



Maximum Strength.
Minimally Invasive.

ZenFlex™ Clinical Case Booklet

Introduction

Welcome to the ZenFlex™ Clinical Case Booklet, a comprehensive collection of diverse root canal treatment cases utilizing the Kerr ZenFlex file. This booklet serves as a valuable resource for dental professionals, offering insights into both routine and challenging scenarios encountered in endodontic practice.

In our commitment to advancing dental care, we have gathered a variety of clinical cases that highlight the versatility and effectiveness of the ZenFlex file. From straightforward treatments to complex cases that test the limits of our skills, each entry is designed to provide practical knowledge and enhance your understanding of root canal procedures.

As we recognize that every dentist faces unique challenges in their daily practice, and this booklet aims to be a reliable reference guide. We hope that you will find valuable information that can be applied directly to your work. Each case is presented with detailed descriptions, outcomes, and key takeaways, allowing you to learn from real-world experiences.

In addition, we hope that this booklet not only enriches your clinical practice but also inspires confidence in your ability to tackle various endodontic challenges. The editor and contributors are dedicated to ensuring that this resource is beneficial for every dentist performing root canal treatments.

Thank you for being a part of this journey with us!



Anthony Renz

Manager of Professional Education & Clinical Affairs EU



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Endodontic treatment #25 on ZenFlex™ simplified technique

Dr. Atenea Baena Urueña - Netherlands 

A patient came to the practice after a prolonged period without visiting a dentist. The patient reported intense pain in the upper left premolar, particularly in response to cold and heat, and also experienced spontaneous pain. After a comprehensive examination, various treatment options were discussed with the patient. Due to the severe pain, the patient opted to begin with the treatment for the second premolar.

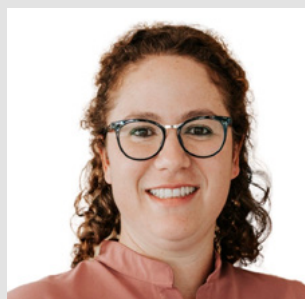
Clinical Examination

Upon clinical examination, caries were diagnosed in the distal area of tooth #24, and a deep caries lesion in the mesial area of tooth #25 was found to be causing irreversible pulpitis. In tooth #26, only a root remnant was present, and an extraction was planned. (Fig. 1 & 2)

Treatment

Local anesthesia with articaine hydrochloride 40mg / epinephrine 0,012mg was administered, followed by rubber dam isolation. The caries in teeth #24 and #25 were completely removed. For tooth #24, a sectional matrix was used for the reconstruction. Selective etching of the enamel was performed, followed by bonding application. The cavity was filled using SimpliShade™ composite in Medium shade.

About Dr. Atenea Baena Urueña



Graduated in Dentistry from Universidad Cardinal Herrera-CEU, Valencia, in 2008. In 2012, I completed a Master's in Endodontology at Universitat de Valencia, where I developed a profound interest in the complexity of root canal

treatments and advanced endodontic techniques. Since then, I have been practicing in the Netherlands, focusing exclusively on endodontics and continuously enhancing my skills through numerous specialized courses and international conferences.

I am also passionate about sharing my knowledge with colleagues through lectures and training sessions, promoting evidence-based techniques and innovation in endodontics, while staying at the forefront of advancements to provide optimal care and contribute to the professional growth of the dental community.



Fig. 1 The X-ray initially reveals the following findings: caries on the distal surface of tooth #24, mesial caries on tooth #25, and a root remnant associated with tooth #26.



Fig. 2 Pre-treatment image captured during an intraoral examination.



Fig. 3 Reconstruction of the mesial wall using SimpliShade prior to endodontic treatment.

In tooth #25, the mesial wall was first reconstructed using the same technique, leaving the central portion of the cavity open to facilitate the root canal treatment (Fig. 3). Root canal treatment was then performed using the elements™ Connect and Apex Connect systems. The initial file used was Traverse Glide path file size 13/.06 (21 mm), followed by ZenFlex files 20/.06 and 25/.06 (21 mm). Sodium hypochlorite 5.25% was used as an irrigant between files, with ultrasonic irrigation and a final rinse with EDTA 17%. For canal obturation, the vertical condensation technique was employed using an epoxy-amine resin-based sealer with the elements™ IC system (Fig. 4).

Then, the cavity was cleaned with alcohol and filled with a SimpliShade composite in Medium shade.



Fig. 4 Canal shaping performed with Traverse and ZenFlex files, followed by obturation using the 3D continuous wave technique.

Outcome

The root canal treatment was successfully completed, and the patient reported relief from the spontaneous pain. (Fig. 5&6).



Fig. 5 Final radiographic assessment following the composite restoration of tooth #24 (occluso-distal) and tooth #25 (occluso-mesial) using SimpliShade Medium.



Fig. 6 Post-treatment image taken following the polishing of the composite restoration.

Endodontic treatment #17: Management of medium-large canals

Dr. Roman Blahuta - Slovakia 🇸🇰

A 22-year-old female patient presented with pain upon biting and a persistent dull ache in the area of tooth #17. The patient had no significant medical history.

Clinical examination of the vestibular and palatal areas in the first quadrant showed no visible signs of swelling, redness, or fistula formation. Palpation was also negative. Periodontal probing depths did not exceed 3 mm. Teeth numbers #15, #16, and #17 had previously been treated with composite fillings by another dentist. Only tooth #17 tested negative for vitality and positive on percussion. An intraoral X-ray was performed, showing a deep filling and signs of periapical radiolucency on tooth #17 (Fig. 1). Based on these findings, pulpal necrosis was identified as the cause of the symptoms, with chronic apical periodontitis determined as the main diagnosis. The patient was scheduled for root canal treatment.

Due to the complex root canal anatomy, treatment was completed over two appointments. After creating the access cavity, the orifices of the MB1, DB, and P root canals were visualized under dental operating microscope



Fig. 1 The intraoral X-ray reveals a deep filling and indications of periapical radiolucency on tooth #17.

About Dr. Roman Blahuta



Dr. Roman Blahuta earned his degree and completed a PhD in dentistry at Comenius University in Bratislava, Slovakia.

As an endodontic specialist, he works in a private dental center, focusing on advanced treatments.

He is a founding member and current president of the Slovak Endodontic Society.

Over the years, Dr. Blahuta has become a highly respected speaker and lecturer, sharing his expertise at conferences, seminars, and workshops.

He regularly leads hands-on courses, providing advanced training in endodontics to dental professionals.

(DOM). Due to the small radius of curvature in the MB1 and DB canals, the glide path was initiated with pre-bent C-files #6, 8, and 10, followed by a K-File #10 to establish the correct glide path. A M4 handpiece was also utilized. The palatal root canal was instrumented initially with a K-File #25. To access MB2, the dental ridge above its entrance was removed using Muncie burs. After scouting the entrance with a C-file #8 (Fig. 2), the Traverse glide path file 13/06 was used to achieve a straight-line path, gently brushing mesially without forcing the file apically

(Fig. 3). Ultimately, a secure glide path was established in all root canals. The MB2 canal showed a connection to MB1 (Vertucci Type II configuration). Throughout the treatment, copious NaOCl irrigation and activation of the solution were performed. Calcium hydroxide dressing, sterile Teflon tape, and an adhesive filling were used to secure the access cavity.

In the second appointment, final preparation was completed with the Traverse glide path 13/06 file and ZenFlex files: MB1 40/06, MB2 25/06 (prepared only to

the connection), DB 40/06, and P 40/06. Copious NaOCl irrigation and activation of the solution were repeated at each stage. NaOCl was removed and EDTA was left in the root canal system for 5 minutes. NaOCl was used as the final irrigant. A single-cone obturation technique was performed using a calcium-silicate-based sealer. Core build-up with short-fiber reinforced composite was applied, followed by a top layer of composite to restore the correct occlusal morphology. A final intraoral X-ray was taken post-treatment (Fig. 4). The patient was scheduled for a 12-month recall (Fig. 5).

