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# Insights into the June 2020 Issue of the JOE



Welcome to the June 2020 issue of the JOE. Here, we share some of our favorite articles that are published in this issue of the *Journal*. We hope you look forward to reading these and other articles in the JOE.

## FEATURED PAPERS FROM THE JUNE ISSUE

In this issue, Yu et al<sup>1</sup> report that dental endodontic emergency cases at the Wuhan University more than tripled during the corona virus disease 2019 (COVID-19) outbreak period. This significant increase in patients seeking endodontic treatment at the university emergency dental clinic may have been related to unavailability of other providers during the lockdown period. Approximately one half of the cases were diagnosed with symptomatic irreversible pulpitis, and pain was the primary chief complaint. Therefore, there is high demand for endodontic treatment in areas of high COVID-19 risk. Important steps in treating patients in areas of high COVID-19 risk include careful screening for COVID-19 symptoms (fever, coughing, and shortness of breath), avoiding production of aerosols, and minimizing treatment time by using vital pulp therapies and single-file techniques. In addition, adherence to all universal precautions and disinfection protocols must be heightened. Importantly, high levels of anxiety were reported among patients; thus endodontists should also care about the overall psychological and well-being of patients by using stress reduction techniques. Using protocols described in this article, no dentist or staff member contracted COVID-19.

By using a cross-sectional design, Limeira et al<sup>2</sup> investigated the prevalence of root canal treatment (RCT) and apical periodontitis (AP) in 50 hospitalized patients older than age 18 with type 1 diabetes (T1D) and 100 age- and sex-matched nondiabetic dental school patients. The T1D patients had significantly fewer remaining teeth and significantly more teeth with RCT, AP, and RCT with AP. Multivariable analyses controlling for relevant confounding variables showed significant associations between 11- to 15-year history of T1D diagnosis and RCT and between T1D and AP.

Sun et al<sup>3</sup> examined the relationship between clinical symptoms and the microbiota

in advanced caries by using 16S rDNA sequencing of 111 extracted carious premolars and molars. Samples were collected from the deepest layer of carious tissue. The relative abundance of *Lactobacillus* was positively correlated with referred pain, cold test, percussion sensitivity, and diagnosis. *Lactobacillus reuteri*, a probiotic bacterium, was more abundant in teeth with referred pain and teeth diagnosed with symptomatic irreversible pulpitis. The authors concluded that clinical symptoms and diagnosis were significantly associated with specific microorganisms in the deepest layers of dental caries.

Endodontic clinicians have long recognized that the anatomic complexity of the root canal system can vary considerably among teeth. One common variation is the fused root, which can present unique challenges when it comes to debriding the canal system. Cone-beam computed tomography (CBCT) imaging has revealed that a significant number of teeth have fused root systems. However, the impact of this anatomy on endodontic prognosis has not been fully investigated. In this issue Pereira et al<sup>4</sup> present a cross-sectional study of 3701 endodontically treated teeth using CBCT to evaluate the proportion of periapical lesions associated with maxillary and mandibular molars, with and without fused roots. A total of 1160 CBCT scans were reviewed from patients evaluated between 2012 and 2018 from 8 private dental clinics. The field observers used a standardized methodology for analyzing the images, and individual and group reliability were tested. The results were subjected to statistical analysis for significance. The authors report that fused rooted molars with prior endodontic treatment have 1.3-fold higher odds of being associated with periapical lesions compared with treated nonfused molars. This finding was not significant, but it underscores the importance for further study of the role of canal complexity in prognosis and treatment methodologies designed to address complex anatomy.

Validated methods to quantify the sequelae of untreated caries, such as irreversible pulpitis and apical periodontitis, is lacking today. In this clinical investigation, Teh et al<sup>5</sup> developed a pulpal involvement, ulceration, fistula, and abscess (PUFA) index to

screen for the clinical consequences of untreated dental caries. This index ideally reflects the underlying pulpal and periapical involvement of the carious lesion, thereby serving as a screening test to prompt additional clinical and radiographic examinations for a definitive diagnosis. In this study, 165 participants with a total of 4115 teeth were screened. On the basis of the current findings, it is concluded that PUFA is reliable and more accurate ( $P < .05$ ) than periapical index in screening for pulpal and apical diseases. Furthermore, it is suggested that PUFA index can complement the decayed, missing, and filled teeth index to assess the consequences of untreated dental caries.

