



### **“Holistic” Root Canal**

New Paradigm for Root Canal Procedure:  
Advanced imaging: Digital x-rays, 3D CBCT  
Enhanced vision with Operating Microscope  
Advanced Cleaning and Disinfection with Root Canal specific Laser  
Additional Disinfection with use of Medical grade Ozone  
High Biocompatibility Sealer  
Endodontist: Specialized Dentist only performs Root Canal procedures

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University of Michigan Dental School. Honors. Class rank #1.  
30+ years experience as an Endodontic Root Canal Specialist  
15+ years experience performing “Holistic” Root canals using Laser disinfection,  
Ozone, and Biocompatible filling materials.

### **Professional Endodontics, PC.**

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## Holistic Root Canal Summary/Abstract

A “Holistic” root canal is an endodontic or root canal procedure performed using several elements considered holistic in nature. The root canal procedure is essentially a surgical procedure to remove infected and damaged tissue and microbial pathogens from within the tooth. This procedure allows the tooth to be retained in the mouth for proper chewing and maintenance of ideal tooth and jaw position needed for airway maintenance and jaw joint function. There is some controversy about the effectiveness of the procedure due to complex internal tooth anatomy, microbial pathogenicity, difficulty in assessing healing, role of continued infection on the health of other organs and body systems, and clinical limitations affecting the ability of the clinician to deal with these factors. More than 22 million root canal procedures are performed every year by dentists possessing a wide range of knowledge, training, philosophy, and instrumentation. State of the art treatment will usually include use of operating microscope, laser, ozone, CBCT imaging (cone beam 3D x-ray machine), other specialized instruments, and bioceramic sealer. Root canal treatment success should be evaluated carefully and effectiveness of treatment will depend on materials, methods and operator skills in addition to the patient's own immune system.

## Holistic Root Canal: A New Paradigm

A “Holistic” root canal is an endodontic root canal procedure performed using several elements considered holistic in nature and therefore cannot be considered truly holistic. The root canal procedure is essentially a surgical procedure to remove infected and damaged tissue and microbial pathogens from within the tooth. This procedure allows the tooth to be retained in the mouth for proper chewing and maintenance of ideal tooth and jaw position needed for airway maintenance and jaw joint function.

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According to the American Association of Endodontists website, more than 22 million root canal procedures are performed every year by dentists. This number includes those performed by general dentists and endodontic specialists, and likely those performed by dental students as well. It is thought that only 15% are performed by endo specialists and 85% are performed by general dentists. Although the basic procedure may be similarly performed by all in a broad sense, the endodontic specialist will have had a minimum of two additional years of training beyond dental school and a licensing exam associated with specialty practice. In addition, performing the same procedures repeatedly results in the highest level of experience. The specialist will have dedicated instruments and materials not often found outside the specialty practice which are indispensable for practicing at the highest level. This may include operation

microscopes, laser, CBCT imaging (cone beam 3D x-ray machine), and many other specialized instruments. The success rate for each group is found to be different as well, with general dentists around or below 80% and specialists above 90% depending on the study. Root canal treatment success should be evaluated carefully and effectiveness of treatment should take into account materials, methods and operator skills when interpreting results.

The root canal procedure is performed after an examination to determine the nature and extent of pathology, and localization of any symptoms to the affected tooth. This is accomplished using patient history and description of the problem, X-ray images, CBCT 3D x-ray, clinical tests, and input from other practitioners if needed.

Once the diagnosis is made and a discussion has taken place to describe the procedure and any alternative such as extraction has taken place, the jaw and tooth are profoundly numbed with local anesthetic. Access to the infected pulp tissue is made by making a small opening into the biting surface of the tooth, measurements are made and tissue is initially removed using very fine sterile stainless steel and titanium instruments under high power operating microscope. Photodynamic/ultrasonic/neosonic activation, in addition to irrigating solutions, surfactants, demineralizing agents, ozonated water, and antibiotics are used to kill bacteria and remove remaining tissue. These are used within the root system and do not extend beyond the "apex" or tip of the root into the surrounding tissues. Several methods are used to activate the solutions within the spaces to allow access to otherwise unreachable areas in hidden canals and porous tooth walls with their dentinal tubules. Photodynamic pulsed laser energy is used to activate oxidizing agents and water and in addition, can kill bacteria directly. This energy has been recently been observed to penetrate into the dentinal tubules up to 1000 microns. Medical grade gaseous ozone/oxygen is used after the internal canal spaces are dried and further provides antimicrobial action into the dentinal tubules and into the periapical tissues through the apical opening at the end of the root tip. This is thought to also provide additional healing properties upon contact due to its immune modulation effects.

