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roots

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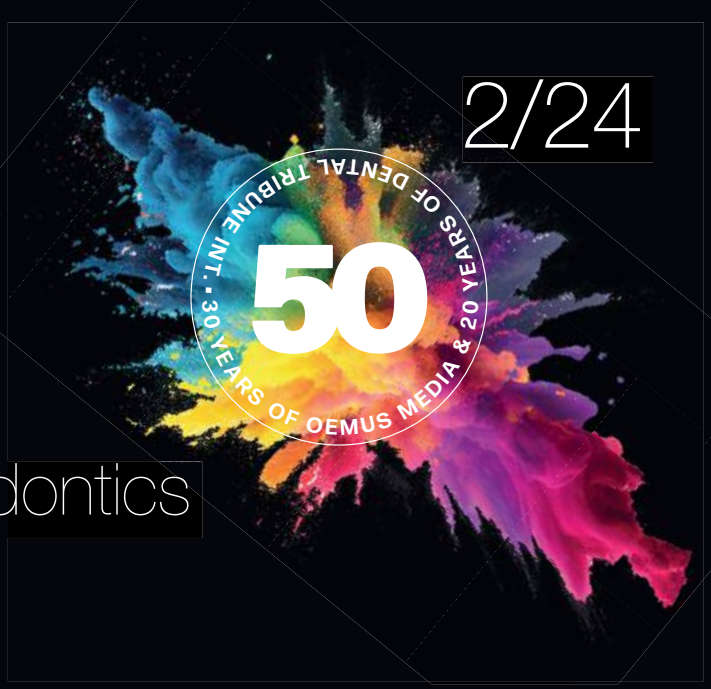

interview
"Antibiotic resistance could become a serious problem"

technique
The access cavity in endodontics: Three rules for a predictable outcome in complex cases

case report
Hemisection in a molar with a vertical root fracture: Four years of follow-up

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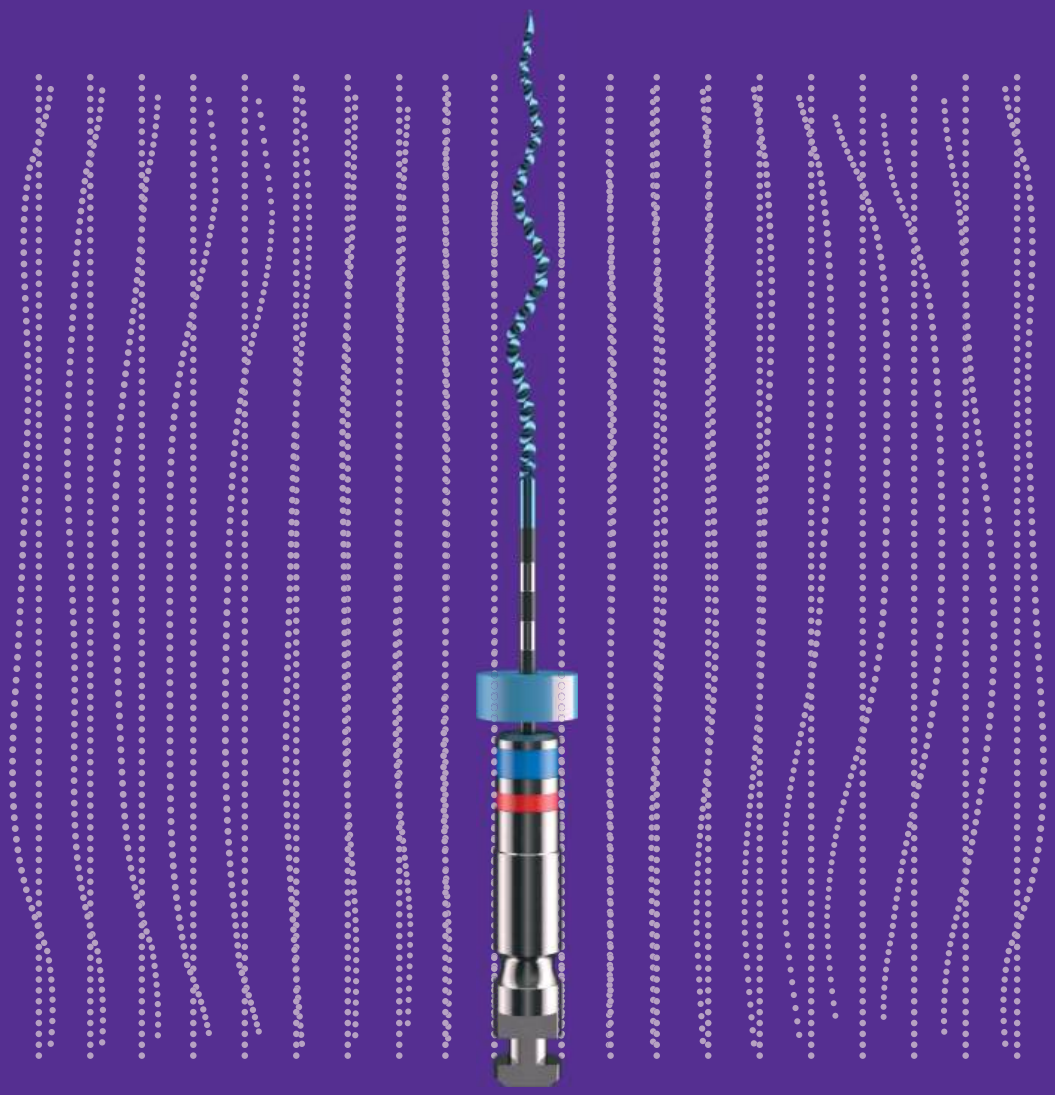

