

RESEARCH ARTICLE

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STUDY OF DENTAL PULP LESION IN HUMAN ASSOCIATED WITH INFECTION OF *ENTAMOEBIA GINGIVALIS* AT BASRAH CITY/ SOUTHERN IRAQ

ABSTRACT:

A histopathological study on human nerve root with pulp lesion at Basrah city/ southern Iraq was carried out. Five cases were selected from a total of one hundred patients who suffered severe pain due to toothache and complicated by tooth nerve root lesions associated with infection by *Entamoeba gingivalis*. Evidence of degenerate vacuolated nerve fibers associated with crystalloid deposits was noticed. There was also chronic inflammatory reaction containing mononuclear cells and fibrosis.

KEY WORDS:

Entamoeba gingivalis, buccal cavity, dental pulp, parasitological investigation.

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INTRODUCTION:

Buccal cavity as a compound ecosystem has always been ignored in parasitic infection studies. Studies done on mouth and tooth parasites are very limited and have been conducted only in few countries (Gharavi *et al.*, 2006). *Entamoeba gingivalis* and *Trichomonas tenax* are human buccal protozoan parasites, live in the dental tartar, in the necrotic cell mucosa of the mouth and the gingival fringes of the gums (Feki and Molet, 1990).

Entamoeba gingivalis belongs to family Entamoebidae and sub- order Tubulinae (Albert *et al.*, 1988; Gharavi, 2004). This parasite is found only in trophozoite form, varies from 5-35µm in size (Dao *et al.*, 1983). The parasite *E. gingivalis* phagocytose not only bacteria and other organisms but also red blood cells and leukocytes. Similar to *E. histolytica*, *E. gingivalis* has the karyosome located in the center and makes it like *Entamoeba coli* (Gharavi *et al.*, 2006).

This parasite inhabits the area around teeth and gums, even in the space between teeth and especially in decayed teeth cavities (Dao *et al.*, 1983). But Gharavi (2004) isolated *E. gingivalis* trophozoites from tonsil crypts and tonsil tissue sections. Jian *et al.* (2008) reported that *E. gingivalis* is a parasitic protozoan of the oral cavity, most often in gingival tissues around the teeth associated with poor oral hygiene. Among different ways of transmission of *E. gingivalis*, it can cause contamination by close contact, contaminated food, dishes and mouth droplets (Wantland and Laver, 1970). *E. gingivalis* cause gum itch, palate sore, unpleasant smell of mouth, fatigue, severe headaches and periodontal disease (Lyons *et al.*, 1983; Linke *et al.*, 1989).

The aim of this study was to analyze the relation between infection with *E. gingivalis* and damage nerve roots as pathological changes from patients suffering from heavy teeth pain and the dentist decided to cut off the nerve roots from some teeth in one

clinical dentistry study at Basrah city southern Iraq.

MATERIAL AND METHODS:

A total of one hundred swaps from human mouth which came to the clinical dentistry for different reasons, were rinsed in normal saline and processed according to the method of Al-Azizz *et al.* (2009) then examined for the presences of *E. gingivalis* trophozoit.

Patients with positive *E. gingivalis* suffering from heavy teeth pains and the dentist recognized the nerve root of one or more teeth was damaged and must be cut off. So, nerve root was cut, fixed in 10% formalin, and processed according to the method of Annpreece (1972) for histopathological sections, and stained with Eosin-Haematoxyline stain.

RESULTS:

In this study five nerve root samples from one hundred affected nerve root damage patients were associated with sever pain and the mouth content was positive for *E. gingivalis* (more than 50 trophozoites per mouth).

Detailed analysis of the histopathological changes showed degenerate/ vacuolated nerve fibers in adjacent to granulomatous inflammatory reaction (Figs 1&2).

Other reactions as areas of vacuolated / degenerate nerve fibers associated with deposits of crystalloid materials were observed (Figs 3-5). Figures 6-8 demonstrate varying degrees of degeneration and vacuolation of nerve fibers with many grades of concentrated deposits of crystalloid materials. Also, the vacuolated degenerate nerve was enclosed by granulomatous inflammatory reaction of mononuclear cells and fibrosis (Fig. 9).

