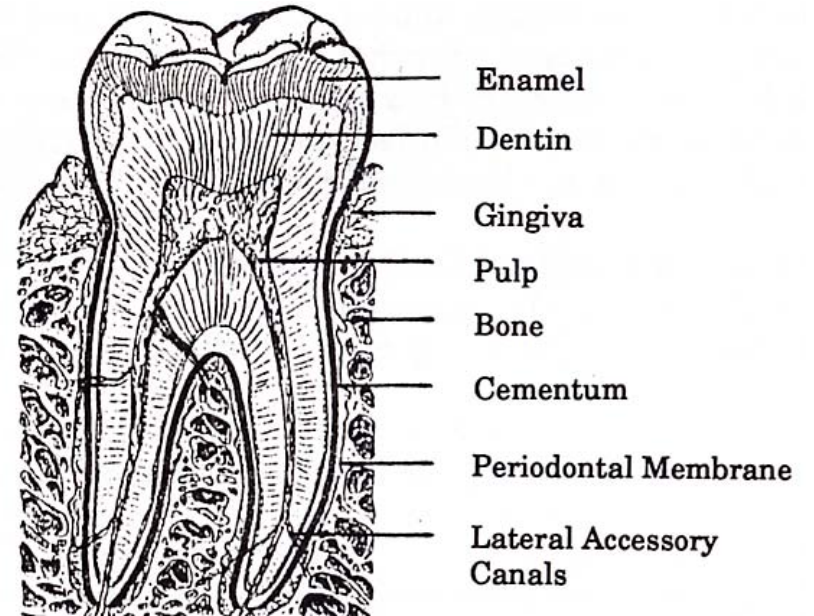


A Patient's Guide To Root Canals



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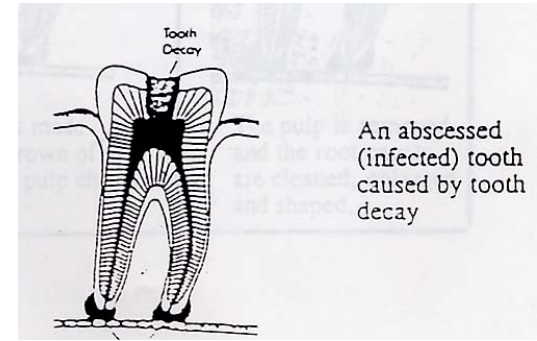
What is Root Canal Therapy?

Within each tooth, there is a formation of soft tissue referred to as dental pulp; it contains nerves, arteries, veins, and lymph vessels. If you were to look at a cross section of a tooth, the exterior surface of the crown is the enamel, followed by a tissue called "dentin." Dentin is the bone-like tissue that supports the enamel and makes up most of the tooth structure. Within the dentin, lies the dental pulp tissue. The pulp extends from a pulp chamber in the crown of the tooth (that portion of the tooth visible above the gums) down to the tip of the root, being contained in what is referred to as the "root canal." Teeth can have more than one root; molars for example have two or three roots with root canals in each root. All teeth have only one pulp chamber.

In the early part of this century, when a tooth would become diseased or the dental pulp was injured, the accepted treatment was to extract the tooth. However, beginning in the late 1950's teeth with infected or injured dental pulp were being successfully saved using a procedure called endodontics, or root canal therapy. There is little question that the public's acceptance of endodontic treatment is on the rise. In 1969, for example, it was estimated that six million root canal fillings were being done each year. That number has now risen to about twenty-five million and by the year 2000, it is estimated that 30 million root canals will be filled annually.

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What Happens When the Pulp is Damaged?