The clinical diagnosis of symptomatic irreversible pulpitis (SIP) can present challenges. For example, the subjective bias imposed by both the clinician and patient with existing diagnostic tests indicates a need for refinement of these testing tools. In this issue, Costa et al<sup>6</sup> present a case-control study that evaluated a chairside qualitative standardized sensory testing (QualST) tool to evaluate the impact of somatosensory stratification of SIP on pulp sensibility testing in 66 participants. The authors report that patients with SIP related a higher frequency of intraoral hypersensitivity than healthy participants (58% vs 33%;  $P < .05$ ) and with post-QualST evoked pain of increased intensity and duration, suggesting that somatosensory alterations impact pulp sensibility testing in patients with SIP. The authors conclude that the trigeminal somatosensory evaluation of adjacent tissue may provide “fine tuning” in the clinical diagnosis of SIP.

The *in vitro* study performed by Jain et al<sup>7</sup> is the first look at the accuracy of optically driven, computer-aided, 3D dynamic navigation technology with high-speed drills to access simulated calcified canals in 3D printed jaw and tooth models. This is in contrast to an earlier generation of guided access using static acrylic surgical guides, whose disadvantages are explained well by the authors. Briefly, the operator performing dynamic access uses a preoperative CBCT scan and planning software to plan the entry point, angulation, and depth of the access preparation. This plan is then fed into a system that monitors the positioning of the handpiece by using attached

optical tracking tags to guide the operator as the preparation is made using a high-speed precision access bur. The mean drilling time through this artificial calcified canal system was less than 1 minute. The mean 2D horizontal and 3D deviations were 0.9 mm and 1.3 mm, respectively. This may be large enough to make this type of access prone to risk of perforation in very small thin roots, but it would appear to be far better than freehand access accuracy, although that was not compared in this study. There is also a significant learning curve needed to master this type of technology. One strength of this article is the demonstration of the workflow involved in this novel technique. Clinicians will find this description very useful in interpreting future studies of this technology. There were limitations to the methodology of the study, as described by the authors, but with more research and refinement, dynamic access navigation could become a large leap forward, not only for endodontic access of calcified canals but also for nonsurgical retreatment and guided apical surgery.

Using 120 polymer teeth filled with either gutta-percha/tricalcium silicate-based root canal sealer or gutta-percha/zinc oxide-eugenol sealer, Marchi et al<sup>8</sup> showed that both experienced practitioners and junior practitioners were able to remove the materials from all 3 canals of the acrylic teeth. The experienced practitioners took less time to remove the materials regardless of the canals treated or materials used. The clinical relevance is that Bioceramic sealer used with the single cone technique can be removed from the root canal in case of retreatment, as any other zinc oxide-eugenol based material.

Cone-beam computed tomography (CBCT) imaging is useful in detecting the radiographic pathosis, which is often missed in conventional 2D periapical (PA) radiographs. In this issue of JOE, Jang et al<sup>9</sup> present a retrospective chart review to identify preoperative patient- and tooth-related factors that were associated with the presence of apical periodontitis visible in CBCT images but missed with PA radiographs. Of 203 untreated teeth included in final analysis, apical periodontitis was detected in 24.6% of PA radiographs and 35.5% of CBCT images. They found that pulp necrosis, lesion sizes <2 mm in diameter, and the involvement of molars were significant factors of apical periodontitis

that was visible only in CBCT images ( $n = 22$  teeth, 10.84%). This study is limited in its final sample size for regression analysis. Yet, it highlights that selection of the radiographic modality should be made carefully on the basis of the balance between expected diagnostic yield and radiation risk in accordance with as low as reasonably achievable (ALARA) principle. As such, a CBCT scan should be considered only when PA radiography cannot provide accurate information.

We hope you enjoy this issue of your *Journal of Endodontics*.

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