoxicity compared to fluorine [5]. The formulations also have anti-biofilm action [3] and demonstrated independent activation, continuously producing reactive oxygen species in the presence of molecular oxygen [5]. Therefore, Dental Gel Phtalox is able to interfere in the formation of bacterial plaque. Since dental calculus is formed by a portion of organic and inorganic matter, the authors speculate that Phtalox could inhibit the initial formation processes of calculus and dental staining.

The clinical protocol used in the present case suggests a possible potential for calculus control and stains reduction, according to the patient's report and confirmed by the clinical examination. However, large randomized clinical trials are necessary to confirm these actions of Dental Gel Phtalox.

CONCLUSION

The adjuvant use of Dental Gel Phtalox was effective in controlling calculus and stains during the six-month follow-up of the present case.

Keywords: Dental Gel Phtalox, Environmental temperature, Periodontal disease, Phthalocyanine derivative

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Author Contributions

Caique Andrade Santos – Conception of the work, Acquisition of data, Analysis of data, Interpretation of data, Drafting the work, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

Fabiano Vieira Vilhena – Conception of the work, Design of the work, Acquisition of data, Analysis of data, Interpretation of data, Revising the work critically for important intellectual content, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

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Guarantor of Submission

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Consent Statement
Written informed consent was obtained from the patient for publication of this article.

Conflict of Interest
Authors declare no conflict of interest.

Data Availability
All relevant data are within the paper and its Supporting Information files.

REFERENCES

1. Jorge AOC. Oral Microbiology and Immunology. Rio de Janeiro: Elsevier 2012. p. 384.
2. van Loveren C, Duckworth RM. Anti-calculus and whitening toothpastes. Monogr Oral Sci 2013;23:61–74.
3. Santos CA, Novaes PM, Farias MF, Khouri S, Vilhena FV, Teodoro GR. Antibiofilm Action of PHTALOX®-containing Oral Care Formulations. J Dent Res 2020;99(SpecIss A). Abstract number, 3326, 2020 IADR/AADR/CADR General Session (Washington, D.C., USA).
4. Santos PSS, Orcina BF, Machado RRG, et al. Beneficial effects of a mouthwash containing an antiviral phthalocyanine derivative on the length of hospital stay for COVID-19. 2021.
5. Teodoro GR, Santos CA, Carvalho MA, Koga-Ito CY, Khouri S, Vilhena FV. PHTALOX® antimicrobial action and cytotoxicity: In vitro study. J Dent Res 2020;99(SpecIss A). Abstract number, 0839, 2020 IADR/AADR/CADR General Session (Washington, D. C., USA).

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