Centuries In Periodontology

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Introduction

The Speciality of Periodontics has a long history in civilization, dating back to prehistoric, early middle eastern and Egyptian cultures where there is skeletal and written evidence of periodontal diseases. Ancient Indian and Chinese histories describe scurvy and other conditions and advocate cleansing of teeth for health. On through the Greek and Roman civilizations, through the renaissance and into modern times, disease of the periodontium as well as remedies and preventions were described.

The first independent full-fledged department of Periodontics in an American dental school was created at the New York University College of Dentistry in 1926 as the "Department of Periodontia". Graduate programs in periodontics started in the late 1940's at the University of Michigan, Columbia university and Tufts University as two year training programs. In 1948, the American Dental Association recognized Periodontology as the official speciality. This was only the second such board to be recognized by the ADA, after Oral surgery. Around 1990, the explosion of knowledge in periodontics, implant dentistry, conscious sedation, guided tissue regeneration and other innovations made expansion of graduate programs to three years necessary.

Gingival and periodontal diseases have afflicted humans since the dawn of history. Almost all early writings that have been preserved have sections or chapters dealing with oral diseases, and periodontal problems comprise a significant amount of space in these writings.

Ancient Civilizations

Greece

The practice of oral hygiene was slow in Greece. A disciple of Aristotle, Theophastus wrote that it was considered a virtue to save frequency and to have white teeth. Athenian physician of Aristotles' time, admonished, "Every morning you should rub your gums and teeth with your bare fingers and with finely pulverized mint, inside and outside and remove thus the adherent food particles. Hippocrates of Cos (460-377 BC) was the father of modern medicine. He discussed the function and eruption of the teeth and also the etiology of periodontal disease". He believed that inflammation of the gingiva could be caused by accumulations of pituita or calculus, with gingival haemorrhage occuring in cases of persistant diseases.1,2

Romans

The Romans had a high regard for oral hygiene. They used "dentifricium" - bones, egg shells and oyster shells having been burnt and sometimes mixed with honey, Among the Roman, Auius Cornelius Celsus (25 BC - 50 AD) referred to disease that affects the soft parts of the mouth and their treatment as follows. "If the gums separate from the teeth, it is beneficial to chew unripe pears and apples and keep their juices in the mouth"3

Egyptians

The earliest documented evidence of periodontal diseases among Egyptians is George Ebers Papyri. Dating from about 1550 BC it is not an original work but merely a compilation of many medical texts of still earlier times some written as early as 3500 BC.4

Ancient India

The ancient medical science of the Hindus "Ayurveda" (the science of life) contained descriptions of dental disease as well as remedies for them. The sacred Hindu Veda (4000-3100 BC). in the "Susruta Samhita" there are numerous descriptions of severe periodontal disease with loose teeth and purulent discharge from gingiva. In a later treatise, the "Charaka Samhita", tooth brushing and oral hygiene are stressed. The stick for brushing should be either astringent or pungent or bitter. Both Susruta and Vaghbata speak of the need for removing calculus from the teeth using for the purpose a special instrument with a flat diamond shaped end.5,6

Ancient China

The ancient Chinese approach to medicine included both medical and herbal remedies. Chinese medical writings list 388 acupuncture points, 26 of which are for relief of tooth ache and of these 26, 6 are specifically for gingival maladies.5

In the oldest Chinese medical work written by Hwang - Ti (2500 BC), Oral disease were divided into 3 types:-

1. Fong-ya or inflammatory conditions.
2. Ya kon or disease of the soft investing tissues of the body.
3. Chong ya or dental caries

   One gingival condition. "Ya-Heou" in which the gums were described as red, soft, swollen and a fetid purulent matter exudes from them, the teeth are not painful. In another condition was 'Tcharg-Che-Tong" "Flow of purulent mucous mixed with blood. Bad smelling breath. Tooth falls". The treatment was by draughts, mouth washes.

   The Chinese were among the earliest people to use toothbrush to clean the teeth and massage the gingival tissues.5

Arab Medicine (Islam)

Albucasis (Abul-Qusim: 936-1031) described two specific periodontal procedures. The first was the operation for removal of epulis. The lesion was retracted with rakes or forceps and cut away down the roots. The wound was then cauterized with iron vitriol or another haemostatic. He also described calculus removal in great detail. The instruments consisted of variously shaped scrapers, most of which were double ended. He also wrote in detail on the extraction of teeth, on splinting loose teeth with gold wire and on filing gross occlusal abnormalities.1,7

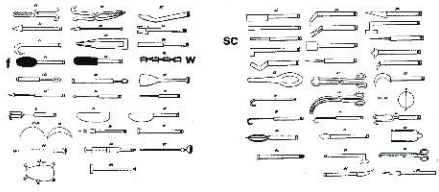


Illustration of Albucasis' periodontal instruments, showing scalers (sc), files (f), and the wiring of loose teeth (w).

