“He brought a world of enthusiasm and knowledge to the global endodontic community”

Fred Weinstein, DMD, MD, DFCI, FICD, FACS, who passed away Oct. 15, 2017, at the age of 78, is pictured in Anaheim, Calif., at the California Dental Association meeting, CDA Presents: the Art and Science of Dentistry, in 2012. A retired endodontist from Vancouver, British Columbia, Weinstein often traveled to dental meetings to keep his knowledge of the specialty current and to visit with his many friends. (Photo/Fred Michmershuizen, Managing Editor of DT America)

Fred Weinstein was born in 1939 in Winnipeg, Manitoba. He graduated from the University of Manitoba at the age of 22 with a degree in general dentistry, and then he went on to study endodontics at the University of Pennsylvania School of Dental Medicine in Philadelphia, under the tutelage of Dr. Louis Grossman, known as the “Father of Endodontics.” After receiving his Certificate in Endodontics from the University of Pennsylvania in 1969, he moved his family to Vancouver and established an office in the Fairmont Medical Building, where he would go on to practice for more than 40 years.

“Fred was a character, but in the best sense of the word. He was entertaining, charming and unpredictable. That was Fred. But to those of us who knew and loved him, he was much more than that. He was a loyal friend who made a maximum effort to understand each of us in a personal and supportive way. Really, at the end of the day, Fred was a mensch. He will be very much missed.”

Weinstein’s accomplishments within the profession were notable. He served as an assistant clinical professor at the University of British Columbia and was a past president of the Canadian Academy of Endodontics, the British Columbia Society of Endodontists, the International Federation of Endodontic Associations (IAF). He was a member of the Royal College of Dentists, and he was a fellow of the American College of Dentists and the International College of Dentists.

He was especially proud to have served as the general chairman for the 2007 IFA World Congress in Vancouver. To drum up excitement for that meeting, he dressed as a Royal Canadian “Mountie” at several events leading up to it — something that friends and colleagues remembered for years.

“Fred always had a smile and was known as the ‘Canadian Mountie’ for his outfit that he wore at every dental meeting to promote the IFA meeting in Vancouver in 2007,” remembered Samuel O. Dom, DDS. “He was truly dedicated to the Canadian Academy of Endodontics and its place in global endodontics. His passion and unpredictable nature will never be forgotten.”

“Cherish my photo of us with him dressed as a Mountie when he was president of IFA,” said Dr. William Ben Johnson. “Fred and I started out as endodontic colleagues, then became friends. So much so he would go snow skiing with me even when he didn’t care for skiing, and I would drink wine with him when I preferred scotch. I’ve lost a friend.”

After his retirement from practice, Weinstein continued to travel to dental meetings to keep his knowledge of the specialty current and to visit with his many friends. For many years, Weinstein was editor in chief of roots magazine, the international C.E. magazine of endodontics, published by Dental Tribune America.

“Above all of Fred’s accomplishments and titles, his family remained his number one priority in his life, always,” his family wrote in the Sun. “He had a gentle heart of gold, compassion and sincerity and a smile that would illuminate a room.”

By Fred Michmershuizen, USA

He will be remembered as a friend, a teacher and a healer. Fred Weinstein, DMD, MRCD(C), FICD, FACD, who passed away Oct. 15, 2017, at the age of 78, after a brief illness. His fellow specialists expressed sadness at his passing and acknowledged how his passion for dentistry and the specialty current and to visit with his many friends.
MTA placement with the Produits Dentaires (PD) MAP System

By Dr. Mauro Amato, Switzerland

More than 20 years ago, Torabinejad et al. (1993) first described a new root-end filling material called mineral trioxide aggregate (MTA). MTA showed in vitro better sealing ability than amalgam or Super EBA when used as a root-end filling material. Later, several in vivo and in vitro studies demonstrated more applications for MTA. Pulp capping, apexitification, repair of root perforations and root-end filling are commonly described clinical procedures to seal the pathway of communication between the root canal system and the external surface of the tooth. The application of MTA was first described as being achieved with aid of plastic or metal spatulas (Torabinejad and Chivian 1999). Unfortunately, proper placement was not possible in this manner. Therefore, Produits Dentaires introduced a universal carrier system for clinical and surgical MTA placement. Its Micro-Apical Placement (MAP) System offers different application points for every clinical situation. The Intro Kit and the Universal Kit are for orthograde obturation and the Surgical Kit for retrograde obturation. The NiTi Memory Shape tips can be manually shaped to any required curvature. After autoclave sterilization, the needle returns to its initial shape. With the use of the MAP System, proper placement of MTA has become an easy task for every dentist. In combination with the MAP System, Produits Dentaires offers a white MTA specially developed for placement with the MAP System. The optimized practical size means economical application for each treatment. There are many indications for the PD MTA White, and with the MAP System, proper placement is easy in every situation.