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Magda Wojtkiewicz

Managing Editor

Tools, techniques and continuing education as the basis for successful endodontic treatment

Endodontics is a blend of precision, expertise and innovation. As practitioners dedicated to preserving natural teeth, you know that successful treatment outcomes require not only technical proficiency but also an unwavering commitment to learning and improvement. This issue of roots **magazine** explores the multifaceted nature of the specialty, offering valuable insights and tools to help you enhance your practice.

At the heart of any effective treatment lies strict adherence to established protocols. Each step in the endodontic treatment process—from accurate diagnosis and access cavity preparation to canal shaping, disinfection and obturation—plays a pivotal role. Compliance with these procedures ensures predictability, which is especially crucial in complex cases, where even minor deviations can compromise long-term outcomes. Dr Alessandro Fava's article on access cavity preparation offers in-depth practical guidance on navigating these challenges with confidence.

Equally important is the continuous development of endodontic materials and instruments. The modern era has brought remarkable innovations, such as heat-treated nickel–titanium rotary files. These continued advancements not only improve efficiency but also prioritise the preservation of tooth structure and the promotion of patient comfort. Dr Philippe Sleiman's case report introduces the ZenFlex ONE file system, highlighting its ability to balance cutting efficiency, debris removal and flexibility—a testament to how technology continues to redefine endodontists' capabilities.

Another significant advancement is the use of lasers in managing pulpal exposure, as detailed by Drs Randy McCormick and Gregori M. Kurtzman. Their case report explains how laser technology can potentially avoid the need for endodontic treatment in specific cases, offering a minimally invasive option while preserving the vitality of the tooth. This innovative approach demonstrates how technology can expand the scope of conservative treatment options for patients.

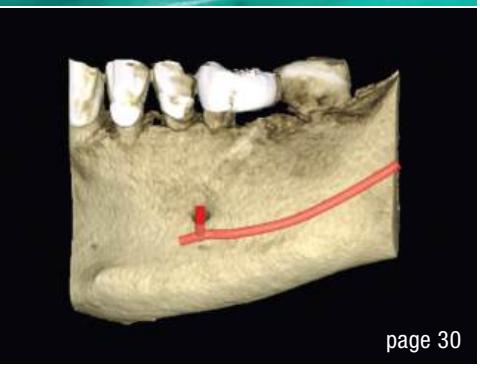
However, no tool or technique can replace the clinician's skill and judgement. Experience is a cornerstone of success in endodontics, and ongoing education is essential to staying ahead in this rapidly evolving field. This issue of roots features a wealth of knowledge-sharing content, including Dr Dhiraj Arora's article on a straightforward sequence for achieving successful root canal outcomes.

