



**Steven Singh DDS**

**Greetings!**

Pulp Fiction...our new quarterly publication! I hope you find the contents useful, providing current topics in Endodontics as we take a team approach with you in providing the best endodontic treatment for your patient. We are hoping to familiarize ourselves with the everchanging numbers of new dentists so we can better serve the community's need for excellent endodontic treatment. We are also hoping to reach out to keep you updated on our practice, our Endo/Implant study club as well as our involvement with

the European Society of Endodontology. We have enjoyed taking several of our referring doctors to the biennial meetings and keeping up to date on Endodontic research and development. The next one is Portugal, 2013! We thank our referring doctors for your continued support since our establishment in 2001! Enjoy the contents!!!

**IAN Block and Buccal Infiltration in Teeth with Irreversible Pulpitis**

Several recent articles have focused on the effectiveness of various anesthetic solutions and injection techniques. The literature is replete with studies reporting a failure to anesthetize the inferior alveolar nerve (IAN) as often as 20% of the time. In addition, there are times when a patient has an irreversible pulpitis (IP)-diagnosed tooth that elicits all the clinical signs of a successful IAN after a reasonable waiting period (15 minutes) but experiences pain while accessing the pulp chamber or the canal orifice. This phenomenon, commonly referred to as the "hot tooth syndrome," often defies attainment of total anesthesia, regardless of the injection technique or choice of anesthetic. Many clinical trials have demonstrated the anesthetic efficacy of 4% articaine. In fact, there is clinical evidence that a buccal infiltration of 4% articaine alone will produce successful pulpal anesthesia in less than or equal to 92% of uninfamed pulps.

However, there is no evidence of any clinical statistical superiority of articaine infiltration over articaine (delivered normally) in an IAN block of teeth with IP. Thus, the purpose of this preliminary,

prospective, randomized, double-blind clinical trial by Poorni et al from Ragas Dental College, India, was to compare the anesthetic efficacy of the customary IAN block with the infiltration of 4% articaine with 1:100,000 epinephrine in teeth with IP.

After the number of participants necessary to provide a 90% chance of a continuous outcome measure was recruited (90 men, 66 women), they were divided into 3 groups of 52 individuals each. Members of groups A and B received either a standard IAN block or a buccal infiltration of 4% articaine with 1:100,000 epinephrine, whereas members of group C (control) received a standard IAN block injection of 2% lidocaine with 1:100,000 epinephrine.

All individuals were asked to assess and record their pain levels on a Heft-Parker visual analog scale at 3 different times:

1. 20 minutes after anesthetic administration
2. after the chamber access was being prepared
3. after pulp extirpation

The individual responses were calculated to form a baseline for statistical analysis via Pearson Chi-squared test, Student's paired t-test, 1-way analysis of variance and Friedman test (Table 1). The calculations showed no significant difference in success rates among the 3 legs of the trial.

Although buccal infiltration and IAN block of 4% articaine were equally effective, buccal infiltration following an IAN block may be helpful.

*Poorni S, Veniashok B, Senthilkumar AD, et al. Anesthetic efficacy of four percent articaine for pulpal anesthesia by using inferior alveolar nerve block and buccal infiltration techniques in patients with irreversible pulpitis: a prospective randomized double-blind clinical trial. J Endod 2011;37:1603-1607.*

**Spring 2012**

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**Table 1.** Number and percentage of successful anesthesia for 156 volunteers

Endpoint	Number of patients with successful anesthesia						p value
	IAN block with 4% articaine (n = 52)		Buccal infiltration with 4% articaine (n = 52)		IAN block with 2% lidocaine (n = 52)		
	n	%	n	%	n	%	
Access preparation	39	75	36	69.2	36	69.2	.755
Pulp extirpation	36	69.2	34	65.4	34	65.4	.891

## The Ferrule Effect

Preserving intact coronal and radicular tooth structure and maintaining cervical tissue will increase the stress resistance of a full crown. The literature suggests that the greatest success rate is offered by a 360-degree metal collar of the crown surrounding the parallel walls of the dentin that extends coronal to the shoulder of the preparation. This conservative prosthodontic approach, commonly known as the “ferrule effect,” is considered crucial to optimizing the biomechanical behavior of the restored tooth.

Trauma and extensive caries almost always present a diagnostic treatment conundrum.

- Will the extent of the remaining tooth structure be sufficient enough to produce a high-quality root canal that will offer long-term success?
- Is the remaining tooth structure ample enough to permit the construction of a restoration able to withstand the various biting forces it will be subjected to?
- Will a crown meet all the normal functional and esthetic requirements?
- If the remaining tooth structure is judged to be insufficient, will a post and core be able to satisfactorily support a restoration?

Although the metal-cast post-and-core systems were the standard for many years and are still popular, demands for simpler procedures and more pleasing esthetics have led to the development and use of stress-absorbing prefabricated posts made of ceramics and fiber-reinforced composites. Currently, research laboratories and manufacturers have focused on the canal length (depth) of the dowel, a luting material that will reinforce the remaining intra canal walls (possibly a cured resin system such as Resilon [Resilon Research LLC, Madison, CT]) and a crown design that reflects intraoral forces, thereby making it safer and a more reliable core.

