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Mechanical Properties of Biological Tissues

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Abstract : We will present four different topics in estimating the mechanical properties of biological tissues. First we elucidate the viscoelastic behavior of collagen molecules whose diameter is a couple of nanometers. By using the molecular dynamics simulation, we observed the viscoelastic behavior in different pulling velocity. Second, the protein layer, so called 'sheath' in enamel microstructure reduces the stress concentration in enamel minerals. We examined the result by using the finite element methods. Third, the anisotropic elastic constants of dentin are estimated by micromechanical analysis and estimated results are close to the experimentally measured data. Last, new formulation between the fabric tensor and the wave velocity is established for calcaneus by employing the poroelasticity. This formulation can be simply used for future experiments.

Keywords : tissues, mechanics, mechanical properties, wave propagation
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