BIOMECHANICAL ESTIMATE OF OUTPUT FORCE OF LIGAMENTUM PATELLAE IN CASE OF ITS RUPTURE

JELEN, K.
Research Centre of Faculty of Physical Education and Sport
Charles University
Prague
Czechoslovakia

Using a case of patellar ligament rupture of a weightlifter in a contest, the critical stages are shown on film recordings of the lifter's movements. Special program of PAM (polynomial approximation method) was used in evaluating the discreet positions of the selected points of the weightlifter - barbell system. Analytical solution is presented for the time dependence of the displacement, speed and acceleration of the points under study. Especially that of the barbell centre of gravity. Dynamic characteristics in the time range of the patellar ligament rupture moment are used in the mathematical estimate of the resultant tendon force of the quadriceps femoris muscle and of the force stretching the patellar ligament. Data processing showed that the resultant tensile force acting on the patellar ligament was around 14 500 N. The presentation is complete with figures, tables and calculations.