

## ***Abstract***

**Title:** *Effect of femoropatellar joint morphological changes on the rheological response of the knee joint.*

**Aim:** The purpose of this work is to evaluate the possibilities of the rheological diagnostics of the effect of the femoropatellar joint morphological changes on total rheological response of a knee joint. The methodological aim is to evaluate the *biorheometry* as a sufficient method, sensitive and specific for *in vivo* measurement of the abnormality, and to compare results of the functional measurement and structural examination.

**Methods:** Standard clinical data of defined group of tested probands were analysed in clinical phase of this study. Specific parameters for measurement of radiological examination were defined. The effect of factual morphological abnormality of the knee joint was identified in experimental phase of this study with the help of *biorheometry*. The method enables *in vivo* measurement of the passive momentum (resistance) of a knee joint during forced flexion and extension. The result is expressed as the specific rheological response of the knee joint. Namely, the dependence of the passive momentum  $M$  on the angle  $\varphi$  in flexion and extension of the knee is detected. As a result, the total rheological characteristic of the passive resistance of the whole *knee-joint system* is obtained.

**Result:** *Biorheometry* provides reliable results and shows good response of a *knee joint system* to femoropatellar joint morphological changes. Results of the radiological examination correlate poorly with measured clinical parameters.

**Conclusion:** There is evidence, that the morphological changes of a femoropatellar joint have effect on rheological properties of the *knee joint system*. This experimental study confirms the *biorheometry* as the diagnostic method usable for the specific morphological femoropatellar pathology of the knee joint. This method complexly measures rheological properties of a knee joint *in vivo*.

**Key words:** *biorheometry, femoropatellar joint, knee joint, patella, rheological properties.*