

# Toxicities Associated with Asymptomatic Root Canal Treated Teeth

Received.....4.10.10 Scientific Review.....4.18.12 IAOMT Board Review.....9.20.12 Reevaluation.....	<h2 style="margin: 0;">Root Canals &amp; Cavitations</h2>	Approval.....9.20.12 Provisional Approval No Opinion No Approval
<p><b>Explanation of IAOMT position:</b> Treatment of endodontically infected teeth is ultimately a decision of each patient under the care of their health care practitioners and patients should be informed that root canal treated teeth still harbor bacteria, fungi and viruses and their toxins.</p>		

<p><b>Name of Scientific Review:</b> Toxins Associated with Asymptomatic Root Canal Treated Teeth</p>
<p><b>Alternative name(s) of Scientific Review:</b></p>
<p><b>This Scientific Review is related to:</b> Medicine &amp; Dentistry</p>
<p><b>This Scientific Review is a Publication</b></p>
<p><b>Do you have a vested financial interest in any part of this SR?</b> No</p>
<p><b>Purpose of the SR:</b> Determine whether asymptomatic root canal treated teeth harbor bacteria and their associated toxins. Determine the impact of endodontic toxins on commercially available enzymes which are associated with ATP production.</p>
<p><b>SR History:</b> For almost 100 years there has been debate regarding toxicity associated with teeth that have undergone root canal therapy. Weston Price, D.D.S., M.S., F.A.C.D., Director of the Research Institute of the National Dental Association, correlated numerous systemic illnesses with diseased teeth, including teeth that had undergone root canal therapy.</p> <p>His testing methods involved isolating bacteria from infected teeth, injecting these bacterial cultures into experimental animals, then observing the systemic effects on the experimental animals. He found that many systemic illnesses were precipitated by diseased teeth, including teeth which had undergone root canal therapy.<sup>1,2</sup></p> <p>Recent research has revealed that teeth which have undergone root canal therapy continue to harbor bacteria, viruses, and fungi. Price demonstrated that the toxins produced by pathogens within root canal treated teeth had an even more profound impact on systemic health than the bacteria themselves.<sup>1-10</sup></p>
<p><b>Briefly describe the SR:</b> The purpose of this study was to determine the level and frequency of toxicity associated with root canal treated teeth. These teeth were asymptomatic using the following criteria:</p> <ol style="list-style-type: none"> <li>1) had undergone excellent root canal therapy as confirmed by radiographs</li> <li>2) had no radiographic evidence of disease</li> <li>3) had no symptoms with respect to chewing pressure or thermal sensitivities.</li> </ol> <p>In other words, they were the “best-of-the-best” root canal treated teeth.</p>

**Specifically, by outline if appropriate, describe the SR:** During a three-year period 87 root canal treated teeth were extracted on patients who requested removal of their excellently performed, asymptomatic root canal treated teeth. After root canal therapy, all of these patients had experienced a demise in their systemic health and had been informed by their health care providers of the possible systemic health risks associated with root canal treated teeth. Only extracted root canal treated teeth which met the previously mentioned “best-of-the-best” criteria were accepted into the study.

Radiographs of the 87 extracted teeth were independently evaluated by three additional dentists who were asked to critically examine each radiograph. Only teeth which radiographically had been completely obturated to within .5 millimeters of the apex, had no extrusion of the root canal filling material, and which showed no sign of disease were admitted into the study. Of the 87 original teeth, only 25 were unanimously approved by the investigator and three independent evaluators.

The laboratory which evaluated the toxicity of the 25 tested teeth, ALT Bioscience Laboratory, reported that all of the teeth were toxic with an average of 65.6% inhibition of six critically important enzymes necessary for human life. The enzymes tested were Phosphorylase Kinase, Phospholase A, Pyruvate Kinase, Phosphoglycerate Kinase, Creatine Kinase and Adenylate Kinase. ALT's nucleotide affinity labeling technique measured toxicities from a low of 28% to a high of 89%. The standard deviation was 16.6.