Filling the canal spaces is accomplished using a bioceramic filler, such as Brasseler Endosequence. This calcium silicate bioceramic is very biocompatible and does not contain any metal oxides. It has a creamy consistency and can be placed with or without gutta percha core (GP: generally used core material), if necessary when there is allergy to GP or it is recommended to not use metal oxide radio-opacifiers (used to make material show up on x-rays). Material placement requires skill to fill the space to the apex/tip of the root without voids/bubbles. The Endosequence is extremely biocompatible and generally reacts favorably if a minute amount passes into the surrounding tissues. The resulting "puff" is often considered desirable and indicates a good seal at root end. The material also possesses a pH of 12 until set which may provide an additional degree of antimicrobial activity. Additionally, using SEM (scanning electron microscope) bioceramics such as this have been shown to crystallize into the dentinal tubules spaces and result in rupture of bacteria within these spaces.

When no GP is used as a core, the root canal is considered to not be "retreatable" or able to be re-cleaned in the future if there is crown leakage or reinfection. In most cases this is not an issue if the tooth has been properly treated and restored. Failure of the treatment is often due to some other reason such as tooth/root fracture.

Upon completion, a temporary filling is placed into the root canal access opening in the biting surface and an x-ray is taken for confirmation of completed treatment. The patient is directed to return to the dentist after 10 days for final restoration with filling or crown as needed.

Follow-up evaluation is necessary to ensure that the root canal treatment has allowed proper healing by the body. In cases where healing has not occurred, a discussion has to follow about the additional treatment, which may include a surgical process to physically remove any additional infection, or removal of the entire tooth if necessary.

The root canal procedure is a technical process that sets the body up to heal. Success of this procedure and any other medical treatment cannot be guaranteed as healing is dependent on several factors relating to the variability of microorganisms and their pathogenicity and the variability of the human body including local and systemic factors that affect healing, such as immune function, etc.,.

Some common misconceptions regarding root canal treatment effectiveness involve the impossibility of removing all of the microorganisms from within the tooth and apical tissues and the continued presence of the pathogens. While this may be true in many instances due to the complex anatomy of the teeth, presence of dentinal tubules, and nature of microorganism biofilms, in addition to inadequate cleaning and disinfection techniques, advanced disinfection protocols should result in a greater degree of microbicidal effect and allow better healing. Additionally, studies used to demonstrate the persistence of microorganisms in most all root canal treated teeth show flaws relating to sample collection and differentiation of root canal infection and periodontal infection.

Advanced disinfection protocols would include: use of high power operating microscope to visualize complex anatomy and cleaned internal surfaces (even extending to the apex in some cases), activation of microbicidal solutions using ultrasonic/neosonic vibration and photodynamic laser energy, use of freshly produced medical grade ozone/oxygen placed into the canals, and the use of sealer possessing antimicrobial properties.

Most discussions of root canal effectiveness are based on old data lumped together involving procedures performed by a wide variety of practitioners with variable training, instrumentation and experience. This historical view of the procedure is simply outdated and not relevant to modern high level treatment being performed by an experienced endodontic specialist.

The human body is teeming with microorganisms from the entire skin surface through the entire intestinal tract. It is generally not just their presence that constitutes disease, but the presence of the certain number in a certain location in a certain combination. In endodontic disease there are hundreds and perhaps thousands of different microorganism species present. When their presence is reduced in number and variability of species, the pathogenicity is also less. They need the entire group to survive and cause damage. In most cases, the immune system can control the situation at this point, as it does in other parts of the body.

There is thought to be a pressure gradient out through the dentinal tubules in a healthy tooth prior to any root canal procedure. This gradient is lost and possibly reversed in treated teeth. The effect of this would not be great in the tooth with healthy periodontium without periodontal

disease. In the periodontally diseased tooth with bone loss the effect could be greater, but the overall effect of this may not be significant in most teeth treated with bioceramic filling materials but could lead to root canal treatment failure in underfilled or weakly filled teeth.

The effect of root canal procedures on changes in acupuncture meridian or electrical conductivity have been discussed by some practitioners, but the author is not aware of any scientific studies demonstrating their cause and effect relationship. Perhaps these should be tested on an individual basis as their effect is likely not the same for all situations. Additionally, methods exist for equilibration of these areas post treatment.

In closing, the root canal procedure has evolved and will continue to evolve with advances in modern science and medicine to provide an extremely safe and healthy treatment as long as several parameters are adhered to. It has gone from an essentially blind procedure done using tactile feel to a specialized high tech procedure done under high power microscopic magnification, using 3-D visualization when needed, and state of the art vibrational and laser energy systems plus ozone for disinfection. Alternatives to root canal treatment include extraction and possibly placement of implants or use of removable resin/plastic appliances . It is important to balance considerations of this treatment versus extraction and the importance of maintaining position of other teeth in the jaws and maintaining the position of the jaws in relation to one another to allow proper chewing and jaw function. The final decision should consider these factors in addition to considering the patient's immune function and ability to heal following treatment.

In Health,

Dr. Lou  
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