The prophet Muhammad and oral hygiene

Muhammad who was born in Mecca about 570, introduced basic oral hygiene into the Arab world by incorporating it into the muslim religion. The prophet also recomended cleaning the teeth with a siwak (or miswak) a twig of the Salvadora percia tree, whose wood contains sodium bicarbonate and tannic acid as well as other astringents that have a beneficial effect upon the gums.7

The Middle Ages

The Middle Ages added little but myth

and superstitions to medical or dental knowledge. Vesalius set the number of teeth as 32 and was the first to note that this number was equal for men and women.

Renaissance

Paracelsus (1493-1541) understood that pathologic calcification occurred in a variety of organs, and he considered these disease conditions to result from a metabolic disturbance whereby the body takes nourishment from ' food and discards the refuse as "tartarus," a material that cannot be broken down and the ultimate matter, or materia ultima. Toothache was thus comparable to the pain produced by calculus in other organs such as the kidneys.

Eustachius's treatment of periodontitis was remarkably modern in that he advised both scaling of calculus and curettage of granulation tissue so that an actual reattachment of the gingival and periodontal tissues could take place. Ambroise Pare (1509-90) understood the etiologic significance of calculus and used a set of scalers to remove the hard deposits on the teeth. The first book written in a common language (German) and specifically devoted to dental practice, entitled Artzrtey Buchlein or Zene Artzne, was published in Leipzig in 1530. The author also suggests scraping black teeth and the use of toothpastes or powders to rub against the teeth.

Anton van Leeuwenhoek (1632-1723) using material from his gingival tissues, first described oral bacterial flora, and his drawings offered a reasonably good presentation of oral spirochetes and bacilli.1, 7

18th Century

Modern dentistry essentially developed in l8th-century Europe, particularly France and England. Pierre Fauchard, born in Brittany in 1678, is rightly regarded as the father of the Dentistry. His book, The Surgeon Dentist, published in 1728, gave respectability to the profession.

a.)Frontispiece of Fauchard's book entitled The Surgeon Dentist (1746 edition).
b.) The five types of instruments used by Fauchard for detaching tartar from the teeth: 1, chisel; 2, parrot beak; 3, graver; 4, convex blade; and 5, Z-shaped hook.

All aspects of dental practice are presented in his book He described in detail his periodontal instruments and the scaling technique to "detach hard matter or tartar from the teeth." Modern dentistry owes its greatest debt to a remarkable Frenchman who synthesized what was known in the west about dentistry and who presented it in an organized form so that all practitioners could benefit.

The eighteenth century ushered in profound changes in the practice of dentistry, the impetus for which came from the scientific discoveries of preceding century. Dentistry ultimately became an independent scientific discipline - not overnight, however but after much painstaking experimentation and dedicated effort on the part of several generations of practitioners.1, 9, and 13

John Hunter (1728-93), the most distinguished anatomist, surgeon, and pathologist of 18th-century England, wrote an excellent treatise on dentistry entitled The Natural History of the Human Teeth, He offered remarkably clear illustrations of the anatomy of the teeth and their supporting structures. He also described the features of periodontal diseases and enunciated the concept of active and passive eruption of teeth. A contemporary of Hunter, Thomas Berdmore (1740-85), published the Treatise in the Disorders and Deformities of the Teeth and Gums in 1770, with several chapters devoted to periodontal problems. The first qualified American dentists were trained in England or France. Robert Woffendale (1742-1828) wrote one of the early dental books in America. John Baker (c. 1732-96) tells the public about importance of removal of tarter. He said that . . . if not timely prevented, eats away the gums so that many people's teeth fall out fresh. . .

19th Century

Leonard Koecker (1785-1850) described inflammatory changes in the gingiva and the presence of calculus on teeth, leading to their looseness and exfoliation. He mentioned the careful removal of tartar and the need for oral hygiene by the patient, which he recommended to be performed in the morning and after every meal, using an astringent powder and a toothbrush, placing the bristles into the spaces of the teeth. Levi Spear Parmly (1790-1859) was a New Orleans dentist who is considered the father of oral hygiene and the inventor of dental floss. The term pyorrhea alveolaris was used for the first time by Alphonse Toirac (1791-1863) in 1823. In the mid-19th century, John W. Riggs (1811-85) was the leading authority on periodontal disease and its treatment in the U.S., to the point that periodontitis, or alveolar pyorrhea, was known as "Riggs' disease." Riggs strongly advocated cleanliness of the mouth because he believed that "the teeth themselves, with their accumulated accretions and roughened surfaces ... are the exciting cause of the disease." He strongly opposed surgery, which at tile time consisted of resection of the gums.1, 11, and 12

Younger (1838-1920) considered periodontal disease a local infection and in 1893, he was the first to discuss the possibility of "reattachment." In 1902, Younger reported a case in which he grafted gingival tissue "from behind the third molar" to an extensive area of recession in an upper cuspid of the same patient. He first treated the root of the cuspid with lactic-acid and then fixed the gum graft with "fine cambric needles," and he claims the operation to have been a success.

