



PIERRE FAUCHARD: LIGHT FOR DENTISTRY

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ABSTRACT

The most significant contribution to the development of dentistry was made by Pierre Fauchard (1678-1761), whom we rightly consider the "father of modern dentistry". He wrote down his observations, thoughts, and innovations and in 1728 published "Le Chirurgien Dentiste ou Traite des Dentes". It is the first scientific textbook in this field and is considered to be the basis of a new age in dentistry. For the next hundred years, it was a basic textbook in dentistry. He managed to separate dental medicine from surgery, which has since been called odontology and set it on its own feet as an independent profession. As a result of Fauchard's efforts, dental practice has changed for the better.

Keywords: Pierre Fauchard, surgeon dentist, history of dentistry.

INTRODUCTION

The present can be known and understood only if its past is known and understood. The dentistry we know today did not come into being all at once, nor did it bear this name. Throughout history, healthy teeth have been a symbol of youth, health, beauty and strength. Dentistry has evolved in the context of medicine, surgery. It has been practiced for centuries by sorcerers, priests, quacks, barbers, skilled trained doctors, and barbers-surgeons. It was not until the 18th century that the foundations of modern dentistry were laid. Europe was ahead of the rest of the world, most notably France and England [1,2]. A significant contribution to the development of dentistry was made by Pierre Fauchard (1678-1761), whom we rightly consider the "father of modern dentistry". Fauchard was famous and respected during his lifetime. He managed to separate dental medicine from surgery, which has since been called odontology and set it on its own feet as an independent profession [3]. He was the first to point out that art and science unite in dentistry [4]. As a result of Fauchard's efforts, dental practice has changed for the better.

Pierre Fauchard/ Early life and training

Pierre Fauchard was born in France, Brittany in 1678 to a low-income family, so his education was rather meager [3,5]. Relatively young, he joined the French Royal Navy, where he served under a ship's doctor Alexander Poteleret [4,6,7]. Surgeon Major Poteleret interested young Fauchard in diseases of the oral cavity. Under his leadership, he acquired the first surgical skills he could perform on his own and was "an inspiration for a large number of discoveries" as Fauchard later wrote about him [8,9]. While in the Navy, Fauchard followed with great interest the course of many oral diseases, including scurvy, which was common and present among sailors at the time. After several years of service, Fauchard leaves the Navy [4,5].

Around 1700, he began his independent dental practice in the university town of Angers, in western France [4,5], where he started a large part of his revolutionary medical work as we know it [3]. During his work, he saw the shortcomings of his previous knowledge, which is why he devoted his free time to constant reading and analyzing the available literature. It should be noted that the standards of dental tissue treatments were in line with the level of development of medicine as science in that era. Some patients could afford the services of surgeons with a spe-

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cial interest in teeth, but most still relied on people who extracted teeth and who could be found in city squares, markets, and fairs. The fact is that such persons were unprofessional practitioners, who looked to extract some benefit for themselves in someone else's trouble, although there were probably well-meaning ones among them [5]. In that period, there were no official courses, nor official schools where adequate knowledge could be acquired for diseases of the oral cavity. In general, there were few books in the field of dentistry. A skilled and above all talented man, such as Fauchard, began to take an interest in but also to study crafts in his immediate environment, such as: making watches, jewelry and enameling [5]. Unusual perception and fine manual skills had a significant influence on the development of his talent. He noticed similarities between the mentioned crafts and what he did in everyday practice. Therefore, he came up with the idea to take over some techniques and instruments from these crafts, which he modified and adapted for work in dentistry [7].

Recognized as a dentist with immeasurable skill and sharpness, he attracted the most elite patients, who came from distant lands. Some of the most successful surgeons regularly sought his advice [5,7]. During the next twenty years of work, Fauchard moved to Nantes, Tours, Rennes and eventually came to Paris in 1719 at the age of 41, where he continued his long-term independent practice [8]. Before coming to Paris, Fauchard not only read everything about surgery but also consulted with top surgeons of the time, exchanged ideas, and expanded his knowledge. Paris, in the eighteenth century, was considered a center of learning and enlightenment [7]. Constant dental education has become Fauchard's lifelong passion [5]. Thanks to his experience and the reputation that accompanied him, he soon had a large clientele in the city of Light as well.

Essence of *Le Chirurgien Dentiste ou Traite des Dentes*

Due to his previous personal experience, he was encouraged to write down his observations, thoughts and innovations, and in 1728 he published "*Le Chirurgien Dentiste ou Traite des Dentes*" (The Surgeon Dentist or Treatise of the Teeth) [5,7]. It is the first scientific textbook in this field and is considered to be the basis of a new age in dentistry. Some authors considered it the "Bible" in dentistry [4].

