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A Brief History of Endodontics

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The history of Endodontics begins in the 17th century. Since then, there have been numerous advances and developments, and research has proceeded continuously.

In 1687, Charles Allen, describing the techniques of dental transplants, wrote the first English-language book devoted exclusively to the field of dentistry.⁵

At that time, necessity was the mother of invention: experimenting with new techniques, materials, and instruments, even though very rudimentary, the aim of Endodontics has been to relieve pain, maintain exposed pulp, and preserve teeth. Often, these attempts were successful.

Advances in the field of Endodontics have since continued without pause, but especially after Pierre Fauchard (1678-1761), considered the founder of modern dentistry, who in his textbook "Le chirurgien dentiste" precisely described the dental pulp³ and dispelled the legend of the "tooth worm," which had been considered the cause of caries and toothaches since the time of the Assyrians.¹⁶

In 1725, Lazare Riviere introduced the use of oil of cloves for its sedative properties.¹²

In 1746, Pierre Fauchard described the removal of pulp tissue.

In 1820, Leonard Koecker cauterized exposed pulp with a heated instrument and protected it with lead foil.

In 1836, Shearjashub Spooner recommended arsenic trioxide for pulp devitalization.

In 1838, Edwin Maynard of Washington, D.C. introduced the first root canal instrument, which he created by filing a watch spring.

In 1847, Edwin Truman introduced gutta-percha as a filling material.

In 1850, W.W. Codman confirmed that the aim of pulp capping, which had already been proposed

by Koecker in 1821, was to form a dentin bridge.¹⁴

In 1864, S.C. Barnum of New York prepared a thin rubber leaf to isolate the tooth in the course of filling.⁷

Together with G.A. Bowman, he introduced the rubber dam clamp forceps in 1873.¹

In 1867, Bowman used gutta-percha cones as the sole material for obturating root canals.¹¹

Also in 1867, Magitot suggested the use of an electric current to test pulp vitality.¹⁸

In 1885, Lepkoski substituted formalin for arsenic to "dry" the non-vital pulp stumps left in the root canals after excision of the coronal pulp to prevent their decomposition.⁴

At the end of the century, prosthetic restorations, including the Richmond or Davis crown, became increasingly popular. Since they required the use of canal posts, they created an ever greater need for endodontic therapy.

In 1891, the German dentist Otto Walkhoff introduced the use of camphorated chlorophenol as a medication to sterilize root canals.

In 1895, and more precisely in the evening of November 8 in his laboratory in the Bavarian city of Wurzburg, the scientist Konrad Wilhelm von Roentgen accidentally discovered a new form of energy that had the ability to penetrate solid material. Because of their unknown nature, he decided to call these rays "X".¹⁵

A few weeks later Otto Walkhoff, a dentist in Brunswick, Germany, took the first dental radiograph, making a contribution to dentistry that almost equaled Roentgen's to medicine.⁶ Roentgen's discovery of the X-ray has been ranked in importance with the discovery and development of anesthesia by Horace Wells and William Morton, both dentists, and the discovery of microorganisms and their role in disease by the likes of Pasteur and Lister.¹³

A true dental pioneer, C. Edmund Kells, is the one who

quickly grasped the potential for applying Roentgen's discovery to dentistry and thereby forever changed the way dentistry would be practiced.¹³

In 1900, Price described periapical radiolucencies as "blind abscesses" and advised the use of radiography for establishing the diagnosis of pulpless teeth.¹⁸

In 1908, Dr. Meyer L. Rhein, a physician and dentist in New York, introduced a technique for determining canal length and level of obturation.⁶

About the same time, G.V. Black suggested a measurement control to determine the length of the canal and the size of the apical foramen, so that overfilling could be prevented.⁴

These are only some of the more important achievements of the pioneers of Endodontics, who made continual advances, with undoubtedly surprising results, considering their means and knowledge.

After 1910, when safe and effective local anesthetics were developed and radiographic machines, which were being perfected, came into wide use, one would have expected to see tremendous strides being taken to develop a safe and reliable system of endodontic therapy. Indeed, such advances would undoubtedly have occurred had the death knell of American dentistry in general and for endodontic treatment in particular not been sounded.

