Abstract: One of the major objectives of tooth restoration is the protection of exposed dentin against bacteria and their toxins. The interface between the restoration and dental hard tissue is an area of clinical concern as insufficient sealing can result in marginal discoloration, secondary caries, postoperative sensitivity, restoration failure, pulpal pathology or pulpal death and partial or total loss of restoration. Microleakage is related to several factors, such as dimensional changes of materials due to polymerisation shrinkage, thermal contraction, absorption of water, mechanical stress and dimensional changes in tooth structure. For that reason, adequate sealing is essential for optimal clinical performance. Numerous laboratory studies have found that microleakage is usually unavoidable whilst clinical studies report substantially less pessimism about the sealing ability of dental restorations. This review of the literature is presented on various forms of leakage in dental restorations, distinguishing leakage, micro-leakage and nano-leakage. The aim of this review was to question whether in vitro marginal integrity studies on dental restorative systems are a reliable indicator for clinical performance.

Conclusion: In reality, it is the clinical assessment of materials that reveals good clinical performance, while in vitro microleakage studies may predict incorrect results.