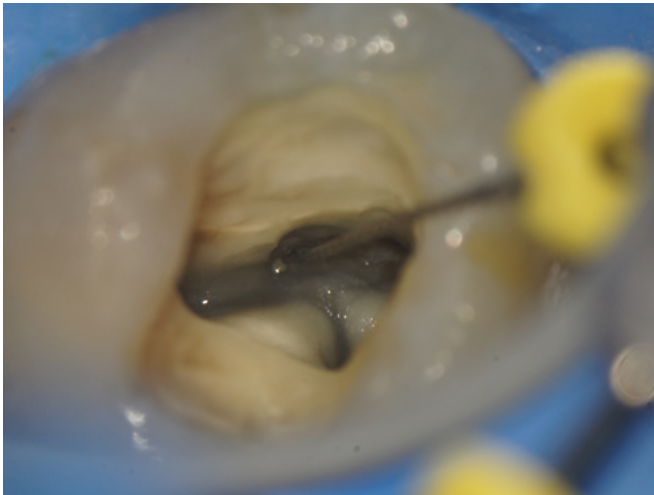


Fig. 2 The image illustrates the exploration of the MB2 entrance using a C-file #8 after the removal of the dental ridge with Muncie burs.

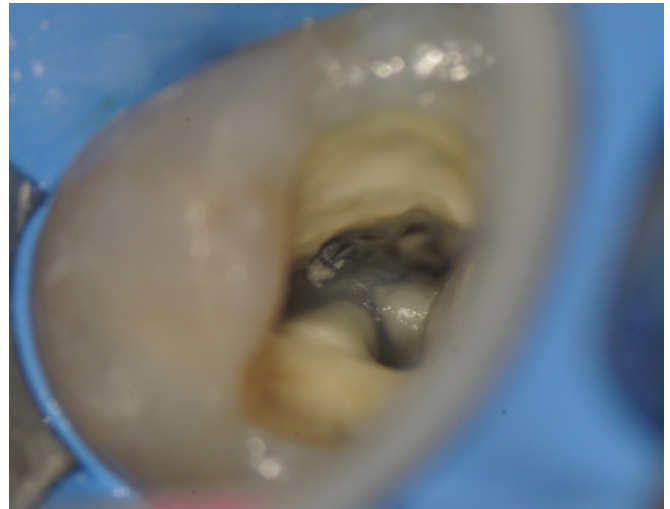


Fig. 3 The image indicates that a secure glide path was created in all root canals using the Traverse glide path file 13/06.



Fig. 4 The X-ray image demonstrates the complete sealing of the root canal treatment after canal preparation and the single-cone obturation technique.



Fig. 5 The X-ray image shows the follow-up after 12 months.

Conservative technique with minimally invasive endodontic treatment on narrow canals in tooth #33

Dr. Valter Fernandes - Portugal 🇵🇹

A 36 year old female patient presented for treatment of symptomatic apical periodontitis on anterior lower canine (#33). After an initial attempt of treatment, where the dentist couldn't find the canal, the patient was on excruciating pain, medicated with pain killers and antibiotic. At that time, the dentist referred her to an Endodontic specialist's office.

After clinical and radiographic examination, a calcifying metamorphosis was detected on coronal portion of



Fig. 1 The radiographic examination revealing calcifying metamorphosis in the coronal portion of the root.

the root (Fig. 1). An endodontic treatment under microscope magnification was proposed to patient, in order to remove pulp stone, find the canal and deal with necrotic pulp tissue on the apical part of the root.

Following initial diagnosis and planning, treatment was initiated with patient being anesthetized with 4% articaine. After a waiting period, rubber dam was placed. The provisional restoration was removed and an initial irrigation was made with NaOCl 5,25% and Citric Acid (10%). Under magnification of 4x-16x times, with a (ZEISS - Germany) microscope and diamond ultrasound tips (Woodpecker – China), the calcifying tissue was meticulous removed and the entrance of canal was negotiated with a small 10 K-File. Because it was a narrow canal on compromised anterior teeth, that is subject to high occlusal forces, it was decided to use low taper endodontic instruments to preserve dentin structure. After glide path was achieved with a 10 and 15 K-File a low taper cutting rotary instruments were used ZenFlex 20.04 /25.04 and 30/04. Copious and abundant irrigation was used during all the mechanical instrumentation procedure. A final irrigation protocol, with passive ultrasonic activation and a chelation agent was done before drying the root canal. For root canal sealing, a 04 taper gutta-percha cone was cal-

About Dr. Valter Fernandes



Dr. Valter Fernandes is an Invited Professor in Endodontics at IUCS, Portugal, and holds a PhD in Biomedical Sciences. He is a board member of the Portuguese Society of Endodontics and a member of the European Society of Endodontics. With extensive experience in teaching, speaking and publishing, he has contributed significantly to national and international congresses and hands-on endodontic courses. Since 2010, his clinical practice has focused on Microscopic Endodontics. He is also recognized for his expertise and contributions to the field of endodontics

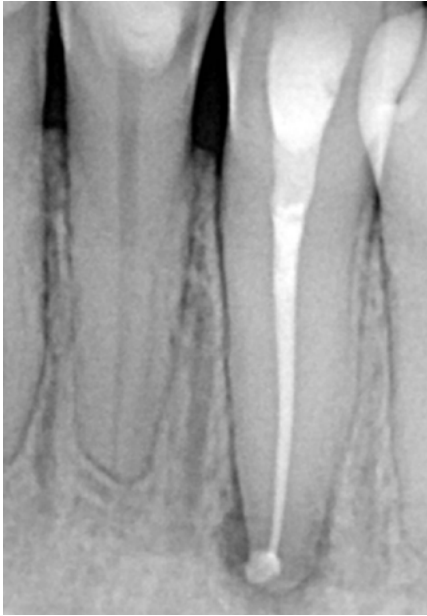


Fig. 2 The root canal sealing, a 04 taper gutta-percha cone was fitted to the canal, and a bioceramic sealer was applied using the cold hydraulic technique.

ibrated and fitted to the canal and a bioceramic sealer was used and cold hydraulic technic (Fig.2).

Conclusion

This case demonstrates the importance of magnification and ultrasound on modern endodontics, but also the importance of highly effective and versatile rotating files like ZenFlex™, offering a variety of tapers (04 and 06) that allow the clinician to adapt his instrumentation system to the characteristics of the root canal.

The combination of cutting edge technologies and materials provide the best tools for the clinician to approach challenging cases like this.

elements™ Connect & Apex Connect

Cordless Endodontic Motor and Electronic Apex Locator

Your safe path

Elevate your confidence while enhancing patient safety.

Greater visibility into canal depth and exceptional reliability during every shaping procedure.

Add confidence to your shaping, with elements Connect and Apex Connect. Designed to work seamlessly together to support patient safety while simplifying your procedures.



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Integrated CBCT to daily routine practise

Dr. Christophe Verbanck - Belgium 

Performing routine endodontic treatments has become more efficient with advanced instruments and the dental operating microscope, allowing for minimally invasive procedures in root canal treatments. However, the risk lies in approaching cases without a thorough understanding of root canal anatomy, which can lead to improper instrument selection, frustrations and treatment complications.

Cone Beam Computed Tomography (CBCT) imaging can significantly enhance treatment planning. Investing time in this planning not only reduces treatment duration but also improves safety and outcomes, benefiting both the patient and the practitioner.

In a recent case, a patient was referred for endodontic treatment of the right maxillary first premolar after a second premolar extraction due to a vertical root fracture. A persistent sinus tract indicated necrosis in the first premolar, prompting treatment.

Pre-operative X-rays (fig.1) did not reveal significant issues but analyzing the CBCT images (fig.2-3) showed a more complex buccal root than expected. It had two canals that merged in the apical region, while the palatal canal presented no challenges.

Given the small size of the buccal root, the decision



Fig. 1 The pre-operative X-ray for the root canal treatment on tooth #14.

About Dr. Christophe Verbanck



Christophe Verbanck (09/05/1985) became a general dentist in 2009 and graduated as an endodontist in 2012, after a 3-year post-graduate training program at the same university.

