

## History of the dental root canal therapy

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### Abstract

The pain caused by dental decay reaches our brain through nerves originating in the root canal. From ancient times humans thought to destroy the dental pulp to eliminate toothache.

**Keywords:** periodontal diseases, dentin hypersensitive, pulp capping, pulpotomy, pulpectomy, dental anesthesia, x-ray, panoramic imaging, computer tomography imaging, MRI imaging, digital imaging

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The pain caused by dental decay reaches our brain through nerves originating in the root canal. From ancient times humans thought to destroy the dental pulp to eliminate toothache. The first description of dental pulp cauterization appears in the Persian and, subsequently, Arabic texts of the 7-8th century (1). This technique reached Europe in the 16th century (2). Burning the dental pulp was a common remedy for Ambroise Paré (3), a method also used to cure pain caused by the *tooth worm*, i.e., caries. Alternatively, a decayed tooth was swabbed with cotton wool dipped in hot oil. Pierre Fauchard placed arsenic inside aching teeth, although not inside the root canal. The first to fill a root canal with gold foil was an Irish American, Edward Hudson, in 1824 in Philadelphia. The same year the French Augustine Delmond used a barbed needle to remove the dental pulp.

In the 19 century, the pulp-burning technique was further improved. It included the so-called *cauterium actuale*: direct cauterization of the nerve in the root canal with a thin hot, straight, or bent metal needle. Alternatively, the so-called *cauterium potentiale* used substances with the potential to destroy the nerve chemically. These included treatment with *ammonium causticum* (hydrate of ammonia), sulfuric acid, or lye (an alkali metal hydroxide). Others, like Carl Philip Steinhel (Munich, 1843), used galvanic current to destroy the nerve. Two years later, the Viennese dentist Moriz Heider destroyed the nerve using an electrically heated platinum wire. In 1846 the Finnish Gustav Samuel Crusell coined the

procedure *galvanocaustie*, a technique Albrecht Theodor Middeldorpf of Breslau successfully used in 1854 with direct current (DC) (4).

The use of arsenic for devitalization has been known since 1836 in America. Shearjashub Spooner's method became known in Europe only in 1856. Unfortunately, the destruction of the nerve was often slow and painful, and the effect of arsenic could not be contained. Arsenic treatment caused considerable complications, including alveolar bone necrosis. Advances in modern cautery were extended beyond pulp destruction to the treatment of many other diseases. Spooner is considered a pioneer in controlling dental pain.

To avoid the side effects of arsenic and to control dental pain, new chemicals were introduced at the end of the 19th century. In 1880, Müller experimented with cobalt salts (metallic arsenic, *arsenicum nativum* or *ars metallicum*, *cobaltum cristallisatum*). Mixing cobalt with creosote shortened the seemingly long chemical reaction time. Charles Moginier (1920) conducted a histological examination of the effect of cobalt on teeth (5). Because the application of pure arsenic was painful, creating a sodium arsenic salt or mixing arsenic with 5% carbolicum improved it.

Subsequently, arsenic was replaced with a thymol solution. Furthermore, instead of removal of the entire pulp, a procedure for partial removal of the dental pulp – amputation, was developed. It resulted in a germ-free mummification of the dental pulp.

To prevent pulp inflammation following abutment preparation for crowns, the Swiss dentist Alfred Gysi (1900) first cleaned the abutment with warm air, then applied a paste made up of tricresol, creolin, glycerin, trioxymethylene formalin, and zinc oxide, and sealed the dentinal tubules hermetically with zinc oxychloride cement. Gysi later confirmed that access to the pulp was sealed. Using a histological examination, he showed that.

1. The pulp chamber of the abutment tooth did not shrink;
2. The pulp chamber in the abutment is demarcated from the rest of the pulp by a necrobiotic belt made up of connective tissue;
3. Moving towards the apex, new reactive dentin is formed along the canal wall;
4. The abutment remained sterile.

In truth, Gysi's procedure had many disadvantages. Today's procedures use different materials, have reduced toxic side effects, and require far less time.

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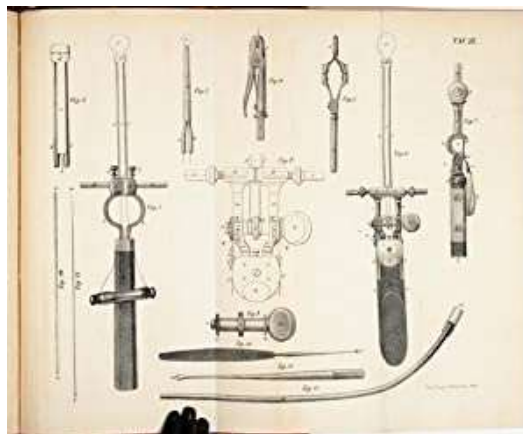
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1. Figure Cauterization of the tooth in Abulcasis: *Kitab al Tasrif*



2. Figure An electric heater to destroy the dental pulp

**Figure**

An electric heater to destroy the dental pulp (From Ref #4).