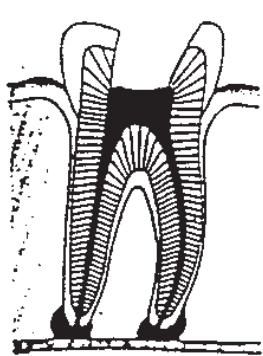
When the pulp is diseased or injured, your body will attempt to repair and heal itself. However, if it is unable to repair the diseased or injured pulp, the pulp dies. This is normally caused by bacteria gaining access to the pulp chamber, either through a fractured tooth or a deep cavity which can expose the pulp to the bacteria found in your own saliva. The presence of bacteria in the pulp causes an infection inside the tooth. Left untreated, this infection can abscess, (a buildup of infectious material (pus) at the root tip), eventually causing the pulp to die and the supporting bone surrounding the tooth will be destroyed.

What Does Root Canal Therapy Involve?

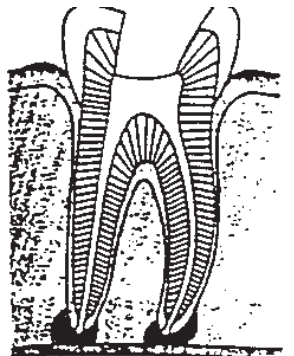
Root canal therapy involves the various procedures used by the endodontist (root canal specialist) or dentist to save the tooth from having to be pulled by removing the infected or diseased pulp from the tooth. In simple terms, the pulp chamber and root canal(s) of the tooth are cleaned, sterilized, and sealed to prevent re-contamination of the root canal system. Although the treated tooth is no longer

vital (you won't be able to feel pain, hot, or cold, etc.), you have achieved several advantages:

1. The tooth was not removed leaving an empty space, which if left empty would cause teeth next to or opposite the empty space to begin shifting from their normal position. Shifting can cause teeth to become crooked or crowded, causing alignment problems that may eventually result in even more teeth being lost.
2. Your natural tooth has been retained maintaining the normal cosmetic appearance of your teeth.
3. The need to have a replacement tooth (bridge) put in place of the removed tooth is eliminated. Bridges are normally expensive and may also require extensive work on adjacent teeth for retention of the bridge.



An opening is made through the crown of the tooth into the pulp chamber.



The pulp is removed, and the root canals are cleaned, enlarged and shaped.

Biocalex mixture as the final endodontic filling. Upon completion of the endodontic treatment, the balance of the dental work will be completed. This will usually be placement of the permanent crown or prosthetic appliance to be used.

If your dentist is re-treating an existing root canaled tooth, whether to eliminate toxic materials or infection, the procedures and protocols outlined above remain the same.

Strengthening the Immune System

- Eliminate immune suppressors – stress, high fat and processed food diet
- Begin a diet of fresh fruit and vegetables plus nuts, seeds grains and other foods that are high in fiber.
- Include chlorella, garlic and barley – these contain germanium which is beneficial to the immune system.
- The following herbs can help boost your immune system - Astragalus, Goldenseal, Green Tea, Milk Thistle, Echinacea, Hawthorn Extract, White willow

the alternatives to treatment along with the associated risks and benefits. Your record will be annotated, indicating these facts and that you do understand the proposed root canal treatment.

Endodontic treatment using Biocalex may be completed in one appointment or two, dependent upon your particular diagnosis and agreed upon treatment plan. Regardless of the number of appointments, this office makes every effort to minimize the number of x-rays to which you are exposed. However, endodontics has some mandatory minimum documentation x-ray requirements.

If your endodontic therapy is to be done in two appointments, this is what you may expect. During the first appointment, the infected dental pulp will be removed and the canal(s) may be filled, short of the apex, with only a mixture of calcium oxide and the ethyl glycol/water liquid. You will be scheduled for a second appointment within 8 days of the first appointment. Not adding the zinc oxide to the mixture at the first filling insures that the calcium oxide will not harden prior to the second appointment. However, this in no way affects the ability of the calcium oxide to do its job. It will expand within the canal(s), effectively eliminating any bacteria that may be present and insuring a sterile canal when the final filling is placed at the second appointment. A temporary crown or covering will be placed at this time so that your bite is functional.

