

# BETTER ROOT

Excellence in the Art and Science of Endodontics

www.endodonticassociates.com Toll Free: 1-800-667-7668

## Experience the Better Root

As we enter our 48th year, Endodontic Associates remains one of the GTA's oldest group endodontic practices. We are proud of the solid reputation that we have built and the long-standing relationships that we enjoy with general practitioners throughout the Greater Toronto Area.

While the field of endodontics has changed drastically since we opened our doors in 1973, our devotion to providing superior patient care has not. Our continued mantra is "Excellence in the Art and Science of Endodontics."

While the COVID-19 pandemic has changed the way we welcome our patients and perform treatments so that we can keep our patients and staff healthy, when referring a patient to us, you can expect:

### Ease of Patient Access

We recognize that your patients are often in pain. With two doctors and four locations, we are generally able to accommodate them immediately. Our policy for emergency cases is "Send them right over."

### Experienced Clinicians and Staff

Our highly-trained team uses the most up-to-date technology, to provide your patients the best care possible, and we are constantly evaluating new developments to remain at the forefront of our field.

### Exceptional Patient Care

We strive to make each patient feel comfortable in a relaxed environment. When everything is said and done, the two things we most enjoy hearing, from a patient are: "Wow that is it? – I heard a root canal was a terrible thing." and "Thank you." from you. We are constantly striving to be The Better Root.

In addition to our high standards of infection control, we have installed a special air purification system by Surgically Clean Air™ at ALL of our offices. Through a combination of UV light and a HEPA-Rx filter, the unit eliminates 99.9% of bio-aerosols and viruses. This state-of-the-art device does more than just filter pollutants – it destroys them.

Thank you for your continued confidence.

**Wayne H. Pulver**  
D.D.S., Cert. Endo.

**Marc M. Factor**  
D.D.S., M.S., Cert. Endo.

## 4 Offices in the G.T.A.

### Main Office North York

159 Willowdale Avenue  
North York, ON M2N 4Y7  
Tel. (416) 222-9900  
Fax (416) 222-9901

**TOLL FREE: 1-800-667-7668**

### Scarborough

2100 Ellesmere Road, Suite 333  
Scarborough, ON M1H 3B7  
Tel. (416) 439-4200  
Fax (416) 439-4203

**TOLL FREE: 1-800-565-7668**

### Unionville

10 Unionville Gate, Suite 202  
Unionville, ON L3R 0W7  
Tel. (905) 479-4333  
Fax (905) 479-2250

### Bramalea

40 Peel Centre Drive, Suite 119  
Brampton, ON L6T 4B4  
Tel. (905) 792-2400

**We Welcome Out-of-Town Patients**

Call us if we can help.  
**Tel. 1-800-667-7668**

## Case Example: Complex Canal Anatomies



The patient presented with internal resorption on the upper right central incisor. There was a history of trauma to this region. A CBCT scan was taken and showed significant tooth resorption in the middle third of the root. The complex canal was successfully shaped and obturated – sealing the large centralized defect. Note the accessory lateral canal that was obturated in the process.

## Locating the MB2 Canal in Relation to MB1 in Maxillary First Molars Using CBCT

A recent study published in the Australian Endodontic Journal presented useful findings to guide endodontists on the use of cone-beam computer tomography maging (CBCT), in finding the sometimes-elusive MB2 in maxillary first molars, in relation to the MB1.

Variations in maxillary first molar anatomy contribute to a higher failure rate after receiving endodontic treatment when compared to other teeth. The contributing factor to the failure rate is a missed MB2 canal. The incidence of missed MB2 canals has been reported from 51.5% to 96.1%. Additionally, root canal treated teeth with missed MB2 canals are 4.38 times more likely to return to a state of pathosis.

The research consisted of a retrospective radiographic study of CBCT scans of 346 maxillary first molars. The researchers' intent was to study the relative location of MB1 and MB2 canals. The results showed the average distance from MB1 to MB2 was  $2.06 \pm 0.52$  mm. Statistically significant differences occurred between male and female tooth specimens, with male (2.22 mm) and female (1.92 mm). No differences in distance were observed between initial treatment and subsequent retreatment of affected teeth.

