APPENDIX A. SUPPLEMENTARY DATA

FIGURE S1

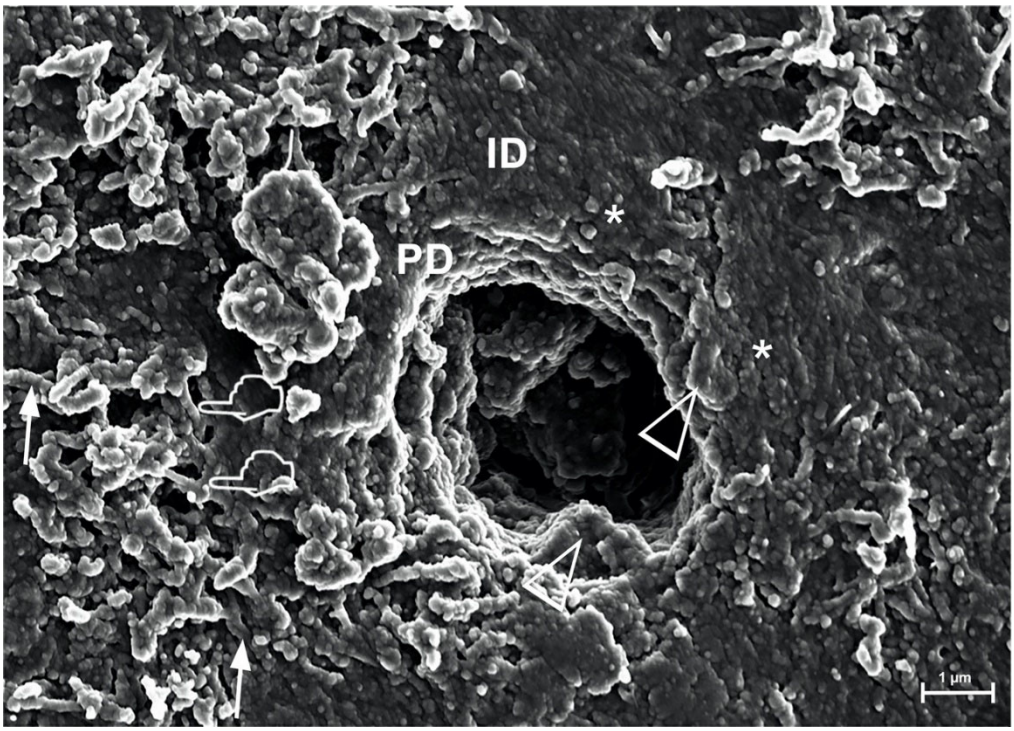

Figure S1. Field emission scanning electron microscopy (FESEM) image of a dentin surface. Peritubular dentin (PD) and intertubular dentin (ID) are clearly differentiated. Some collagen fibers were demineralized (pointers) or appeared mineralized (arrows). Mineralized clusters perform partially covering both the PD and the ID (arrow heads). A single layer of minerals partially shielded the ID and some extension of the PD (asterisks).

