

Historical Milestones in Endodontics: Review of Literature

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ABSTRACT

Endodontics is a well-known branch of dentistry. As we are growing into microscopic level and signaling stages, there is a need to look back on how this reputed branch of medicine came into existence. Here, only milestones in endodontics are discussed for the reader to enhance their knowledge by having a look at the historical background of endodontics and analyze the slow evolution in this field.

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INTRODUCTION

Dentistry is a growing branch of science no less in comparison to any other field in terms of research and innovation. With the evolution of this branch of medicine into microscopic level and signaling stages, there arises a need to understand as to how and when this reputed field of science came into existence. Mostly a comparison of new instruments, techniques, materials, and experiments is in focus. This article enlightens us about the milestones in endodontics, its historical background, and the contributions made by some eminent scholars toward this field, which should not be forgotten. It is important for us to know that all the research and development of this science that we have inherited is a result of limited resources as compared with the facilities that are provided today.

It inspires us to focus on the development of materials that are easy to manipulate, accessible, and economic at the same time for the benefit of our patients.

Although endodontics was recognized as a specialty in 1963 by the American Dental Association, it has been in practice since 200 BC.¹ The evolution of endodontics was a gradual process owing to its interrelation with other fields of science like microbiology, pathology, physiology, anatomy, dental materials, roentgenology, and anesthesiology. This field also takes the credit for dealing with dental emergencies as described by Pierre Fauchard in his book "The Surgeon Dentist."²

With time, endodontics developed into a well-sophisticated discipline of dentistry from cauterizing the pulp and stuffing the open canal with cotton² to properly extirpating pulp painlessly and giving a three-dimensional obturation and even concerning with flare-ups and debris extrusion apically. The oldest known root canal was found in the skull of Nabatean warriors around 200 BC; after radiographic analysis, it was disclosed that a 2.5 mm bronze wire was present in the root canal, till now this is the ancient root canal filling found in archeology.² Later during 1200–1300 BC, Anastasia Papyrus suggested the "worm theory" stating that the worms burrow inside the tooth, for which the ancient metal root canal treatment was done to prevent pain.¹

CHINESE HISTORY OF ENDODONTICS

The ancient Chinese explained the theory of tooth worm during fourteenth century BC. They had a very clear concept of dental caries, which is visible on their Oracle bone inscriptions. Their language character for caries was composed of a worm on the top of the tooth. Later around 200 AD, they were using arsenicals to treat pulpitis, which is the first time in the world that any civilization used such things for pulp. They were also reported to fill the cavities in 659 AD. In endodontics, they were far ahead of other civilizations.³

EUROPE AND NORTH AMERICA

The concept of dentistry in both these continents came centuries later, which was a big reason for the further development and evolvement of dentistry into a respected branch of science. It was Pierre Fauchard who first introduced the concept of endodontics and is referred to as the father of modern dentistry. He wrote the first

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book on dentistry called "*Le Chirurgien Dentiste*" in 1728 in which he dispelled the tooth worm theory⁴ and sited the presence of dental pulp.⁵

The initial pulp capping procedure was given by Phillip Pfaff, who used gold/lead for this procedure in 1756.⁶ The research was on its peak due to this new field of science, but it took almost 10 years for another advancement, which occurred in 1766. Robert Woofendale of New York he was the first to cauterize the pulp and stuff cotton in the open canal.² This came as a major breakthrough for pain relief in the procedure of endodontics, while its consequences remained unexplored due to the unavailability of radiography because of which the periapical pathosis could not be seen, clinically but tested only through percussion, and it was first done by Fedrick Hisrchat by the end of 18th century. The year 1809 was when Edward Hudson first used a root canal filling with gold foil,⁷ and the next milestone was in 1834 when Runge introduced phenols into the canal for irrigation.²

