WHAT IS ROOT CANAL THERAPY?

Within each natural 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 gum) down to the tip of the root, being contained in what is referred to as the "root canal." Although 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.

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, which is 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 recontamination of the root canal system. Although the treated tooth is no longer alive (you won't be able to feel pain or 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) Eliminates the need to have a replacement tooth (bridge) put in place of the removed tooth. Bridges are normally expensive and may also require extensive work on adjacent teeth for retention of the bridge.

THE FOCAL INFECTION THEORY

Although there exists a great deal of controversy regarding the success of endodontic therapy, the scientific facts at the present time are that only about 10% of root canal treated teeth experience some type of failure. 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, antibiotics, new methods and products, and 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.

Let's 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. 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 Tiedens and associates demonstrating that anaerobic bacteria (bacteria not requiring oxygen to survive) were able to survive and maintain an infectious disease in perilous lesions of non-vital teeth. In a 1991 follow-up study of endodontically treated teeth, these authors recovered microorganisms from periradicular lesion of all examined teeth.

The immediate question this raises is: 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 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 which he authored. In the focus infection theory researched by Dr. Price holds that 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 treated 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 Up” by George Mienie. D.M.D., past president of the American Association of Endodontists. Dr. Mienie 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 “Endocal10” that is offering new hope in resolving difficult endodontic problems.

**THE CALCIUM OXIDE OPTION!**

Endocal10 is a product that has been used in Europe for over 15 years in the treatment of infected dental pulp. Similar authority to market Endocal10 in Canada was provided to Bodident by the Canadian Government. Endocal10 is a product that uses calcium oxide (GO), zinc oxide (ZnO), and a special activating 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.

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The pulp chamber and root canals are filled and sealed The crown of the tooth is then restored

Extraneous that calcium hydroxide was more effective than paramonochlo- rophenol (PMP) in killing anaerobic bacteria isolated from infected root canals. Further confirmation of the tremendous bactericidal ability of calcium oxide, Cavallini and associates in 1980 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 apices (absence of any germ) in the root canals.

At this point you might logically ask, if Endocal10 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 are 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 Endocal10 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 adequate science to substantiate the calcium oxide expansion protocol. Another concern related to the use of Endocal10 is that it is not always radiopaque, as it may in time lose its’ radiopacity, (when something is radiopaque, it blocks the passage of the x-rays, thereby showing up on the finished x-ray as a light or white area). Although Endocal10, can be seen on an x-ray initially, after conversion to calcium carbonate it will look no different than the normal tooth structure. Consequently, if radiopacity diminishes, you won’t be able to tell whether the tooth has been endodontically treated or not. A pericoronal lesion was marked, and the teeth extracted because of an inability to tolerate the materials that would be used to endodontically treat the infected tooth.

So where does that leave you as a patient trying to unscramble the confusion and make a logical and sensible decision about what is best? We feel quite strongly, that if you have been advised that you will require endodontic treatment, you should discuss the use of calcium oxide with your dentist. This is especially true if you presently have a peripapical lesion. Information in the Color Atlas of Endodontics, clearly indicates that Endocal10 has a very high clinical success rate in saving otherwise unsaveable teeth. Even if your dentist does not like calcium oxide for the final root canal therapy, the great bactericidal activity of Endocal10 warrants serious consideration to treat the infected pulp. If your dentist would like more information on the subject, we will be happy to provide him or her with a complete package of information on Endocal10, including the supporting scientific documentation.