At the second appointment, the material placed at the first appointment will be removed and the condition of the canal(s) checked. The final mixture of calcium oxide, zinc oxide and ethyl glycol/water will then be placed in the canal, once again insuring that the canal(s) are only filled to within 1.5 millimeters of the apex. You should be aware that, dependent upon the dentist's evaluation, a decision may be made to use gutta percha points inserted into the

Basic Concerns of the Patient

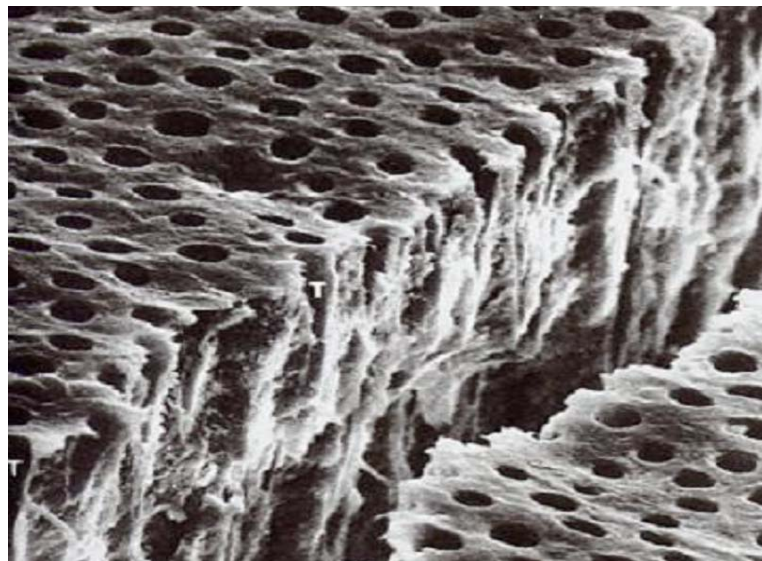
Individuals undergoing root canal therapy for the first time usually have great apprehension and many concerns: Is the procedure painful? Will this tooth have to be extracted later? How long will the tooth last? Will it turn black? Normally the procedure is painless as your dentist will use local anesthesia prior to starting work on the tooth. Most restored teeth will last as long as your natural vital teeth. The reason for this is that as long as the root(s) of the endodontically treated tooth are properly nourished by the surrounding tissues, your tooth will remain healthy. It is somewhat of a paradox in that the average person thinks that a root canaled tooth is a dead tooth. However, it is not a "dead tooth" as long as the roots of the tooth are embedded in healthy surrounding tissues that bathe the external surface and offer it nutrition. For this same reason, it is seldom that a tooth will turn black. If appearance does become a prime concern, the tooth may be bleached or veneered (by having a porcelain or composite facing placed over it). Most often, retention of the tooth and bleaching, veneering, or crowning are preferable to extraction and replacement with a prosthetic appliance (artificial tooth).

The Focal Infection Theory

Although there exists a great deal of controversy regarding the success of endodontic therapy, the controversy over endodontic treatment is not new. Beginning in about 1912, there was wide acceptance of the theory of "focal infection" which resulted in the wholesale extraction of both vital and pulpless teeth. It wasn't until well after World War II, with the availability of improved x-rays, anesthetics, new methods and products and with the publication of the first major

text book devoted to “Root Canal Therapy” that the “focal infection” theory lost favor and “saving” rather than extracting the tooth became the “standard of care.” Now, however, the 1990’s has seen a resurrection of the focal infection theory.

Lets look briefly at the “Focal Infection” theory. The main purpose of the dental pulp is to supply nutrients to the dentin as long as the tooth is alive. This is done through microscopic tubules in the dentin. To give you some indication of what is meant by microscopic, each tooth contains approximately 1.5 million tubules. As the living cells necrose (rot) within the central pulp chamber of an infected tooth, this same phenomenon is happening within the tubules. In theory, root canal therapy attempts to completely obliterate and fill the main pulp chamber and canals. **However, it is impossible to fill the millions of microscopic tubules. Once inside, the tooth bacteria can remain within the tubules growing and multiplying.**



