

Comparison of Efficacy of *Candida* Isolation from Oral Swab and Oral Rinse in HIV-infected Individuals

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ABSTRACT

Introduction: The major cause for morbidity and mortality in human immunodeficiency virus (HIV)-infected patient is fungal infection, which affects the quality of life. The most common fungal opportunistic infection is oral candidiasis. Almost all HIV patients are infected with *Candida* and 90–95% develop clinically, as the viral disease progresses. High plasma HIV RNA and low CD4 count are found to be associated with carriage of oral candidiasis in HIV patients. When HIV patients are treated with antiretroviral therapy, oropharyngeal candidiasis also subside simultaneously without specific antifungal therapy. The present study is intended to isolate *Candida* from oral swab and oral rinse and to find out which of these technique would demonstrate more isolation of *Candida* species.

Materials and methods: Samples are collected from 84 HIV seropositive patients attending tertiary care in Puducherry by using swab and rinse. Oral swabbing is done in areas with candidiasis and individuals without candidiasis. The oral rinse technique involves the patient holding 10 mL of sterile phosphate-buffered saline (0.01 M, pH 7.2) in the mouth for 1 minute. Collected samples are inoculated in Sabouraud's dextrose agar (SDA) at 37°C for 48 hours.

Results: Out of 84 samples collected, 40 (47.6%) were positive for *Candida* and 44 (52.4%) were negative. Out of which swab isolated 30 (75%) *Candida* and oral rinse 26 (65%) of *Candida* with *p* value 0.46.

Conclusion: In our study, oral swab yield more positive colonies compared to concentrated oral rinse; however, the *p* value was statistically significant.

Keywords: *Candida*, Oral rinse, Swab.

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INTRODUCTION

The human immunodeficiency virus (HIV) causes the acquired immunodeficiency syndrome (AIDS) and it is characterized by suppression of the immune system.¹ In all over the world, 36.7 million people are living with HIV. Advanced HIV patients are prone to malignancies and infections that are termed as opportunistic infections.¹ Clinical severity of the disease and increased *Candida* species prevalence may be a reflection of immunological changes in HIV-positive patients.² Oropharyngeal candidiasis, which is the first sign of HIV infection,³ develops at stage 3 and stage 4 of WHO clinical staging and gradually 90% of HIV patients develop candidiasis at some point.² Though *Candida albicans* was found to be common organism, the prevalence of non-albicans has increased from 14 29% and albicans has decreased from 86 to 71%.^{2–10} It has been stated that non-albicans like *Candida glabrata*, *Candida dubliniensis*, *Candida parapsilosis*, and *Candida tropicalis* are most commonly found organisms in HIV patients for the past few years. Emergence of non-albicans can also cause invasive candidiasis and increases mortality in HIV patients^{2,3} because of less susceptibility to common antifungal drugs.² In recent studies, the most commonly resistant drug was fluconazole by *Candida krusei* and *C. glabrata*, which is one of the predominant species of non-albicans and most organisms are susceptible to Amphotericin B.¹⁰ As prevalence of non-albicans increased and as they are resistant to normal antifungal drug, proper identification of species and antifungal susceptibility should be done for betterment of patients. The present study is intended to isolate the efficacy of *Candida* isolation from oral swab and oral rinse and to find out which of these technique would demonstrate more isolation of *Candida* species.

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MATERIALS AND METHODS

Samples are collected using oral swab and oral rinse in HIV seropositive individuals attending a tertiary care hospital in Puducherry. A total of 84 samples were collected. Oral swab collected in areas with candidiasis and individuals without candidiasis. The oral rinse technique involves the patient holding 10 mL of sterile phosphate-buffered saline (0.01 M, pH 7.2) in the mouth for 1 minute. The collected samples are transported to the microbiology laboratory without delay.

Collected samples are inoculated in Sabouraud's dextrose agar (SDA) at 37°C for 48 hours. Colonies formed in SDA are further confirmed for the yeast cell in gram stain and the germ tube test is

Table 1: *Candida* isolated from oral swab and oral rinse from 84 samples

Results	Oral rinse (%)	Swab (%)
Positive	26 (65)	30 (75)
Negative	14 (35)	10 (25)
Total	40 (100)	40 (100)

done to identify *C. albicans* and *C. dubliniensis*. Results are tabulated and statically analyzed.

RESULTS

Table 1 shows that out of 84 samples collected 40 (47.6%) were positive for *Candida* and 44 (52.4%) were negative. Out of which swab isolated 30 (75%) *Candida* and oral rinse 26 (65%) of *Candida* with *p* value of 0.46.

DISCUSSION

In HIV, patient's oral health is considered as an important guideline as it divulges the immune status of an individual.¹¹ HIV patients are prone to 64–80% of oral disorders in which oral candidiasis occurs in 17–43% cases with HIV infection and 90% cases with AIDS.¹² *Candida* is a polymorphic fungus, gram positive, and budding yeast cells, which produces pseudohyphae in culture and in tissues.⁵ As candidiasis is common commensal in the oral cavity, definite diagnosis of candidiasis is carried by invasion of the tissue by *Candida*. In a recent study, they stated that patients with oral candidiasis have 2.5 times greater risk of progression to AIDS than those who are not with oral candidiasis.¹³ Fungal infection is the first sign or symptoms of HIV disease and at times it may be the patient's chief complaint. It extends directly from the oral cavity to other sites in the host and makes immunocompromised patients more prone for transmission.¹⁴ Microbiological diagnosis is carried when clinical diagnosis requires confirmation in order to differentiate primary candidiasis. It is identified by smear, stain, 10% KOH, and by culturing in SDA.¹⁵ Though there are multiple techniques to isolate such as swab, rinse, smear, and imprint culture, the present study is intended to isolate the efficacy of *Candida* isolation from oral swab and oral rinse and to find out which of these technique would demonstrate more isolation of *Candida* species. Thereby, 84 HIV seropositive patients samples are collected individually from oral swab as well from oral rinse. The procedure involves gently rubbing lesional areas with sterile cotton inoculating into SDA for *Candida* growth at 37°C for 48 hours. Simultaneously, concentrated oral rinse is done by asking the patients to hold 10 mL of sterile buffered saline for 1 minute in the oral cavity. Followed by centrifuging, the sample is incubated for 24–48 hours at 37°C in SDA and assessed for *Candida* colonies. In our study, oral swab yield more positive

colonies compared to concentrated oral rinse; however, the *p* value was statistically significant.

CONCLUSION

No single technique is enough to isolate yeast in order to generate universal comparable sampling method is standardize. Though hi-tech techniques are available, still the gold standard techniques such as oral swab and oral rinse are found to be more effective and can be followed in the routine.

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