Working in private practice since 2010

he's always been passionate about instrument design and 3D treatment planning, for minimal invasive and complex surgical and non-surgical endodontic treatments.

In 2016, together with his wife, he started 'Lovendo' his own referral practice for endodontology in Lovendegem (Belgium).

Besides treating patients he also teaches and writes about contemporary endodontic topics both national and internationally.

was made to start with the smallest Traverse Rotary Glide Path file (13, 0.06 taper). The ZenFlex file system was then used for further preparation, sticking to 0.04 tapered instruments for their effective cutting and slim design. Using a 0.06 taper could have enlarged the orifice too much, risking strip perforation or future vertical root fractures.

Only one buccal canal was prepared to a size of 30, while

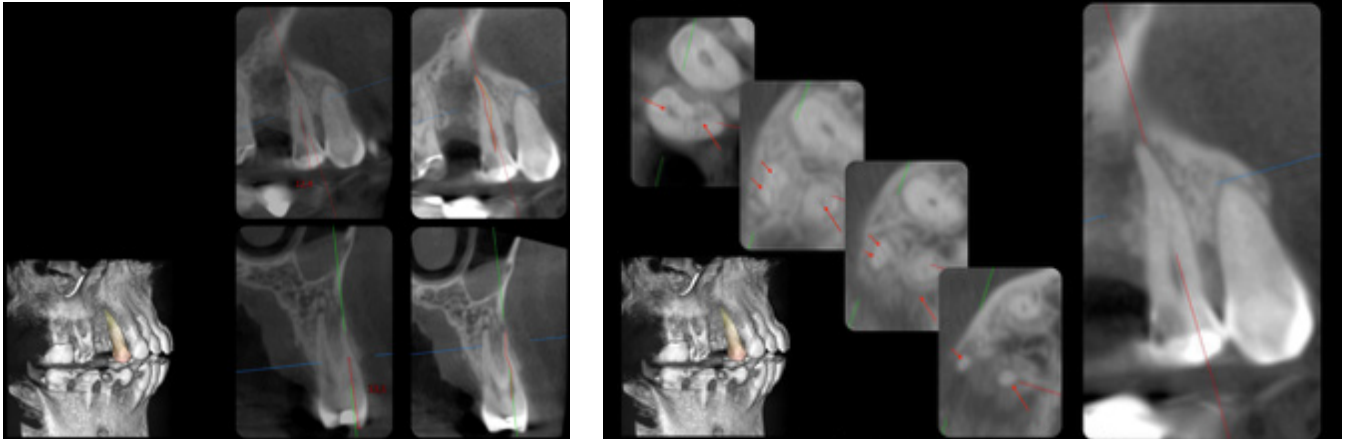


Fig. 2 & 3 The CBCT images reveal two canals merging in the apical region, while the palatal canal posed no challenges.

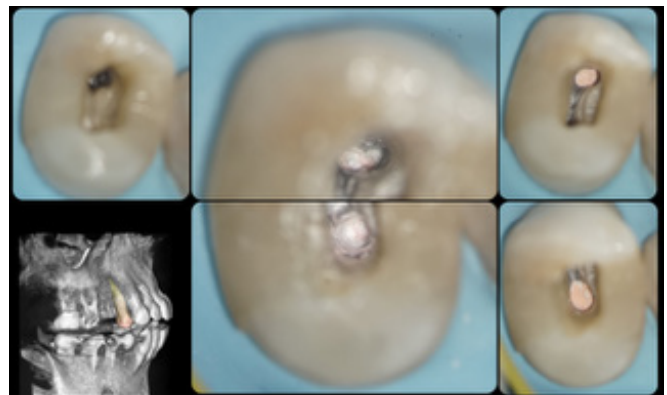
the joining canal was kept at 25 to avoid over-enlargement. The palatal canal was prepared to size 30, taper 0.04. After thorough chemo-mechanical debridement, all canals were obturated with gutta-percha points, and continuous wave obturation was performed using the Kerr elements IC unit (fig.4). The tooth was restored with fibre-reinforced composite and a coronal restoration, pending further indirect treatments.

A six-month follow-up showed no clinical symptoms and complete apical healing. (Fig.5).

Conclusion

Failing to identify the additional buccal canal can lead to complications, such as persistent sinus tracts, discomfort, difficulties in placing adjacent implants or crowns on the treated tooth. Lack of awareness regarding anatomical complexities can result in poor instrument choices, over-preparation, extended treatment times, and potential future fractures.

These issues can be avoided through careful planning



using 3D imaging, allowing practitioners to master their techniques and ensure successful outcomes.
Fig. 4 The images show the obturation performed using the continuous wave technique

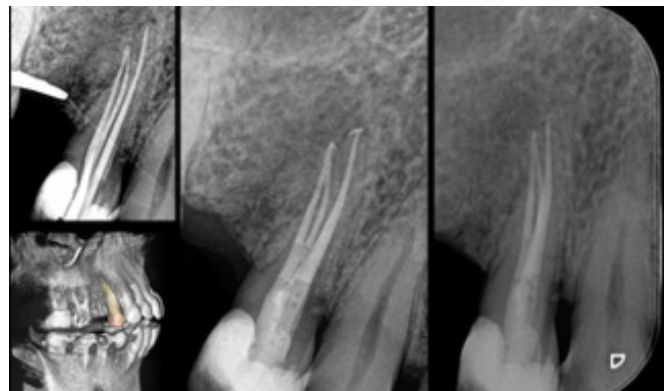


Fig. 5 A six-month follow-up showed no clinical symptoms and complete apical healing.

Management of tooth 46 with complete pulp necrosis and extensive inflammatory involvement

Dr. Maciej Mikolajczyk - Poland 

A 40-year-old male patient visited my dental office for a routine control visit. An orthopantomogram revealed inflammatory changes around the roots of tooth 46 (Fig.1), although the patient reported no discomfort. During the intraoral examination, there was no reaction to percussion tests, and the tooth did not respond to the ethyl chloride test, indicating complete pulp necrosis with inflammatory changes in the periodontal ligament and surrounding bone. This diagnosis was confirmed with additional intraoral X-rays (Fig.2).

In such cases, obtaining a single intraoral X-ray is crucial for monitoring the healing process. This allows us to observe bone healing during follow-up visits while minimizing radiation exposure, adhering to the ALARA (As Low As Reasonably Achievable) principle.

The likely cause of necrosis was a large composite filling placed near the pulp about ten years ago. Notably, significant changes were observed around the distal root, extending to the proximal roots via the periodontal ligament. The absence of spontaneous pain in such cases is uncommon but possible.

Upon opening the chamber, it was empty, facilitating easy access to the canal entrances. These were enlarged using a Traverse Orifice Opener 25/08 (Fig.3). Canal length was measured with the elements™ Connect and Apex locator and an ISO 10 K-File, which I find effective for canal negotiation due to their flexibility.

The proximal canals were measured at 20 mm and prepared using an ISO 10 K-File, followed by NaOCl solution and Traverse glide path file 13/06 to full working length. The Traverse file was operated in the Adaptive mode. Consequently, ZenFlex™ files with a .04 taper were selected. The ZenFlex 20/04 was used first, followed by the ZenFlex 25/04, which served as the final file to

About Dr. Maciej Mikolajczyk



Dr. Maciej Mikolajczyk graduated from the Dental Faculty of Lodz Medical University, he has authored several theses on minimally invasive treatments in prosthetics and traumatology. He earned his PhD in 2008, directed an international educational program from 2010 to 2012, and has been the editor-in-chief of an endodontics publication since 2013. He also owns a private practice in Łódź.

He also owns a private practice in Łódź.



Fig. 1 The orthopantomogram, which shows inflammatory changes surrounding the roots of tooth 46.

