EDITORIAL

Outcomes of Endodontic Treatment: Which Measures Are Important?

Endodontic clinicians have always been keen on providing their patients with treatment based on the best available evidence. Over the past few decades, there has been a gradual evolution of the type of evidence that is most relevant to clinical practice in endodontics. Frequently, evidence is provided to show the importance of specific treatment protocols, techniques, or materials based on the outcome of bench-top models, animal studies, or selected case reports. However, the limitation of these studies is that the models used may not have been validated to show the intended outcome clinically or may present a very unique situation that does not apply to most patients.[1]

In recent years, the highest levels of evidence have been attributed to well-performed clinical observational studies, randomized clinical trials, or systematic reviews of clinical studies. To ensure the highest quality, recent guidelines have been published to assist investigators in designing and publishing their studies, using different study designs[2,3].

The American Association of Endodontists (AAE) has always recognized the importance of identifying important treatment outcomes in endodontics. In 2017, the AAE formed an ad hoc committee to determine the most important clinical outcomes in endodontics and whether a consensus conference is needed to finalize these outcomes. The committee decided to pursue an approach based on a growing trend in medicine and dentistry to identify the Core Outcome Measures in Effectiveness Trials (COMET)[4]. This approach is initiated by applying to develop a Core Outcomes Set (COS) for a particular area of health care in an online repository (https://cometinitiative.org/), based on a scoping review of all published outcomes in this area, and then using an iterative interview/survey process of all stakeholders, known as the Delphi process, to develop a small number that all agree are the COS for this area of health care.

The AAE committee developed a request for applications (RFA) for investigators to undertake the scoping review. This was limited to nonsurgical root canal treatment, nonsurgical retreatment, and apexification due to the extensive literature on outcomes in endodontics. A group of investigators from Toronto University were funded by the AAE and the Foundation for Endodontics (FFE) to do the scoping review that was published in the *Journal of Endodontics*[5-7]. The scoping review included 19 domains of outcomes, based on 354 clinical studies, published after 1980. The committee then issued another RFA for the Delphi study. This time the scope of the study was expanded to vital pulp therapy, regenerative endodontic therapy, and surgical endodontics, as scoping reviews in these areas had been published elsewhere[8-10]. The RFA specified that the domains of patient-, clinician-, and researcher-based outcomes must be included[11].

An international group of investigators from several universities were awarded a grant from the AAE and the FFE to complete the Delphi study. In this issue of the *Journal of Endodontics*, the results of the Delphi study are published[12-16]. The methodology and resulting outcomes are described in detail and reveal the great effort undertaken to perform the study and analyze the data.

There also has been a parallel effort to develop COS for endodontics by a group of investigators in Europe, which was recently published[17]. The 2 sets of outcomes are similar in many respects, but not identical (Tables 1–3).

Going forward, there remains some work to be done on how these outcomes can be implemented in endodontic research and in clinical practice. For example, specific metrics need to be identified for measuring these outcomes that have been validated and accepted in the literature. Specific outcomes may be more suitable to measure using certain study designs, or with minimal sample sizes, controls, and/or thresholds for measurement. It should be determined whether there are accepted methodologies to reconcile the AAE/FFE-sponsored and the European COS, to minimize confusion and facilitate research using these outcome measures. Furthermore, it needs to be determined how the final COS can be implemented in guidelines to inform investigators, clinicians, patients, and other stakeholders. A consensus conference may still be on the horizon to answer these questions.

TABLE 1 - Core Outcomes Set Endodontics Treatment Chart—Azarpazhooh et al., 2025[12-16]

Nonsurgical root canal treatment/ Retreatment	Surgical endodontics	Vital pulp therapy studies	Apexification and regenerative endodontics
Tooth survival	Tooth survival	Tooth survival	Tooth survival
Pain	Pain	Pain	Pain
Signs of infection	Signs of infection	Signs of infection	Signs of infection
Radiographic evidence of periradicular healing	Radiographic evidence of periradicular healing	Radiographic evidence of maintained periradicular health	Radiographic evidence of periradicular healing
Success	Success	Success	Success
Functional tooth	Functional tooth	Functional tooth	Functional tooth
Need for further intervention	Need for further intervention	Need for further intervention	Need for further intervention
		Continued root development	Continued root development

TABLE 2 - Core Outcomes Set Common to All Endodontic Treatment Modalities— El Karim et al, 2024[17]

1. Pain
2. Signs of infection (swelling, sinus tract)
3. Further intervention/exacerbation
4. Tenderness to percussion/palpation
5. Radiographic evidence of disease progression/healing
6. Function
7. Tooth survival
8. Patient satisfaction

TABLE 3 - Treatment-Specific Outcomes Identified in the Consensus Process—El Karim et al, 2024[17]

Vital pulp treatment	Revitalization	Nonsurgical root canal treatment	Surgical endodontics
Maintenance of vitality	Further root development	Vertical root fracture	Mobility
Further root development	Resorption	Integrity of restoration	Soft tissue healing
Integrity of restoration	Discoloration		Root perforation/ fracture
Resorption	Integrity of restoration		Resorption
			Difficulty chewing
			Altered sensation/ neurological damage

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