

## Buccal Cavity Protozoa in Patients Referred to the Faculty of Dentistry in Tehran, Iran

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(Received 21 May 2006; accepted 2 Oct 2006)

### Abstract

Buccal cavity as a compound ecosystem has always been ignored in parasitic infection studies; however it seems that studying on mouth and tooth prevalent parasitic infections is of great importance. In this study, from 120 patients of both sexes referred to Faculty of Dentistry, Tehran University of Medical Sciences, Iran, (2001-2002) 240 samples were taken from the plaques and calculus of depth of tooth and gum pockets. Wet-mount technique is regarded as the best and quickest diagnostic method for *Trichomonas. tenax* while *Entamoeba. gingivalis* is best diagnosed by Trichrome vitelli staining method using Bovin fixative. 41.7% and 9.2% of the cases were infected by *Entamoeba. gingivalis* and *T.tenax*, respectively, while 3.3% were infected by both parasitic protozoa. Infection to mouth amoeba was more prevalent in males at the age of 21-30 yr old while no relation was found between age/sex as to infection with *Trichomonas. tenax*. Accordingly, a direct relation was found between the frequency of the parasites and some factors such as periodontal tissue condition, degree of gum bleeding and inflammation, gum color and tooth decay.

**Keywords:** Buccal cavity, Parasitic infection, *T. tenax*, *E. gingivalis*, Iran

### Introduction

Buccal cavity as a compound ecosystem has always been ignored in parasitic infection studies. The researches done on mouth and tooth parasites are very limited and have been conducted only in a few countries. These studies revealed the existence of two parasitic protozoa called *E. gingivalis* and *T. tenax*.

*E. gingivalis* belongs to Entamoebidae family and sub-order of Tubulinae (1, 2). This parasite is found only in trophozoite form, which varies from 5-35 µm (1, 3-5). The parasite phagocytes not only are bacteria and other organisms but also red blood cells and leukocytes. Like *E. histolytica*, the karyosome is located in the center and like

*E. coli* is big. Morphologically, this protozoan is similar to *E. histolytica* and diagnosis requires enough attention so that this protozoan could be differentiated from *E. histolytica* released from long abscesses. This amoeba has a large number of pseudopodia. This parasite inhabits around teeth and gums, even in the space between teeth and especially in decayed teeth cavities (4, 6-10).

In some cases, it has been isolated from tonsil crypts and tonsil tissue sections (1, 6, 7). Vagina and uterus are regarded as suitable growth media for the organism (11). Among different ways of transmission, we can mention close contact, contaminated food, dishes, and mouth droplets. The prevalence rate in patients suf-

fering from pyorrhea varies from 55% to 86% (6, 12). The prevalence rate is in relation with age and sex. The prevalence rate reported in Japan and the Czech Republic are 9% and 8-30%, respectively (5, 12). According to some studies, this amoeba is considered as an important cause of periodontal diseases (4, 8, 13, 14). It causes gum itch, palate sore, unpleasant smell of mouth, fatigue, severe headaches, and periodontal tissue damage.

*T. tenax* is one of Trichomonadidae family members (1, 2). The flagellated organism is only found in the form of trophozoite and its size varies from 5-12  $\mu\text{m}$  (6). *T. tenax* and *E. gingivalis* are both mouth inhabitants but *T. tenax* is more active. *T. tenax* and *E. gingivalis* are transmitted through the same ways but *T. tenax* remains viable in water for a few hours to a few days (15). The infection rate to *T. tenax* differs from 0-20% depending on mouth hygienic condition (6). The prevalence of *E. gingivalis*, *T. tenax* and the mixed infection has been reported as 39%, 23%, and 17.7%, respectively (16). There is also one report of lung trichomoniasis (17) Epl cell, red blood cell and leukocyte lyses by the parasite (9). The aim of this study was to determine the frequency of buccal cavity protozoa in patients referred to Faculty of Dentistry, Tehran University of Medical Sciences, Iran.

### Materials and Methods

In this study, 120 patients, referred to Faculty of Dentistry, Tehran University of Medical Sciences, Iran, were chosen by convenience probability sampling. At first, they were asked to fill in a questionnaire about the disease. Deep parts of periodontal pockets and decayed tooth cavities were targeted. Sampling was done by dental court and then the plaque depth

was measured by periodontal probe.