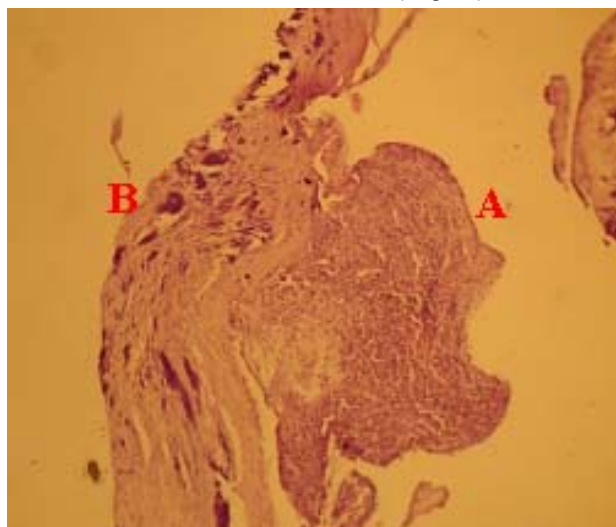


Fig. 1. Photomicrograph of a transverse section of dental pulp lesion showing granulomatous inflammatory reaction (A), in adjacent degenerate nerve fibers and crystalloid material (B), 125X.

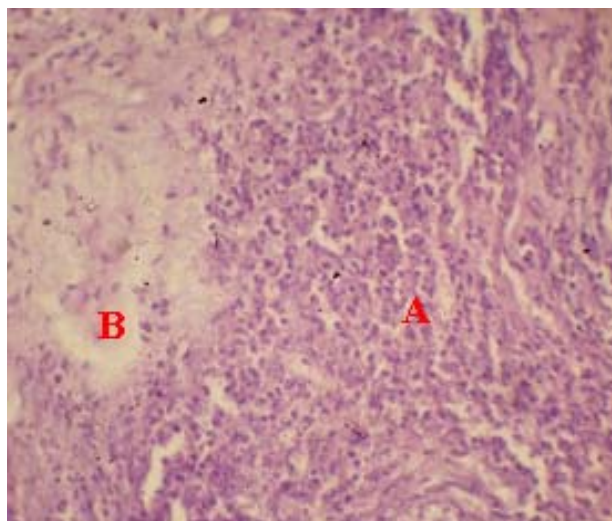


Fig. 2. High magnification of a transverse section of dental pulp lesion showing granulomatous inflammatory reaction (A), in adjacent degenerate nerve fibers (B), 500X.

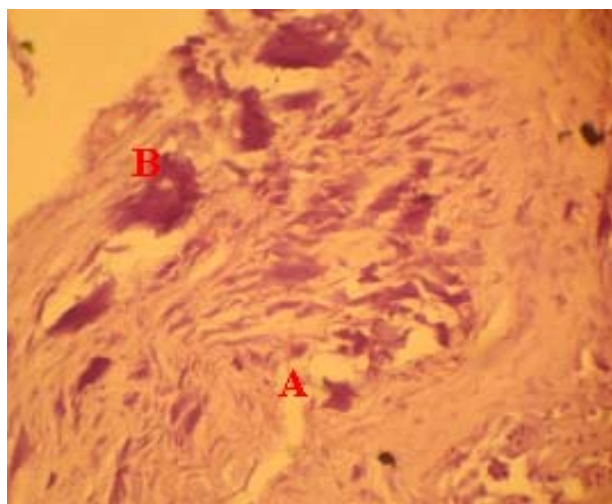


Fig. 3. Photomicrograph of a transverse section of dental pulp lesion showing degenerate vacuolated nerve fibers (A) note presence of crystalloid materials (B), 500X.

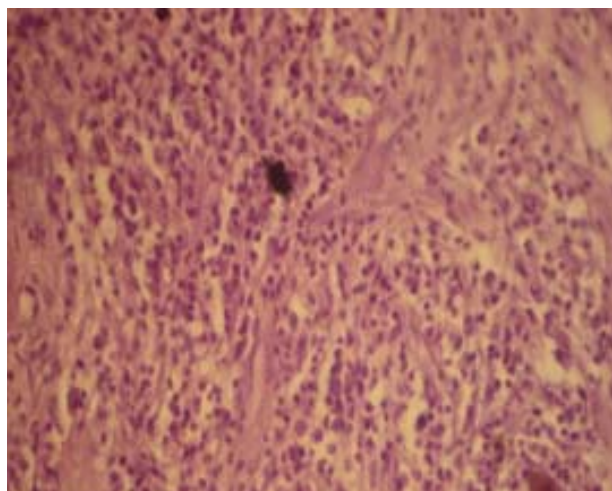


Fig. 4. A high magnification of granulomatous inflammatory reaction showing mononuclear cells and fibrosis, 500X.

