

Pathophysiology Involved in Root Canal Treatment

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DESCRIPTION

Root canal treatment is the process of removing the inflamed or infected pulp tissue within the tooth. The pulp, commonly referred to as the nerve of the tooth is comprised of blood vessels, nerves and connective tissue. Signs and symptoms that show the root canal treatment are pain, sensitivity to hot or cold, spontaneous or constant dental pain, sensitivity while biting or pressing the tooth, swelling, etc.

Root canal is necessary when there are deep tooth decays, cracked tooth and traumatic dental injury. Tooth decay is caused by bacteria. The pulps defense against bacteria is inflammation known as pulpitis. Irreversible pulpitis is the condition where the pulp tissue will not recover and heal which eventually leads to infected pulp followed by dental infection. A crown is necessary to restore a cracked tooth for normal chewing function. Root canal treatment is often necessary to remove the inflamed pulp prior to crown replacement. Traumatic injury may expose the pulp and disrupt the blood supply to pulp.

Diagnosis

These tests along with the x-rays help in accurate assessment of the status of the pulp and whether to perform the root canal or not. Some of the instruments used are surgical operating microscope, electronic apex locators, digital x-rays (radiographs), rotary nickel-titanium files, ultrasonics, etc.

Surgical operating microscope identifies the cracks/fractures of the tooth and also identifies the complexities of the root canal such as multiple canals within a single root if left untreated can affect the root canal treatment. Electronic apex locators allow the accurate determination of length of the root canals. Digital x-rays (radiographs) aids in pointing out the key elements of dental condition, decreases the radiation upto 90% compared to dental film radiographs. Usage of rotary nickel-titanium files leads to the efficient way of cleaning the canal system which significantly reduces the operating time and also navigates the curved canals.

Ultrasonic vibration of instruments produces energies which are capable of removing debris, tooth structure and bacterial biofilms.

Root canal treatment

The procedure involves the following steps:

Accessing the root canals: A small opening is made either on the chewing surface of the tooth or on the tongue side of the tooth.

Rubber dam isolation: Involves the isolation of the tooth with rubber dam. Keeps bacteria from entering into the tooth. Also prevents debris, instruments, etc., from going down the patient's throat.

Cleaning: Many instruments of different sizes and shapes are used for proper cleaning and shaping of the specific root canal anatomy.

Disinfection: Sodium hypochlorite is one of the disinfectants used to reduce the bacteria load within the tooth. Specialized blunt-ended needles are used to deliver these disinfectants to the end of the root.

After thorough cleaning and shaping the canals, the canals are dried prior to filling the roots.

Filling the root canals: Finally, the canals are sealed with 2 components such as sealer and gutta percha. Sealer is cement that sets over time and gutta percha is a filter made from natural form of latex. This serves as the permanent root canal filling.

Upon completion of the root canal treatment, a temporary filling is placed over the sealed canal that has 2 parts such as cotton pellet soaked in an antibacterial solution and a solid temporary filling on top. A final restoration (usually a crown) is placed which restores the functionality to tooth and protect from fracturing. The bone takes on an average of one year to heal completely.

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