

Letter to the Editor of International Endodontic Journal

Title: Proposal for a new diagnostic terminology to describe the status of the dental pulp

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Running Title: Proposal for diagnosis

Dear editor,

We have read with great interest the thought-provoking editorial by Rechenberg and Zehnder (Rechenberg & Zehnder 2020) that called for a review of diagnostic nomenclature and terminology used in Endodontics. The authors have underscored several important points that prompted us to write this reply to the Editorial. Here, we would like also to discuss our thoughts on the currently used endodontic diagnostic terminologies and to present a suggestion on the topic.

In an ideal scenario, an important task for a dental health care provider is to arrive at a correct diagnosis that accurately represents the biological events occurring in the dental pulp. It is a commonly held paradigm that “Diagnosis leads to Treatment”, an approach that, in many ways that are not straightforward, dictates the fate of a dental pulp or even a tooth. Typical treatment decisions by nature start with a dichotomization, such as “yes/intervention” or “no/no intervention”; this dichotomy in decision-making in endodontic retreatment is well described (Kvist et al. 1994).

In contrast, other dental specialties like Periodontology for example have developed more calibrated, quantified and staged diagnostic methods and terminologies (Tonetti et al. 2018). Consequentially, this disease concept results in treatment strategies that are guided by a clear path that defines the nature, severity and extent of periodontal disease. While we recognize fully the differences between disease concepts in periodontics and endodontics, we are also compelled to emphasize that the current endodontic diagnostic nomenclature and terminology is mostly descriptive in nature. It is subject to the operator’s interpretation of the patient’s own

interpretation of the clinical testing method being performed, albeit resulting in the black-and-white decision-making outlined above.

As elaborated by the Rechenberg and Zehnder, the current diagnostic terminologies developed by the AAE and the WHO have shortcomings and we agree that it should be re-examined. In particular, the terms “reversible” and “irreversible” were deemed to be “obsolete in the context of minimally invasive endodontics” (Wolters et al. 2017). The differences in clinical presentation between reversible and irreversible can be confusing and have been described to correlate poorly with the actual histopathology of the pulp (Seltzer et al. 1963; Garfunkel et al. 1973; Dummer et al. 1980). Once irreversible pulpitis is diagnosed, the recommended course of action would be to extirpate the dental pulp.

Amongst the diagnostic clinical testing methods used in Endodontics, the most accurate by far is cold testing (Balevi 2019). This method does not directly measure vitality; however, a tooth that elicits a response to cold testing is assumed to have either a normal or an inflamed pulp. EPT can be used in conjunction with cold testing to further increase diagnostic accuracy.

With currently mounting evidence for preserving the dental pulp even in cases diagnosed with irreversible pulpitis (Ricucci et al. 2019), we would like to respond to the authors’ call and propose that, for pulp conditions, we may use the terms **“viable”** and **“non-viable”**. While well known in cell biology (Malinin & Perry 1967), this terminology is effective yet perhaps less commonly used when referring to organ condition. Describing pulp viability is not an entirely new concept, it was discussed in a study that evaluated the ability of the pulp tissue to survive under extreme conditions (Price & Cserepfalvi 1972).

The intent to label tissues as “viable” or “non-viable” will compel the operator to explore the clinical presentation, possibly by direct observation using optical magnification or with other

techniques. This process will allow to determine, at a given point in time, the present and extent of inflammation and the appropriate place for biomaterial placement in vital pulp therapy (VPT). In case of non-viability in such locations amenable to VPT, root canal therapy (RCT) may then be performed.

The determination that a pulp is “non-viable” may be made through cold testing and EPT and/or with other diagnostic means (as applicable) may be treated with RCT after appropriate planning. Our proposal above is certainly not a panacea but given the reality facing patients in low socio-economic stratum who cannot afford RCT and those in rural areas with no trained RCT provider, examining the dental pulp first and performing vital pulp therapy can prove to be a more cost-effective treatment than extraction (Alqaderi et al. 2016; Emara et al. 2020).

The present understanding of the biology of the dentine pulp complex stresses its regenerative potential (Peters et al. 2021) ; in this context the importance of preserving the vital pulp is evident (Duncan et al. 2019). In line with the current efforts to practice minimally invasive dentistry the challenge appears to be to develop clinical guidelines on vital pulp therapy that can address different clinical conditions but also patients’ preferences, clinicians’ belief systems and, importantly, remuneration schedules. In addition, research on biologically driven diagnostic methods should be encouraged and supported. We hope that the new term, viability, can help define pulpal disease in a manner that leads to a more defined approach to treatment and thus ultimately helps our patients.

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