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Micromechanics of Dentin: Review

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Abstract. In this review we discuss mechanical properties of dentin in relation to its microstructure. Dentin is a rather complex anisotropic material with hierarchical structure consisting of collagen fibers and hydroxyapatite particles at the lower level. Different concentrations of hydroxyapatite in this tissue correspond to peritubular and intertubular dentins. At the next, microscopic level dentin can be represented as intertubular dentin matrix containing parallel cylindrical holes (the tubules) surrounded by layers of peritubular dentin. Generally, dentin shows viscoelastic behavior; however, its reaction on fast loading can be described in the framework of elasticity. We review the state-of-the-art of dentin experimental characterization and methods of micromechanical modeling of its overall elastic and viscoelastic properties.

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