Several major developments in medical science occurred in the second half of the 19'" century, starting the era that can be called modern medicine; which of course includes dentistry. The first was the discovery of anesthesia by Horace Wells (1813-48) of Hartford, Conn in 1845 and by William Morton (1819-1968) of Boston in 1846, who discovered the general anesthetic effects of nitrous oxide and ether, respectively. Four decades later, Sigmund Freud (1856-1939) experimented on the psychic effects of cocaine and noted its numbing effects on the tongue. He provided his friend Carl Koller (1857-1944), a Vienna ophthalmologist, with this drug, and he produced anesthesia of the eye with drops of cocaine. Further developments led to the discovery in 1905 of procaine by the Munich chemists Alfred Einhorn and Richard Willstadter. Later, with the addition of adrenaline, discovered separately in the U.S. by Jokichi Takaraine and Thomas Bell Aldrich, local anesthesia was born.11,12

The second scientific breakthrough was made by the French chemist Louis Pasteur (1822-95), who finally proved that spontaneous generation of organisms does not exist and who established through his studies of the diseases of silk worms that one organism (a protozoa) can cause disease in another (the silk worm), thus establishing the germ theory of disease. Subsequently, the German physician Robert Koch (1843-1910), in a series of brilliant investigations, discovered the microorganism that causes the cattle disease anthrax and the bacterial etiology of tuberculosis.

The concepts of Pasteur were initially transferred to the clinical and surgical practice by Joseph Lister (1827-1912) of England, and thus the era of antisepsis (and later, asepsis) in surgery was born.

A third scientific finding that changed the practice of dentistry in general and periodontics in particular- was the discovery of radiographs by the German physicist Wilhelm Roentgen (1845-1923) Rontgen's discovery was made in 1895 at the University of Wurzburg and was purely a basic science finding, but it was immediately taken up by physicians and dentists and proved to be a crucial development in periodontics and many other areas of medicine and dentistry.

Also in the late 19th century, studies by Rudolph Virchow (1821-1902), Julius Cohnhein (1839-84), Elie Metchnikoff (1845-1916), and others had started to shed light on the microscopic changes occurring in inflammation. This resulted in an understanding of the pathogenesis of periodontal disease based on histopathology studies.

The first individual to identify bacteria as the cause of periodontal disease appears to have been the German dentist Adolph Witzel (1847-1906), who taught at the University of Jena, but the first true oral microbiologist was Willoughby D. Miller (1853-1907). He believed that the disease was not caused by a specific bacterium but by a complex array of various bacteria normally present in the oral cavity. This constitutes what was later known as the nonspecific plaque hypothesis that went unchallenged for seven decades.

However, Miller did not recognize bacterial plaque. This was left to J. Leon Williams (1852-1932), an American dentist who practiced in London and who in 1897

described a gelatinous accumulation of bacteria adherent to the enamel surface in relation to caries; and to G. V. Black (1836-1915), who in 1899 coined the term gelatinous microbic plaque.,1,11

Salomon Robicsek (1845-1928), born in Hungary, obtained his medical degree and practiced dentistry in Vienna. He developed a surgical technique consisting of a scalloped continuous gingivectomy excision, exposing the marginal bone for subsequent curettage and remodeling. The first description (1901) of a possible role of trauma from occlusion and bruxism in periodontal disease is generally attributed to the Austrian dentist Moritz Karolyi (1865-1945), who also recommended its correction by grinding occlusal surfaces and preparation of bite plates.1

Acute necrotizing ulcerative gingivitis had been recognized in the 4th century BC by Xenophon, who mentioned that Greek soldiers were affected with "sore mouth and foul-smelling breath." In 1778, Hunter had described the clinical features of this disease and differentiated it from scurvy and chronic periodontitis. ANUG occurred in epidemic form in the French army in the 19th century, and in 1886 the German pathologist Hersch discussed some of the features associated with the disease, such as enlarged lymph nodes, fever, malaise, and increased salivation.

20th Century

In the first third of the 20in century, periodontics flourished in central Europe, with two major centers of excellence: Vienna and Berlin.

Vienna

The Vienna school developed the basic histopathology concepts on which modern periodontics were built. Bernhard Gottlieb (1885-1950) published extensive microscopic studies of periodontal disease in human autopsy specimens. A younger contemporary of Gottlieb's in Vienna was Balint J. Orban (1899-1960) carried out extensive histologic studies on periodontal tissues that serve as the basis for much of current therapy. Other members of the Viennese school were Rudolph Ktonfeld (1901-40), Joseph P. Weinmann (1889-1960), and Harry Sicher (1889-1974). All these scientists emigrated to the United States in the 1930s and contributed greatly to the progress of American dentistry.