Pulp capping
Vital pulp therapy has become more popular in recent years. Calcium hydroxide has been the most common material for pulp capping, but MTA has shown even better results in biocompatibility and outcome (Aguilar and Linsuwanont 2010). Cases with large carious pulp exposure can be treated successfully with partial pulpotomy and MTA as a capping agent, keeping teeth vital (Figs. 1a–e).

Apexitification
In order to prevent extrusion of root canal filling material in immature teeth with open apices, MTA is used as an apical plug. The results of many studies have shown that MTA induced apical hard tissue formation more often and its use was associated with less inflammation than with other test materials (Simon et al. 2007) (Figs. 2a–g).

Repair of root perforations
Accidental perforation of the pulp chamber or of the root canal significantly changes the prognosis of the tooth. Perforation repair with a biocompatible sealing material such as MTA may save compromised teeth (Mintz et al. 2014) (Figs. 3a–e).

Apical surgery
MTA is the material with the most favorable outcome as a root-end filling material for apical surgery. MTA has been associated with significantly less inflammation, cementum formation over MTA and regeneration of the periodontal tissue (Torabinejad and Chivian 1999) (Figs. 4a–f).

Dr. Mauro Amato is a lecturer and researcher at the department of periodontics, endodontics and cariology of the University of Basel in Switzerland. Dr. Amato is a committee member of the Swiss Society for Endodontology. He can be contacted at mauro.amato@unibas.ch

References:
- Aguilar and Linsuwanont 2010
- Simon et al. 2007
- Mintz et al. 2014
- Torabinejad and Chivian 1999
Preservation of root cementum: A comparative evaluation of power-driven versus hand instruments

By Bobzay E, Dominio F, Golbeig AT, Grzesik S, Guida L, Aydin MS, Mariotti A, Pilloni A, Italy

Background
Grzesik et al suggested that cemen-
tum plays an important regulatory role in periodontal regeneration. One of the major goals of periodontal treatment is the removal of patho-
genic micro-organisms by scaling and root planning. In the past the misconception was to obtain a root surface with smooth and hard sur-
face characteristics that was free of endotoxins which resulted in the re-
moval of the subgingival plaque and calculus deposits, and the removal of all or most of the cementum. Recent studies have reported that cementum were not located within cementum and removal of diseased cementum was not necessary for a successful periodontal treatment. Saygin et al concluded that preser-
vation of cementum on the root surface was necessary for new attach-
ment and as a source of growth fac-
tor. Hence non-aggressive removal of cementum is essential for optimal periodontal health and regeneration.

Ultrasonics with new shaped tips and subgingival air polishing devices has been developed for removal of root accretions with minimal root damage. Air polishing has been sug-
gested as a treatment modality for root debridement resulting in prob-
ing depth reductions and removal of subgingival biofilm. No scientific ev-
dence exists today showing the loss of root substance or surface rough-
ness produced by either ultrasonics or Air polishing.

Aim
To assess the amount of cementum remaining following in vivo root in-
strumentation as well as the surface characteristics of the retained ce-
mentum.

Material and Methods
- Four caries free single rooted teeth in 27 patients diagnosed with severe chronic periodontitis with periodon-
tal probing depth (PPD) ≥4 mm in at least two sites per tooth with radio-


graphical bone loss of more than two thirds of root length and scheduled for extraction were included in this study.
- Teeth were randomly divided into four treatment groups: Instrumenta-
tions were performed with medium power settings

1. Piezoelectric ultrasonic scaler - (Air-
2. Piezoelectric ultrasonic scaler - (Air-
Flow Master Piezon, Instrument Tip PS, EMS SA) followed by air polishing with the glycine powder (AirFlow Powder Petro, Petro-Flow Nozzles, EMS SA) - U + AP.
3. Air polishing with the glycine pow-
der (AirFlow Powder Petro, Petro-
Flow Nozzles, EMS SA) - AP.
4. Hand instruments (Gracey curettes 5/6, 11/12, 13/14 American Eagle, Mis-
soula, MT, USA) - HC.