The study's results demonstrated that, while anatomic variations are a constant factor in endodontic treatment of any level of complexity, the measurement guidelines cited in this study can offer useful numeric guidelines to detect the location of the elusive MB2 canal. The study further supports the use of CBCT radiographic imaging by endodontists in complex cases where more precise locations of the MB2 canal support an optimized treatment outcome.

## Teeth Grinding, Cracked Teeth Increases During the Pandemic

Bruxism, or teeth grinding while awake or asleep, is a long-recognized dental condition where patients have symptoms from mild to severely debilitating. Symptoms can include jaw disorders, headaches, and damaged teeth. Stress associated with the COVID-19 pandemic has patients presenting to dentists with a marked increase in compromised teeth.

"We have seen an increasing amount of fractured teeth in probably the past months," said Dr. Paul Koshgerian, an oral surgeon with The Oral Surgery & Dental Implant Specialists of San Diego. COVID-19 doesn't make teeth more fragile, but the 'anxiety' that surrounds everything that's going on — COVID, the rioting, the protesting, the looting, (and) the general state of the country — has gotten everybody's thermostat dialed up a couple notches," Koshgerian said.

From an endodontic perspective, damage to teeth is serious. If a tooth is cracked, and extends to the enamel and dentin but not to the pulp chamber, a tooth is treatable.

Patients should call their dentists if they experience lingering pain or feel broken teeth. If the sides of your face feel sore upon awakening, you might be grinding your teeth at night, Koshgerian said.

## Conservative Preservation of Maxillary Incisors with Uncommon Root Anatomy, Using an MTA Apical Plug

Preservation of the natural tooth is the goal of restorative and endodontic treatment, especially in juvenile patients and in esthetic oral areas. Advanced technology such as the operating microscope, ultrasonic instrumentation, CBCT, and mineral trioxide aggregate (MTA) are the essential tools and dental materials to treat extra-large maxillary incisor foramina.

Dr. Andrea Polesel and Dr. Arnaldo Castellucci studied how the conservative preservation of maxillary incisors with uncommon root anatomies like dens invaginatus may benefit from a combination of nonsurgical-surgical endodontic retreatment aided by CBCT. The dentists' case studies followed two complex endodontic patients.

*The key factors for case resolutions include:*

- 3D radiology is mandatory to analyze the morphology of the dens invaginatus to determine internal anatomy, the diameter of the foramen, and the dimensions of the lesion.
- The dental operating microscope is mandatory to treat and analyze the root canal system during treatment. The microscope provides illumination and magnification to manage complex anatomy.
- Appropriate carrier to perform a precise apical plug to position the material directly at the foramen.
- Cleaning and irrigation supported by ultrasonic instrumentation is most efficient for complex root canal morphology found with dens invaginatus.
- A combined nonsurgical-surgical approach includes the use of MTA as the elective material to seal an extra-large foramen. The issue related to the shape of the root canal is that normal constriction of the size of the canal prevents overextension of the root filling material. The anatomic constraint of a large foramen requires precision in the placement of the material.
- Management of an extra-radicular infection is another crucial factor which determines healing success. Long-standing sinus tracts may function as a route of infection between peri-radicular areas and the external environment, allowing the passage of oral fluids into the apical periodontitis lesion.

In summary, a proper diagnosis, isolation of the operating field, adherence to the basic principles in cleaning, shaping and obturating, as well as anatomic and biologic knowledge, are crucial with complex root canal systems. The large foramen found in dens invaginatus endodontic cases is a challenge, but enhanced operative systems like CBCT, the operating microscope, and MTA, increase case success.

## Final Endodontic Irrigation: 70% Ethanol Enhanced Calcium Hydroxide Removal From the Apical Third

A Brazilian team of endodontists from national university endodontic departments researched the efficacy of final endodontic irrigation with 70% ethanol to enhance calcium hydroxide removal from the apical third during root canal treatment.