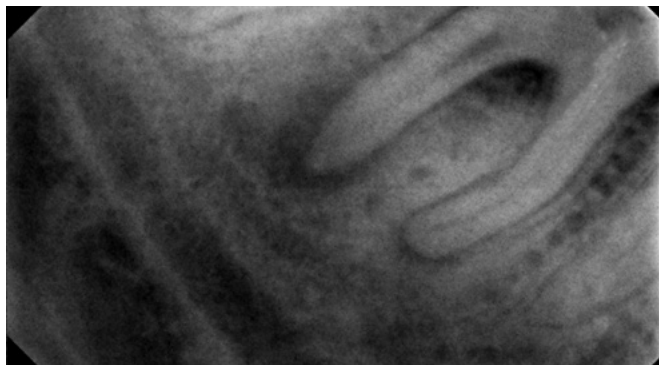


Fig. 2 The X-ray reveals complete pulp necrosis along with inflammatory changes in the periodontal ligament and the surrounding bone.

achieve complete preparation of the proximal canal. (Fig.4)

The distal canal measured 21 mm and was prepared with the Traverse glide path file and NaOCl solution. Due to a lack of wall engagement, ZenFlex files with a .06 taper were chosen. The ZenFlex 25/.06 reached full working length with the Adaptive mode, which served as the final file to achieve complete preparation of the distal canal. (Fig.5) After thorough rinsing with NaOCl and chlorhexidine, calcium hydroxide paste was placed in all canals, and the tooth was sealed with Glass Ionomer Cement for one month to monitor healing.

During the next visit, an intraoral X-ray showed resolution of inflammation and ongoing bone healing, allowing for full root canal filling. The canals were filled with elements™ IC warm gutta-percha, and the tooth was sealed with SimpliShade™ Bulk Fill material. The patient was scheduled for a follow-up in three months.

At the final control visit, an intraoral X-ray revealed complete healing of the bone tissue around the roots (Fig.6). The patient reported no complaints, and the treatment was successfully completed, with regular monitoring planned.

Conclusion

This case emphasizes the significance of thorough diagnostics and advanced endodontic techniques. The ZenFlex file system's flexibility allowed effective navigation through curved canals, minimizing invasiveness. Routine imaging, like intraoral X-rays, is crucial for monitoring healing and ensuring timely interventions, ultimately leading to successful treatment outcomes. Regular follow-ups will ensure long-term success.



Fig. 3 Traverse™ orifice opener is used to enlarge the cervical part of the canals.



Fig. 4 The shaping procedure of the proximal canal utilizing the final instrument, the ZenFlex file size 25/.04

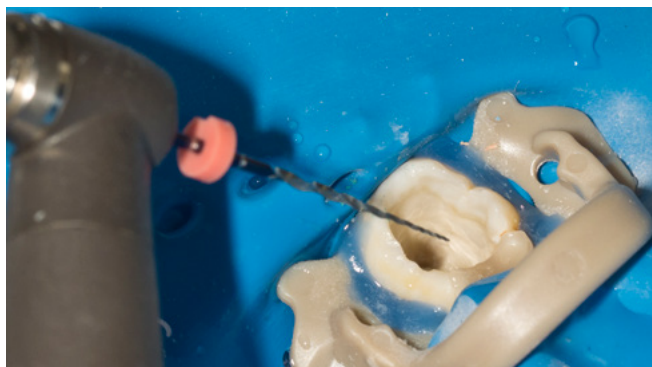


Fig. 5 The shaping procedure of the distal canal utilizing the final instrument, the ZenFlex file size 25/.06.

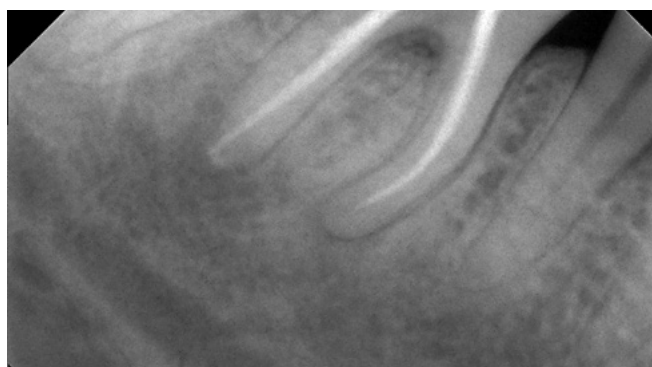


Fig. 6 The intraoral X-ray revealed complete healing of the bone tissue around the roots.

Endodontic treatment of tooth #36 with pulp stone

Dr. Razvan Branzan - Romania 🇷🇴

Patient MA, a 45-year-old female, presented to our dental office with spontaneous pain in tooth # 36, which was temporarily alleviated by oral NSAIDs. She reported no history of chronic illnesses, allergies, or ongoing medications. The patient maintained good oral hygiene and had no other oral pathologies, although she had several composite restorations.

Clinical examination revealed a healthy periodontal status, with soft tissues appearing normal and probing depths within acceptable limits. The patient reported brushing her teeth twice daily, in the morning and evening. Extraoral examination showed normal structures upon visual inspection and palpation, with lymph nodes associated with tooth #36 also appearing normal.

Radiographic evaluation (Fig. 1) revealed a large composite restoration with poor adaptation near the pulp chamber, which appeared narrowed, suggesting the presence of pulp stones. Additionally, the root canals were narrowed and calcified. Based on these findings, the diagnosis was established as irreversible pulpitis.

The treatment plan included endodontic therapy for the affected tooth, followed by coronal reconstruction with composite resin and an indirect restoration. The procedure commenced with the complete removal of the old restoration (Fig 2). Partial calcification in the pulp chamber was addressed using ultrasonic tips (Satelec E3D). Access to the root canal was achieved with a Traverse 25/08 file, followed by irrigation with 5.25% sodium hypochlorite (NaOCl).

A glide path was established using a Traverse 13/06 file, with the elements™ Connect endomotor and apex locator employed for precision. Working length was confirmed with K-files. For the mesial root canals, a sequence of ZenFlex™ 20/04 and ZenFlex 25/04 files was used, while the distal canals were shaped with ZenFlex 20/06 and ZenFlex 25/06 files, which joined in the apical third (Fig 3).

During mechanical preparation, only NaOCl was utilized after each file. The final irrigation protocol included 17% EDTA for one minute, followed by NaOCl for 7-8 minutes with sonic activation, and a final rinse with distilled water.

About Dr. Razvan Branzan



4. Dr. Razvan Branzan is a distinguished general dentist with over 20 years of experience, specializing in clinical endodontics. He is passionate about dental aesthetics, complex oral rehabilitation, and restorations. Dr. Branzan graduated from the University of "Grigore T. Popa Iasi" in 2004 and completed his Endodontic residency there in 2015. He began his academic career as an Assistant Professor in the Odontotherapy Department at "Grigore T. Popa Iasi" University in 2021. His dedication and expertise led to his promotion as a Senior Specialist in Endodontics in 2024.



Fig. 1 Radiographic evaluation showed a large composite restoration poorly adapted near the narrowed pulp chamber, indicating possible pulp stones.

After drying the canals with paper points, obturation was performed using the continuous wave technique with gutta-percha and a resin-based sealer (Fig 4). For coronal restoration, both flowable and condensable composite materials were used (Fig 5).

Post-treatment radiographic control indicated that the obturation was well adapted and within normal radiological limits (Fig 6). The patient reported a favourable follow-up with no symptoms, and the prognosis is positive, indicating the need for an indirect restoration. The patient was advised to return for recall appointments every six months.

Conclusion

Effective treatment of irreversible pulpitis involves careful diagnosis through clinical exams and X-rays to find pulp stone in pulp chamber and narrowed root canals. Using ZenFlex files for precise canal shaping, along with proper cleaning and filling techniques, leads to successful outcomes. Regular follow-up appointments are important for monitoring and maintaining dental health.



Fig. 2 The old restoration and the partial calcification in the pulp chamber have been removed.



Fig. 3 The image displays the final outcome of canal preparations using the ZenFlex file system and elementsConnect motor.