Fauchard began writing his famous work when he had the title of certified "mâitre" (master) "chirurgien-dentist". The 600-page manuscript was first registered in 1723. After numerous revisions and corrections, which he made after consulting with 19 eminent experts in the field of medicine and members of society (eminent scientists and doctors of that time) in 1728, he published the final form of work with 783 pages [10]. The term he coined and used for himself was "Chirurgien-Dentiste", represented a significant shift in dentistry. Thanks to him, a distinction was made between those who had adequate surgical training and those who did not [10]. It was the first textbook in dentistry

in which data were presented thoroughly, systematically and scientifically [10]. This openness was unique at the time, when knowledge and techniques were a valuable asset that practitioners jealously guarded.

The publication consisted of 64 chapters arranged in two books (volumes), accompanied by many illustrations. Fauchard shared his knowledge and observations with colleagues and students, describing his techniques with remarkable clarity and detail. In it, he covered almost all aspects of dentistry: restorative dentistry, prosthetics, oral surgery, periodontology and orthodontics. The anatomy of the teeth, oral hygiene, diseases of the teeth and gingiva, and the ergonomics of the workplace were described by Fauchard through the first 23 chapters of the first volume. He explained his many years of clinical experience through the text of chapters 24 to 38. He summarized operative techniques in the text of chapters 1 to 7 of the second volume, while he discussed interventions in orthodontics, surgery, and prosthetic procedures through chapters 8 to 12 and 13 to 26 [8]. As a result of this work, France has become recognized as a leading center for dental innovation.

Since it was a complete knowledge of dentistry of that time with novelties, it aroused great interest, so it experienced two more editions (the second in 1746, the third in 1786). Only five years after the first French edition, it was translated into German in 1733. The Spaniards compiled him in partial translation in 1795 and 1799. The first English translation was not published until 1946. The translation appeared in Japan in 1984, and in America in 1969 [11]. With the availability of such published texts, the education of dentists became a generally accepted form of education in the 18th and early 19th centuries.

Many of his proposals were radical for the practice of the time. He made his modest contribution to the ergonomics of the dentist's workplace. For example, he advised patients to sit during dental procedures. The usual approach until then was to lay the patient on the floor with the patient's head in the therapist's lap [7]. He found it much more comfortable for both the patient and the dentist, for the patient to sit in a comfortable chair. This was especially true for pregnant women and advanced pregnancies [4]. The therapist in that case should be behind, possibly on the right side of the patient, depending on the intervention he is performing. Such a position of the therapist is important from the aspect of reducing the patient's fear on the one hand and good visibility of the work field on the other hand [9]. He was the first physician to emphasize the importance of the necessary knowledge of preclinical skills in the provision of dental care.

He distinguished 103 oral diseases, which arose under the influence of various causes [12]. He pointed out the mutual influence of dental health and the body's general state of health. At that time, the theory was still valid that the "worm" caused tooth decay. Fauchard studied the destroyed teeth under a microscope and failed to detect the presence of worms within the carious lesion, thus substantiating his opinion that worms are not the cause of caries. Although he did not fully

elucidate the etiology of the most common dental disease, he explains that caries occur under the influence of "fluid" that is created in the body, but it can also be created by external factors. It penetrates the tooth structure and leads to its decomposition [1]. Observing the habits of his patients, he came to the conclusion that increased sugar intake harms not only the teeth but also the gums, which is why he advised them to limit their intake in their daily diet [4]. Unlike his predecessors, he filled carious teeth with lead, gold, and tin foils according to the patient's ability, with the help of specially designed instruments, which he designed himself [13,14]. By filling, he wanted to strengthen the tooth [4], to serve the owner longer. Tin foil was the cheapest of the offered options, due to its elasticity it could be easily adapted and after its wear, it could also be easily replaced. These types of fillings were intended for teeth that had a small carious lesion. Given that these are metals that are good conductors of heat, and given the fact that at that time they did not know the materials used to insulate (cover) dentin, patients complained of pain when chewing or after exposure to heat/cold that stimulated from food [13], which is why he decided to fill only smaller lesions in this way. He treated pulpitis with clove oil [4]. For deeper, more extensive carious lesions accompanied by excruciating toothaches, he recommended that patients rinse the oral cavity with a few tablespoons of their urine [4,9]. This type of treatment became popular many centuries before Fauchard, although, from today's point of view, it seems disgusting. He described dentinal dysplasia and cysts that he thought were caused by caries [10].

Fauchard introduces innovations in the treatment and filling of teeth. He opened the aching teeth with a hand drill, after which he removed the contents of the root canal with a needle. He placed a piece of cotton saturated in an essential oil such as clove or cinnamon oil in the canal itself. He knew at the time that these oils had an anodyne effect but not an antimicrobial one. He changed the oil-saturated cotton pads until the pain stopped, after which he would close the tooth canal with gold or lead tin leaves [15]. He called for caution when using instruments to work in the root canal, warning of potential breakage and/or swallowing of parts, and gave some valuable tips that are still relevant to modern dental practice [5].

