Candida albicans and Denture Stomatitis: Evaluation of Its Presence in the Lesion, Prosthesis, and Blood

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Denture stomatitis is a primarily oral disease that affects denture wearers. The presence of *Candida albicans* in the palatal mucosa, on the internal surface of the maxillary denture, and in the blood of patients with denture stomatitis was evaluated. Although the results did not show *C albicans* in the bloodstream of patients, a strong relationship between denture stomatitis and *Candida* sp was confirmed for both the palatal mucosa and maxillary denture. *Int J Prosthodont 2010;23:158–159.*

Denture stomatitis (DS), considered a form of oropharyngeal candidosis, is defined as an inflammatory process in the mucosa underlying a removable prosthesis.

It is speculated that *Candida albicans* would be present in the blood of DS patients in much lower amounts than in candidemic patients. Although without a prognostic value, one could highlight the invasion of fungi in the localized disease and explain specific aspects of immune responses in these patients. Thus, this study sought to evaluate the presence of *C albicans* in the palatal mucosa, on the inner surface of maxillary dentures, and in the blood of patients with DS. To verify a possible transient blood contamination, patients were reassessed after a mean period of 7 days.

Materials and Methods

Denture wearers diagnosed clinically as having or not having DS (groups 1 and 2, respectively; n = 14 in each group) were selected from the population referred to the Clinic of Prosthodontics at the Bauru School of Dentistry, University of São Paulo, Bauru, Brazil. Healthy individuals not wearing dentures comprised the control group (group 3, n = 14). Complete clinical, medical, and dental histories were taken and an intraoral examination was performed. The protocol was approved by the Institutional Ethics Committee and the subjects signed a committee-approved informed consent form. Exclusion criteria were: smoking, alcoholism, any disease or medicine generating immunosuppression, autoimmune disease, individuals who had received or were currently receiving treatment with antibiotics or antifungals, and drug use.

DS was diagnosed clinically and classified according to Newton.[1] A microbiologic diagnosis and swab were obtained from all individuals according Gasparoto et al.[2]

Extraction of *Candida* DNA from the blood samples was done by a modified method previously described.[3] Three hundred microliters of blood was added to 800 µL of TXTE buffer (10 mM Tris, 1 mM ethylenediaminetetraacetic acid [pH 8.0], 1% Triton X-100) and the mixture was incubated for 10 minutes at 25ºC. *C albicans* ATCC 10231, at different concentrations, was added to multiple 300-µL blood samples and used as a positive control. The samples were washed (1 mL TXTE, 10,000 × g/8 min), resuspended with 200 µL of InstaGene (Bio-Rad Laboratories), and incubated for 30 minutes at 56ºC. After boiling for 10 minutes, 170 µL of the supernatant liquid was stored at –80ºC until the polymerase chain reaction was performed.[2,4]

Results were analyzed using the chi-square test and one-way analysis of variance. Statistical significance was set at $P < .05$.

Results

Results show that DS patients used their prostheses for a mean 20.2 years, while healthy denture wearers used theirs for 19.62 years.

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Table 1 No. of Individuals in Each Group Showing the Different Species of *Candida*, Isolated or Mixed, from Biologic Material Obtained from the Inner Surface of the Maxillary Prosthesis and Palatal Mucosa (n = 14 for each group)

	Maxillary denture		Palatal mucosa		
Candida species	Group 1	Group 2	Group 1	Group 2	Group 3
albicans	3	4	4	5	4
tropicalis	4	3	5	2	–
krusei	3	1	2	2	–
albicans + *dubliniensis*	1	1	–	–	–
albicans + *krusei*	2	–	3	–	–
tropicalis + *krusei*	1	1	–	–	–
Without growth	–	4	–	5	10

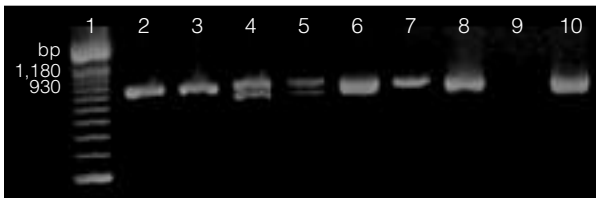

Fig 1 Product of the polymerase chain reaction for the detection of *C albicans* from the green colonies grown on CHROMagar *Candida*, obtained from the internal surfaces of the prosthesis and the palatal mucosa of four individuals with DS. Column 1: molecular weight marker of 100 bp, columns 2 to 8: the presence of *C albicans* (1180 bp), columns 4 and 5: presence of *C dubliniensis* (930 bp), column 9: the negative control (water), and column 10: positive control of the reaction (isolation of *C albicans* ATCC 10231).

The majority of DS patients (50%) had type II DS. *C albicans* was the most common species isolated from the maxillary prosthesis and palatal mucosa of denture wearers (Table 1). No significant differences were seen between groups in the detection of *C albicans* on the maxillary prosthesis as well as the palatal mucosa. One DS patient presented *C albicans* and *C dubliniensis* on both the palatal mucosa and maxillary prosthesis (Fig 1).

The authors verified that neither denture wearers, regardless of DS, nor the volunteer nonwearers presented DNA with Hwp1 protein (*Candida albicans* hyphal wall protein 1) in the blood.

Discussion

In this study, no DS patient presented the DNA fragment encoding the protein Hwp1 of *C albicans* in the blood. Failure to detect *C albicans* DNA in the blood of these patients allows us to predict the effectiveness of local and systemic immune mechanisms capable of abolishing these antigens. However, the possibility that very low amounts of this fungus, not revealed by conventional polymerase chain reactions, reach the blood cannot be discarded. Although revealing the probable absence of the spreading of *C albicans,* the authors demonstrated the large presence of this fungus on the maxillary prosthesis and palate of denture wearers.

There was a significant correlation between DS patients and the presence of *Candida* on both the maxillary prosthesis and palatal mucosa, corroborating the findings of Figueiral et al.[5] It was found that DS patients carry *C albicans* associated with *C krusei* or *C dubliniensis* on the maxillary prosthesis and palate.

In this study, the majority of DS patients (50%) had Newton's type II DS, which disagrees with previous reports.[5] This variability among different researchers can be partly explained by the subjectivity of this classification.

Conclusions

This study found that patients with clinical and microbiologic diagnosis of DS did not show *C albicans* in the bloodstream. In addition, a strong relationship between DS and the oral presence of *Candida* sp was confirmed in these patients. Although *Candida* antigens were not found in the patients' blood, the prescription of systemic antifungal drugs could facilitate an immune defense against yeasts and avoid persistence of the infection.

References

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