Although the toxins associated with root canal teeth have not been specifically identified this research demonstrates that these toxins have a potent inhibitory effect on six critically important enzymes which are essential for ATP production. Very recent unpublished research has revealed through DNA analysis, that a myriad of anaerobic bacteria are responsible for the production of the toxins.

This study demonstrates that although the patient's response to the bacteria and the toxicities from root canal teeth is varied, even the “best of the best” root canal treated teeth are toxic.

**Manufacturer(s), distributor, or publisher:** This paper is going through editing prior to publication in a peer-reviewed journal.

#### **Scientific Literature:**

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**Legal Aspects of this SR:** From a legal perspective this scientific review points to the fact that dentists should provide an informed consent to patients which details:

- 1) the scientific fact that root canal treated teeth remain infected with bacteria, fungi and viruses,  
and  
2) the toxins produced by the bacteria in root canal treated teeth impair the function of critically important enzymes.

<b>Applicant Name:</b> Stuart M. Nunnally		<b>Office Phone:</b> 830-693-3646
<b>Mailing Address:</b> 1010 Arbor Lane		<b>Office FAX:</b> 830-693-4061
<b>City:</b> Marble Falls		<b>Home Phone:</b> 512-289-8684
<b>State of Province:</b> TX	<b>Zip code:</b> 78654	<b>Home FAX:</b>
<b>Country:</b> USA		<b>e-mail:</b> snunnally@mac.com
<b>IAOMT Member #:</b> 955		<b>IAOMT Chapter:</b> North American

The following comments were made during an email thread reviewing the above SR in July 2012:

Question was asked: Did you or ALT have any data for untreated extracted teeth, such as third molars or ortho bicuspid? There are no control data in this publication.

Dr. Boyd Haley responded: For ALT to get a CLIA approval for our toxicity testing we had to produce data and clearly show that our testing indeed did show a difference between control and infected teeth that also correlated with the increase in reactive sulfhydryl. We were inspected by CLIA officers every year and had to go over our techniques and show how we validated the toxicity level in order to get continued approval. In the CLIA requirements was the absolute need to show that indeed the exposure of the testing solution to teeth was the cause of any test enzyme inactivation---on each analytical gel that we ran. Therefore, in each analysis of teeth sent by dentists and done by ALT there were control extracts used to set the base line of effect on enzyme labeling (with the level of toxicity being placed into 4 categories based on the inhibition of enzyme activity). We had many teeth sent that had toxicity levels determined that indicated they were not producing reactive sulfhydryls and likely not infected with reactive sulfhydryl producing bacteria. Therefore, the inhibition capability of the teeth Dr. Nunnally sent in were based on the toxicity of control extracts used on the same analytical gel----CLIA approval of the testing required this. For example, on each analytical gel ALT ran we had to have the following controls: (1) a lane with no extract added, (2) a lane with control extract added and (3) a lane with excess hydrogen sulfide added (to show the enzyme activity could be inhibited 100%.

When I first started developing the TOPAS test I collected about 10 non-infected control teeth that were used to produce an initial base line to compare to obvious infected teeth. Also, we also had many dentists send control teeth with their infected teeth if more than one tooth was being tested. Bottom line, without an infection that could produce hydrogen sulfide there appeared to be no toxicity to enzymes and no reaction to our colorimetric assay for reactive sulfhydryls. I would point out that this is consistent with current literature on periodontal disease and the most up to date research on the infections found in teeth with root canals.

Also, in the chairside test for presence of reactive sulfhydryls in crevicular fluid it was very possible to identify teeth that were infected in mouths with many other non-infected teeth just by the presence of the reactive sulfhydryls in the nearby crevicular fluid. However, this could be due to periodontal disease---but analysis of teeth extracted from sites of periodontal disease on electron microscopy has clearly shown that the bacteria are penetrating into the tubules of these teeth. So it is very difficult to separate out perio infections which have or have not invaded the adjacent tooth. Some dentists have used ozone or Iodine to treat these situations and greatly decrease the infection as measured by the decrease in reactive sulfhydryls being detected.