Several years before, in 1904, Frank Billings directed

the attention of dentistry and medicine to the apparent relationship between oral sepsis and bacterial endocarditis.⁴ Five years later, one of his students, E.C. Rosenow, developed the theory of "focal infection" in a study of the bacterial aspects of root canal therapy. He demonstrated that streptococci were present in many diseased organs and that they could cause infection at some distant site by hematogenous spread.⁴

Rosenow defined a "focus" as a well-circumscribed tissue containing pathogenic organisms. He distinguished two types of foci: primary, in the skin and mucosa, and secondary, which develop from the former by metastasis. He believed that organisms could migrate from an apical granuloma to reach peripheral organs and cause other diseases. The following diseases could originate as a metastatic infection from chronic foci of infection such as pyorrhea alveolaris and alveolar abscesses: rheumatic fever, acute and chronic infectious arthritis, myositis, neuritis, endocarditis, myocarditis, pericarditis, phlebitis, peritonitis, meningitis, nephritis, appendicitis, cholecystitis, gastric and duodenal ulcer, pancreatitis, thyroiditis, erythema nodosum, herpes zoster, osteomyelitis, pneumonia, septicemia etc.⁸

In the same year, 1909, Mayrhofer published a work linking the nature of pulpal infection with specific microorganisms. The results indicated that streptococ-



Fig. 1.1 Dr. Alberto Castellucci in his private office in 1938.

ci were present in about 96% of the cases studied.¹⁷ In October of that year, William Hunter, an English physician and pathologist, gave a lecture on focal infection at the University of Montreal. Its impact was such that for more than twenty years it blocked not only research in and the teaching of Endodontics, but more importantly its practice. His lecture, "The Role of Sepsis and Antisepsis in Medicine", also was published a year later in a respected medical journal of the time, the *Lancet*. Hunter was harshly critical of dentistry (particularly against prosthetic dentistry); indeed, he claimed that gold crowns were "a mausoleum of gold over a mass of sepsis". Although Hunter's concern was particularly directed more toward the septic conditions found around poorly constructed prosthetic restorations, it was widely interpreted as an indictment of the pulpless tooth.⁸ "The worst cases of anemia", said Hunter, "gastritis, colitis, of obscure fevers of unknown origin, of purpura, of nervous disturbances of all kinds, ... of chronic rheumatic afflictions, of kidney disease, are those which owe their origin to (or are gravely complicated by) the oral sepsis produced, in private patients, by these gold traps of sepsis".¹⁰ It was therefore believed that all systemic diseases could be cured by the extraction of teeth. Consequently, for almost 40 years, American dentists continued to extract any devitalized teeth, while the more timorous extracted even vital teeth with some restoration, large filling, inlays, crowns, or bridges. The theory of focal infection therefore reigned for

many years, counting an enormous number of followers. Some of them feared the effects of focal infection itself, but others were simply tired of performing root canal therapy, a very difficult, meticulous, and poorly remunerated task.

Fortunately, a small group of dentists did not stop, but rather sought to improve their current procedures by using aseptic techniques, bacteriological and histological methods, and X-rays for diagnostic purposes. This group included men like Coolidge, Johnson, Reihn, Callahan, Grove, Prinz, and others. Mainly because of their efforts, the principle of preserving the pulpless tooth survived.¹

It was not until the late 1940s or early 1950s that the cumulative laboratory research and clinical evidence was sufficient to confirm that the devitalized tooth did not play a role in the causation of systemic disease. Thus the theory of focal infection fell and faith was restored in endodontic treatment.¹⁰

Owing to the efforts of these researchers, patients today can be assured of predictably reliable and safe endodontic treatments, the success rate of which, as perhaps in no other branch of medicine, approaches 100%. Thanks to them, the number of people who specialize in Endodontics today is very high and continues to rise and Endodontics has assumed its precise role in the field of dentistry. In many foreign universities, and hopefully soon also in Italy, Endodontics is a distinct discipline, distinguished from restorative dentistry by its own curriculum.

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