Department of Biomechanics

Doctoral Degree

2017

Author	:	**Azza Mohammed Abd El Mohsen.**
Title	:	**Effect of specific weight bearing program on selected isokinetic parameters, balance and bone mineral density**
Dept.	:	**Department of Biomechanics.**
Supervisors	**1.**	**Ghada Mohamed Elhafez**
	2.	**Hisham Misbah Soliman**
	3.	**Nagui Sobhi Nassif**
	4.	**Hossam Eddien Fawaz Abd El Ghaffar**
Degree	:	**Doctoral.**
Year	:	**2017.**
Abstract	:	

Background: Exercise is widely recommended to preserve bone health and muscles strength and reduce risk of falls by maintaining postural balance. Purpose: The current study was conducted to investigate the effect of Weight-bearing Exercise for Better Balance program on the isokinetic strength of hip and knee muscles, body balance, and bone mineral density in osteopenia. Methods: Twenty-four postmenopausal females with osteopenia volunteered to participate in this study. They were divided into two equal groups of 12; experimental and control. The Biodex System 3 isokinetic dynamometer was used for collecting the peak torques per body weight ratios of hip flexors, extensors, abductors, and adductors and knee flexors and extensors in a concentric mode of muscle contraction at an angular velocity of 60°/sec. The body balance was assessed using the Berg Balance Scale. Additionally, the bone mineral density T-scores were measured using the Dual Energy X-ray Absorptiometry. All measures were done for all participants of both groups before and after six weeks of the program. Results: Statistical analysis using 2x2 Mixed Design MANOVA revealed that there was a significant increase in the post testing mean values of isokinetic peak torques per body weight ratios of hip flexors, extensors, abductors, adductors, knee flexors, and extensors and Berg Balance Scale balance scores compared with the pre testing ones in the experimental group ($p < 0.05$). On the other hand, there was no significant difference in the post testing mean values of all measured variables compared with the pre testing ones in the control group ($P > 0.05$). Moreover, there was a significant increase in the post testing mean values of isokinetic peak torques per body weight ratios of hip flexors, abductors, adductors, and knee flexors, and extensors and Berg Balance Scale balance scores in the experimental group compared with the control one ($p < 0.05$). Conclusion: Weight-bearing Exercise for Better Balance program has significant effects on lower extremity muscle strength and body balance and can be included in the intervention programs for osteopenia and osteoporosis.

Key words	**1.**	**Weight-bearing.**
	2.	**Balance.**
	3.	**Bone mineral density.**
	4.	**Isokinetic parameters.**
Classification number	:	**000.000.**
Pagination	:	**p.**
Arabic Title Page	:	**تأثير برنامج خاص لتحميل الوزن على قيم أيزوكينيتيكية مختارة, والاتزان, وكثافة العظام.**
Library register number	:	**5263-5264.**

Author	:	**Bassam Ahmed Nabil Abd Elmaboud.**
Title	:	**Evaluation of selected isokinetic parameters of shoulder joint in tennis elbow versus golfr's elbow**
Dept.	:	**Department of Biomechanics.**
Supervisors	**1.**	**Salam Mohamed El-Hafez**
	2.	**Magdy Abd- Elaziz**
	3.	**Ahmed Salama Ymani**
	4.	**Mariem Abd-Elmoniem Ameer**
Degree	:	**Doctoral.**
Year	:	**2017.**
Abstract	:	