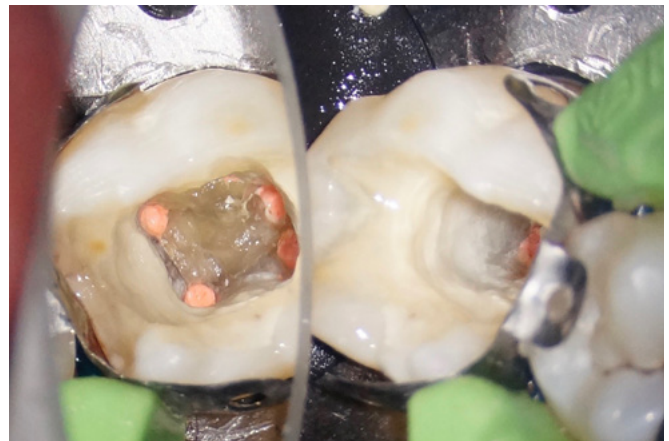


Fig. 4 The image illustrates that canal obturation was performed using the continuous wave technique with elements IC.



Fig. 5 To restore the coronal part, a combination of flowable and condensable composite materials was used.



Fig. 6 Post-treatment radiographic evaluation showed that the obturation was well-adapted and within normal radiological limits.

Endodontic treatment of tooth #46 with calcification on mesial root

Dr. Andrew Powell-Cullingford - United Kingdom 

A 48 year old male patient presented with pain to percussion and palpation over the mesio-buccal root of the lower left first molar.

Radiographically the tooth had been restored eight years previously with a well-adapted bonded crown (Fig.1). Periodontally the tooth was sound but displayed extensive calcification in the mesial root systems. Vitality testing gave a negative response to both electrical and thermal testing. A diagnosis was established of an acute periapical periodontitis associated with a necrotic pulp in the lower left first molar.

Access was achieved and a straight line for the glide path was created to the orifice of the three canals. Using No.15 hand files the working length was established 0.5mm short of the apex with the apex locator (Fig.2). A ZenFlex™ 04 taper 20 tip was operated at 500 rpm with torque of 100 g-cm and advancing with a single controlled motion, the file was withdrawn cleaned and re-inserted and allowed to prepare the canal to the desired



Fig. 1 Radiographic examination shows that the tooth, restored 8 years ago with a well-fitted bonded crown, was periodontally sound but had extensive calcification in the mesial root.

About Dr. Andrew Powell-Cullingford



Having completed his Masters Degree in Endodontics in London, Andrew established his endodontic referral practice in Esher, Surrey. He has continuously maintained a close association with the American Association

of Endodontics and as an early advocate of Nickel-Titanium Rotary preparation and Thermoplasticised Obturation, he founded the Fairoak Endodontic Training Centre to help general practitioners develop these new techniques. He has been closely involved with the integration of the operating microscope in both surgical and non-surgical endodontics.

Andrew has lectured worldwide and written numerous articles relating to endodontics, and is a past president of the British Endodontic Society

Following completion of his MSc, Andrew attended Dr Gary Carr's Pacific Endodontic Research Facility, San Diego, California.

Which introduced the use of the microscope to endodontics, especially in techniques for microsurgical endodontic re-treatment.

Andrew also trained under Dr John McSpadden in Tennessee, who's unparalleled knowledge of file design and application in endodontics has been instrumental to the provision of new rotary file systems in today's clinical practice.

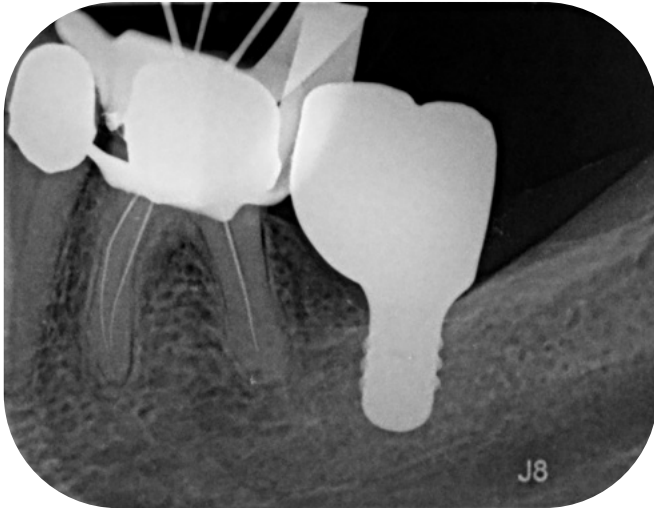


Fig. 2 The working length was established 0.5mm short of the apex.

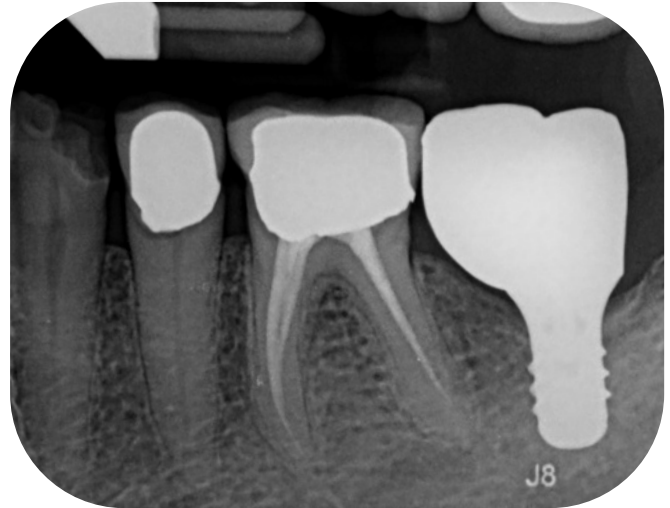


Fig. 3 After shaping all root canals with the ZenFlex File system, obturation was performed using the warm vertical compaction technique.

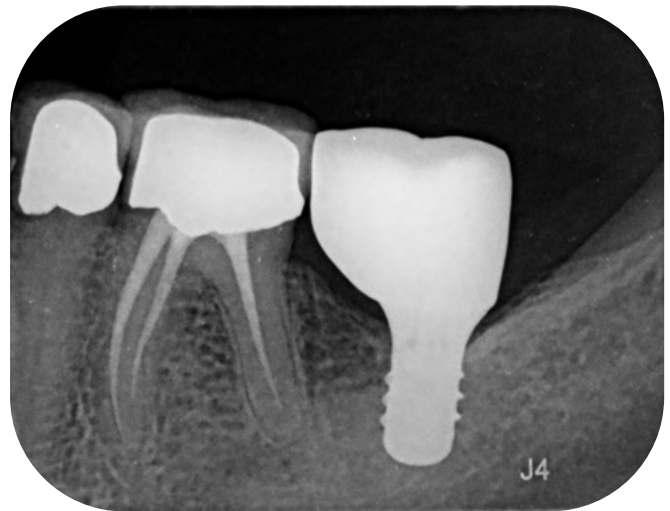


Fig. 4 & 5 The radiographic image illustrates the tooth #46 after 6 and 12 months.

working length in each canal. Next a ZenFlex 06 taper 25 tip was used in similar method to prepare all three canals to the same working length. Both files negotiated the calcified canals without difficulty and the root system was obturated with warm vertical compaction (Fig. 3).

Symptoms resolved within 24 hours and the tooth has remained symptom free at 6- and 12-month reviews (Fig 4 & 5)

Conclusion

The ZenFlex system efficiently managed a complex case of acute periapical periodontitis with necrotic pulp, demonstrating its effectiveness in negotiating calcified canals. Clinical outcomes showed rapid symptom relief and sustained health of the tooth over a 12-month period.

Endodontic retreatment of teeth with periapical lesions

Dr. Iulian-Costin Lupu - Romania 🇷🇴

Our patient, a 43-year-old male, presented with two old fixed metal-composite prosthetic bridges in the maxilla. He sought replacement due to poor adaptation and discoloration but reported no pain or other symptoms. His medical history was unremarkable, with no chronic illnesses, medications, or allergies.