Treatment
- One approximal root surface of each tooth was randomly subjected to debondment, and the other ap-
proximal surface was used as control.
- Following instrumentation, the teeth were immediately extracted traumaetically and analyzed with a dissecting microscope.
- Remaining calculus, root surface roughness and loss of root substance were evaluated along with scratches, gouges, cracks, and any other chang-
es in the cementum that was present were noted.

Results
Remained cementum:
- Percentage of coronal cementum remaining following subgingival in-
strumentation was 86% for U, 80% for U + AP, 94% for AP and 65% for HC.
- The amount of retained cementum with AP was significantly greater than with HC.
- Smoother root surfaces were pro-
duced by the HC followed by the AP.
    - Coronal and apical sections showed that AP produced the least amount of cementum loss and therefore the greatest retention of residual cemen-
tum.
- Root surfaces instrumented by U or U + AP presented grooves and scratches.

Time taken to complete root instru-
mantation:
- Shortest time taken was using AP.
- AP required 3% less time for root preparation in comparison to HC.
- HC and AP were the effective and superior in preserving cementum.
- Hand instrumentation using cu-
rettes was most effective in remov-
ing cementum in comparison to ul-
trasonics or hand instruments.
In the course of two major international events in the dental industry, Swiss dental specialist COLTENE interviewed over 130 dentists and Endo experts about their experiences with its latest NiTi file system. The results of the product tests are more than impressive: 98% of the participants would continue to use the HyFlex EDM for the treatment of their endodontic cases, even after the tough test.

The necessary cutting edge

Every two years, both the International Dental Show in Cologne (IDS for short) and the Congress of the European Society for Endodontics (ESE Congress) serve as an international platform for professionals with an interest in endodontics to exchange experiences between colleagues. Thus, both events in 2017 provided the ideal occasion for a large-scale test campaign for the latest NiTi file generation from COLTENE. Selected dentists and joint practices throughout Europe were given the opportunity to put the flexible HyFlex EDM’s file system through its paces under heavy-duty use. In fact, HyFlex EDM files are up to 100% more resistant to cyclic fatigue compared to traditional NiTi files. A special combination of material surface and tapering allows a significant reduction in the number of files used without compromising the preservation of the natural root canal anatomy. These smart features were also evaluated positively in the test and the dentists use the robust high performance instruments primarily for cases where they want to produce reliable results quickly with a reduced number of files.

Additional files sizes allowing more flexible application

Due to limited access endo experts often want more flexibility from their instruments. Pre-bendable tools can extend the horizon into new dimensions. Particularly in a limited working space, modular nickel-titanium systems display their full strength. With a total of seven highly flexible file variants, COLTENE offers a wide-ranging HyFlex NiTi program. In addition to the usual lengths of 25 mm, all preparation files of the popular EDM series are also available in 21 mm working length. The application of the more agile, shorter models is particularly recommended in the posterior molars and in patients with cranio-mandibular problems.

The new HyFlex EDM 20/05 preparation file augments the existing Hyflex EDM line. The additional file enables fans of the flexible NiTi range to treat curved channels only with the efficient EDM files. After creating a glide path with the glide-pathfile 20/05, the new file with the same taper allows minimally invasive, fast preparation of the canal. Subsequently the actual shaping can be done in the usual manner with the universal file Hyflex EDM One-File, size 25. Depending on the canal anatomy, apical preparation can be finished with EDM files up to ISO size 6x. Even in those large sizes the files work safely and without transportation of the canal center.

Full control in the dental practice

As an established Endo provider, COLTENE has been working closely with leading dentists, universities and endo experts for many years. The multitude of sophisticated treatment aids, ranging from specially hardened instruments to bioactive obturation materials, reflects the self-image of the Swiss innovation leader. True to the company’s motto “Upgrade Dentistry”, the COLTENE service team regularly asks practice owners and endodontic specialists about their wishes for even more confident work in virtually all situations. This also formed the basis for the development of the production process called “Electrical Discharge Machining” (EDM for short) by the dental manufacturer’s renowned R&D department, which ultimately gave the exceptionally break-resistant files their name. The practice-oriented Endo offer is complemented by a large number of application-related workshops, training materials and personal services.

