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History of the periodontal disease

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Abstract: Periodontal disease has existed for at least 100,000 years, possibly as far back as 3 million. Unlike caries, periodontal disease is a local irritant- and bacteria-induced inflammatory response of the host leading to the destruction of the dental supporting structures.

Keywords: periodontal disease, caries, inflammation, gingivectomy, halitosis, bad breath,

Periodontal disease existed for at least 100,000 years, possibly as far back as 3 million. Unlike caries, periodontal disease is a local irritant- and bacteria-induced inflammatory response of the host leading to the destruction of the dental supporting structures. The earliest evidence dealing with the consequences of advanced periodontal disease comes from 3-4c BCE for tightening loose teeth using gold wire. Such gold wire ligatures are Egyptian from the Ptolemaic period, Greek, Phoenician, or Roman (1).

The 18th c. BCE Ebers Papyrus referred to periodontal disease. It included several remedies for gingivitis and periodontitis using *cow's milk, fresh dates, and uah grain, kept moist and chewed nine times.* In ancient India, the founders of Ayurvedic medicine, Charaka and Sushrata (7th-6th BCE), compiled medical, herbal, and surgical texts to deal with periodontal disease and provided recipes for its treatment. Similarly, the ancient Chinese text, *Nei Ching*, recommends acupuncture for several forms of periodontal disease.

The first to describe the four cardinal signs of inflammation: *tumor, rubor, calor,* and *dolor* was Aulus Cornelius Celsus, a Roman physician (2). Albucasis and Rhazes, Islamic scholars used cauterization of the gums with hot red arsenic and calcium boiled in vinegar inserted with a protective funnel to treat gum disease. Albucasis understood the relationship between calculus and periodontitis and developed a set of scalers for its removal and silver wire to ligate loose teeth to each other (3).

During the Renaissance, Leonello Vittori suggested a topical ointment of chicken fat or chamomile oil mixed with honey. Jacques Guillemeau recommends a touch of "blue water", a mixture of nitric and

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hydrochloric acid for gingival putrefaction. In 1683, Anthony van Leeuwenhoek (1632-1723), an early microscope enthusiast, identified oral spirochetes (4) as one of many "*animalcules*" in saliva.

In his 1660 edition, Lazare Rivière considered periodontal disease due to "*acrid humors causing inflammation and ulcerations leading to scurvy*". Pierre Fauchard suggests cleaning the teeth with instruments (5) and instituting strict oral hygiene as a remedy. Fauchard connected saliva to calculus formation and the consistency of salivary stones. Etienne Bourdet, a contemporary of Fauchard, in 1757, links gingival pocket to periodontal bone loss and suggests a reduction of the excess gingiva using a cautery with a hot iron. Edme FJ Botot suggested a less traumatic approach. He proposed removing calculus and applying camphor oil to the gingiva.

In 1806, Joseph Fox, a London dentist, dedicated six sections of his book to describe gum diseases and a separate section to teeth scaling. For inflamed gums, the period's literature still suggested the placement of 2-3 leeches on the gum.

The symptoms and management of what we call today chronic periodontal disease appeared in a carefully worded, but at the time, very much ignored work of Leonard Koecker. Few dentists took up his treatment. John W. Riggs, Mark Twain's dentist, did. He focused on the treatment of such patients. Hence the name for periodontal disease in the early literature is *"Riggs disease"*.

The microbial connection between pathogens and periodontal inflammation was one of the most important discoveries in the history of periodontal disease. In 1847, Robert Ficinus, from Dresden, observed pathogens in the fibers between the gingiva and cement. The prominent oral microbiologist Willoughby Miller 1890 published the first oral microbiology text, *The Microorganisms of the Human Mouth* (6). Miller proposed the chemo-parasitic nature of caries and proposed the *nonspecific plaque hypothesis,* that local irritants, calculus, food debris, poor hygienic conditions, and multiple nonspecific bacteria were part of the cause.

In 1897 J Leon Williams provided a basic understanding of how plaque can contribute to gingivitis and periodontitis. At the same time, Salomon Robicsek proposed gingivectomy as a form of treatment. The surgical technique was modified and coined "gingivectomy" in 1912 by Henry Percy Pikerill. Over the years, surgical improvements have been adopted, including those of GV Black from Chicago, Robert Neumann of Berlin, and Leonard Widman of Sweden. The interventions removed excess and necrotic soft and hard tissue and provided a refreshed surface for healing and repair.

In the early 20th century, two centers of excellence in periodontal study stand out: Vienna and Berlin. Leo Fleischmann, Bernhard Gottlieb, and later Balint Orban undertook a systematic microbiological and histological analysis of the periodontal pocket advancing the bacterial and chronic nature of the disease. To this, the Berlin school brought the contributors like Oskar Weski. Over the latter part of the 20th century, regenerative techniques that included bone graft or root surface remineralization attempts replaced surgical interventions. Guided tissue regeneration introduced in 1982 proved particularly promising.

Throughout the 20th c., further disease stratification gradually occurred, separating acute from chronic and marginal periodontitis from periodontosis. In 1965 Harold Löe designed experimental gingivitis models. It was the first direct evidence of a cause-effect relationship. As a better understanding of periodontal disease emerged, efforts to provide non-surgical interventions emerged using low-dose tetracycline (doxycycline) as an inhibitor of matrix metalloproteinases (MMP-8). A series of studies by Axelsson started in 1970 on

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prevention in oral health demonstrated that comprehensive plaque control for 6, 15, and 30 years can prevent both periodontal disease and caries.

Management of periodontal disease over the millennia has dramatically changed. The field is evolving from benign neglect to hot iron cauterization to surgical removal to prevention and tissue regeneration. It establishes a systemic connection that should have been apparent for a long time.

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Figure 1. Ebers Papyrus from National Library of Medicine, the image in Public Domain.