

Thesis Title        Biomechanics of the Snatch Technique of  
                         Thai Weightlifters  
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#### ABSTRACT

The purpose of this biomechanical study was to analyze the movement patterns of the snatch technique in terms of kinematic and external kinetic parameters in different levels of weightlifters: highly skilled (HS) and skilled(S), to compare the effects of various loads at 0%, 50% and 80%1-RM of lifting. In addition, the relationships between maximum weight lifted and muscle strength, aerobic and anaerobic capacity in HS and S were also analyzed. Videotape recording during the lifting of eleven HS and eleven S were analyzes from Peak-2D motion analysis system and recorded ground reaction force(Rz) from force platform. The snatch technique could be divided into three phases of lifting : the pull, the drop under barbell and the sqatting phase. The data were further subdivided into 9 events:1) Starting(ST), 2) Lift-off(LO),3) First knee bend (ME1),4) Maximum knee flexion(KF),5) Second knee bend(ME2) 6)Overhead(OH),7) Lower trunk (LT), 8) Push up (PU) and 9) Complete of lifting (CO).

The results indicated that the HS had more muscle strength than the S group ( $p < 0.05$ ). The maximum weight lifted were positively correlated with the training

experiences, handgrip strength and anaerobic capacity. The increasing loads could change both the kinematic and kinetic of the snatch lifting as seen in the barbell and intersegment joints movements which was similar in both HS and S groups. The HS could lift larger weight than S group ( $p < 0.05$ ). The increasing loads tended to prolong the time intervals of the drop under barbell and the squatting phase of lifting, lower barbell position and speed ( $p < 0.05$ ). The HS lifted faster and had lower barbell position than the S group ( $p < 0.05$ ). The increasing loads were found to increase knee and hip extension, velocity and acceleration during the pull while decreased during the drop under barbell and the squatting phase. The HS had more body extension, joints velocity and acceleration than S group in the pull phase ( $p < 0.05$  at the ME2) and more flexed position, decreased joint speed than those of the S group during the drop under barbell phase. The increasing loads found to increase the force apply to barbell and ground reaction force, the HS had more these force than S group during the lifting ( $p < 0.05$ ). However, in the present study indicate that HS shows the better and smooth patterns of lifters which no disruption in the increase barbell velocity to maximal value while the S cannot develop this technique at heavy load lifting. The HS tend to have the good technique by extend the body during the pull phase to pull the barbell up and place it as close as possible to body which may decrease the moment arm and result in decrease the loads on lumbar spine. The HS could be use the efficiency muscular work by more flex position during the drop under barbell for readjustment of CG and to stretch the knee extensor muscles to generate more force for squatting barbell to completion of lifting.