More convinving features for the testers

The new Hyflex EDM 20/05 preparation file augments the existing Hyflex EDM line. The additional file enables fans of the flexible NiTi range to treat curved channels only with the efficient EDM files. After creating a glide path with the glide-pathfile 20/05, the new file with the same taper allows minimally invasive, fast preparation of the canal. Subsequently the actual shaping can be done in the usual manner with the universal file Hyflex EDM One-File, size 25. Depending on the canal anatomy, apical preparation can be finished with EDM files up to ISO size 6x. Even in those large sizes the files work safely and without transportation of the canal center.

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Success evaluation of N2 treated teeth with open apical foramen.
A retrospective study

By Dr Anette Joschka, Dr Robert Teunissen & Prof. Jerome Rotgans, Germany

Abstract
95 teeth with open foramen were identified in a general dentist practice during the years 1985—2007, 75 of which could be followed up by X-ray after an average time of 70 months (follow-up X-ray). 40 teeth were subject to vital extirpation (VitE), 28 teeth to vital amputation (VitA), and seven teeth with necrotic pulp underwent conservative root canal treatment (RT). Apexitis success rate amounted to 85.5% (VitA 96.1%, VitE 85.7%, non-vital RT 97.6%). Another 12% could be judged as partial success in molars, as a certain number of the molar roots showed apexitisication, however, others not yet. The percentaged difference of a successful application between vi-
tally extirpated teeth and root canal treatment of non-vital teeth was sig-
nificant (p = 0.0249). Apexitisication re-
result was irrespective of the filling level of root canal treated teeth as well as of endodontic success

Endodontic failures resulted in two cases (3.5%). Statistic significance was found regarding failure rate of VitA (71.5%) and root canal treatment of non-vital teeth (28.5%), p = 0.0357.

Within the observation period 19 out of the 95 teeth with open foramen (20%) were extracted. There was a significant difference regarding ex-
traction frequency between the VIT group (44.6%) and the non-vital group (57%, p = 0.0269).

Introduction
Endodontic treatment of teeth with incomplete root growth poses a spe-
cial challenge. In young patients, the necessity for endodontic treatment results from an accident or profound caries. Aside from damage control, this treatment aims at promoting tooth maturation including narrow-
ing respectively closure of the apical foramen (apexitisication) and possibly root extension (apexogenesis).

According to Zehndel (1997) the fol-
lowing treatment options are com-
morally used:
- For vital teeth: Pulpotomy (VitA) with subsequent conservative root canal treatment (RT);
- For non-vital teeth: either RT or – RT in connection with apicocoto-
my/retrograde root canal filling of – inducing of bleeding with root canal filling in the coronal root part only.

Kratzow et al. (1997) disapproved of a VT inevitably following root canal filling of the root canal. The authors pointed out that the often diverging roots of imma-
ture teeth exclude a dense root canal filling, and that open apical foramen promotes overfilling. Some authors, like Korkausland et al. (2002) and Hult-
er (2009), state that the dental papilla may simulate an apical periodontium in the area of the open apical fora-
men. Various methods favouring matura-
tion of the immature teeth are de-
scribed. Surgical interventions turned out to be less promising (Kreter 1999, Khoury 1999). Herforth (1998) obtained a very high healing rate of apical periodontitis with iodoform deposits, however the success rate regarding stimulation of hard tis-

u
te induction only amounted to 3% versus 83% with calcium hydrox-
ide (Ca(OH)2). Hermann (1920, 1930)
troduced calcium hydroxide as material with osteogenic potential. Frank (1966) was the first to use it as the dental dressing in teeth with incom-
plete root growth. These dressings should be replaced every three months. Cvek (1977) and Fuglie (1985), however, do fa-
vour a replacement of the dressing only in case of pathology. The long-
treatment duration—and thus loss of patient compliance—as well as a decrease of fracture resistance (Cvek 1972, Andreasen, Fabrik and Munks-
gard 2001, Ansmaen, Munksgarrd and Bakland 2006, Trope 2006) are regarded as adverse features of the calcium hydroxide method.

As formaldehyde also features an os-
togenic potential (Orban 1993, 1997), tests with formaldehyde versus calcium hy-
drooxide were made as well. Within a pulpotomy study, Speiding et al. (1996) judged formaldehyde as being more appropriate for apexification. Latest literature prefers mineral tri-
oxide aggregate (MTA) over calcium hydroxide (Andreasen et al. 2006, Schwartz et al. 2008, Schaefer 2009, Shubhabab et al. 1999 as well as 1H5leigh et al. 2006) made a com-
parison between mineral trioxide ag-
gregate and calcium hydroxide end-
ing up in favour of MTA.

