

Letter to the Editor

Sadr S, Golmoradizadeh A, Raoof M, Tabanfar MJ. Microleakage of Single-Cone Gutta-Percha Obturation Technique in Combination with Different Types of Sealers. Iran Endod J. 2015 Summer;10(3):199-203. doi: 10.7508/iej.2015.03.011.

Apical leakage continues to be a topic of great interest, due to the fact that clinical failures still occur, despite numerous advances in Endodontics. Most failures are probably attributed to the proliferation of bacteria that remain viable after chemo-mechanical preparation and cause peri-radicular infection [1]. I read with great interest, the article entitled "Microleakage of Single-Cone Gutta-Percha Obturation Technique in Combination with Different Types of Sealers" by Saeedeh Sadr *et al.* which has been published in your esteemed journal (IEJ Iranian Endodontic Journal 2015;10(3): 199-203). I want to share few of my thoughts regarding this study. It was a good study comparing the sealing ability of three root canal sealers including AH-26, glass ionomer cement (GIC) and zinc-oxide eugenol (ZOE) in single gutta-percha obturating system using the dye penetration method, but the authors can further redefine the study by incorporating few parameters. First, since the validity of dye leakage studies has been questioned because of the possible effect of entrapped air on ingress of the dye solution [2], dye leakage studies can be conducted under vacuum pressure. Studies have reported that vacuum pressure decreases the volume of entrapped air and allows complete dye penetration [3].

Second, though methylene blue has a high degree of staining and a molecular weight even lower than that of bacterial toxins, it possess disadvantages such as dissolution during the de mineralization and clearing process in addition to being difficult to observe the maximum penetration point in some cases [4]. On the other hand, Rhodamine-B dye presents greater diffusion in human dentin than methylene blue [5]. The molecules of Rhodamine-B dye are nanometric and are optimal to simulate bacterial enzymes and their toxins to assess microleakage. Other factors favouring the use of Rhodamine-B dye in leakage studies include: small particle size, water solubility, ease of visualization, better diffusability into dentinal tubules and hard tissue non-reactivity [6]. Hence, authors can attempt further similar studies using the above mentioned parameters for the better

appreciation of the results.

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Authors Reply

We are grateful to the author for his/her interest and insightful comments on our manuscript entitled: Microleakage of Single-Cone Gutta-Percha Obturation Technique in Combination with Different Types of Sealers. We have attempted to answer his/her queries as much as possible.

Response for the first comment

Although dye penetration tests are easy and cost-effective methods to evaluate the sealing ability of various dental materials, a number of criticisms have also been raised in relation to these tests. Sometimes the results cannot be compared with other studies because of the different methodological approaches [1]. According to the study by Spångberg et al. [2], entrapped air bubbles produces artifacts in passive immersion technique. They suggested that entrapped air should be evacuated from the void before dye introduction. However, the elimination of air may lead to an overestimate of the in vivo extent of microleakage [3]. In our study, we didn't apply vacuum before the dye was introduced. This procedure appears to be more similar to clinical reality.

Response for the second comment

Various types of dyes in different concentrations have been used in microleakage studies. Little attention, however, has been paid to the molecule sizes and specific behavior of materials in different circumstances [4]. Having high molecular weight and little capacity for ionic dissociation are the characteristics of both methylene blue and Rhodamine-B [5]. The molecule of Rhodamine-B is smaller than that of methylene blue dye. It is also less tensoactive than the latter and its penetration is deeper [5, 6]. Some studies also detected that Rhodamine-B showed the highest intradentinal penetration indexes and can be adequately visualized [6, 7]. Moreover, as a result of acidic pH and a possible reaction with dentin, methylene blue would be metabolized to colorless leukomethylene blue which is difficult to be visualized [8]. On the other hand, some authors reported that methylene blue favored the assessment of marginal microleakage compared to fluorescein and Rhodamine-B [9].

Despite the various advantages of Rhodamine-B, it has been used in a few studies when compared with other tracers. Many studies used methylene blue as dye since methylene blue is inexpensive, easy to manipulate and presents a high degree of staining as well as a molecular weight even lower than that of bacterial toxins [10]. However, there are some disadvantages with the use of methylene blue as a tracer in

leakage studies. Dissolution during the demineralization and clearing process, in addition to being difficult to observe its maximum penetration point in some cases are some negative points [11]. Hence, we hold the view that further similar studies using the above mentioned parameters for the better appreciation of the results should be done.

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