In the maxilla, he had two fixed metal-composite prostheses spanning teeth #17 to #22 and #25 to #27, with tooth #23 present but exhibiting a distal palatal carious lesion. The mandible had two bilateral posterior fixed bridges (PFM) from the first premolar to the second molar on

each side. The anterior mandibular teeth showed gingival retraction with mild inflammation.

The patient maintained good oral hygiene, brushing twice daily and using mouthwash. A general examination revealed normal oral and facial structures, with no pathological findings. Lymph nodes were normal upon palpation. Intraoral examination showed all tissues were normal, with no signs of pathology.

X-rays indicated periapical lesions on teeth #13, #21, and #22, necessitating endodontic retreatment with a reserved prognosis (Fig 1, Fig 2). After removing the bridges, the



Fig. 1 & 2 The radiographic examination revealing calcifying metamorphosis in the coronal portion of the root.

About Dr. Iulian-Costin Lupu



Dr. Iulian-Costin Lupu, a dedicated dentist and general practitioner with my own practice since 2005. My passion lies in adhesive direct and indirect restorations and dental aesthetics, which I bring into my clinical work to provide precise, high-quality care. Alongside my practice, I serve as an Associate Professor at the Faculty of Dental Medicine at “Grigore T. Popa” University of Medicine and Pharmacy in Iași, Romania. Balancing my academic and clinical roles allows me to integrate the latest research with practical applications, continuously striving to elevate standards in my dental care.

teeth exhibited normal mobility and probing values. We presented various treatment options, and the patient agreed to a fixed aesthetic PFM bridge from #17 to #27.

The endodontic treatment posed challenges, particularly in removing old root filling material while preserving the endodontic anatomy and minimizing the transport of infected tissue to the apical region. To address this, we selected the ZenFlex™ rotary file system, known for its minimal transportation properties. The files, starting with 30/04 and 30/06, are designed to avoid altering the endodontic anatomy due to their metal alloy properties.

For the retreatment protocol, we began with the 30/06 file at 850 rpm (Kerr recommendation is 500 rpm), using an endomotor and an apex locator. The irrigation protocol involved 5% NaOCl after each file, with K-files used to confirm working length. The final files for all 3 teeth were 40/06, and the last irrigation step involved distilled water. Root canals were obturated

using the continuous wave warm vertical condensation technique with the elements™ IC. Finally, the teeth were restored with fiber posts (FibreKleer™ 4x from Pentron) and prepared for crowns. Control X-rays confirmed the success of the endodontic treatment. (Fig.3)

A temporary bridge was placed for one month to stabilize the gingival tissue, followed by the definitive PFM fixed bridge from #17 to #27. (Fig.4) One year post-treatment, follow-up X-rays indicated promising healing of the periapical lesions. (Fig 5, Fig 6)

Conclusion

Effective endodontic retreatment can restore function and aesthetics, while careful management of existing conditions, such as periapical lesions, is crucial for long-term success. Additionally, the use of advanced techniques and materials, like the ZenFlex rotary file system, enhances treatment outcomes and preserves tooth anatomy. Regular follow-ups are essential to monitor healing and ensure patient satisfaction.



Fig. 3 Image demonstrates the successful endodontic treatment.



Fig. 4 The image shows a temporary bridge placed for 1 month to stabilize the gingival tissue, followed by a definitive PFM fixed bridge from #17 to #27.



Fig. 5 & 6 demonstrates the successful endodontic treatment after 1 year follow up.

Retreatment of tooth #18 with management of a severely curved canal

Dr. Dimitar Kosturkov - Bulgaria 🇧🇬

This report details the retreatment of tooth #18, referred for endodontic treatment before prosthetic restoration. The patient presented asymptotically, prompting referral due to the poor condition of the existing root canal obturation, as reported by the referring dentist during clinical examination. (Fig.1 & 2)

Upon arrival at the clinic, the retreatment process started with the negotiation of the root canals using a K-File #10. The primary objective was to remove the old obturation material, which consisted of paste, while ensuring the integrity of the root canal system.

The retreatment protocol was executed systematically. Initially, coronal flaring was performed in the coronal third of the root canal using a Traverse orifice opener 25/08 file to facilitate access and improve visibility. Next, a Traverse Glide path 13/06 file was utilized to establish a glide path to the full working length of the canal, ensuring smooth navigation for subsequent shaping instruments.

Canal shaping was performed using the ZenFlex rotary file system. The mesio-vestibular (MV) canal was shaped with a ZenFlex 20/04 file, followed by a ZenFlex 25/06 file. The disto-vestibular (DV) canal was shaped using the same initial file (ZenFlex 20/04), after that with ZenFlex

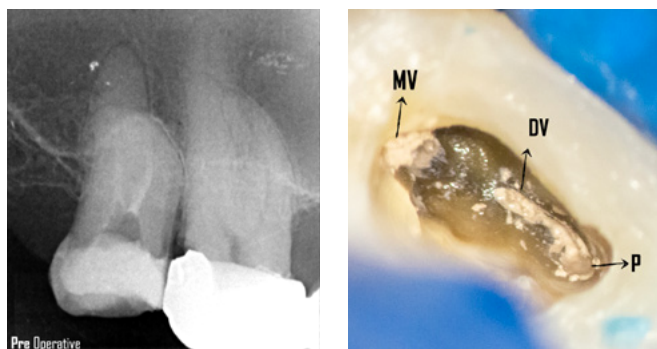


Fig. 1 & 2 The images reveal the improper condition of the existing root canal obturation.

About Dr. Dimitar Kosturkov



Graduated in the Faculty of Dental Medicine, Sofia in 2014. In 2019 he obtained PhD degree and in 2020 specialty in operative dentistry and endodontics. He is now chief assistant professor in dental faculty - sofia in the department of conservative dentistry.

He is also working as endodontist and restorative dentist in private dental clinic in Sofia. Author of many scientific articles about endodontics, caries treatment, dental diagnosis, microscopic dentistry and digital dentistry. KOL of Kerr endodontics and Carl Zeiss endodontics and restorative dentistry.

25/04 file until the level of merging with the MV canal. The palatal (P) canal was shaped using a ZenFlex 20/04 file, followed by ZenFlex 25/06 and finishing with a ZenFlex 30/04 file. (Fig.3)

Following the shaping process, disinfection of the root canals was performed according to standard protocols. Each canal was disinfected by three cycles of alternating solutions of 5,25% sodium hypochlorite and 17% EDTA.

The obturation of the root canals was accomplished

using the elements™ IC system, employing the continuous wave of condensation technique. The materials used for obturation included Sealapex Xpress as the sealer and gutta-percha points to fill the canals adequately (Fig.4 & 5). The entire retreatment procedure was completed in a single visit, ensuring efficiency and patient comfort. Post-treatment, the patient was advised on follow-up care and the importance of monitoring for any potential symptoms.

Conclusion

This case highlights the importance of thorough evaluation and retreatment of endodontically compromised teeth prior to prosthetic restoration. The use of advanced rotary systems and disinfection protocols contributed to the successful removal of old obturation materials and effective canal shaping of challenging cases such as big curvatures of root canals. The single-visit approach not only enhances patient satisfaction but also streamlines the treatment process, paving the way for successful prosthetic outcomes.

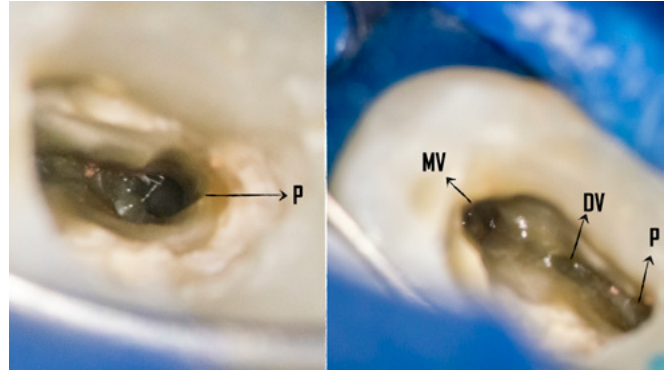


Fig. 3 The images show the final canal preparation using the ZenFlex file system.