The history was repeated once again when Spooner of New York used arsenic trioxide to devitalize the pulp before removing it, which the Chinese had done in 200 AD. With sudden growing interest in pulp and pain related to tooth, the pioneer in endodontic instrumentation was Edwin Maynard who developed the first endodontic instrument, which was a broach made up by filing a watch spring in 1838.⁵

The next major advancement was in 1857 when Watt recommended gutta-percha, but it was Bowman who demonstrated its use in obturation in 1867.⁵ With the advancement in the field of infection control and antiseptics, there came an introduction of using a sheet of rubber during the endodontic procedure by Burnum of New York in 1864, referred to as rubber dam. It took 3 years for the complete set of rubber dam instruments to be designed and brought into the industry by Hodson.²

The diagnosis for pulp disease is much confusing like other diagnoses. The dentists were confused whether to encroach the pulp or not. That was the time when Magitot used electric current for pulp testing in 1867.⁵ Pulp capping is an ongoing concept, but the foundation was laid in 1870 by Black, who recommended zinc oxychloride for pulp capping.²

Dental treatment was considered to be a nightmare due to pain. A major discovery that was useful not only for medicine but also in dentistry was anesthesia, which was introduced by Karlkoller as cocaine in 1884, and in the same year Halls Halstead used it in dentistry.² Bowman who already demonstrated gutta-percha came up with a new concept of chloropercha in obturation in 1885.² During this year, another interesting and important solution for fixing the pulp stump known as formalin came into the limelight by Lepkowski.⁵ Since the concentration

was on obturating material in 1890, Cramm introduced copper points for obturation.⁸

Though endodontics was gaining popularity in dentistry, nobody was sure of what was happening inside the teeth until Nov 6, 1895 when Roentgen changed the face of science by inventing X-rays and took medicine a step forward. Soon radiographs found their way into dentistry by Walkoff.^{5,6} The interaction of roentgenology and endodontics came up in 1896 when Kells used X-rays to study canals filled with lead wires. The last development in the end of 19th century was by Buckley who introduced formocresol as canal medicament.²

At the turn of the 20th century, further advancement occurred in this field when Onderdonk recommended culturing of the root canal.² It was the time when the theory of focal infection was developed and popularized. In 1912, Fisher published the first comprehensive study of the root canal anatomy.² Since the need of radiographs became a major part of endodontics, the commercial dental X-ray machines were available by 1919, but using a diagnostic wire to determine the canal length by X-ray was given in 1908 by Rhein, a physician and dentist from New York.⁵

That was also the time when Herman in 1920 used calcium hydroxide to fill and treat infected canals. Also, he was the one to use it for pulp capping.⁹ In 1925, Rickert recommended the use of sealer with gutta-percha cone, thus making it the golden year in the era of dentistry. The invention of rotary spiral bur for inserting the paste by lentulo made the sealing procedure easy.¹⁰ Silver points were developed by Jasper in 1933,⁶ which were in use for many years. The concept of irrigation for root canal treatment got a turn when Walker recommended sodium hypochlorite in 1936 and is being used till date.¹¹

In 1943, the American Association of Endodontics was formed. In the same year, Grossman recommended hypochlorite and peroxide irrigation. Nygaard Ostby introduced ethylenediaminetetraacetic acid for canal irrigation in 1957,⁶ and finally in 1963 endodontics was recognized as a separate dental specialty by the American Dental Association.⁷

In 1993, a revolutionary material for the apical sealing in retrograde filling material, furcation repair, was introduced by Parioikh and Torabinejad.¹² It is an ideal retrograde filling material for root end sealing with nontoxic, noncarcinogenic, nongenotoxic, biocompatible, insoluble properties in tissue fluids, and dimensionally stable.

History has an important role to enhance the knowledge and get provoked to think deeply in all aspects of their field, because research, invention, and discoveries are not a 1-day process. All the above-mentioned major developments in the field of dentistry were slow with hard work, dedication, interest, and most importantly they gradually evolved step by step.

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