

**ELECTRONIC GUIDE TO THESES APPROVED BY
DEPARTMENT OF BIOMECHANICS
PREPARED BY NERVEEN ABD EL SALAM ABD EL KADER AHMED**

Department of Biomechanics

**Doctoral Degree
2010**

Author	:	Ayman Goda Mohammed Matar.
Title	:	Mechanical Analysis of Squat and Stoop Lifting with Known and Unknown Load Center of Mass Location.
Dept.	:	Department of Biomechanics.
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Degree	:	Doctoral.
Year	:	2010.
Abstract	:	
<p>Lifting an object with incorrect load knowledge may lead to low back pain and injuries. The purpose of this study was to examine the effects of different locations of load's COM and load knowledge on the erector spinae EMG and trunk kinematics during squat and stoop lifting tasks. Lumbar erector spinae EMG and trunk kinematics (ROM and velocity) were collected from 30 subjects (mean age 19.4 years \pm (1.3), mean height 175.8 cm \pm (5.1), and mean weight 72.4 kg \pm (10)). Trunk ROM and velocity were recorded through 3D Motion Analysis System, while myoelectric activity from the right and left erector spinae muscles were picked up by using surface electrode at L3 level. Each participant lifted a 6.5 kg box plus a 4 kg weight randomly placed in one of its selected five compartments (center, Rt-ant, Lt-ant, Rt-post, and Lt-ant). Four lifting series (5 lifts per series) were completed, two series of squat lifting with and without knowledge of the load's COM location and the other two series of stoop lifting also with and without knowledge of the load's COM location. The dependant variables were compared among five tested load locations using MANOVA with LSD test, while effect of the load knowledge were tested by using paired t test to compare between known and unknown conditions. Finding revealed significant differences in the tested dependant variables due to changes in COM location, with most potent effect when the COM located at left anterior location. However, considering load knowledge effect, there were non significant differences for most of the tested conditions except for trunk flexion velocity during stoop and squat lifting and erector spinae dominant side EMG during stoop lifting. Therefore, it can be concluded that lifting an object with unknown COM location put a high injury risk on the lower back especially if it is located toward non-dominant side anteriorly. In addition injury risk can be minimized if the load's COM location is located posteriorly toward dominant side either in stoop or squat lifting</p>		
Key words	1.	Squat and stoop lifting.
	2.	Load knowledge.
	3.	COM location.
	4.	Erector spinae EMG.
	5.	Trunk kinematics.
	6.	Mechanical Analysis.
	7.	Center of Mass Location.
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Title	:	Isokinetic Evaluation of Pelvic Muscles in Osteitis Pubis.
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	2.	Nagui Sobhi Nassif.
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Year	:	2010.
Abstract	:	
<p>Osteitis pubis in athletes is an old problem and its aetiology is still the subject of debate. The purpose of the study was to compare the isokinetic torques for the trunk flexors/extensors, hip flexors/extensors, and hip abductors/adductors muscle groups in osteitis pubis soccer players with that of normal athlete soccer players. Isokinetic data were collected from 20 osteitis pubis (OP) soccer players with mean (\pmSD) for age of 19.94 (\pm3.51) years, mean height of 176.16 (\pm4.93) cm, mean weight of 70.91 (\pm7.26) Kg, and 20 healthy male soccer players (control group) with mean age of 20.78 (\pm3.35) years, mean height of 176.0 (\pm4.15) cm, and mean weight of 71.33 (\pm7.35) Kg. Peak torque/body weight (PT/BW) was recorded from hip muscles as well as from trunk muscles at isokinetic concentric contraction mode with a speed of 180°/sec. A multivariate analysis of variance (MANOVA) was used for each hip muscle group's PT/BW, and trunk muscles, also (MANOVA) was conducted for each hip flexors/extensors (Flex/Ext) and adductors/abductors (Add/Abd) torque ratios to compare between control and OP groups. Independent samples t-test was conducted for abdominal/back (Abd/Back) ratio of control and OP groups with the initial alpha level set at 0.05 with subsequent Bonferroni adjustments. Additionally, one way analysis of variance (ANOVA) was conducted for Abdominal/Adductor peak torque ratio of control and OP groups. Finally, correlations were conducted to study the relationships between hip and trunk muscles in control and OP groups. Findings revealed that the hip flexors PT/BW value of OP group was significantly higher than that of control one. For the hip extensors, adductors, and abductors PT/BW values, there was no significant difference between the two groups of athletes. However, there was a significant increase in hip Flex/Ext peak torque ratio of OP group. Moreover, there was a significant decrease in PT/BW value of back muscles, with a subsequent significant increase in Abd/Back peak torque ratio in OP group. Finally, regarding the OP group, there was non-significant positive correlation between the hip flexors and adductors, abdominal, back muscles. As well as, there was non-significant weak positive correlation between the abdominal and back muscles. This study may support that a combination of factors may explain the pathogenesis of the OP in soccer players such as excessive back muscles weakness, muscular imbalance between the lower limbs, muscular imbalance between trunk and lower limbs.</p>		
Key words	1.	Osteitis pubis.
	2.	Isokinetic evaluation.
	3.	Concentric contraction.
	4.	Hip muscles.
	5.	trunk muscles.
	6.	Pelvic Muscles.
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