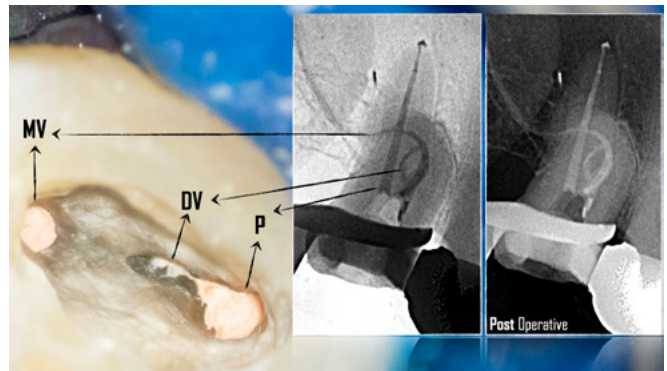


Fig. 4 The images illustrate the final obturation of the canals with a severe curvature in the mesio- and disto-vestibular canals.

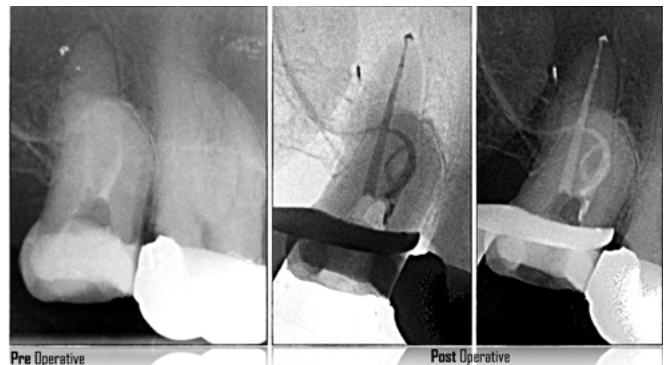


Fig. 5 A comparison of the pre- and post-operative conditions. The patient received guidance on follow-up care and the importance of monitoring for any potential symptoms.

Endodontic retreatment on tooth #16 with an open apex

Dr. Arnaud Nisky - France 

The patient was referred for the completion of endodontic treatment on tooth #16, which presented with necrosis. An initial radiographic examination revealed only a single vestibular canal, with the apex appearing open. (Fig.1) To mitigate the risk of material extrusion during the obturation process, the referring colleague requested that I conduct the procedure to determine if there were any additional vestibular canals present.

Preoperative imaging, including periapical and cone-beam computed tomography (CBCT), indicated the presence of two canals: a wide vestibular canal and a palatal canal. The apex of the palatal root was significantly open, which heightened the risk of extrusion during the obturation phase (Fig.2). The access cavity had been previously prepared by the referring colleague, allowing for easier access to the cavity and facilitating the identification of any additional canal orifices.

To ensure precise measurements, I confirmed the working lengths using K-Files #10 and #15, validating the information obtained with the Kerr apex locator. Following this verification, I proceeded with canal shaping using ZenFlex™ instruments, achieving final file sizes of 35/.06 in the palatal canal and 30/.06 in the vestibular canal. (Fig.3)

Next, I attempted to fit the master cones, which aligned well and provided a satisfactory tug-back, indicating a good seal. During the obturation phase, I utilized elements™ IC, carefully managing the gutta-percha to prevent any extrusion beyond the apex. This technique was particularly crucial due to the open nature of the palatal canal. Additionally, I applied SimpliShade™ Bulk Fill to complete the procedure effectively.

Postoperative radiographic assessment and CBCT confirmed that the obturation was dense and accurately positioned at the apex in both the vestibular and palatal canals, with no indications of extrusion, ensuring a successful outcome for the treatment.

About Dr. Arnaud Nisky



Dr. Arnaud Nisky graduated from the University of Paris Descartes in 2011, he initially worked in endodontics at Charles Foix Hospital. He pursued an Inter-University Diploma in Endodontics from

2016 to 2018, affiliated with Paris Descartes University and Bretonneau Hospital. From 2018 to 2020, he served as a Hospital-University Assistant at Henri Mondor Hospital in the Conservative Dentistry and Endodontics department. Currently, he practices exclusively in endodontics at a specialized clinic in Paris.

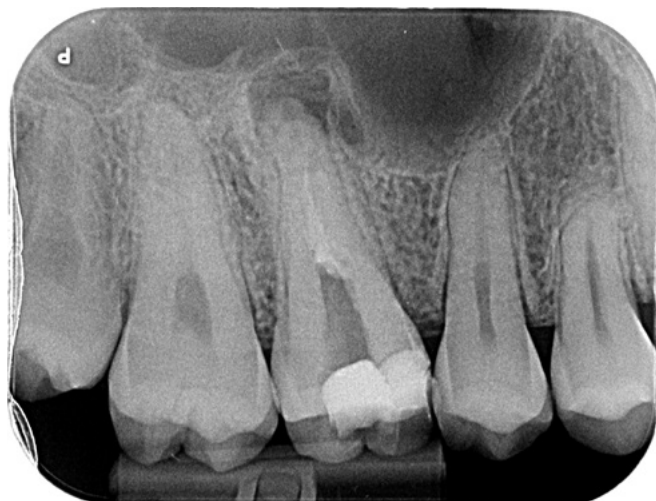


Fig. 1 An initial radiographic examination revealed only a single vestibular canal, with the apex appearing open.

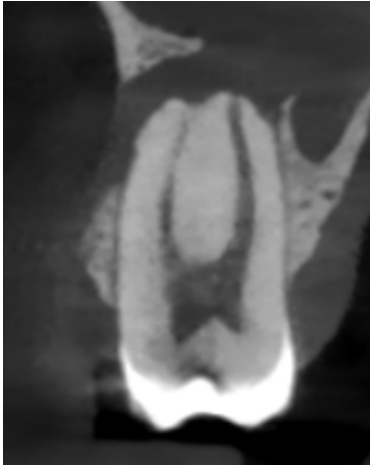


Fig. 2 The CBCT revealed two canals: a broad vestibular canal and a palatal canal, with the apex of the palatal root being notably open.



Fig. 3 Canal preparation was performed using the ZenFlex file system, resulting in final file sizes of 35/.06 for the palatal canal and 30/.06 for the vestibular canal.

Conclusion

This case emphasizes the importance of thorough imaging, as initial radiographs suggested only one canal, while CBCT revealed two. Managing the open apex of the palatal canal was crucial to prevent material extrusion during obturation. Accurate measurement verification with K-Files ensured precise canal shaping. The use of ZenFlex instruments and careful gutta-percha management led to successful obturation. Overall, collaboration and carefully technique were key to achieving a positive treatment outcome in this complex case.

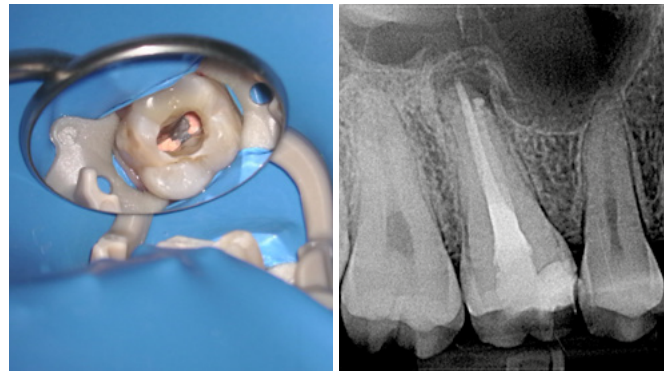


Fig. 4 Carefully controlling the gutta-percha during the obturation phase to avoid any extrusion beyond the apex.

