4.2 Periodontal Disease – Etiology, Classification and Diagnosis

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Introduction

Periodontal disease reaches far back into the history of humankind, and can be verified by periodontal lesions in skeletal material of the earliest humans (Loe et al. 1992). Hillson states that diseases are a “part of the ecology of an individual. It represents the impact of the environment and part of the body’s reaction to it […] Disease of the teeth reflect much of what is in the diet. Teeth are in direct contact with all of the diet, but most of the dental disease are related to interactions between diet and microorganisms that live in the mouth” (1986, 283). Although anthropological study has been devoted to periodontal disease for a long time, opinions diverge concerning the progress of periodontopathy through the millennia as well as regarding the diagnosis and findings of periodontal disease (see Lavigne and Molto 1995).

Some anthropologists are of the opinion that periodontal disease has increased since the palaeolithic period, with relative frequency in the Neolithic period and further increases up to the present time (Schranz 1962; Moore and Corbett 1983; Clarke et al. 1986). In the present day, the prevalence of the disease ranges from 75% and 96% (Curilovic et al. 1972; Mutschelknauss 1977). Other anthropologists state that periodontal disease cannot be regarded as an illness produced by civilization, but was already existent in former times (Newman 1974; Bach et al. 1975; Brothwell 1981; Costa 1982; Lange 1983; Hildebolt and Molnar 1991; Loe et al. 1992). Rathbun (1984) reports that the constant part of “periodontoclasia” is about 50–60% (see also Costa 1982). Recently Periera et al. (1994) described the oral condition of three Yanomama Indian tribes of South America. The frequency of periodontal disease (after Ramfjord’s 1967 disease index) is of a usual level in the Yanomama groups (frequencies range between 77 and 94%).

The aim of this paper is to present an overview of the manifestations of marginal periodontal disease from the anthropological point of view. For an understanding and diagnosis of historical findings a specific knowledge of present
day clinical results is imperative. Therefore a description of the anatomic basis as well as etiological questions and clinical results are an essential part of this paper. Only on the basis of modern scientific results can dental/anthropological examinations of periodontal disease make sense and be successful.

Gingival, or beginning periodontal disease, can be easily recognized in the clinical patient, but cannot be verified in osteological material. At first glance this implies that the frequency of periodontopathy was lower in former times (Brothwell 1981; Moore and Corbett 1983), but is additionally the reason why living and historical examinations can only be compared in a limited way.

Many difficulties exist regarding the results of periodontal disease in osteological material: first, postmortal damage caused by ground storage may be found in sensitive alveolar bone (manifestation of decomposition); second, it is difficult to draw conclusions relating bone and soft tissue; third, insufficient findings exist concerning the effect of abrasion on the periodontium; and fourth, standardization regarding the recording of results is lacking (Moore and Corbett 1983; Hildebolt and Molnar 1991). However, “alveolar recession has been used by archaeologists as an indication of the severity of periodontal disease found in populations of former times” (Watson 1986, 123).

Examination of skeletal material offers many advantages: Because of the lack of soft tissue, bone surfaces and the alveolar crest can be interpreted in a precise way; fenestrations, dehiscences, bifurcation and trifurcation involvement and the loss of bone are easier to diagnose and the corresponding measurements are easier to make (Hildebolt and Molnar 1991).

Anatomy of Healthy Periodontium

When examining skeletal material, the clinical connection should never be neglected. Knowledge of the normal biological structure and morphology of periodontal tissue is a precondition for the understanding and recognition of pathological changes.

Under the term “periodontium” four hard and soft tissues are contained: the cementum of the root surface, the alveolar bone, the periodontal ligament and the gingiva. These four elements of the periodontium anchor the tooth in its osseous socket, the alveolus. The periodontium can adapt to functional and topographical changes and forms the contact area with the oral cavity (Schroeder 1992). Unfortunately, in historical material only two of the four elements of the periodontium can be analysed, the alveolar crest and the root cementum.

The cortical plates of the lamina externa of the maxilla and the mandible enclose cancellous bone which is rich in marrow. The alveolar crest, which encloses the alveoli, is a part of the maxilla. The corresponding structure in the mandible is called the pars alveolaris. Tooth sockets (alveoli dentales) are embedded in trabecular cancellous bone and separated by septa (septa interalveolaria). Within an alveolus further subdivisions for multirooted teeth are made by septa interradicularia. At the exterior surface the roots result in prominences called juga alveolaria. The lamina dura (lamina cribriformis) lines the inner surface of the alveolus and consists of cancellous bone perforated like a sieve. On radiographs