Physical Therapy Department for Neuromuscular and Neurosurgical Disorder and Its Surgery

Doctoral Degree

2015

Author	:	**Abd El-Hamied Ibrahim El-Sayed Mohamed**
Title	:	**Influence of cervicocephalic kinesthetic sensibility on postural control and vertebral artery blood flow in cervical discogenic lesions**
Dept.	:	**Physical Therapy Department for Neuromuscular and Neurosurgical Disorder and its Surgery.**
Supervisors	**1.**	**Ebtessam Khattab Gad-El Mawla**
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	3.	**Mohamed El-Sayed,**
Degree	:	**Doctoral.**
Year	:	**2015.**
Abstract	:	

Background: Cervical kinaesthetic sensibility has become increasingly important in the study of neck-related syndromes. Cervical kinaesthesia appears to be impaired especially with a higher degree of pain and disability illustrating its potential role in the pathogenesis. Purpose: of this study was to determine the effect of wearing standard hard cervical collar for four weeks on vertebral artery blood flow, postural control and cervical proprioception in patients with cervical discogenic lesions. More over, to determine the effect of the effect of selected cervical proprioceptive training on postural control in patients with cervical discogenic radiculopathy. Methods: Thirty six patients suffered from cervical discogenic radiculopathy were recruited for this study. Their age ranged from 35-50 years. Postural control was examined by using the NeuroCom Smart Balance Master® as a method of laboratory examination; cervical proprioception was assessed by cervical position sense test and vertebral artery blood flow was measured using colour pulsed doppler ultrasonographic apparatus. Patients of group A was measured for postural stability after wearing cervical collar for a period of four weeks, while patients of study group B were measured for postural stability after wearing cervical collar in addition to having selected cervical proprioceptive training for a period of four weeks. Results: showed significant changes in all measured variables as a result of wearing hard cervical collar. Also results proved that selected cervical proprioceptive training was effective not only in reducing cervical discogenic manifestations, but also in cervical proprioception acuity as well as postural control in patients with cervical discogenic lesions. Conclusion: alteration of cervicocephalic kinesthetic sensibility by decreasing it by wearing cervical collar and increasing it, by specific cervical proprioceptive training had a significant effect on postural control and cervical proprioception but not on vertebral artery blood flow in patients with cervical discogenic radiculopathy.

Key words	**1.**	**Cervical collars, vertebral artery blood flow**
	2.	**cervical radiculopathy**
	3.	**postural control.**
	4.	**cervical proprioception,**
	5.	**cervical kinaesthetic sensibility**
	6.	**proprioceptive training**
Classification number	:	**000.000.**
Pagination	:	**1710 p.**
Arabic Title Page	:	**تأثير الإحساس الحركى العنقي على إتزان القوام وتدفق الدم في الشريان الفقاري في إصابات الغضاريف العنقية**
Library register number	:	**4543-4544.**

Author	**:**	**Ahmed Metwally El-Shinnawy**
Title	**:**	**Specific Sensory Motor Exercise Program Versus Task Specific Training On Balance In Stroke Patients**
Dept.	**:**	**Physical Therapy Department for Neuromuscular and Neurosurgical Disorder and its Surgery.**
Supervisors	**1.**	**Magdy Ahmed Arafa**
	2.	**Mohamed ElSayed Elawady**
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Degree	**:**	**Doctoral.**
Year	**:**	**2015.**
Abstract	**:**	

Background: Sensorimotor cortex is responsive to peripheral and central stimulation by mechanisms that are important for learning motor tasks. The purpose of this study was to compare between specific sensory motor exercise program and task specific treadmill training on balance in stroke patients. Methodology: Forty stroke hemiparetic male subjects were assigned into two equal groups (group A and B): group (A) received specific sensory motor exercise program while group (B) received task specific treadmill training. Subjects were assessed using balance master system including static (sway velocity of center of gravity during unilateral and double stance), dynamic (rhythmic weight shift) and functional balance (sit to stand, tandem walk and step/quick turn). Results: This study revealed that balance is significantly improved in group (A) treated by sensory motor training than those of task specific treadmill training. Conclusion: Specific sensory motor training could be considered a valuable method for treating balance in stroke patients.

Key words	**1.**	**Stroke**
	2.	**Specific Sensory Motor Exercise Program**
	3.	**Task Specific Training**
	4.	**Balance In Stroke Patients**
Classification number	**:**	**000.000.**
Pagination	**:**	**152 p.**
Arabic Title Page	**:**	**برنامج خاص بالتدريب الحسي الحركي مقابل برنامج التدريب الموجه في التوازن لمرضى السكتة الدماغية.**
Library register number	**:**	**4085-4086.**

Author	**:**	**Shaimaa Mohamed Abdelmageed**
Title	**:**	**Geometry of intervertebral foramen in relation to lumbar disc prolap using finite element model**
Dept.	**:**	**Physical Therapy Department for Neuromuscular and Neurosurgical Disorder and its Surgery.**
Supervisors	**1.**	**Moshera Hassan Darwish**
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Degree	**:**	**Doctoral.**
Year	**:**	**2015.**
Abstract	**:**	

