

Fungal Infection of the Oral Cavity by Candida Albicans in Patients Wearing a Removable Dental Prosthesis

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Abstract: Permanent wearing of a removable prosthesis can be a source of mechanical irritation, which will lead to the appearance of pathological conditions. These conditions can be of several types but the most common are oral candidiasis with *Candida albicans*. As part of the scientific research, we have begun a practical study that aims to establish the relationship between the wearing of a removable denture and the colonization of the oral cavity by *Candida albicans*. This study was carried out in collaboration with the central laboratory of parasitology –mycology of the Ibn Sina University Hospital Center of Rabat (CHU) and assistant prosthesis department of the clinic of the Faculty of Dentistry of Rabat. The present study was carried out on 45 specimens from the oral cavity in subjects with a removable prosthesis. We observed that most subjects affected by oral candidiasis had inflammation in the oral cavity and these subjects did not have adequate oral hygiene. 30% of these subjects had chronic diseases and 20% of male subjects were smokers. Most subjects with prostheses older than 10 years were the most affected. Mycological examination of the samples made allowed us to note 35.5% of fungal infection by the genus *Candida* and 27% by the species *Candida Albicans*. *C. albicans* was the most isolated yeast representing 75% of the yeasts isolated in this study, followed by *C. famata*, after *C. tropicalis* with a lower frequency and finally *C. dubluensis* with the lowest frequency. We also observed a relationship between the nocturnal use of the prosthesis and the presence of *Candida albicans*, indeed most subjects affected by oral candidiasis kept their prostheses during the night.

Keywords: Oral candidiasis, candida albicans, removable dental prosthesis, prosthetic biofilm.

INTRODUCTION

The oral cavity is an interactional medium of many elements. It contains the oral mucosa, teeth, saliva, restoration materials, microorganisms and nutrients.

At first, this cavity contains only the oral mucosa, and then with age, the emergence of teeth is observed. Over time, microorganisms develop when all the teeth are present on the arch. This cavity therefore offers supports on which these microorganisms, including yeasts (*Candida albicans*), are able to adhere [1].

The oral cavity may contain different materials that are inserted by the dental surgeon to meet clinical and aesthetic needs.

These materials can be used for the realization of restorations, dental implants and for the realization of prostheses in particular in acrylic resins. These materials installed in the mouth can cause modifications. Indeed, they are considered strangers without causing complications [2].

Despite the technological evolution in oral implantology, the removable prosthesis remains the most widespread means of rehabilitation. Permanent wearing of this removable prosthesis can be the source of mechanical irritation, which in the absence of rigorous hygiene will cause the appearance of fungal infection of the oral cavity by *Candida albicans* [3].

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MATERIAL AND METHOD

This prospective study was carried out at the Central Laboratory of Parasitology-Myecology of the Ibn Sina University Hospital of Rabat in collaboration with the Assistant Prosthetic Service of the Clinic of the Faculty of Dentistry of Rabat. The study included all subjects with a partial or total old removable prosthesis who are not on antifungal treatment. These topics are addressed to the Prosthetics Department to put new removable prostheses. We were welcomed as an intern in the parasitology-mycology department over a period of 3 months, and we were welcomed in the assistant prosthesis department from June 24 to July 31 to take samples of the oral cavity in these subjects.

A swab was taken from the oral cavity using sterile swabs to perform the mycological examination for *Candida albicans*. Samples were obtained from 45 subjects.

The mycological examination of swabs involves the realization of microscopic examination, the realization of cultures on the 3 Sabouraud media (Sabouraud simple, Sabouraud chloramphenicol, Sabouraud cyclohexamide (actidione)). Identification was based on morphological, physiological and biochemical traits.

- Filamentation test.
- Chromogenic medium (CandiSelect).
- Sugar assimilation study: auxanogram (Auxacolor®)
- Search for circulating Ag of *Candida albicans* by agglutination of latex particles (Bichrolatex®).
- The study of the sensitivity to antifungals was carried out using the antifongigram (Fungitest®).

RESULTS AND DISCUSSION

RESULT

Of the 45 mycological samples taken at the parasitology laboratory – mycology at the IBN SINA University Hospital in Rabat, 17 samples were taken in male subjects and 28 samples in female subjects. Of the 45 cases, 10 had thrush in the form of detachable whitish plaques in the oral cavity, 8 had inflammation in the form of red plaques on the palate and tongue and 3 had whitish lesions at the corners of the lips. The rest of the cases had no sign.

On direct examination, we noted the presence of yeasts in 16 samples, among which 14 samples were characterized by the presence of yeasts accompanied by mycelial filaments.

