

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

Department of Biomechanics

Master Degree
2012

Author	:	Amir Abdelsattar Beltagi.
Title	:	Effect of Core Stability Exercises on Balance between Trunk Muscles in Healthy Adult Subjects.
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Degree	:	Master.
Year	:	2012.
Abstract	:	
<p><u>Background:</u> Core stability training has recently attracted attention for optimizing performance and improving muscle balance for healthy and unhealthy individuals. The purpose of this study was to investigate the effect of beginner's core stability exercises on the trunk flexors'/extensors' peak torque ratio and trunk flexors' and extensors' peak torques. <u>Methods:</u> Thirty five healthy individuals, randomly assigned into two groups; experimental (group I) and control (group II), participated in the study. Group I involved 20 participants (10 male & 10 female) with mean \pmSD age, weight, and height of 20.7 ± 2.4 years, 66.5 ± 12.1 kg and 166.7 ± 7.8 cm respectively. Group II involved 15 participants (6 male & 9 female) with mean \pmSD age, weight, and height of 20.3 ± 0.61 years, 68.57 ± 12.2 kg and 164.28 ± 7.59 cm respectively. Data were collected using the Biodex Isokinetic system. The participants were tested twice; before and after a 6-week period during which the experimental group performed a core stability training program. <u>Findings:</u> Statistical analysis using the 2x2 Mixed Design ANOVA revealed that there were no significant differences in the trunk flexors'/extensors' peak torque ratio between the "pre" and "post" tests for either group ($p > 0.025$). Moreover, there were no significant differences in the trunk flexors'/extensors' ratios between both groups at either test ($p > 0.025$). Meanwhile, the 2x2 Mixed Design MANOVA revealed that there were significant differences in the trunk flexors' and extensors' peak torques between the "pre" and "post" tests for group I ($p < 0.025$), while there were no significant differences inbetween for group II ($p > 0.025$). Moreover, there were no significant differences between both groups for the tested muscles' peak torques at either test except for that of the trunk flexors at the "post" test only ($p < 0.025$). <u>Interpretation:</u> The improvement in muscle performance indicated by the increase in the trunk flexors' and extensors' peak torques in the experimental group recommends including core stability training in the exercise programs that aim to improve muscle performance.</p>		
Key words	1.	core stability Exercises.
	2.	isokinetic
	3.	trunk muscles.
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Background: Core stability exercises are nowadays used to improve torso muscles' performance in a way that protects the spine from damage. Abdominal muscle endurance, torso balance, and dynamic balance are important for trunk stability, appropriate posture, and proper body movement. The purpose of this study was to examine the effect of core stability exercises on trunk muscle endurance and dynamic balance in healthy adult individuals. **Methods:** Thirty five male and female college students participated in the study. The participants were randomly assigned to two groups; experimental (group A) and control (group B). Group A consisted of 20 participants (10 male and 10 female) with mean±SD age 20.7±2.4 years, weight 66.5±12.1 kg, and height 166.7±7.8 cm. Group B consisted of 15 participants (6 male and 9 female) with mean±SD age 20.3±0.61 years, weight 68.57±12.2 kg, and height 164.28 ±7.59 cm. Isokinetic endurance parameters (total work and work fatigue) and dynamic balance parameters (antero-posterior (AP), medio-lateral (ML) and overall (O) stability indices (SI)) were collected using the Biodex Isokinetic and Biodex Balance systems respectively before and after a 6-week period during which group A performed a core stability exercise program. **Findings:** Considering the endurance parameters, the 2x2 Mixed Design MANOVAs revealed that there were significant differences between both groups for the total extension and flexion works only in the "post" test (p<0.01), with no significant differences inbetween for all the tested variables in the "pre" test (p>0.01). Moreover, they revealed significant differences between the "pre" and "post" tests for the total extension and flexion works in group A and the total flexion work only in group B (p<0.01) with no significant differences inbetween for the work fatigue at either of the tested groups (p>0.01). The Mann-Whitney tests revealed that there were significant differences between both groups for the APSI, MLSI and OSI in the "post" test (p<0.01), with no significant differences inbetween for all the tested variables in the "pre" test (p>0.01). The Wilcoxon Signed Rank tests revealed significant differences between the "pre" and "post" tests for the APSI, MLSI and OSI in group A and the MLSI and OSI only in group B (P<0.01). **Conclusion:** It may be concluded that core stability exercises are effective in improving trunk muscle endurance and dynamic balance.

Key words	1.	Core stability.
	2.	Isokinetic.
	3.	Balance.
	4.	trunk muscle endurance.
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