In a prospective study, Simon et al. (2007) report on 43 one-stage MTA treatments, which were followed up after a control period of at least 12 months (up to 36). 65% of apical le-
sions were completely healed and an apical barrier could be observed in 11 cases (25%). 78.7% were free from apical periodontitis, whereas apexitisication took place in only 64 out of 75 cases (85.5%). The time period for control of apical development was clearly longer, though, amounting to 70 months.

Aside from the therapy with various medicaments, the ‘revascularization’ therapy was established also (Kam et al. 1972, Hülsmann et al. 2008, Bose et al. 2005). Hucl et al. 2002, Garcia-
Gody and Murray 2011) provoking a light bleeding into the pulp by punc-
tion beyond the apex. Dressing is placed coronary. MTA, calcium hy-
drooxide, formocresol or a triple anti-
biotic paste. The latter one provided thicker canal walls than calcium hydroxide respectively formocresol. Also the length growth was stronger versus MTA application (Hehrselder 2004).

Based on the knowledge that formal-
dehyde preparations have a similar (revascularization, osteogenic) effect to the pulp like calcium hydroxide, the secondary author of this study as long-time owner of a general dental practice suggested an analysis of basic endodontic treatment cases with open apical foramen regarding apexitisication/apexogenesis, which had been carried out by Joschka (2013) as then doctoral candidate from which this article reports.

Material and method
95 endodontics treatments of teeth with open apical foramen were taken

Read more about VDW’s DT Posts at: https://www.vdw-dental.com/en/products/post-endos/
Case 1: Male (born 5 June 1987): Tooth 35

Fig. 3a: 18 March 1997 ante pulpotomy.
Fig. 3b: 18 March 1997 post pulpotomy.
Fig. 3c: 6 May 2005 status.

The average age of the patients was 10.7 years (6–25). Most cases (N=154) were attributed to mandibular molars (72%), among these mostly the first lower molars with 48 cases (30.5% of the cases to be analyzed), followed by maxillary incisors. 75 cases were subject to one or—in intervals—multiple follow-up X-rays. 40 teeth (25.5%) were extirpated vitally. 28 teeth (18%) were amputated and seven non-vital teeth (4.5%) underwent conservative endodontic treatment. Post endodontic clinical control averaged at 73 months (12–271), the follow-up X-rays to be evaluated at 70 months (10–228).

Statistical significance was assumed for an error assumption of p < 0.05 for comparison of two parameters and calculated by means of the logrank test.
The longer therapy dated back, the easier the endodontic treatment. Aim ap correspondent or apexogenesis could be verified. Two cases featured open apical foramen for 1-2 years. Apexification occurred in 90% of patients after 20 years. Patients who only needed the apices closed to achieve histological success could not have been considered prior to this time, which could have been clarified in a prospective study only. However, histological observation period of 70 months is long compared to other publications. The long period of injury could be clarified after 20 years (1978) with 3.9 years after treatment of 541 front teeth, condition after accident, with calcium hydroxide and lidoform and with four years by Cvek (1972) who evaluated the data of 1874 intra-ulated maxillary front teeth treated with calcium hydroxide by 158 practitioners. 21 months after MTM treatment of 30-root, non-vital teeth with open apical foramen Annan and Mungur (2009) demonstrated a success rate of 100% (N = 27) for their 20 teeth treated by MTA in different appointments. The healing and apexification process was not subject to recall interval. However, advanced growth of the apexes after N2 application over a period of several years could have been followed by MTA in several appointments. The radiographic diagnosis of the present study is 138 % positively without apical periodontitis. 93 % apical periodontitis questionable; 2 % apical periodontitis with 87 % featuring 'apical closure' and 36.7 % remaining the only practical method. An inter pretation bias in this study could be largely eliminated due to the consensus finding of the three X-ray evaluators. While in short-term studies with low case numbers extractions are not mentioned, this study counted 29 extractions, 14 of which were allotted to the first mandibular molar. Thus the mandibular molars represented 73.7% of all extractions with a 50.5% share. Despite of the diagnostic deficits to be assumed, X-ray in combination with a clinical examination remains the only practical method. An inter pretation bias in this study could be largely eliminated due to the consensus finding of the three X-ray evaluators. In the present study, pulp tissue, possibly blood as well, had contact to the outer wall. As at the same time was a time- and cost-saving method.

Editorial note: A list of references is available from the publisher.