All positive samples examined had a positive culture with more than 30 colonies. *C. albicans* was isolated in 12 cases (75%) with a ration sex of H/F = 0.71.

The other species were represented by *C. famata* (1 case), *tropicalis* (2 cases) and *C. dubliensis* (1 cas).

DISCUSSION

The oral cavity usually contains yeasts of the genus *Candida*. These are found in particular in the biofilms present on removable prostheses. In case of poor hygiene, candidiasis can develop. It is often characterized by red patches on the palate or tongue. It can also manifest as thrush or whitish lesions on the tongue or corners of the lips. The risk of candidiasis will be increased in case of xerostomia, saliva no longer exercising its protective role of the oral mucosa. It can also be noted that poor hygiene coupled with contamination of the prosthesis by *Candida albicans* may be responsible for prosthetic stomatitis [4].

In this approach, the fungal infection of the oral cavity in subjects with a removable prosthesis is an important part of oral pathology.

The clinical forms are diverse and depend on several parameters including prosthetic state, oral hygiene and general condition [5].

In the present study, we examined 45 samples of the oral cavity from subjects aged 50 to 80 years and carrying removable dentures, of both sexes, 62% female and 32% male.

We showed a fungal infection by the genus *Candida* in (16 cases, 35.5%) of the total number of subjects examined, and by the species *C. albicans* in 27% of the total number of subjects. This rate is almost similar to some rates reported in the literature (Budtz-Jørgensen *et al.*, 2000) but lower than other studies (Kuc *et al.*, 1999; Pires *et al.*, 2002).

Among the 16 cases carrying *Candida*, 12 were carriers of *Candida albicans* (75%). *C. albicans* was the most common yeast among our samples, which confirms the results of other studies (Kuc and neck. 1999; Budtz-Jørgensen *et al.*, 2000; Dorko and coIl., 2001; Pires *et al.*, 2002; Cross *et al.*, 2004).

41% of the men examined are affected by oral candidiasis of which 72% have a fungal infection with *C. albicans*, 14% with *C. tropicalis* and 14% with *C. famata*. For the women examined, 32% are affected, of which 78% have oral candidiasis with *C. albicans*, 11% in *C. famata*, 5.5% in *C. tropicalis* and 5.5% in *C. dubliensis*. According to these results, women are more affected than men. Moreover it should be remembered that for various reasons, women seem to be more affected by oral candidiasis than men. However, 28/45 of our patients studied were women, so these results do not show any statistically significant difference.

Table 1: Distribution of positive mycological examinations by sex

Gender	Male	Female
Total number reviewed	17	28
Number of positive samples	7	9
Percentage of positive samples	41%	32%

Table 2: Distribution of Candida albicans positive mycological examinations by age and sex

Age	Female	Male
50-60 years	1 14%	1 20%
61-70 years	2 29%	2 40%
71-80 years	4 57%	2 40%
Total	7 100%	5 100%

