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Submicron hiati in acid-etched dentin are iatrogenic artifacts. KA AGEE[1]*, EL PASHLEY[1], A ITTHAGARUN[2], FR TAY[2], DH PASHLEY[1] (Medical College of Georgia, Augusta, USA, University of Hong Kong, HKSAR, CHINA).

The submicron hiatus is a term that is referred to more and more frequently in the dentin bonding literature. It represents a potential space created at the base of the demineralized collagen network when dentin is acid-etched for bonding. These spaces were observed in SEM studies after acid-etched dentin were critical point dried or dehydrated in hexamethyldisilasane. However, they have never been identified in TEM studies of dentin hybrid layers. This TEM study critically examined the cause of submicron hiati formation using a silver staining technique. Two multi-step, total-etch adhesives (Single Bond, 3M; One-Step, Bisco) and two single-step, self-etching adhesives (Prompt L-Pop, ESPE; One-Up Bond F, Tokuyama) were examined. Flat dentin surfaces were bonded with these adhesives and a lining composite. For each adhesive, 0.8 mm thick slabs from the same tooth were coated with nail varnish applied 1 mm from the bonded interfaces. The varnish was either left to dry completely for 10 min before immersing in 50 wt% $AgNO_3$ for 24 h (group D), or painted on blotted tooth slabs that were dropped immediately into the $AgNO_3$ solution (group M). After developing, undemineralized, unstained, epoxy resin-embedded sections were prepared for transmission electron microscopy. Nanoleakage patterns were observed for all adhesives. Fine reticular silver deposits were also found in the undemineralized dentin. In group D, submicron hiati were seen as tunnels of heavy silver deposits beneath hybrid layers. Specifically, a hiatus occurred between the undemineralized intertubular dentin and a cohesively fractured layer of the same that was still attached to the base of the hybrid layer. Hiati were completely absent in group M. It is concluded that submicron hiati are iatrogenic artifacts created by desiccation during specimen processing, and should be referred to as such in future studies of bonded dentin interfaces (Supported by grant DE06427 from NIDCR).

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