

## Mathematical model of pennate muscle

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*Abstract:* The purpose of this study is to create a new mathematical model of pennate striated skeletal muscle. This new model describes behaviour of isolated flat pennate muscle in two dimensions (2D) by taking into account that rheological properties of muscle fibres depend on their position. A new mathematical model is implemented in two types: 1) numerical model of unipennate muscle (unipennate model); 2) numerical model of bipennate muscle (bipennate model). Applying similar boundary conditions and similar load, proposed numerical models had been tested. Obtained results were compared with results of numerical researches by applying a Zajac muscle model (this is a Hill type muscle model, in which the angle of pennation is taken into consideration) and a fusiform muscle model (a muscle is treated as a structure composed of serially linked different mechanical properties parts).

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