Background: Despite the clinical importance of lumbar intervertebral foramen (IVF) dimensions, there was little in vivo data on the degree of changes in dimensions of IVF with different spinal positions. Purpose: The purposes of this study were to measure and analyze the geometry of lumbar IVF changes and amount of disc bulge at different loading trunk positions, to validate finite element model, to match the results with kinesiological H-reflex findings and to determine the optimal spinal position used in treatment. Methods: Twenty male patients had L4-L5 disc prolapse and ten normal subjects matched patients represented the sample of this study. The study was conducted to three equal groups. First group (G1) represented healthy asymptomatic subjects, second group (G2) patients with L4-5 posterior disc bulge and third group (G3) patients with L4-5 posterolateral disc bulge. Three dimensional finite element models (FEM) were created based on radiological imaging (micro MRI, micro CT, 3D CT, DXA, and X-ray). The construction and analysis of FEM was done by using simpleware (Scan IP, Scan FE, and Scan CAD) and Ansys11.0. Dimensions of IVF (height, width, and cross sectional area) and amount of disc bulge were measured at different loading positions: axial compression, flexion, extension, axial rotation, lateral bending, and coupled movement. Model was validated in vitro studies. Each subject underwent dynamic H-reflex monitoring via stimulation of the tibial nerve and recording activity from lateral gastrocnemius muscle. Results: There was significant difference of cross sectional area of the lumbar IVF among the tested trunk positions for. Area of LIVF decreased at extensions in G1 and G3 while it increased at flexion, rotation to opposite side of disc bulge and opposite side bending with rotation to same side significantly increased area at the all groups ($p \leq 0.05$). Extension significantly decreased in posterior disc bulge in G2. Amount of disc bulge decreased significantly at axial rotation to opposite side and at opposite side bending with rotation to same side of trunk in three groups and it also decreased at extension of trunk in G2. Amplitude of H-reflex increased at opposite side bending with rotation to same side of trunk in three groups and it also increased at extension of trunk in G2. The results of in-vitro study were closely matched with the results of FEM. Conclusion(s): It was concluded that opposite side bending with rotation of trunk to same side position was optimal spinal position in treating patients with L4-L5 disc bulge (posterior and posterolateral). Extension was recommended in treating patients with L4-L5 posterior disc bulge. Sustained lumbar flexion must be avoided in treating patients with disc bulge.

Key words	**1.**	**Finite element modeling**
	2.	**lumbar disc; H reflex**
	3.	**lumbar intervertebral foramen**
	4.	
	5.	
	6.	
Classification number	**:**	**000.000.**
Pagination	**:**	**72 p.**
Arabic Title Page	**:**	**قياس الأبعاد الهندسية للثقبة الفقرية في الإنزلاق الغضروفي القطني بإستخدام نموذج العناصر المحدودة**
Library register number	**:**	**4419-4420.**

Author	:	**Youssef Mohamed Mohamed Elbalawy**
Title	:	**Modified constraint induced movement therapy versus bilateral arm training on arm function in stroke patients**
Dept.	:	**Physical Therapy Department for Neuromuscular and Neurosurgical Disorder and its Surgery.**
Supervisors	**1.**	**Abdulalim Atteya**
	2.	**Ebtesam Mohamed Fahmy**
	3.	**Waleed Talat Mansour**
Degree	:	**Doctoral.**
Year	:	**2015.**
Abstract	:	

Background and Purpose: Recovery of motor function after stroke may depend on balance of activity of neural network involving the affected and the unaffected motor cortices. Modified constrained induced movement therapy and bilateral arm training share similar key therapeutic elements (mass and repetitive practice with specific techniques). Constraint induced movement therapy acts through restraining the unaffected limb in combination with intensive training of the affected limb while bilateral arm training acts through utilization of the unaffected limb to enhance motor function in the affected limb. The aim of this study was to compare the effect of the two techniques on improving arm function in stroke patients. Patients and methods: Forty Five male ischemic stroke patients with age ranged between 45-55 years were included in this study. Patients were divided randomly into three equal groups. Group I received modified constrained induced movement therapy in addition to a selected physical therapy program. Group II received bilateral arm training in addition to the selected physical therapy program. Group III received the selected physical therapy program. All patients were assessed pre and post treatment using Fugl-Meyer Scale, Action Research Arm Test, Box and Block test and Reaching Movement Kinematic Analysis using two dimensional analysis system. Results: showed statistically significant improvement in motor impairment and hand function in the three groups post treatment. There was a statistically significant increase of the mean value of Fugl-Meyer score in GI and GII compared to GIII with the best scores for GII. There was a statistically significant increase of the mean value of Box and Block Test and Action Research Arm Test score in GI compared to GII and GIII. Also, a statistically significant decrease in trunk displacement and time of reach to grasp after treatment in GI and GII with the higher scores in GII for trunk displacement and in GI for time of reach to grasp and a statistically significant increase in trunk displacement in GIII while there was no significance difference in time of reach to grasp. Also, there was a significant increase in shoulder flexion and elbow extension in GI and GII after treatment with the higher score in GII while there was a statistically significant decrease in shoulder flexion in GIII and a non-significant difference in elbow extension. Conclusion: Modified constraint induced movement therapy and bilateral arm training improve upper limb function and reaching movement kinematics in stroke patients. Superiority of modified constrained induced movement therapy was on improving motor function and hand dexterity while Superiority of bilateral arm training was on improving arm impairment and reaching movement kinematics.

Key words	**1.**	**Stroke**
	2.	**neural network**
	3.	**constrained induced movement therapy**
	4.	
	5.	
	6.	
Classification number	:	**000.000.**
Pagination	:	**150 p.**
Arabic Title Page	:	**العلاج الحركي المستحث بالتقييد المعدل مقابل التمرين المزدوج للذراعين على وظيفة الطرف العلوي في مرضى السكتة الدماغية**
Library register number	:	**4415-4416.**