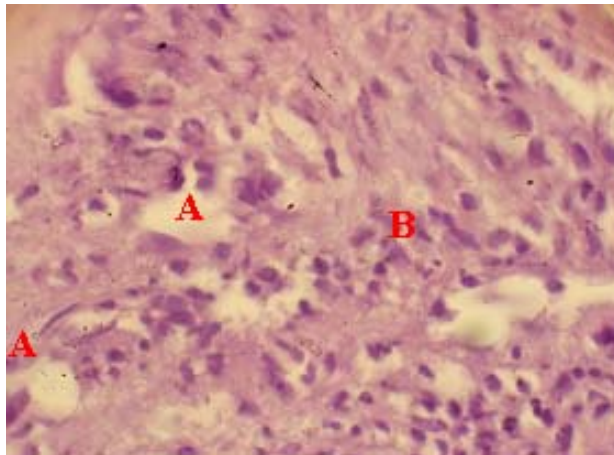


Fig. 5. Photomicrograph of a transverse section of dental pulp lesion showing degenerate vacuolated (A) nerve fibers in association with few inflammatory cells (B), 1250X.

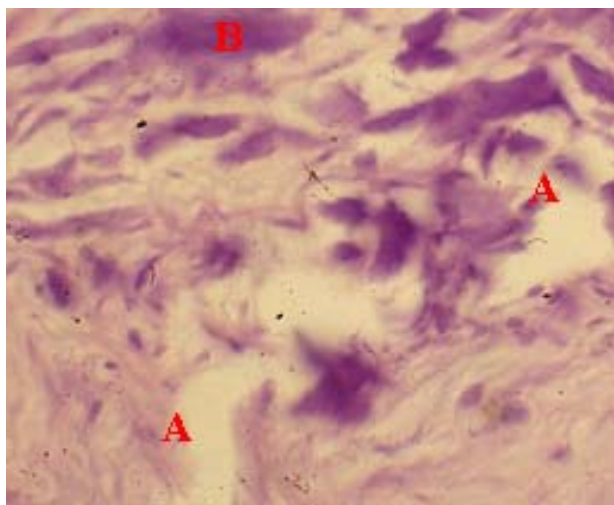


Fig. 6. High magnification of degenerate vacuolated nerve fibers (A) in association with crystalloid materials (B), 1250X.

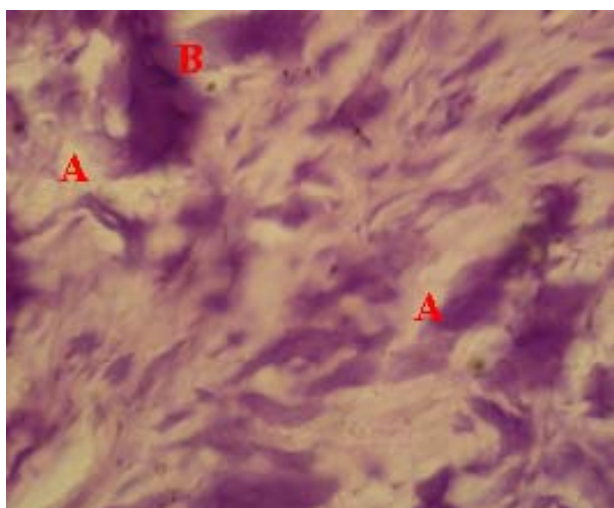


Fig. 7. Photomicrograph of a transverse section of dental pulp lesion showing degenerate vacuolated nerve fibers (A) in association with crystalloid materials (B), 1250X.

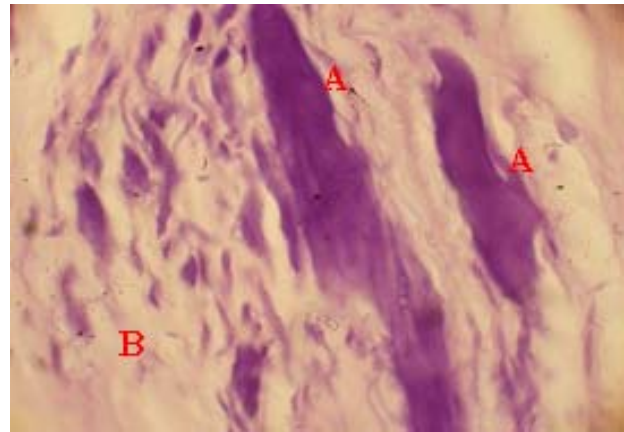


Fig. 8. Photomicrograph of a transverse section of dental pulp lesion showing significant amount of crystalloid materials (A) in association with degenerated vacuolated nerve fibers (B), 1250X.