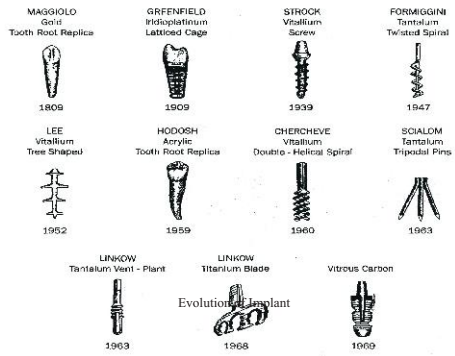
Berlin

The Berlin group consisted mostly of clinical scientists who developed and refined the surgical approach to periodontal therapy. Weski (1879-1952) carried out pioneering studies correlating radiographic and histopathologic changes in periodontal disease. He also conceptualized the periodontium as formed by cementum, gingiva, periodontal ligament, and bone and gave it the name paradmtium, which was later changed (owing to etymologic reasons) to parodontiutn, a term still used in Europe, Neumann (1882-1958)), in a book published in 1912 (with new editions in 1915, 1920, and 1924) described the principles of periodontal flap surgery, including osseous recontouring as it is currently known. Other clinicians who described flap surgery at the beginning of the century were Leonard Widman of Sweden (1871-1956) and A. Cieszynski of Poland. A bitter controversy developed between Widman, Cieszynski, and Neumann in the 1920s over the priority in the description of the periodontal flap.8.9 Animal models of periodontal disease were developed, and the role of local and systemic factors were studied by many investigators, Irving Glickman (1914— 72) was a leading researcher of this period. Among other scientists who contributed to the knowledge of the experimental pathology of the periodorttal tissues were Herman Becks (1897-1962), Paul Boyle (1901-80), Henry Goldman (1911-91), Balint Orban (1899-1960), Sigurd Ramfjord (1911-91), Isaac Schour (1900-64), Joseph Weinmann (1889-1960), and Helmut Zander (19(2-91). In the clinical area, many authors expanded this knowledge, including Frank Beube (1904-95), Samuel Charles Miller (1902-57), Timothy O'Leary (1921-91), .John Prichard (1907-90), .Saul Schluger (1908-90), and Sidney Sorrin (1900-78). The leading figure of the Scandinavian group was Jens Waerhaug (1907-80) of Oslo, whose dissertation, The Gingival Pocket, published in 1952, opened a new era in the undemanding of the biology of the periodontium, challenging the ideas of the Vienna school on gingival attachment, and establishing the primary role of bacterial plague in the etiology of periodontal disease." Prominent members of the Scandinavian school include Harald Loe, Jan Lindhe, Sture Nyman.

At present, the role of microorganisms and the immunologic response are the center of attention of many research groups. Investigators such as Robert Genco, Roy I'age, Sigmund Socransky, Max Listgarten, Walter Loesche, Jorgen Slots, and many others are carrying the torch into the future.

The American Academy of Periodontology, founded in 1914 by two female periodontists, Grace Rogers Spalding (1881-1953) and Gillette Hayden (1880-1929),has become the leader in organized periodontics. Its monthly scientific publication, The Journal of Periodontology, presents all the advances in this discipline. Other scientific periodontal journals include Journal of Periodontal Research, journal of Clinical Periodontology, Periodontology 2000,and International Journal of Periodontics and Restorative Dentistry. In other languages, Journal de Parodontologie (France), Periodoncia (Spain), and Journal of the Japanese Association of Periodontology (Japan) deserve mention

Branemark's research started with vital phenomena and the microvascular structure in tissue injury and repair. To observe these vascular changes, Branemark implanted in die bone metallic chambers containing an optical system for transillumination. Some were made out of tantalum and others of titanium. Branemark and coworkers demonstrated that the implants achieved osseointegration, which they defined as the absence of interposed tissue between fixture and bone.



Other Implantology has become a widely used technique that has revolutionized the practice of dentistry. Concepts of prognosis and treatment planning are being revised, with the new option of implant placement appearing often as more reasonable and safe than the heroic attempts to save teeth with severe endodontic or periodontal problems.

Conclusion

Periodontics has matured into a speciality that interfaces with every aspect of dentistry. Modern periodontics so claimed its triumph as a result of hardwork and labour put forth from the ancient civilization of Greek, Egyptian, Roman, Chinese, Indian & several other cultures. Traditionally, most clinical decisions in dentistry have been based upon the experience of gifted clinicians.

Time and again, the clinicians and semanticists in the field were critically appraised of the therapeutic procedures they performed on their patients. The traditional examination and remedies were questioned repeatedly which led to the evolution of present day's practical approaches with simultaneous increase in standards of professional care.

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