The Frequency of Infections by Oral Protozoa in Budapest

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The protozoan species Trichomonas tenax Müller, 1773, and Entamoeba gingivalis Gros, 1849, parasitize the human oral cavity. Much information was published on their distribution by BRUMPT (2), DOFLEIN et REICHENOW (4), FAUST et RUSSEL (6), HEGNER (8), JIROVEC (10), LŐRINCZ (11), and ZOLTAI (15), but the clinical and public health importance of oral protozoa is as yet insufficiently investigated.

Frequencies of 30-73 per cent of infection by E. gingivalis were demonstrated in populations examined respectively by ABDULABEKO (1), DE CARNERI (3), FISCHER (7), JEPPS (9), JIROVEC (10), POPOFF et al. (12), and WESTPHAL (14). According to HEGNER (8), about one half of the human population is infected by this protozoon. T. tenax, on the other hand, seems to be slightly rarer; DE CARNERI (3), JEFPS (9), JIROVEC (10), and WESTPHAL (13) demonstrated it in only 4-53 per cent of cases examined. HEGNER (8) estimates its frequency around 10-30 per cent.

In Hungary, B. FARKAS (5) investigated oral protozoa at Szeged in 1929-1930. E. gingivalis was found to occur in 42.5% and 52.4%, respectively, of the so-called "matera alba" sampled from the mouth of 73 children and 426 adults. Among the adults, 144 individuals suffered also from dental or oral diseases; the amoeba occurred in 66% of these cases T. tenax occurred less often: in 19.4% of 282 healthy individuals, and in 23.6% of the above cited 144 sick donors. According to FARKAS's investigations, the
incidence of infection by oral protozoa increases with advancing age.

Until now, no data were available on protozoal infections of the mouth with regard to the population of Budapest. Since no generalizations can be made or inferences drawn from the results of observations, made by various techniques and in different countries, on oral protozoal infection of the inhabitants of Budapest, I have analysed data obtained from the examination, commenced in 1963, of 741 individuals. I have attempted to form a picture of the frequency of oral parasites and of the distribution of infections according to sex, age, and the state of oral hygiene.

**Method.** The research material consisted of the oral secretion of individuals living, or having resided for some time, in Budapest. Part of the material was obtained from patients treated during the free consulting-hours in local dental surgeries, and part was specially collected from various individuals and groups. On the label of each sample, the state of oral hygiene was indicated by the symbols 0 = mucous membrane healthy, dentition healthy; I = mucous membrane healthy, caries; II = gingivitis; III = stomatitis ulcerosa. Secretion samples were taken by a depurator from the alveolus, the gingival sacculum, the gingiva, carious teeth etc., and immediately inoculated into liquid CRAIG medium (15). To the pre-heated media, one loop of finely powdered sterile rice starch was added prior to inoculation. Cultures were incubated at 37°C for 72 hours but checks were made every 24 hours.

**Results.** Of the 741 examined individuals, 560 (75.5 %) were infected by mouth protozoa.

Of the infected persons, 53.4 %, i.e., 297 individuals, were infected by one protozoan species only. *E. gingivalis* occurred in 235, *T. tenax* in 62, cases. On the other hand, both *E. gingivalis* and *T. tenax* occurred in 263 individuals, i.e. in 46.6 % of the infected patients. *E. gingivalis* was therefore recovered from 61.7 % (498 individuals), *T. tenax* from 38.3 % (325 individuals), of the infected persons. In agreement with published data, it
seems that *E. gingivalis* is 20% more frequent than *T. tenax* in Budapest also.

Of the 352 males and 389 females examined, 77.6% of the former and 73.3% of the latter were infected by mouth protozoa. The occurrence of only one species of the respective protozoa was more frequent in males (males: 44.9%, females: 35.2%), dual occurrence was slightly more frequent in females (females: 38.1%, males 32.7%).

Data were also grouped according to age (Table 1). With due attention to the physiological and pathological state of the teeth - e.g. complete eruption of the permanent teeth, stagnation, aging - three age groups were formed: 1-20 years, 21-40 years, and older than 41 years. Infections of 62.7% were found in group 1, 75.6% in group 2, and 83% in group 3, corroborating the statement that the frequency of infection by mouth protozoa also increases with age. Mouth protozoa spread with the oral secretion by means of contact; most infections probably occur during adolescence (16-20 years).

A similar increase in the frequency of infection was found when grouping the data according to grades of oral hygiene (Table 2). Infection was demonstrable, in the case of healthy mucous membrane and teeth (group 0), in 63.7% of individuals examined, and in

<table>
<thead>
<tr>
<th>Age group - Korsóport</th>
<th>Number of individuals - Vizsgált személyek száma</th>
<th>Number of infected persons - Pertőzött személyek száma</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-20 years éves</td>
<td>153</td>
<td>96</td>
<td>62.7</td>
</tr>
<tr>
<td>21-40 years éves</td>
<td>357</td>
<td>273</td>
<td>75.6</td>
</tr>
<tr>
<td>41- years éves</td>
<td>231</td>
<td>191</td>
<td>83.0</td>
</tr>
</tbody>
</table>
Table 2

The frequency of mouth protozoa according to oral hygiene - Szájprotozoonok előfordulásának gyakorisága a szájhigiéne foka szerint