The study evaluated the use of various irrigants, along with non-activated irrigation or passive ultrasonic irrigation (PUI), to remove calcium hydroxide during final irrigation.

The method after root canal instrumentation used 80 single root teeth. The teeth were filled with calcium hydroxide combined with propylene glycol and 0.1% rhodamine B dye. The removal of calcium hydroxide was initially conducted with 10 mL saline solution and then reinstrumentation with the master apical file. The teeth were then randomly separated into eight groups and were flushed: 1) 2.5% sodium hypochlorite, 2) 17% ethylenediamine-tetraacetic acid + 1.25% sodium lauryl ether sulfate (EDTA-T), 3) 37% phosphoric acid, or 4) 70% ethanol. 5 mL saline solution was performed as the final flush.

The results demonstrated that 70% alcohol produced a statistically higher percentage of clean root canal walls and improved the depth of clean dentinal tubules when compared to 2.5% sodium hypochlorite or 17% EDTA-T. The results were measured and confirmed with images from laser scanning microscopy. No differences were noted with non-activated irrigated or PUI protocols.

# Get to Know Us. Meet Our Doctors

## THE BETTER ROOT



Dr. **Wayne** H. Pulver  
D.D.S., Cert. Endo.

Dr. Wayne Pulver received his Certificate in Endodontics from the Harvard School of Medicine in 1976. Dr. Pulver is the past head of the endodontic section of Mount Sinai Hospital. Dr. Pulver has served as President of the Ontario Society of Endodontists, Canadian Academy of Endodontists, George Hare Endodontic Study Club, as well as the Ontario Dental Association. He has received numerous awards and distinctions and has authored a variety of clinical and scientific articles in endodontics. Dr. Pulver has lectured extensively and serves as a member of the Real World Endo Board of Advisors.



Dr. **Marc** M. Factor  
D.D.S., M.S., Cert. Endo.

Dr. Marc Factor received his specialty training in Endodontics in 1995 from SUNY at the Buffalo School of Dental Medicine, paired with a Masters of Science in Oral Biology.

Dr. Factor currently serves on the executive council of Alpha Omega Dental Society and has held an Attending Staff position at Mount Sinai Hospital, where he gave lectures and assistance to dental residents.

He is involved in continuing education organizations, including the George Hare Endodontic Study Club, the Ontario Society of Endodontists and the American Association of Endodontists. Dr. Factor has taught at the University of Toronto as an undergraduate clinical instructor and was President of the York Region Dental Society.

## Developments, Application, and Performance of Artificial Intelligence in Dentistry

The exponential growth in science and technology has introduced different applications that are used daily, such as Siri and Alexa. These applications are found on the top of artificial intelligence (AI) and its components.

AI has mainly been used in dentistry to make the process of diagnosis more accurate and efficient.

### Application of AI technologies in the specialty of endodontics

The success of root canal treatment mainly depends on the accuracy of working length determination. The prognosis of the treatment can only be ensured when instrumentation terminates at the apical constriction. Saghiri et al. used artificial neural networks (a set of algorithms that compute signals via artificial neurons. The purpose of neural networks is to create neural networks that function like the human brain) in determining the working length and showed exceptional accuracy of 96%. These results were similar to the study by Saghiri et al., where they used a similar methodology for locating the minor apical foramen, with an accuracy of 93%.

Additionally, AI has been used to diagnose vertical root fractures in CBCT images and panoramic radiographs with an accuracy of 96.6%.

AI has revolutionized dentistry in the last few years. Numerous studies show that these AI-powered automated systems performed extremely well in various scenarios and can be considered for clinical applications.



### Note Our New Unionville Location

10 Unionville Gate, Suite 202  
Unionville, Ontario L3R 0W7

Tel. (905) 479-4333

Fax (905) 479-2250



**Main Office** 159 Willowdale Avenue, North York, ON M2N 4Y7

Tel. (416) 222-9900 • Toll Free: 1-800-667-7668

[www.endodonticassociates.com](http://www.endodonticassociates.com)