Background: **The role of proximal stability of shoulder joint to enhance distal mobility of elbow and wrist joints minimizes risk of injury. This concept is used and recognized by nearly all disciplines of rehabilitative medicine.** **Purpose:** **The current study was conducted to assess isokinetic peak torque/body weight (PT/BW) for shoulder extensors, abductors, external rotators in healthy athletes and non-healthy athletes with tennis elbow and golfer's elbow. Functional performance and pain intensity were also compared between athletes with tennis elbow and athletes with golfer's elbow.** **Methods:** **Thirty male athletes volunteered to participate in this study. They were equally subdivided into three groups of 10; Group (A) suffers from tennis elbow, Group (B) suffers from golfer's elbow, and Group (C) was healthy controls. Biodex System 3 Multi-Joint testing and rehabilitation was used to assess peak torque per body weight (PT/BW) of dominant shoulder extensors, abductors, and external rotators as indicators for muscles' strengths using eccentric mode of muscle contraction at angular velocities of 60°/sec and 120°/sec. Additionally, normalized PT/BW ratios for shoulder flexors/extensors, abductors/adductors, and external rotators/internal rotators were measured using concentric/concentric mode of muscle contraction at angular velocities of 60°/sec and 120°/sec. Moreover, pain severity was assessed by visual analogue scale (VAS) and functional performance was assessed using quick DASH questionnaire.** **Results:** **The results of 3x2 mixed design MANOVA revealed that there was a significant increase in the mean PT/BW values of all tested muscles' strengths and ratios ($p < 0.05$) except flexors/extensors' ratio ($p > 0.05$) in healthy control group compared with tennis elbow group at both angular velocities. Also, there was a significant increase in the mean PT/BW values of shoulder abductors and external rotators and flexors'/extensors' and external rotators'/internal rotators' PT/BW ratios in golfer's elbow group compared with tennis elbow group at both angular velocities ($p < 0.05$).** **Conclusion:** **Isokinetic strengths of shoulder muscles decreased significantly in athletes with tennis elbow and golfer's elbow compared with healthy athletes. Pain intensity and functional performance have similar results in both tennis elbow and golfer' elbow groups. 5553-5554**

Key words	**1.**	**Tennis elbow.**
	2.	**Golfer's elbow.**
	3.	**Isokinetic parameters**
	4.	**Shoulder joint.**
Classification number	:	**000.000.**
Pagination	:	**147 p.**
Arabic Title Page	:	**تقييم قياسات أيزوكينيتيكية مختارة لمفصل الكتف في حالات مرفق التنيس مقابل مرفق الجولف.**
Library register number	:	**5553-5554.**

Author	**:**	**Rafik Elmaamoon Mohamed Radwan**
Title	**:**	**Evaluation of Effectiveness of Customized Planter Pressure Redistribution Insoles For Patients With Idiopathic Scoliosis**
Dept.	**:**	**Department of Biomechanics.**
Supervisors	**1.**	**Salam Mohamed Elhafez**
	2.	**Mamdouh Mahfouz Ibrahim**
Degree	**:**	**Doctoral.**
Year	**:**	**2017.**
Abstract	**:**	

Background: changes of planter pressure distribution and alteration of foot mechanics in adolescents with idiopathic scoliosis have been investigated in many studies. Altered foot pressure in unbalanced anatomical position accumulates stresses to the musculoskeletal system and causes vertebral deformation. Yet, little is known about the effects of customized insoles in idiopathic scoliosis. **Purpose:** The purpose of the study was to evaluate the effectiveness of customized planter pressure redistribution insoles on the spinal and pelvic parameters as well as on functional disability in patients with adolescent idiopathic scoliosis (AIS). **Methods:** thirty patients with AIS (19 females, 11 males) with mean age of 16.5 ± 1.97 years, body mass of 65.93 ± 5.72 kg and height of 1.66 ± 0.06 m participated in this study. The measured parameters were radiographic Cobb's angle and rasterstreographic scoliotic angle, kyphotic angle, lordotic angle, pelvic obliquity, pelvic torsion, and vertebral rotation in addition to functional disability as measured by Oswestry disability index. Data collected before and after three weeks of wearing the customized insoles were compared for statistical difference. **Findings:** One way within subjects MANOVA and Wilcoxon Signed Rank tests revealed that all measured spinal and pelvic parameters decreased significantly ($p<0.05$) after the use of the customized plantar pressure redistribution insoles. Moreover, there were significant reductions of the pre-experimental Oswestry disability index scores. Moderate positive correlations were found between X-ray Cobb's angles and scoliotic angles as measured by DIERS Formatric 4D. **Interpretation:** customized planter pressure redistribution insoles are effective in improving trunk, pelvis alignment and functional disabilities in patients with AIS. DIERS Formatric 4D is useful method for assessment of Scoliosis.

Key words	**1.**	**planter pressure**
	2.	**Redistribution Insoles**
	3.	**customized insole**
	4.	**Formatric 4D**
	5.	**adolescent idiopathic scoliosis**
	6.	**Scoliosis - idiopathic**
Classification number	**:**	**000.000.**
Pagination	**:**	**122 p.**
Arabic Title Page	**:**	**الليزر منخفض المستوي والبلازما الغنيه بالصفائح الدمويه في علاج تمزق العضلة الخلفية.**
Library register number	**:**	**5332-5331.**