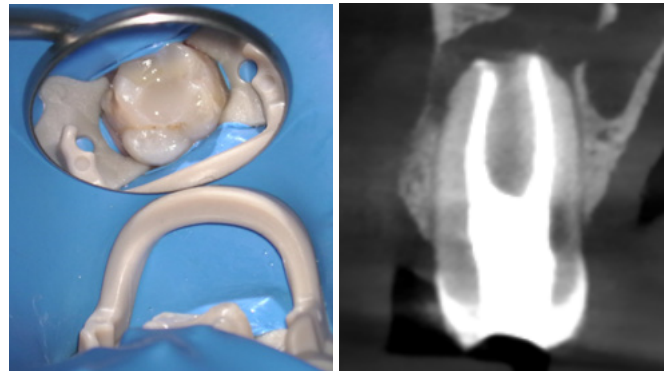


Fig. 5 SimpliShade™ Bulk Fill was used to complete the procedure. Postoperative radiographs and CBCT confirmed that the obturation was dense and properly positioned at the apex of both canals.

Management of dental trauma, a silent pathology

Prof. Philippe Sleiman - Lebanon 

Dental trauma is a chronic condition that often develops silently, typically without noticeable symptoms. Patients usually become aware of the issue only when they notice tooth discoloration or during routine check-ups. This case illustrates such a scenario.

A young female patient visited our office with concerns about slight color changes in her lower anterior teeth. An X-ray was taken (see Picture 1), and analysis using AI technology in the DTX Studio Clinic revealed an apical lesion not clearly visible on the initial X-ray (see Picture 2).

The general dentist referred the case for further evaluation. I requested a 3D scan for clarity (see Picture 3). The imaging indicated significant bone loss beneath her four lower incisors, with nearly all cancellous bone compromised and some cortical bone affected. A cold test yielded negative results for all four teeth, and the cortical bone appeared enlarged with buccal expansion of the mandibular volume.

The patient recalled the accident during gym training six years prior, impacting her lower mandible and teeth, but she had experienced no symptoms since.

I proposed a treatment plan that included root canal therapy and a zero apicoectomy in the same session to preserve her teeth and address the cyst for quicker recovery.

About Prof. Philippe Sleiman



Adj. Prof. Philippe Sleiman is a Dental professional with a robust education, earning a Dental Surgeon Graduate degree in 1989 from the Lebanese University Dental School and subsequent specialized degrees. Serving as Adjunct

Assistant Professor at the University of North Carolina, he has operated a successful practice since 1989 in Beirut, Dubai, and Oman. He actively contributes to dental research and education, including recent work on cryotherapy's impact on root canal temperature.

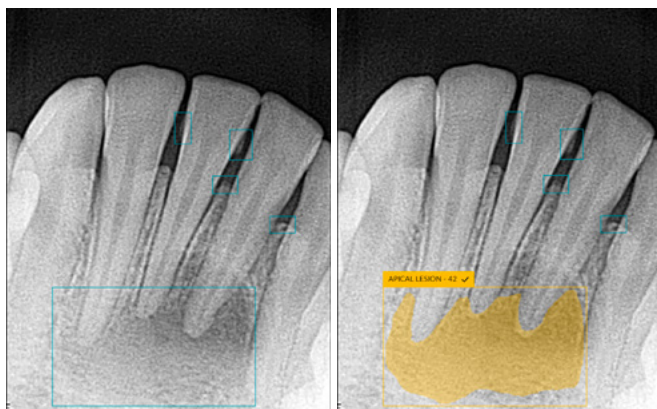


Fig. 1 & 2 The images demonstrate that the analysis conducted with AI technology in the DTX Studio Clinic identified an apical lesion that was not clearly visible on the initial X-ray.

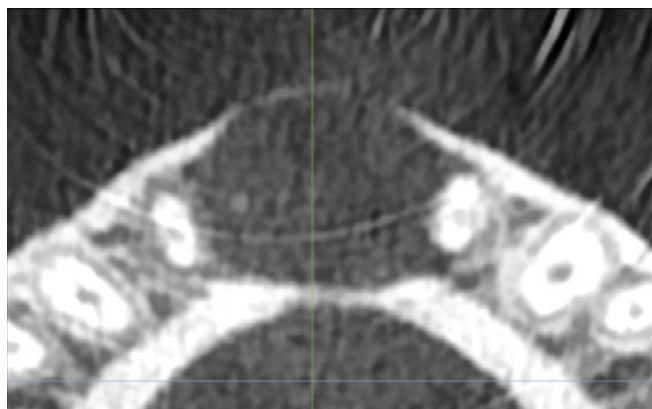


Fig. 3 The CBCT scan reveals the extent of the lesion beneath four lower incisors, indicating that nearly all of the spongy bone has been lost.

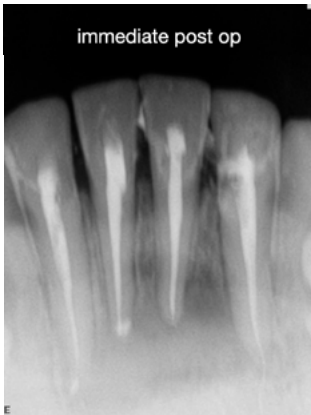


Fig. 4 The image illustrates the final obturation following canal preparation using the ZenFlex File system.

The patient agreed, and the root canal treatment was performed using ZenFlex™ files system. Two files were used: a 25/06 taper and a 30/04 taper for apical enlargement, followed by irrigation and 3D obturation with elements IC and pulp canal sealer (see Picture 4).

After the root canal, I performed the zero apicoectomy to excise the cyst and treat the exposed root, crucial for re-establishing the periodontal ligament (PDL) and preventing resorption.

A follow-up appointment six months later showed normal X-ray results (see Picture 5). After 11 months, a 3D image was captured using the OP3D unit, but I withheld clearance for orthodontic treatment due to incomplete healing. An 18-month follow-up revealed significant healing of the cortical bone (see Picture 6), and the patient was cleared for orthodontic intervention.

In conclusion, a well-planned root canal treatment combined with apical surgery can significantly benefit patients by preserving their natural teeth and promoting healing. This case highlights the importance of thorough assessment and tailored treatment strategies in managing dental trauma effectively.

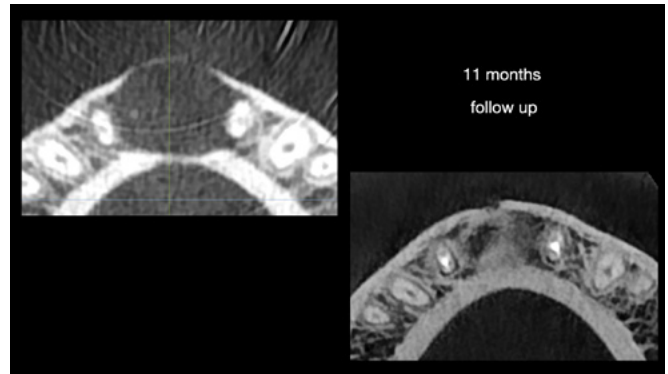


Fig. 5 The CBCT scan shows the bone healing after a 6-month follow-up.

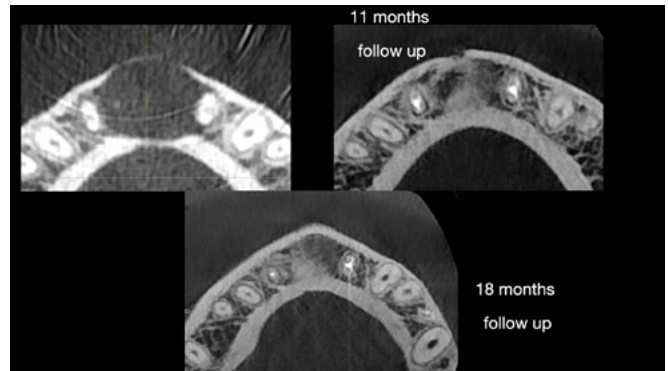


Fig. 6 The CBCT scan shows the significant bone healing after a 11 and 18-month follow-up, and the patient was cleared for orthodontic treatment.



ZenFlex™ Technique Card

SIMPLIFIED PROCEDURE

ADVANCED PROCEDURE

Disclosure: The opinions and technique expressed in the articles are based on the experience of the authors. Kerr is a medical device manufacturer and does not dispense medical advice. Clinicians should use their own professional judgment in treating their patients.