He described in detail the anatomy, shape and structure of the teeth. He pointed out that deciduous teeth also have a root, ie lateral teeth are multi-rooted, which was not easy to accept at that time [1,4,12]. What remains a dilemma for him, when it comes to deciduous teeth, is root resorption. He believed that the eruption of deciduous teeth depends on the structure and temperament of the child, and concluded that children with strong temperament erupt teeth earlier, with birth [12]. Although he did not agree with the premature extraction of deciduous teeth, he advised the extraction of molars, in those situations if there was a possibility of malocclusion in permanent dentition. He advocated that deciduous teeth remain with the jaws until their natural exfoliation [3], so he recommended that they also be cared for. He did not approve of the extraction

of permanent molars, because he noticed that after their loss, the surrounding teeth were moved towards the empty space.

Fauchard is considered one of the first specialists in jaw orthopedics. Namely, two chapters, on just under 50 pages, in his book, he devoted to the problem of the position of irregular teeth [16]. Before making the diagnosis, Fauchard suggested that the therapist must do a clinical examination, ie ask the patient to open and close the mouth, move the lower jaw to the side, slide over the teeth of the upper jaw, and only then assess which teeth are in the wrong position. In this way, he put forward the idea of occlusal balance in dentistry. Fauchard did not know the possibility of spreading arcs, the way we use them today. He solved the crowding either by extracting or filing a crooked tooth (interdental sintering). If he decided to file, he gave recommendations to clinicians on where to stand concerning the patient, how to protect oral tissues, and how to reduce the potential pain that will develop after this procedure [16]. Some of his methods were: the use of fingers, wire, tiles, and pelicans. He advised younger patients who have individual teeth out of the arch to reposition their teeth by pressing their fingers several times during the day. In severe cases, he advised that irregular teeth be wrapped in braided gold wire or silk ribbon, with the therapist activating the wire several times during the week. If there was a group of teeth that found themselves in an incorrect position, Fauchard would use silver or gold plates, placed on the buccal surfaces of the teeth in question, to connect them with wire to the anchor teeth (adjacent teeth that surround the malpositioned). This way of straightening teeth is the forerunner of today's orthodontic wire arches. He constructed a "pelican" instrument to return orally inclined teeth to the correct position [16,17]. To achieve the desired goal, he used wires or lead plates wrapped in cloth placed on or around the straightened teeth, which he tied to adjacent teeth and kept these retention elements in the patient's mouth for some time (on average up to 2 weeks) to therapeutic effect was retained [16]. He concluded that these methods have more effects in younger ones, while older patients need years to achieve the same effect [9,16].

In the field of periodontology, his contribution is reflected in the construction of periodontal instruments that he invented ("donkey snout", "parrot's beak", "three-faced burin", "convex-bladed knife" and "Z-shaped hook") [2]. He also explained in detail the method of removing solid plaque from the teeth, very gently so as not to damage the tooth enamel [2,11]. To heal periodontal tissues, in addition to removing deposits, he advised impeccable oral hygiene, strong gum massage, and rinsing the mouth with liquids. For rinsing the mouth, he recommended fresh urine, although he does not deny the discomfort of this remedy [12]. He also suggested immobilizing loosened teeth with gold wire [2,18]. For good oral health, he advised patients to go to the dentist so that they could professionally clean their teeth [2,9].

However, the special contribution of this great person is seen through innovations in prosthetics. Thanks to the

dental "machines" as he called them, he gained great success. He described in detail how he made prostheses, bridges, and crowns so that even a beginner could manage when making these dental restorations. He put extracted human teeth into the prosthetic restorations. He also made artificial teeth from animal bones (hippopotamus, ox, walrus, elephant tusks) [5,14], and later varnished them to bring their color closer to the color of natural teeth [9]. He connected artificial teeth with existing, natural teeth, using gold wires [4]. His inventions were quite primitive compared to today, but they still represent the basis for the production of prosthetic replacements as they are made today in dental prosthetics [5]. He did not know the effect of negative pressure on denture retention. He connected the upper and lower total dentures with steel springs, which he placed in the area of the last molars. He insulated the springs with silk strips, so that the prostheses would be more comfortable to wear [12]. If he was to make a combination of an upper total and a lower partial prosthesis, he would put it in the lower rail and tie it to the upper prosthesis with a spring. In the case that only the lower total prosthesis needed to be made, he did not use springs, because based on his experience, he realized that one arch could stand on its own [1,12]. The disadvantage of these restorations is reflected in the long period of the patient's getting used to prostheses. Sometimes that period was longer than half a year. For that reason, he is often criticized by colleagues. In addition to mobile work, he also worked fixed. Namely, he would first fill the root canal cavity with lead, then make a hole in the lead with a sharp instrument. For cementing the stakes, he used wax dissolved in turpentine with the addition of white coral [12]. These replacements were of the best quality at the time and became just as useful as natural teeth. Some authors state that the works he made were worn for 15-20 years, especially if the artificial teeth were tied with wire [4], while the much shorter lifespan was if they were tied with linen or silk threads [9].

