Comparison of two sampling techniques for quantitation of oral yeast levels

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Introduction

Quantitative culture techniques that estimate the magnitude of oral reservoirs of bacteria or fungi have utilized methods that enumerate colony forming units (CFU) per milliliter of saliva or rinse solution.[1-4] This technique requires the subject population's cooperation in rinsing and/or expectorating, so it generally is not successful with children younger than 5 years old.

A technique for young children that accurately measures the relative magnitude of oral reservoirs of *mutans* streptococci employs a tongue blade saturated with the patient's saliva and pressed onto a specific area of a selective agar medium.[5-7] The number of CFUs of *mutans* streptococci that grow on the selective medium accurately quantifies the relative magnitude of the oral reservoir of these organisms. This approach helps to quantify oral *mutans* streptococci reservoirs in young children, but we question its use for quantifying oral yeast populations. Yeasts form larger colonies than *mutans* streptococci and the greater potential for confluent growth may cause inaccurate counts. The purpose of this report was to compare a modified "tongue blade" technique for quantifying oral yeast reservoirs with one using rinsing/expectorating.

Methods

The study sample consisted of 72 consecutive adult patients admitted to the Washington Hospital Center for treatment of complications associated with human immunodeficiency virus type 1 (HIV-1) infection. Adult HIV-1 patients were chosen because of the high frequency of varying oral yeast counts and because of their willingness to cooperate with efforts to obtain specimens by both sampling methods. A sterile filter paper disk (12 mm diameter) was placed on the dorsal surface of the tongue of each subject for 10 sec and then transferred to a vial containing 1 mL of sterile 0.9% NaCl without bacteriostatic agents. Each subject then rinsed with 10 mL of the same saline solution for 10 sec and expectorated into a sterile cup. All samples were processed within 2 hr of collection. The disk samples were vortexed for 10 sec before the culture. Aliquots of undiluted and serially diluted samples were plated in duplicate to Pagano Levin agar® (Difco Laboratories, Detroit, MI) containing 100 μg/mL 2,3,5 triphenyl tetrazolium chloride (Sigma Chemical Company, St. Louis, MO) and 50 μg/mL gentamicin. Cultures were incubated for five days at 35°C under aerobic conditions. Sample dilutions yielding plate counts between 10 and 300 colonies were used to determine the number of yeast per mL of sample; counts on duplicate plates were averaged and arithmetically converted to CFU/mL of sample. Yeast isolates were identified as *Candida albicans* by demonstrating a positive germ tube test. Isolates yielding a negative germ tube test were identified by the API 20C assimilation panel (API, Plainview, NY).

Results

Yeasts were not detected in 26 patients; the remaining 46 patients harbored yeasts in both the disk and rinse samples. Cultures of 33 patients yielded growth of *Candida albicans*. Ten additional patients harbored *Torulopsis glabrata*, two patients *C. lusitaniae*, and one patient *C. krusei*. The latter three species are all recently recognized opportunistic pathogens of immunosuppressed patients.[8-11] The range, mean, and median colony counts (CFU/mL) from the eluted disk and rinse samples are presented in the Table. Comparison of counts (CFU/mL) from the two sampling techniques demonstrated a very high correlation (r = 0.97 [Spearman rank correlation coefficient]).

Discussion

This finding (r = 0.97) indicated that the disk sampling technique may help quantify the relative magnitude of oral yeast populations in certain patients at risk for oral yeast infections (e.g., HIV-1 infected infants, or young, post-organ transplant children). Accordingly, using this technique for longitudinal monitoring may

Table. Yeast colony count results*

	Disk Count (CFU/mL)	*Rinse Count (CFU/mL)*
Range	20 – 680,000	30 – 520,000
Median	1140	5500
Mean	46,151	50,753

* Data reflect the 46 samples which yielded growth of yeasts.

provide a useful outcome measure for clinical trials that assess the efficacy of antifungal agents. The technique would be useful in infants and young children who may not be able to rinse and expectorate.

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Report documents first case of "acquired uncombable hair"

Condition is caused by odd-shaped hair shafts

A condition exists that results in hair that is impossible to comb or manage, according to a letter in a recent issue of the AMA's *Archives of Dermatology*.

Christine A. Kuhn, MD, and colleagues at the Cleveland Clinic Foundation, Cleveland, Ohio, describe the first case in which the condition called uncombable hair developed in an adult.

More than 50 cases of congenital uncombable hair syndrome have been reported since it was first described in 1973, and the letter reports the first documented case of acquired uncombable hair, that of a 39-year-old woman.

The condition, also known as spun glass hair, is a unique syndrome characterized by dry, course, *blond-to-light-brown* hair that has a spangled appearance. Researchers have described the hair as having a triangular or kidney-bean shaped cross section or longitudinal grooving of hair shafts under electron microscope examination.

The condition is characterized by wildly disordered appearing hair that stands straight out from the scalp and is extremely resistant to combing. The hair has a slow to normal growth rate, is normal in quantity and length, and is not brittle or easily broken. There is speculation that the syndrome may have been the inspiration for "Struwwelpter," a traditional German fairy tale about a boy with unruly hair who never had combed it.

The usual reported age of onset ranges from three to 12 years, but, in their letter, the doctors say it developed in a 39-year-old woman who was given a diuretic (spironolactone) for treatment of alopecia (loss of hair) after three months.

They describe the case: "During the next three months, the patient experienced decreased scalp hair shedding and regrowth of scalp hair, which was different in character form her original hair. Her new scalp hair was dry, coarse, curly, and virtually impossible to comb because it was tangled. Wetting conditioners would not lead to improvement. Her hair growth was slow, and, although her hair was fine, no increased fragility was noted. She never before had such difficulties. Her eyebrows, eyelashes, fingernails, toenails, teeth, and skin were normal."

The researchers conclude: "Our report suggests that clinicians consider the possibility of structural hair abnormalities when evaluating adults with hair disorders."