Biomechanical features of the pole vault

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Abstract

This report is an attempt to summarize some results of biomechanical research into the pole vault. Phases of the vault, functions of the phases and mechanical principles are combined in an effort to give the coach some background information about the event, but also to elicit comments and suggestions for future research from coaches and athletes. For the purpose of this report the pole vault is subdivided into five distinct phases: the approach, the take-off, the first phase on the pole, the second phase on the pole, the flight phase. For analysis of the kinematics and the energetic parameters of the vaulter’s movement was used video computer system. A good look at the energy budget of any vault yields the following helpful information: the total energy prior to take-off gives an indication of the vaulter’s potential; the difference between energy before and after take-off gives an indication of the take-off efficiency; the efficiency of the energy transformation from kinetic energy to potential energy of the vaulter can be deducted from remaining kinetic energy at the maximum height of the vaulter’s center of mass; the net work done by vaulter is a complex indicator for an individual vaulter’s technique.

Keywords: Biomechanical analysis, athletics, pole vault, energy transfer