Fauchard presented five new and innovative obturator designs that have greatly improved the quality of life for those patients who had the misfortune to require such treatment [7]. Nowadays, palatal defects occur as a result of surgical resection of tumors, trauma, or congenital defects, while in the eighteenth century, such defects were mainly the result of syphilis or trauma. Making obturators in Fauchard's time as well as today is a challenge for the clinician. The first two types of obturators were made by Fauchard for patients who had teeth, and the third and fifth for toothless patients. The oral part of the obturator for the first two types was made of metal, while in the third and fifth they were a combination of metal and bone, in which the teeth were attached as needed [7]. Fauchard usually used human but also animal teeth. The first three and fifth designs basically depend on the same retention principle. Skilled dentists before Fauchard used a sponge for this purpose. Its disadvantage, among other things, is reflected in the fact that it gets dirty quickly and causes an unpleasant odor. Borrowing an idea from his watchmaking hobby, Fauchard used a design that consisted

of two metal wings that would be inserted through a perforation in a vertically upright position. A fourth design was made for patients who lost their upper incisors and had a defect that communicated with the bottom of the nose. The designs were rough and it is hard to imagine a modern patient tolerating some of the obturators mentioned here. Given that no printing techniques had existed before, Fauchard could not make defect models, and since the alternative was an obturator made of leather, gold, or bone with retention achieved by a sponge, then his designs must have seemed revolutionary [7].

He considered permanent tooth loss to be inadmissible [4], which is why he considered the possibilities of replantation and transplantation of teeth, arguing that they could be performed in the same person or between two individuals. He rejected the opinions of self-proclaimed "experts" and relied on his observations or experiences. He began an era of applying new clinical techniques, which he created himself, and thus became a leader in "evidence-based dentistry" [5,19]. He believed that patients must be acquainted with how they had been treated until then since they were often treated by quacks and fraudsters. Sometimes patients gave large sums of money and received "suspicious" fillings, while their carious lesions were treated with acids, which damaged the dental tissues. Therefore, he believed that patients must take care of whom they turn to for help.

In Fauchard's time, it was common for clinicians to keep knowledge and skills to themselves. Fauchard did not support such a practice, so to his financial detriment, he made his methods of treatment and inventions public and accessible to all. He presented everything that interested him and what he did in everyday clinical practice in his publications, and in that way enabled his colleagues to use the novelties that he created. Fauchard's goal was achieved by publishing the first edition of the book "Le Chirurgien Dentiste ou Traite des Dentes". The final manuscript of the first edition of this book is today in the library of the Faculty of Medicine in Paris [10]. His recommendations were accepted and colleagues began to exchange information freely. Similar informative books by other authors followed, and dental practice changed permanently for the better.

Fauchard married three times and was a widower twice [8]. In 1729, Fauchard married Elisabeth Chemin with whom he had a son, Jean Baptiste. Jean Baptiste did not follow in his father's footsteps, but initially practiced law, and later became one of the most gifted actors in French comedy [8]. Fauchard died in 1761, at the age of 84, and was buried in Paris, near his residence [4]. His practice was continued by his son-in-law and student, Monsieur Duchemin [5].

The Pierre Fauchard Academy

In honor of the "father of modern dentistry", an international dental organization was founded in 1936, named after him "The Pierre Fauchard Academy" - PFA (Pierre Fauchard Academy) [1,3,5,9,20]. One of the

goals of this organization is to recognize and recognize versatile dentists around the world and to provide them with an Academy scholarship. In this way, Fauchard's legacy in dentistry is ensured, which aims to encourage the exchange of information among colleagues. The PFA Foundation offers scholarships, funds research, training programs, and supports a wide range of charitable activities. The Academy pays tribute to the most famous dentists in the history of our profession and also, every year, awards a diploma to undergraduate students for exceptional results. The Academy continues to promote the tradition of professionalism and selflessness established by Fauchard. In 1992, the PFA established the Hall

of Fame. This project pays tribute to the greats of the dental profession from all over the world.

CONCLUSION

His unprecedented interest, innovation, success, and prominent research ability enabled him to be heard. He concluded his work with these words: "I hope that those who follow me will continue the work I began on these matters with greater success." [8]. He lit a million lamps in dentistry and illuminated a better and easier future for dentists. It is up to us to keep walking that path.

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