Perhaps this is the real question: Should we focus more on prevention and determining why root fractures of endodontically teeth occur so often? It is conceivable that preliminary operative procedures are responsible. These include excessively preparing pulp accesses at the cost of existing tooth structure; aggressive root canal preparation via unwarranted and excessive intracanal dentin removal that weakens the canal walls (the new taper files and filing systems are designed to do just that); irrigation and obturation inadequacies (leaving obstructive dentin debris in the canal); the selection of oversized posts; and, ultimately, the quality of the coronal restoration. A study by Juloski et al from the University of Florence and Siena, Italy, summarized the results of research conducted on different issues related to the ferrule effect and published in peer-reviewed journals listed in PubMed. The search conducted using the following key words: “ferrule” or “ferrule effect” alone or in combination with “literature review,” “fracture resistance,” “fatigue,” “finite element analysis” and “clinical trials.”

The results indicated that the presence of a 1.5- to 2-mm ferrule has a positive effect on the fracture resistance of endodontically treated teeth. If the clinical situation does not permit a circumferential ferrule, an incomplete ferrule is considered a better option than a complete lack of a ferrule. Providing an adequate ferrule lowers the impact of the post-and-core system, luting agents and final restoration on performance. In teeth with no coronal structure to provide a ferrule, orthodontic extrusion should be considered rather than risking esthetics with a surgical crown-lengthening procedure. If neither of the alternative methods for providing a ferrule can be performed, the literature indicates a poor clinical outcome is very likely, and an implant procedure should be considered.

*Juloski J, Radovic I, Goracci C, et al. Ferrule effect: a literature review. J Endod 2011;doi:10.1016/j.joen.2011.09.024.*

## Validity of Method Used to Measure Pulp Vitality

Of the many improvements in dentistry over the past 2 decades, none are more prominent than the technologic advancements made in endodontics. For example, most decisions to treat or not to treat a diseased tooth have been based on the interpretation of a 2-dimensional (2D) x-ray. The newly introduced computed tomography (CT) scanner produces a 3-dimensional (3D) uncompromised view of any tooth. The scanner’s computer affords the opportunity to rotate that 3D image in every direction and, in so doing, reveal the number and location of hidden (superimposed) roots, as well as the means of tracing the pathway of a canal. By knowing the following information preemptively—the complexity of the root canal system (anatomy), the presence of root aberrations (internal and external resorption), the exact position of a canal impediment (broken file) and the early signs of apical pathology—the diagnosis is assuredly more accurate.

In addition to the CT scanner and a number of years of electronic research, manufacturers are currently marketing electric pulp testers (EPT) that are not only able to establish the extent of a tooth’s vitality but will, via a computed comparison of 2 different electronic impulses bombarding the canal walls, measure the impedance of the canal until patency (no further impedance) is acknowledged.

A study by Chen and Abbott from the University of Western Australia compared the clinical accuracy, reliability and repeatability of laser Doppler flowmetry (LDF), EPT and various traditional pulp sensibility tests including clinically accepted thermal techniques such as CO<sub>2</sub>, Endo Frost (EF; Roeko, Langenau, Germany) and ice. The pulp vitality of 121 teeth was tested during 3 sessions more than or equal to 1 week apart, with the order of the tests reversed on the second visit. LDF measured the mean blood flow of the pulp. The laser source was 780 nm, with 0.5-mm fiber separation in the probe; 3.1 kHz was the primary bandwidth; and the filter was set to a constant 0.1-second time output. When the laser Doppler flowmeter was used to measure the mean pulp blood flow (Flux), it was calibrated against a Brownian-motion medium and zeroed against a static reflector. To ensure that LDF testing was consistent, customized polyvinylsiloxane splints were fabricated for each participant, and a 90-second recording time was used for each tooth where possible. Raw data were analyzed by using repeated measures analysis of variance, pairwise comparisons and interclass correlations (ICC).

The accuracy of the EPT, CO<sub>2</sub> and LDF tests was 97.7%, 97.0% and 96.3%, respectively; the differences (*p* greater than .3) were considered insignificant. The accuracy of EF and ice was 90.7% and 84.8%, respectively. EPT (*p* equals .015) and CO<sub>2</sub> (*p* equals .022) were considered significantly more accurate than EF; LDF was more accurate than EF (*p* equals .063), but the difference failed to reach statistical significance. Ice was significantly less accurate than EPT (*p* equals .004), CO<sub>2</sub> (*p* equals .005), LDF (*p* equals .006) and EF (*p* equals .019). With the exception of ice, all tests were reliable. Ice (ICC equals .677) and LDF (ICC equals .654) were more repeatable, followed by EPT (ICC equals .434) and CO<sub>2</sub> (ICC equals .432).