Microscopic View of Teeth

adequate science to substantiate the calcium oxide expansion protocol. Another problem related to the use of Biocalex is that it is not radiopaque (when something is radiopaque, it blocks the passage of the x-rays, thereby showing up on the finished x-ray as a discernable area). Although Bioealex, with the zinc oxide added, can be seen on an x-ray initially, after conversion to calcium carbonate, it will look no different than the normal tooth structure. Consequently, you won't be able to tell whether the tooth has been endodontically treated unless a gutta percha point was used as part of the final filling. That is why it is extremely important that your dentist note on your records that Biocalex was used as the root canal treatment and that it is not radiopaque after setting. Otherwise, a new dentist might look at an x-ray of your teeth and say that a root canal was never done.

For the chemically sensitive person, endodontic treatment presents some very special problems because of the toxicity of the existing materials used in the treatment. In this regard, Biocalex has been evaluated and found to be highly biocompatible, by an independent testing laboratory (unpublished data). As no toxic chemicals or cements need to be used to sterilize or seal the canal(s), Biocalex offers hope to the patient with multiple chemical sensitivities (MCS) who might otherwise need to have the tooth extracted because of an inability to tolerate the materials that would be used to endodontically treat the infected tooth.

If you should require any root canal treatment, this office uses Biocalex whenever possible as part of its standard endodontic treatment protocol. You will be asked to sign an Informed Consent Form, which will insure that the entire procedure has been explained to your satisfaction. This will normally include the diagnosis, the recommended treatment, the risks and benefits associated with that treatment, and

Further enhancing the beneficial effects of using these materials, calcium hydroxide is ultimately converted to calcium carbonate creating a wall of calcification at vital tissue, thereby sealing root apices and vital dentinal tubules. Moreover, in a 1993 study Georgopoulou and his colleagues demonstrated that calcium hydroxide was more effective than paramonochlorophenol (PMCP) in killing anaerobic bacteria isolated from infected root canals. As further confirmation of the tremendous bacteriocidal ability of calcium oxide, Cavalleri and associates in 1990 found that calcium oxide was more effective than calcium hydroxide for sterilization of the root canal and also for decreasing the recovery time of the lesion before final filling of the root canal. In their evaluation of 58 teeth, they found that calcium oxide resulted in perfect asepsis (absence of any germs) in the root canals.

At this point you might logically ask, if Biocallex is so good, how come all the endodontists and dentists doing root canal therapy aren't using it? It is slow in gaining acceptance because the protocol for its use departs dramatically from the way endodontics is taught in dental school. In dental school, students are taught to "compact" the root canal filling material into the canal to the greatest extent possible. The objective is to completely fill and seal the canal(s) and apex using filling material and chemical sealers and cements. The use of Biocallex is diametrically opposite of this procedure. Because of the volumetric expansion and penetration of the calcium oxide, you cannot fill to the apex of the root canal. In fact, the recommended procedure is to only fill to within 1.5 millimeters of the apex, thus allowing room for the calcium oxide to expand to the apex and seal it and all the other lateral accessory canals. As a consequence, dentists, especially post graduate highly trained endodontic specialists, are very skeptical and find it very difficult to accept the concept, even though there is

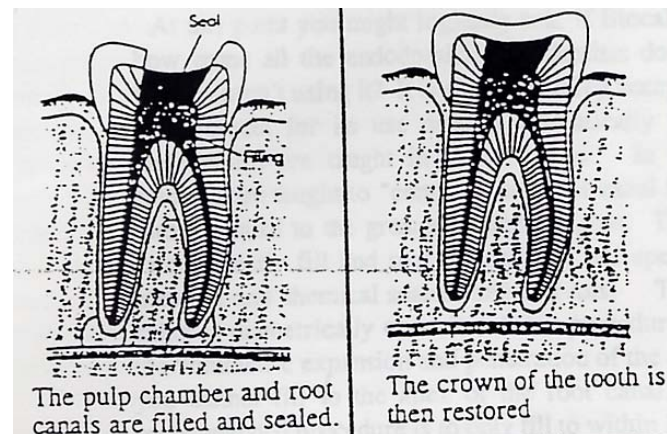
Because microbes can change their form and function in response to a changed microenvironment within the tubules, they can go on living in spite of the altered oxygen and food supply. As they do so, they begin to produce various toxic chemicals, which have been shown to be harmful, sometimes being especially toxic to specific organs or organ systems. This phenomenon was confirmed in a recent 1987 study by Tronstad and associates demonstrating that anaerobic bacteria (bacteria not requiring oxygen to survive) were able to survive and maintain an infectious disease in periapical lesions of nonvital teeth. In a 1991 follow up study of endodontically treated teeth, these authors recovered microorganisms from periapical lesions of all examined teeth.