<table>
<thead>
<tr>
<th>Rate of oral hygiene - Szájhigiéne foka</th>
<th>Number of individuals - Vizsgált személyek száma</th>
<th>Number of infected persons - Fertőzött személyek száma</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>group 0</td>
<td>102</td>
<td>65</td>
<td>63.7</td>
</tr>
<tr>
<td>group I</td>
<td>205</td>
<td>134</td>
<td>65.4</td>
</tr>
<tr>
<td>group II</td>
<td>246</td>
<td>198</td>
<td>80.5</td>
</tr>
<tr>
<td>group III</td>
<td>178</td>
<td>153</td>
<td>86.0</td>
</tr>
</tbody>
</table>

the case of healthy mucous membrane and the presence of some carious teeth (group I), in 65.4 %. The increase was considerably higher in group II (gingivitis) and III (stomatitis-ulcerosa): 80.5 % and 86.0 %, respectively. The evidence implies that it is not the teeth but the mucous membranes — and mainly diseased ones — which are a suitable substrate and medium for the mouth protozoa, favouring their introduction and proliferation.

The examinations also resulted in observations concerning the technique of demonstrating oral protozoa. It was found that reliable demonstration of infection turns on careful sampling. In the case of a rather careless sampling, only 33 % infection was demonstrable in a community of individuals. Having repeated the sampling by a suitably careful technique, the number of infections increased to 73 %. According to our observations, the time of sampling is immaterial but should be prior to eating or the brushing of teeth.

WESTPHAL's (14) statement that culture is the most suitable method of demonstrating mouth protozoa found ample corroboration also in our experiments. For the culture of both *E. gingivalis* and *T. tenax*, the easily producible CRAIG medium and all mono- or biphasic substrates are suitable; they are favourable also for *E. histolytica*. It is advisable to check the cultures after 48 hours; only
about 70% of the actual infection can be shown after incubation for 24 hours, whereas in cultures incubated for 72 hours a certain decrease is to be expected owing to changes in pH values of the medium and the ageing of the amoebas.

Acknowledgement. For his valuable support in organizing sampling, I am greatly indebted, and dedicate this paper, to the late (1966) Dr. D. KECÉRY, dental specialist of the polyclinic at Gyöngyösi ut, Budapest XIII.

Summary

Of the 741 residents of Budapest examined, 560 persons, i.e., 75.5%, were found to be infected by oral protozoa. Cultures of *Entamoeba gingivalis* showed a frequency of 61.7%, that of *Trichomonas tenax* 38.3%. In 53.4% of the infected persons only one, in 46.6% both, protozoa occurred; 77.6% of males, and 73.3% of females were infected. One protozoan species caused infection in 44.9% of males and in 35.2% of females; both protozoa occurred together in 32.7% of males and 38.1% of females.

With advancing age or deterioration of oral hygiene, the number of infections by mouth protozoa increases (Tables 1 and 2).

The author considers careful sampling the basis of reliable mouth protozoa investigations, and culture the best method of demonstrating the parasites.

ARADI, M. P.: Szájprotozoon-fertőzés gyakorisága Budapesten

Budapest lakosságának szájprotozoon-fertőzéséről eddig nem voltak adatok, ezért a szerző 741 budapesti személy vizsgálata alapján adatokat szolgáltat a szájprotozozonok gyakoriságáról, továbbá a fertőzés megoszlásáról nem, életkor és a szájhigiéne állapota sze-
Vizsgálati anyagát részben fogászati szakrendelésre jelentkező személyek szájaváladéka, részben kizárólag e célból vizsgált személyek szaj- és fogkaparéka szolgáltatta, amelyet depurátorral, igen gondosan gyűjtöttek, majd Craig-féle táptalajon te- nyésztéssel vizsgáltak.

A vizsgált személyek közül 560 (75.5 %) volt szájprotozoonokkal fertőzve. Entamoeba gingivalis a minták 61.7, Trichomonas tenax a minták 38.3 %-ából volt kitenyészthető. A fertőzött személyek 53.4 %-ából csupán az egyik, 46.6 %-ából azonban mindkét szajprotozoon kimutatható volt.

A férfiak 77.6 %-a, a nők 73.3 %-a volt fertőzött. A férfiak 44.9 %-ában, a nők 35.2 %-ában egy protozoon-faj okozta a fertő- zést, a férfiak 32.7 %-ában, ill. a nők 38.1 %-ában azonban a két faj együttesen fordult elő.

Az életkor emelkedésével a fertőzések száma növekedik (1. tábl.). Az 1-20 évesek korcsoportjában 62.7 %, a 21-40 évesek csoportjá- ban 75.6 %, a 41 évesnél idősebbek körében pedig 83.0 % volt a szajprotozoon fertőzés gyakorisága. A fertőzések zöme a 16-20 éves korra, vagyis a serdülő korra tehető. Összefüggés tapasztalható a szájhigiéne állapota és a szajprotozo- zoonok gyakorisága között is (2. tábl.). Ép nyálkahártya és ép fogazat ("0") esetén 63.7 %; ép nyálkahártya és caries ("I") esetén 65.4 %; gingivitis ("II") esetén 80.5 %; stomatitis ulcerosa ("III") esetén 86.0 % volt a szajprotozoon fertőzés gyakorisága.

A szerző a megbizható szajprotozoon-vizsgálat alapjának a gondos anyagvétel, legjobb módszerének pedig a tenyésztést tartja.

Referencias

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