Another critical area is addressing global challenges such as antibiotic resistance, as discussed in the interview with Drs Fatemeh Soleymani and Carlos Pérez-Albacete Martínez. Their research serves as a reminder that the role of the endodontist extends beyond clinical procedures to include responsible stewardship of antibiotics and a commitment to public health.

Endodontics is both an art and a science, and the path to mastery is one of lifelong learning, curiosity and adaptation. As you explore the articles in this issue, we hope you find inspiration, practical guidance and a renewed sense of purpose in your practice, as well as the encouragement to continue pushing the boundaries of excellence in endodontics for the benefit of your patients and the advancement of dentistry as a whole.

Sincerely,

Magda Wojtkiewicz
Managing Editor



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Clinical case, Dr. John Millar,
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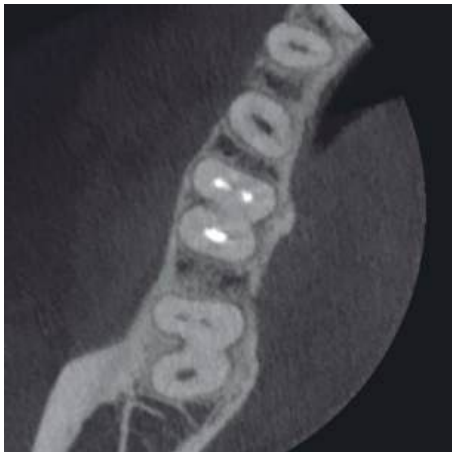
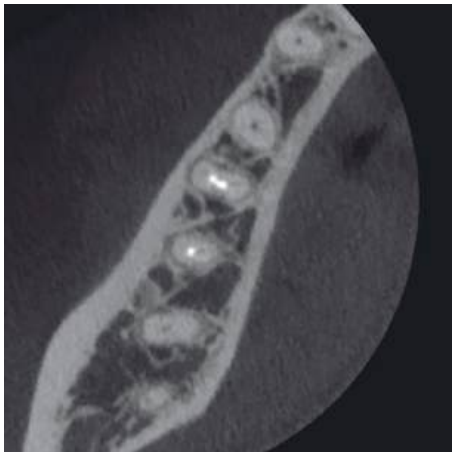


Post-op 3D x-ray: Oval shaped canal filled with OdneTMFill.



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A recent study has demonstrated that extracts of the strawberry and common guava trees and of the garlic plant show strong potential as alternative or supplemental root canal irrigants.

Study examines efficacy of plant-based irrigants for endodontic biofilm management

Dental Tribune International

Concerns about the potential cytotoxicity and environmental impact of conventional root canal irrigants have prompted the exploration of alternative, natural agents with anti-biofilm properties. To this end, a recent systematic literature review by researchers from the International University of Rabat in Morocco assessed the anti-biofilm efficacy of various plant extracts as root canal irrigants, revealing their potential for combating these biofilms.

Out of 78 articles identified from the systematic database search, eight met the inclusion criteria, including evaluating at least one plant extract and one conventional root canal irrigant against endodontic biofilms. The eligible studies examined 12 different extracts from ten plants against eight single-species biofilms and one multispecies biofilm.

The findings showed that *Psidium cattleianum* (strawberry guava) and *Psidium guajava* (common guava) demonstrated superior anti-biofilm activity compared with chlorhexidine and sodium hypochlorite (NaClO). Similarly, *Allium sativum* (garlic) showed comparable efficacy to NaClO. Furthermore, a blend of *Cymbopogon martinii* (palmarosa) essential oil and NaClO exhibited enhanced anti-biofilm effects against multispecies biofilms compared with each agent used alone. Extracts of *Mikania glomerata Sprengel, Salvadora persica* (miswak), *Camellia sinensis* (green tea) and *Vitis vinifera* (grape seed) displayed anti-biofilm properties, but were generally less effective than conventional irrigants.