This raises an immediate question: If there are bacteria present from every endodontically treated tooth, why doesn't every root canal treated tooth become abscessed and fail? An oversimplification of the answer is that your own body's immune system is able to contain and neutralize the bacteria.

Dr. Weston Price, during the early 1900's, devoted most of his brilliant career to the investigation of the focal infection theory. His research, involving thousands of patients and rabbits, formed the basis for the over 220 articles and 3 major books. In essence, the focal infection theory researched by Dr. Price holds that it is not the bacteria that causes systemic problems, but rather the toxic chemicals produced from the necrosis and decay within the tubules, whether the tooth had been endodontically treated or not. As a consequence of the fact that there was no way to completely seal the apex (tip of the root) and the tubules, the need to extract both vital and pulpless teeth, when an infection was evident, became the effective treatment.

There are now a group of dentists around the country who are openly advocating the extraction of every root canal tooth on the basis of the research done by Dr. Price. This is certainly a radical approach to solving a problem that appears to be limited to only about 10% of the total number of root canal treatments done. Furthermore, it certainly does not take into consideration the use of calcium oxide as a root canal medication in the treatment of infected root canals.

Much of the current confusion in the minds of the public about the efficacy of root canal therapy has been precipitated by the book "Root Canal Cover Ups" written by George Meinig, D.D.S., past president of the American Association of Endodontists. Dr. Meinig extensively cites the work of Dr. Price and concludes that there is a serious problem with root canal therapy and teeth that have had root canal treatment. This of course, is a major break with his own previous training and the policies of both the American Association of Endodontists, and the American Dental Association. Patients going to an "establishment" endodontist or dentist who does not subscribe to the focal infection theory are given a much different picture on the efficacy of root canal treatment. Here again, establishment protocols for endodontic treatment rely heavily on the use of some very toxic chemicals and cements. And although there is a 90% success rate for most endodontic procedures, it is still a scientific fact that using the existing endodontic materials and techniques, there is no way to totally seal the apex of the tooth and the dentinal tubules. Using the word "existing" may be a misnomer because there is an existing product called "Biocalex" that is offering new hope in resolving difficult endodontic problems.



The Calcium Oxide Option!

Biocalex is a product that has been used in Europe for over 15 years in the treatment of infected dental pulp. The Food and Drug Administration (FDA) has given Future Dentistry, Inc. permission to market Biocalex in the United States. Similar, authority to market Biocalex in Canada was provided to Biodent by the Canadian Government. Biocalex is a product that uses calcium oxide (CaO), zinc oxide (ZnO) and a special ethyl glycol/water liquid. The calcium oxide's affinity to fluid, in this case endodontic liquids, results in a volumetric expansion (not volumetric increase) that causes penetration of the most inaccessible canals. Furthermore, when calcium oxide combines with water calcium hydroxide is formed. Calcium hydroxide has been repeatedly demonstrated to be the most biocompatible material used in endodontic therapy. The change of calcium oxide + water to calcium hydroxide is due to the affinity of the calcium oxide for water. The reaction travels to the water and is therefore expansive. This results, amazingly, in a penetration of devital dentinal tubules, a phenomenon that does not occur with the initial use of calcium hydroxide by itself.