

STRESS ANALYSES IN DENTAL BIOMECHANICS

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ABSTRACT

The aim of this work was to determine stress distribution in two different examples of oral systems: human mandible during simulation of mastication force loading, and human upper canine teeth loaded with orthodontic force due to mobile or fixed braces.

The 3D geometrical model of mandible was reconstructed from dry human mandible. Analytical and finite-element methods were used for the determination of mandible loading and stress distribution.

An upper canine extracted for periodontal reasons served as a pattern for the design of a CAD model. The tooth was modelled with its basic parts: enamel, dentin, periodontal ligament and cortical and spongy bone as a place where the tooth is anchored in the jaw. The analyses of stress were performed using the finite-element method.

The obtained results may be applied in practice, and the finite-element method represents efficient tool in estimating stresses in dental biomechanics.

Keywords: dental biomechanics, human mandible, single root tooth, finite-element method