The review indicates that certain plant extracts possess qualities that promise to combat endodontic biofilms. It also suggests that combining plant extracts with conventional agents such as NaClO may further enhance anti-biofilm effectiveness. However, the authors cautioned that further research is needed to optimise these combinations and to evaluate their clinical applicability and safety.

The study contributes to the growing body of evidence supporting the use of natural compounds in endodontic therapy, which offer potential benefits regarding biocompatibility and environmental sustainability.

Editorial note: The study, titled "Antibiofilm efficacy of plant extracts as root canal irrigants in endodontics: A systematic literature review", was published online on 24 October 2024 in Frontiers in Dental Medicine.

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Cryotherapy and occlusal reduction may offer improved endodontic analgesia

Anisha Hall Hoppe, Dental Tribune International

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Endodontists can tap into new pain control strategies, according to a recent study.

For clinicians aiming to improve patient comfort and manage postoperative pain more effectively, recent research highlights two promising strategies: cryotherapy and occlusal reduction. These methods may help alleviate discomfort after endodontic treatment, particularly in patients with symptomatic irreversible pulpitis and symptomatic periapical periodontitis. It is crucial to reduce the need for systemic pain medications, since these often have side effects, by offering alternative, less invasive methods for managing postoperative pain.

Through a randomised controlled trial with a double-blinded design and involving 60 patients, the researchers, from Gulf Medical University in Ajman, evaluated the effectiveness of these two methods in reducing postoperative pain. Patients with symptomatic periapical periodontitis affecting mandibular first molars underwent single-visit root canal treatment and were divided into three intervention groups: a control group, in whom final irrigation was done with room-temperature saline; a cryotherapy group, with cold saline irrigation; and an occlusal reduction group, with room-temperature saline. This third group also underwent occlusal reduction after restoration. The postoperative pain intensity reported by the patients was gathered at 6, 24, 48 and 72 hours, as well as on the seventh day.

> "The patients in the cryotherapy group reported the lowest pain levels at 24 hours."

The study found that cryotherapy resulted in a statistically significant reduction in pain scores compared with the control group but only at the 24-hour interval. Beyond this, both cryotherapy and occlusal reduction showed comparable effectiveness to the control group, and there were no significant differences in pain scores at the other time points. By the seventh day, all patients in all the groups reported a zero pain score, indicating the transient nature of postoperative endodontic pain.

The patients in the cryotherapy group reported the lowest pain levels at 24 hours. This outcome is attributed to the vasoconstrictive properties of cold temperatures, which reduce blood flow, oedema and inflammatory responses, thus relieving pain.

The researchers suggest that this effect likely arises from cryotherapy's ability to decrease pain signal transmission and reduce the release of inflammatory cytokines, such as tumour necrosis factor-α and interleukins that contribute to pain perception. These physiological responses to cryotherapy are especially beneficial for patients who are at risk of adverse effects from analgesics.

The occlusal reduction group also experienced a reduction in pain, although the difference was not statistically significant. Occlusal reduction is thought to alleviate pain by diminishing mechanical stimulation of nociceptors sensitised by inflammatory mediators that heighten pain sensitivity. Occlusal reduction may be additionally useful for reducing pain, particularly for patients who experience sensitivity to the mechanical stimulation of occlusal forces.

In sum, this study highlights cryotherapy as a promising conservative method to alleviate pain in the early stages after treatment. Although occlusal reduction also showed potential benefits, cryotherapy's minimal invasiveness and efficacy make it a valuable addition to existing pain management protocols.

Given the absence of adverse effects and the convenience of application, cryotherapy could serve as an alternative or complement to systemic analgesics, reducing the likelihood of medication-related complications.

Editorial note: The study, titled "Effect of cryotherapy and occlusal reduction on postoperative endodontic pain in mandibular first molars with symptomatic apical periodontitis: A prospective, parallel, double-blinded randomized controlled trial", was published online on 7 November 2024 in the European Journal of Dentistry, *ahead of inclusion in an issue.*