Department of Biomechanics

Master Degree
2015

Author	**:**	**Aya Abd EL-Hamied Mohamed Khalil**
Title	**:**	**Effect of Wiihabilitation System on Strength Ratio of Ankle Muscles in Adults**
Dept.	**:**	**Department of Biomechanics.**
Supervisors	**1.**	**Salam Mohamed Elhafez**
	2.	**Sohair Mohamed Abd Elrahman**
	3.	**Ghada Abd Elmoneim Mohamed**
Degree	**:**	**Master.**
Year	**:**	**2015.**
Abstract	**:**	

Background: The use of Wii training for rehabilitation has received substantial attention in the last few years. It is effective in improving balance and functional performance. However, there are no previous studies investigating its effect on muscle strength and strength ratios. Purpose: The study was conducted to examine the effect of Wii training on ankle muscles strength ratio in adults. Methods: Thirty two male healthy volunteers participated in the study. They were randomly assigned into two equal groups (experimental and control). Participants in the experimental group performed Wii training program for six weeks. Data were collected using the Biodex Isokinetic system 3. Peak torque of dorsiflexors and planter flexors from the dominant ankle was measured at an angular velocity of 60°/sec which in turn used to derive ankle dorsiflexion/plantarflexion strength ratio. Findings: 2x2 Mixed Design ANOVA revealed that the mean values of ankle dorsiflexion/plantarflexion strength ratio declined significantly ($p<0.05$) between the "pre" and "post" test records in the experimental group, meanwhile for the control group the difference between the "pre" and "post" test records was not significant ($p>0.05$). Interpretation: Wiihabilitation has an impact on ankle dorsiflexion/plantarflexion strength ratio. So, it can provide an effective training tool in terms of muscular strength and ankle strength ratio. Thus, it could be recommended in both prevention and rehabilitation of patients with chronic ankle instability.

Key words	**1.**	**Wiihabilitation.**
	2.	**Strength ratio.**
	3.	**Ankle muscles.**
	4.	**Ankle instability.**
	5.	**Adults**
Classification number	**:**	
Pagination	**:**	**IX,95,3 p.**
Arabic Title Page	**:**	**تأثير التأهيل بنظام الوى على نسبة القوى لعضلات الكاحل فى البالغين.**
Library register number	**:**	**4453-4454.**

Author	**:**	**Eman Ahmed Ahmed Ahmed**
Title	**:**	**Mechanical Responses To Hip Versus Knee Induced Muscle Fatigue In Patellofemoral Pain Syndrome**
Dept.	**:**	**Department of Biomechanics.**
Supervisors	**1.**	**Nagui Sobhi Nassif**
	2.	**Ibrahim Ali Nassar**
	3.	**Ghada Abdel Moneim Mohamed**
Degree	**:**	**Master.**
Year	**:**	**2015.**
Abstract	**:**	

Background: Impaired skeletal muscle endurance may be an important causal factor in the development of patellofemoral pain syndrome (PFPS). However, there is lack of information regarding the effect of hip versus knee muscle fatigue on isokinetic parameters, and myoelectric activity of hip and knee muscles in these patients. **Purpose:** The study was conducted to investigate the effect of hip abductors versus knee extensors fatigue protocol on knee proprioception, hip and knee muscle strength and their myoelectric activity in patients with PFPS. **Methods**: Fifteen female patients with PFPS participated in the study. They were tested randomly under two fatiguing conditions; hip abductors and knee extensors fatigue protocols. Isolated muscle fatigue of two muscles was induced isokinetically on the affected side in a two separate sessions with a rest interval of at least three days. After determining peak torque, patients performed continuous maximal concentric-eccentric contraction of the selected muscle until the torque output dropped below 50% of peak torque value for 3 consecutive repetitions. Knee proprioception, eccentric hip abductors' peak torque, eccentric knee extensors' peak torque, EMG ratio of vastus medialis obliquus (VMO) / vastus lateralis (VL), and EMG activity of gluteus medius (GM) muscle, were recorded before and immediately after each fatigue protocol using the Biodex Isokinetic system and EMG Myosystem. **Results:** Two-way within subject MANOVA revealed that eccentric knee extensors' peak torque decreased significantly after hip abductors fatigue protocol compared to pre fatigue condition ($p<0.05$). On the other hand, there was no statistically significant difference in the eccentric hip abductors' peak torque after admitting knee extensors fatigue protocol ($p>0.05$). Moreover, no significant difference was found in knee proprioception, EMG ratio of VMO / VL, and EMG activity of GM muscle, after either hip or knee fatigue protocol ($p>0.05$). **Conclusion:** A hip focused rehabilitation program may be beneficial in improving knee function through correcting faulty kinematics and hence decrease knee loading in patients with PFPS.

Key words	**1.**	**Hip.**
	2.	**Mechanical Responses**
	3.	**Muscle Fatigue**
	4.	**Knee Proprioception**
	5.	**Electromyography**
	6.	**Patellofemoral Pain Syndrome**
Classification number	**:**	
Pagination	**:**	**XII,146,4 p.**
Arabic Title Page	**:**	الاستجابات الميكانيكية للاجهاد المستحث لعضلات الفخذ مقابل عضلات الركبة فى متلازمة آلام الرضفة
Library register number	**:**	**4481-4482.**

Author	**:**	**Samar Osama Ahmed Hassounah**
Title	**:**	**Balance Assessment Following Proximal Versus Distal Lower Limb Muscles Cooling in Healthy Females.**
Dept.	**:**	**Department of Biomechanics.**
Supervisors	**1.**	**Ghada Mohamed ElHafez**
	2.	**Nagui Sobhi Nassif**
	3.	**Ayman Goda Matar**
Degree	**:**	**Master.**
Year	**:**	**2015.**
Abstract	**:**	

Background: Cryotherapy is one of the most common and inexpensive forms of treatment for both acute and chronic injuries. Yet, there is a deficiency in research concerning the impact of cooling on balance in healthy females. **Purpose:** The purpose of this study was to investigate the effect of cryotherapy application on hip adductors and ankle evertors on the Overall Stability Index (OSI), the Medio-Lateral Stability Index (MLSI), and the Antero-Posterior Stability Index (APSI). Also to differentiate between the effect of cryotherapy application on the proximal versus the distal lower limb muscles on postural stability indexes. **Methods:** Thirty- three healthy females with mean age 19.59±0.49 years, weight 63.65±10.45 kg, and height 160.18±6.52 cm participated in this study. They were tested under two cryotherapy application conditions that were tested randomly; the hip adductors and the ankle evertors. Tests and data collection were performed before and after the cryotherapy application. Data were collected using the Biodex Balance system. **Findings:** The repeated measure two-way MANOVA revealed that the OSI, MLSI and APSI did not differ significantly (P>0.05) after ice application on either hip adductor or ankle evertor muscles, compared with the pre application conditions. **Interpretation:** The immediate effects of cryotherapy applied to the hip adductors and ankle evertors are not detrimental to lower extremity balance, and can be safely used without fear of reinjures due to decreased proprioception.

Key words	**1.**	**Balance Assessment.**
	2.	**Cryotherapy**
	3.	**Postural Stability**
	4.	**Balance**
	5.	**Proprioception**
	6.	**Proximal.**
	7.	**Distal Lower Limb.**
	8.	**Muscles Cooling.**
	9.	**Healthy Females.**
Classification number	**:**	
Pagination	**:**	**Xii, 102, 3.**
Arabic Title Page	**:**	**تقييم الإتزان عقب تبريد عضلات الطرف السفلي الأقرب مقابل الأبعد في الإناث الأصحاء**
Library register number	**:**	**4461-4462.**