FIGURE S2

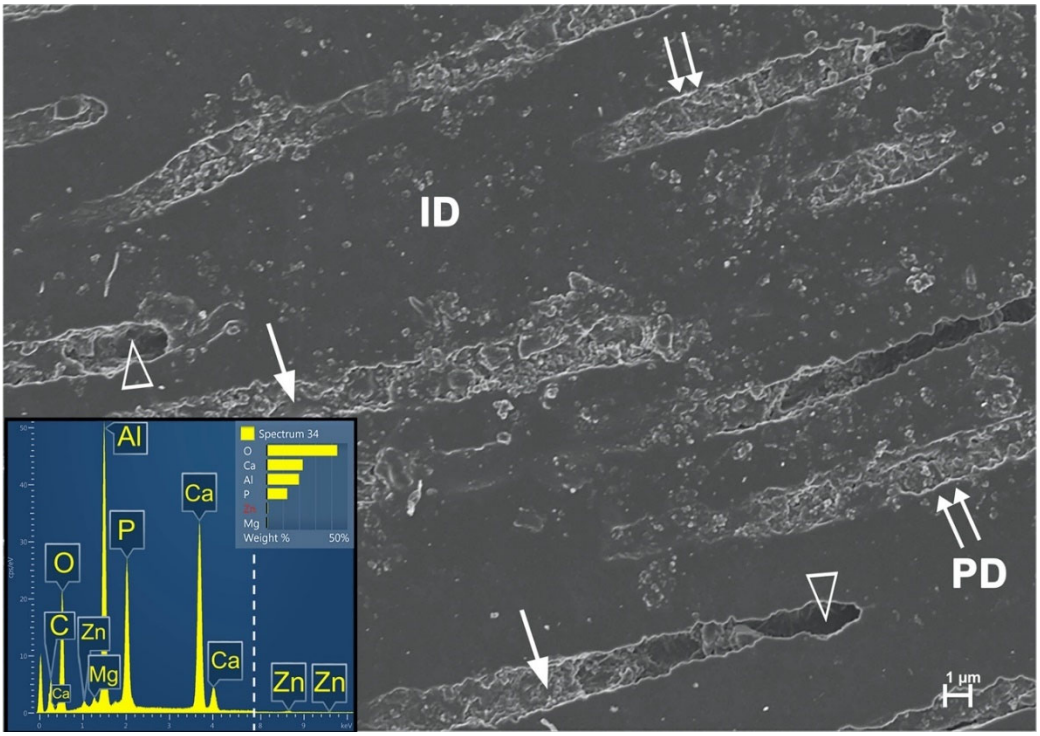

Figure S2. Representative FESEM image of a root inner dentin surface at the apical third, treated with a zinc oxide-modified hydroxyapatite-based sealer (oxipatite), after 12 m storage time. Tubules, crossing the intertubular dentin (ID), resulted almost totally mineralized (single arrows), and hermetically sealed. Some tubular areas remained unfilled (arrowheads), but peritubular dentin (PD) appeared strongly mineralized (double arrows). The inset corresponds to an X-ray elemental analysis spectrum in which it is evidenced the presence of zinc-based salts [phosphorous (P), calcium (Ca), and zinc (Zn)] aggregates.

FIGURE S3

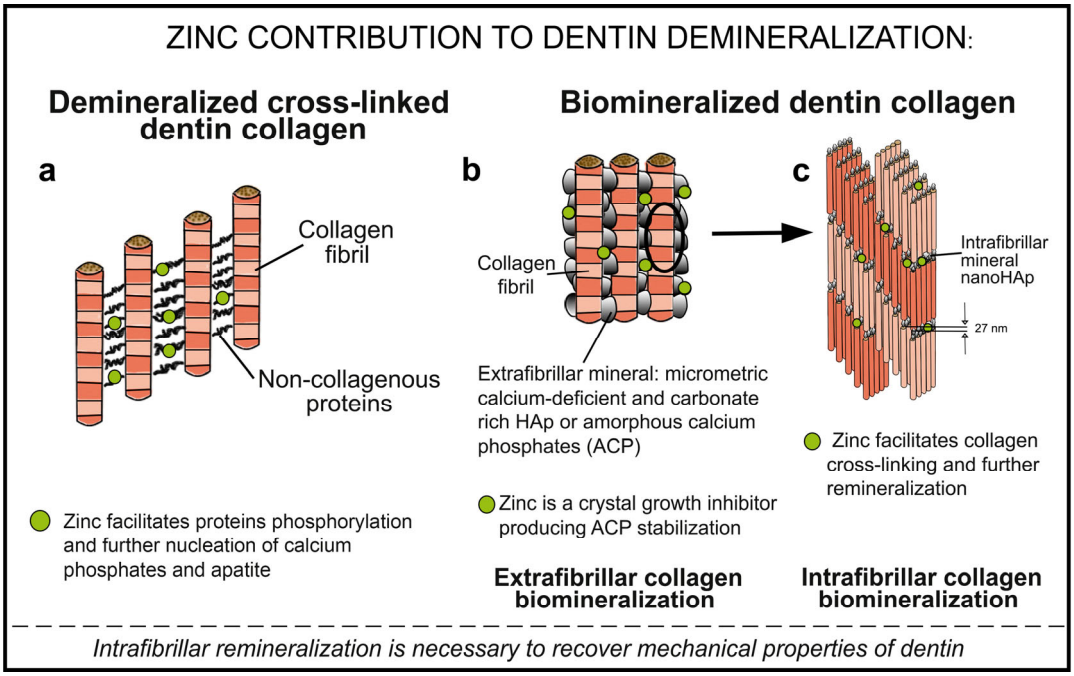

Figure S3. Dentin is a highly mineralized hard tissue. To restore the functional features of dentin, the single analysis of crystal nucleation *per se* may be inadequate. The quality and the degree of the mineralization will condition the mechanical features of the dentin. The stress and strain tooth behavior will also influence properties. A fraction of the extracellular matrix of dentin is constituted by calcium deficient and carbonate rich hydroxyapatite (HAp), prearranged at extrafibrillar and intrafibrillar compartments of the collagen fibers. In the absence of intrafibrillar mineralization, the extrafibrillar mineral performs as a grainy material that can sustain load; the capacity to withstand load in hydrated condition is rather low. In order to ensure that collagen fibers have the same high hardness and Young's modulus as it happens in natural biomineralized dentin, intrafibrillar mineralization plays a crucial role (Marshall et al., 1997; Kinney et al., 2003; Balooch et al., 2008; Bertassoni et al., 2010). (**a**) The schematic unveils noncollagenous proteins linking collagen fibrils. (**b**) The scheme shows collagen fibrils exhibiting the extrafibrillar mineral between fibrils. (**c**) The collagen molecules show the 27 nm overlap zone out coming in the characteristic periodicity of a collagen fibril. These figures were not drawn to scale. Figure reproduced and adapted from Uskoković and Bertassoni (2010) (Uskoković and Bertassoni, 2010).