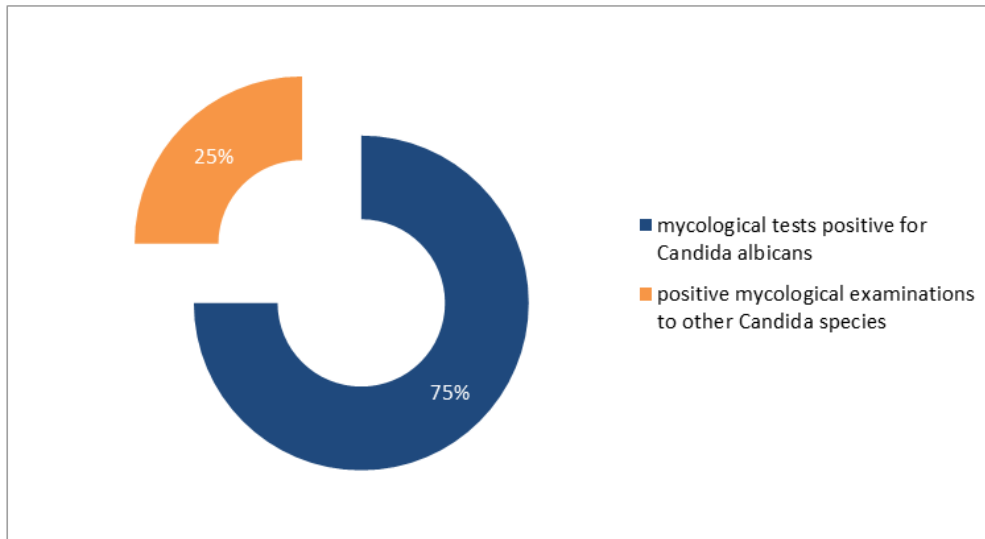


Figure 1: Distribution of mycological examinations positive for C.albicans

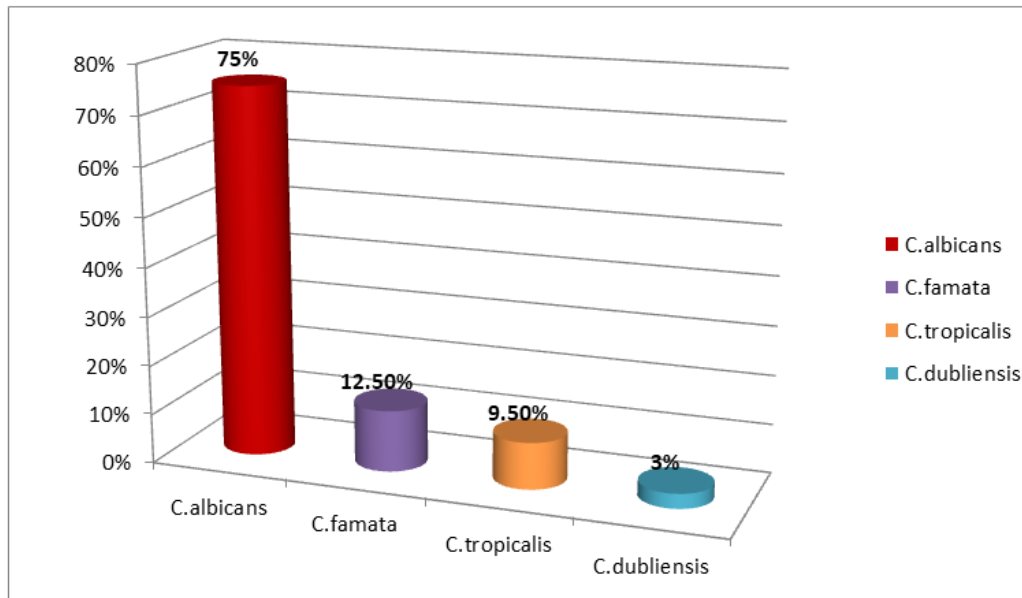


Figure 2: Distribution of other isolated Candida species

We also noted that the prevalence of fungal infection of the oral cavity by *C. albicans* in these subjects with removable prostheses increases with age. Our result is consistent with the literature and with some

studies such as the work done by Emami Ilham (2005) at the Université de Montréal.

In our study, we found that most subjects with oral candidiasis had inflammation in the oral cavity and

these subjects did not have regular oral hygiene or proper denture maintenance. More than 30% of these subjects had chronic diseases (diabetes, heart failure and high blood pressure) and 20% of male subjects were smokers.

We also noted in this study, that most subjects with a prosthesis over 10 years were the most affected by oral candidiasis, a prosthesis installed for several years is a factor promoting colonization and adhesion by *C.albicans*. In addition, the use of prostheses for a long time promotes the accumulation of organisms and deposits in the microporosities of prostheses, and are difficult to remove mechanically, especially without proper hygiene and maintenance.

Another important factor in the etiology of oral candidiasis is the fact that the prosthesis is worn at night. Prolonged nocturnal use of the prosthesis creates favourable conditions for the proliferation of *C.albicans* [6]. In our study we observed a relationship between the nocturnal use of the prosthesis and the presence of *C. albicans*, indeed most subjects affected by oral candidiasis kept their prostheses during the night.

Daily brushing of dentures should be recommended in all subjects who are carriers. The treatment of this candidiasis is based on the decontamination of the prosthesis and the use of antifungals to treat the oral mucosa. These should preferably not be used to decontaminate the prosthesis by risk of resistance development and because they are not very active on the biofilms present on it [7].

The use of a mouthwash containing an antiseptic with fungicidal properties is recommended to treat the prosthesis. Regular brushing of the denture remains the main gesture to encourage, it helps to avoid a recurrence of oral mycosis.

Wearing the prosthesis as little as possible and removing it overnight is desirable. It is important to do dental exams regularly, and if the denture is severely infected, it can be recommended to replace it completely. A neglected oral fungal infection can cause mucosal changes that can only be eliminated by surgery and it can cause an oral tumor [8].

CONCLUSION

Permanent wearing of a removable prosthesis can be a source of mechanical irritation, which in the absence of rigorous hygiene will lead to the appearance of pathological conditions. These conditions can be of several types, but the most common are oral candidiasis, mainly *Candida albicans*.

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