CO<sub>2</sub>, EPT and LDF were the most reliable and accurate techniques to test the level of pulp vitality. However, from a clinical standpoint, LDF was time-consuming and not as accurate as EPT and CO<sub>2</sub>. Though ice was the quickest, most repeatable and popular clinical test, it is the least accurate and least reliable technique to test pulp vitality.

*Chen E, Abbott PV. Evaluation of accuracy, reliability, and repeatability of five dental pulp tests. J Endod 2011;37:1619-1623.*

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## Featured Case

40 y/o patient presents with discomfort with endodontic treatment done several years ago by a general dentist.

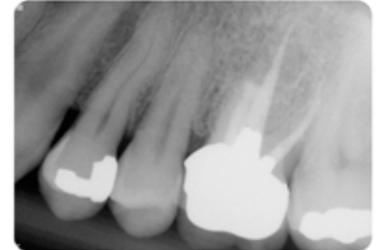
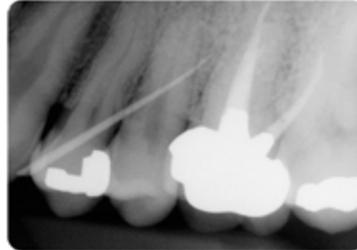
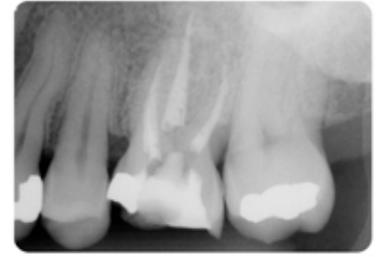
## Diagnosis

Failing previous endodontic treatment with chronic apical abscess associated with the mesialbuccal root.

We initially performed endodontic retreatment using Calcuim Hydroxide as an interm dressing then obturated the canals 4 weeks later. Pt was referred to her GP for final restorations.

Our follow ups showed that the lesion had not fully healed and actually manifested a draining fistula after 4 years. We intervened surgically, removed the cyst and retrofilled the mesial root. After only three months, we have complete healing.

Occasionally endodontic retreatments might require surgical follow-ups. In this case, even after locating the MBII, it may not always be possible to seal the apical anatomical abnormalities via conventional endodontic means. Fins and isthmuses must be cleaned with ultrasonic tips and properly sealed, in this case, with Super EBA.



## Mon, Tues, Wed, Thurs, 7:30am-5pm

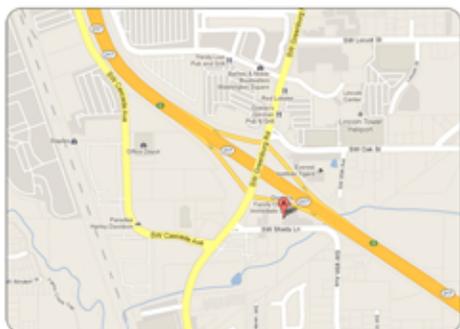
Selected Friday appointment reserved for same day emergencies only.  
Emergencies welcome at all times of business hours!



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**Patients are always bringing us treats to our office, we asked for the recipes for some of our favorites. This cheesecake is one of the best I have ever had!!!**

### Crust

2 Packages of Graham crackers finely crushed  
2 Tablespoons sugar 1/2 Teaspoon Cinnamon  
6 Tablespoons melted Butter

In a mixing bowl, combine cracker crumbs, sugar, and cinnamon. Stir in melted butter until crumbs are well saturated. Heavily butter springform pan. Pat on even layer of cracker crumbs on bottom and sides of pan. After you have the pan evenly covered with crumbs, put in refrigerator while you mix up the filling.

### Filling

3 Eight ounce packages of cream cheese  
1 3/4 cups sugar 1 Pint of sour cream  
3 Tablespoons all-purpose flour  
2 Teaspoons vanilla  
1 Teaspoon lemon juice  
1 Tablespoon finely grated lemon rind  
6 Egg yolks  
6 Egg whites  
Confectioners' sugar



Cream the softened cream cheese by beating it with a spoon in a mixing bowl until it is smooth. Then gradually beat in the sugar. Beat in the egg yolks one at a time until all ingredients are well combined. Stir in the sour cream, flour, vanilla, lemon juice and lemon rind. With a large whisk or rotary beater, beat the egg whites, preferably in an unlined copper bowl, until they are stiff enough to form un-wavering peaks on the beater when it is lifted out of the bowl. With a rubber spatula fold the egg white gently but thoroughly into the cream cheese mixture until no streaks of white show, but be careful not to over fold.

Pour the filling into the pan, spreading it out evenly with a rubber spatula. Bake in the middle of the oven for 1 hour. Then turn off the oven and with the oven door open, let the cake rest on the oven shelf for 15 minutes. Remove and let cool to room temperature. Before serving, remove the sides of the pan and sprinkle the cake with confectioners' sugar.

You can top the cake with your favorite topping, strawberry, raspberry, blueberries or cherry.

**BAKE AT 350 DEGREES FOR ONE HOUR IN THE MIDDLE OF THE OVEN.**