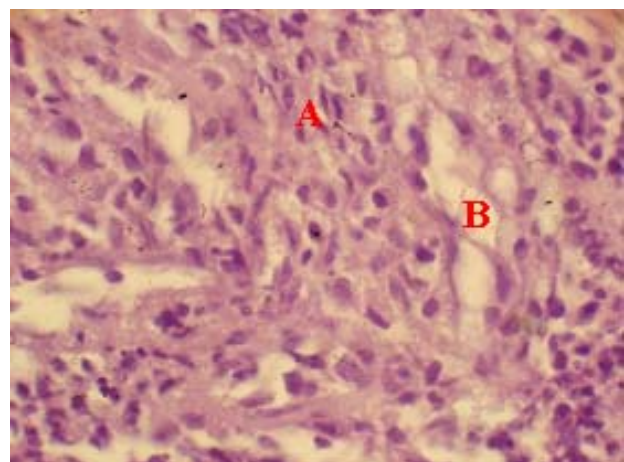


Fig. 9. Photomicrograph of a transverse section of dental pulp lesion showing granulomatous inflammatory (A) reaction inclosing degenerate vacuolated nerve fibers (B), 1250X.

DISCUSSION:

Some investigators believed that *E. gingivalis* is an agent which causes periodontitis, while others consider it opportunist capable of survival in the medium induced by periodontal disease (Elazzouni and Elbrady, 1994).

The present study showed a clear damage with pathological changes in the nerve root in mouth of patients with high number of *E. gingivalis* trophozoites in their mouths. This damage revealed that the trophozoites of *E. gingivalis* had a drastic reaction due to their metabolic activity, feeding and movement in the mouth. Dao *et al.* (1983) studied the frequency of *E. gingivalis* in human gingival scrapings and confirmed the presence of *E. gingivalis* in gingiva that cause the tooth nerve root lesion that was also confirmed by Gharavi *et al.* (2006) who recorded *E. gingivalis* in smears.

Furthermore, in support to the present study, (Linke *et al.* (1989) cleared that *E. gingivalis* present in patients with advanced periodontal disease and correlated the tooth nerve root lesions with *E. gingivalis* induced injury.

In addition Lyons *et al.* (1983) investigated oral amebiasis with the role of *E. gingivalis* in periodontal disease which further support to the present results as the tooth nerve lesion associated with the presence of infectious opportunistic *E. gingivalis*. Al-Azizz *et al.* (2009) discussed the epidemiology of parasitic – bacterial infection in people's mouth and support the association of tooth nerve root lesions with the infectious effects of *E. gingivalis*.

Elazzouni and Elbrady (1994) analyzed the frequency of *E. gingivalis* among periodontal lesion in patients under chemotherapy, and proved the opportunistic role of *E. gingivalis* in causing periodontal lesions in patients with suppressed immune system causing the tooth nerve root lesions

as other treatment have more risk to get infection with *E. gingivalis* especially in case of suppressors of immune response.

The presence of *E. gingivalis* in pulmonary abscess was reported by Jian *et al.*, (2008) which give a real health warning. Mouth lesion as the tooth nerve root lesions could be complicated and the infection with *E. gingivalis* may give a health risk as opportunistic infectious agent that can pass from mouth during breathing and cause pulmonary lesion and pulmonary abscess.

In conclusion, the present report confirms the fact that mouth hygiene can be very important for the health of teeth and the ignorance of health matter can progress to give rise to tooth nerve root and pulp lesions, and in advance cases can be hazards, even to the lung as the possibility of breathing *E. gingivalis* resulting in pulmonary abscess.

So, the good oral hygiene is very important in prevention of microbiological and parasitological oral infection.

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دراسة ضرر عصب السن المرتبط بالإصابة بأوالي الفم *Entamoeba gingivalis* في مدينة البصرة، جنوب العراق

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مزمّن مرتبط بتليف في جذور عصب السن ناتج عن تجمع خلايا التهابية وحيدة النواة مع تليف واضح في الألياف العصبية.

المحكمون:

أ.د. محمد عبد الرحمن بشرط قسم علم الحيوان، علوم القاهرة
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أجريت دراسة إمرائية – نسيجية مرافقة لحالة الألم والالتهاب في جذور أعصاب أسنان من الانسان في مدينة البصرة، جنوب العراق. لوحظ في خمسة حالات من اصل مئة مريض يعانون من ألم حاد في الأسنان مرتبط بالتهابات في جذور عصب السن اصابتهم بأوالي الفم. اظهرت الفحوص المجهرية للمقاطع النسيجية دلائل حول وجود تليف وتحلل في الألياف العصبية، وفي حالتين مرضيتين لوحظ تفاعل التهابي