To study the samples, direct method was applied. The samples were studied under microscope while floating in saliva and in the absence of distilled water (every substance but saliva will change parasite structure). Different staining methods were applied after the samples were fixed (Trichrome vitelli, papanicola, Gram, Giemsa and Modified Giemsa staining). Each method had its own disadvantages (Change in morphology and structure of the parasite, wrong diagnosis, and so on) and advantages. For example, using PVA fixative the parasite was observed in a smaller and intracellular accessories were unclear or in papanicola staining method, *T. tenax*, flagella and its undulating membrane were not distinguished.

Trichrome staining using Bovine fixative is the best diagnostic method of *E. gingivalis* but wet-mount is suitable for *T. tenax* due to its motility (4).

### Results

87.9% of the patients needed plaque removal. 41.7% and 9.2% were infected by *E. gingivalis* and *T. tenax*, respectively and 3.3% were diagnosed infected with both protozoa.

Although no relation could be established between sex and the frequency of the parasites, the infection was more prevalent at the age group of 21-30 yr old (Table 1).

Among factors, which give rise to infection, was low hygienic condition of mouth and tooth. A relation was found between smoking and infection to *E. gingivalis*, which did not apply to *T. tenax*. The infection to the parasites was more likely in patients with gum diseases (gingivitis, gum bleeding). Such relation was found between the frequency of the parasites and the degree of tooth decay and tooth plaque.

The relation between the frequency of the parasites and the antibiotic dose taken, tooth anatomical location, gum and mouth inflammation degree was studied. In the

first two cases no relation was found to infection rate while for two latter was found related ( $P < 0.001$ ).

**Table 1:** Frequency of infection with mouth protozoa considering age (year) in patient and healthy men/women

Age (yr)	Under 20		21-30		31-40		41-50		Over 51		Total	
	frequency	%	frequency	%	frequency	%	frequency	%	frequency	%	frequency	%
Patient/ female	3	8/6	12	42/9	11	40	2	8/6	-	-	28	100
Patient/ male	1	3/6	21	65/5	7	23/6	1	3/6	1	3/6	31	100
Healthy/female	6	22/1	12	42/9	7	23/4	1	3/9	2	7/8	28	100
Healthy/ male	5	17/4	20	63	6	15/1	1	2/7	1	2/7	33	100

## Discussion

In this study, high prevalence rate of mouth protozoa especially *E. gingivalis* shows that infection to *E. gingivalis* is related to factors involved in mouth hygiene, among which we can mention especial habit (smoking), periodontal tissue condition, gum bleeding degree, decayed and loose teeth, the number of calculus formed in mouth, gum inflammation degree, gum color and periodontal pocket depth from which sample has been taken. Prevalence rate of infection to *E. gingivalis* is related to age. The infection is rarely found in fewer than 20 yr old but at the age of 21-30 yr, the frequency is at its peak. In females, since dental and mouth care is more respected, the infection to *E. gingivalis* is less prevalent (12).

High prevalence of mouth amoebiasis in the study represents poor food hygiene and wrong social habits concerning food consumption in our society. The infection is transmissionable through contami-

nated dishes, contaminated food, direct transmission through contaminated mouth droplets and kissing. The prevalence rate of mouth amoebiasis will definitely remain as high as it is unless there is change in our wrong social habits.

High infection rate to *E. gingivalis* in patients who suffer from gum diseases in comparison with its low infection rate in healthy people could be alerted to dentists to take the parasite and its pathogenesis into consideration.

Since infection to *T. tenax* is less prevalent, it is not as important as *E. gingivalis* (16). Infection to *T. tenax* is related to periodontal tissue condition, gum bleeding degree, tooth inflammation and decay degree, but is not related to sex and age. On the other hand, its low prevalence rate shows its sensitivity to mouth conditions and this way of transmission is not common for this parasite (12).

As the conclusion, the following items are considered of importance:

1. Paying more attention to prevent of

mouth amoebiasis and trichomoniasis and teaching food hygiene.

2. Dentists should be warned of mouth protozoa especially in patients with gum diseases who are resistant to typical treatment.
3. Cooperation between dental clinics and laboratories in diagnosing parasitic infections.

To diagnose *T. tenax* and other mouth protozoa pathology departments are recommended to apply wet-mount for all the samples taken from respiratory tract and around mouth.

### Acknowledgments

This study was supported by Iran University of Medical Sciences. Miss. Nooshin Rahnama (MSc of Parasitology) and Miss Samaneh Hamedani (Laboratory Sciences expert) efforts in preparing and editing the article are greatly appreciated.

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