

## Department of Basic Science

Doctoral Degree  
2005

Author	:	Abeer abd Al Rahman Mohamed.
Title	:	Effect of pulse configuration of induced current on sciatic nerve regeneration.
Dept.	:	Department of Basic Science.
Supervisors	1.	Wadida Hassan Abd Elkader.
	2.	Fadel Mohamed Ali.
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Degree	:	Doctoral.
Year	:	2005.
Abstract	:	
<p>The purpose of this work was to study the effect of induced electrical current with specific pulse configuration (shape, frequency and amplitude) that nearly resonates with the pulse for biological excitation of the sciatic nerve and Nerve Growth Factor (NGF) on regeneration of rat sciatic nerve. Surgical crushing of the left sciatic nerve of sixty rats was done. The rats were divided according to treatment into two equal groups; (1) Untreated control group and (2) Treated group received specific pulse determine by preliminary study for 45 min daily for up to five weeks. This pulse had RC-Square Amplitude Modulating Wave (RC-SAMW) shape with 2.5 Hz frequency and 2.5 Vpp amplitude carried on 0.5MHz wave carrier frequency and 10 V pp amplitude. The regeneration rate was measured by Sciatic Function Index (SFI), Toe Spread Reflex (TSR) and histo-morphometric study after one, three and five weeks postoperative. The results indicated that SFI and TSR improved progressively in Treated group and the improvement % was 83% and 89% compared to 68% and 71%% in Untreated group after five weeks, respectively. The number of myelinated nerve fiber/ standard measuring frame, area and area % of myelination and optical density of sum and mean grey of myelination were significantly higher in Treated group than Untreated one, where the P value &lt; 0.0001 , 0.001, 0.01 and 0.001 consequently after five weeks. The study concluded that induced electrical current with 2.5 Hz RC-SAMW enhances early function and morphologic regeneration of the crushed sciatic nerve, probably by accelerating axonal degeneration, stimulating nerve sprouting and myelination.</p>		
Key words	1.	Histology.
	2.	Induce electrical current.
	3.	Morphometry.
	4.	peripheral nerve regeneration.
	5.	Pulse configuration.
	6.	Sciatic nerve.
	7.	Sciatic Function Index..
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**ELECTRONIC GUIDE TO THESES APPROVED BY  
DEPARTMENT OF BASIC SCIENCE  
PREPARED BY NERVEEN ABD EL SALAM ABD EL KADER AHMED**

Author	:	Afaf Ahmed Mohamed Shaheen.
Title	:	Influence of designed resonance electromagnetic impulses on skeletal muscles regeneration.
Dept.	:	Department of Basic Science.
Supervisors	1.	Fatma Sedeek Amin.
	2.	Fadel Mohamed Ali.
	3.	Safinaz Salah EI-Dein Syed.
Degree	:	Doctoral.
Year	:	2005.
Abstract	:	
<p>The present study was conducted to investigate the effect of designed resonance electromagnetic impulses on skeletal muscles regeneration. Methods: the study participated into pre and post repeated measure design. One hundred and fifty adult male Swiss albino rats were used and all rats were exposed to crush injury by applying standered mechanical pressure (<math>4.25 \text{ kg/cm}^2=2 \text{ bar}</math>). The study was divided into two major parts; preliminary (30 rats) to design the electromagnetic impulses with specific characteristics that can resonate with endogenous impulses of skeletal muscle. Experimental study was done on 120 rats. The rats were equally divided into two major groups (A&amp;B) for histological, histochemical and physiological evaluation. Each group was equally divided into three subgroups according to the time treatment and evaluation at 5, 10 and 15 days. Each subgroup was equally divided again into untreated and treated subgroups. All treated subgroups were exposed to amplitude modulated sine wave (AMSW) of 2Hz and amplitude 2Vpp carried by 10 MHz and amplitude 10 Vpp 30 minutes/day up to 5,10 and 15 days. The effect of AMSW was studied through the measurement of histological, histochemical (collagen deposition, glycogen and carbohydrate storage and total protein content) and functional (twitch and tetanic contraction) evaluation. Results: The results revealed significant decrease in collagen deposition to approximate the normal value in treated subgroups as compared with untreated ones, there were marked improvement of glycogen and carbohydrate storage and total protein content in treated subgroups relative to normal as compared with untreated ones. Also there was progressive improvement of functional parameters of skeletal muscle in the form of twitch and tetanic contraction in treated subgroups as compared with untreated ones. Conclusion: AMSW succeeded to resonate with endogenous impulses of skeletal muscle and enhance its regeneration. This study may be considered as a novel treatment protocol of skeletal muscle without fibrosis post injury.</p>		
Key words	1.	Electromagnetic field.
	2.	amplitude modulated wave.
	3.	resonance frequency.
	4.	crush injury.
	5.	skeletal muscle regeneration.
	6.	collagen.
	7.	glycogen storage.
	8.	protein content.
	9.	twitch
	10.	tetanic contraction.
Arabic Title Page	:	تأثير النبضات الكهرو مغنطيسية الرنينية المصممة على تجدد العضلات الهيكلية.
Library register number	:	1255-1256.

**ELECTRONIC GUIDE TO THESES APPROVED BY  
DEPARTMENT OF BASIC SCIENCE  
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Author	:	Mones El Sayed Mohamed El Azzawi.
Title	:	Efficiency of selected physical therapy programme in the prevention and treatment of osteoporosis.
Dept.	:	Department of Basic Science.
Supervisors	1.	Mohsen Mohamed El-Sayyad.
	2.	Samy Abd El-Samad Nassef.
	3.	Mohamed Omar M. Khodair.
Degree	:	Doctoral.
Year	:	2005.
Abstract	:	
<p><b>Background:</b> Osteoporosis is a systemic skeletal disorder characterized by decreased bone mass and deterioration of bony micro-architecture. The result is fragile bones and an increased risk for fracture with even minimal trauma. The role of Therapeutic exercise and other modalities in treatment and prevention are debatable. <i>The purpose:</i> The purpose of the study was to investigate the effect of APS therapy and exercises program in BMD index, blood calcium, and alkaline phosphate on BMD index. <i>Subjects:</i> Forty-four post-menopausal, female patients were selected and assigned randomly into two groups, Group I (APS Therapy) and Group II (Exercise Therapy). These two main groups were each then sub-divided into 4 sub-groups according to their ages a (50-55), b (55-60), c (60-65) and d (65-70). Group I (APS Therapy Group) Twenty-three patients received doses of 1000 mg of calcium per day and APS Therapy sessions of 16 minutes duration, three times per week for six months. Group II (Exercises Group) Twenty-one patients received the same doses of calcium as Group I and selective therapeutic exercise program of varying intensities. <i>Design</i> pre and post control and experimental study. <i>Method:</i> APS devices delivering a periodic, direct current and pulsed electric field. The pulse waveform was a brief mono-physic square pulse (duration 16 ms) followed by exponential decay to base level. The median of the applied current strength was set to 600 <math>\mu</math>A for all the experiments. <i>Results:</i> in Group I a, the mean value of BMD of Ultra distal before treatment was <math>0.425 \pm 0.069</math> gm/cm<sup>2</sup> and became <math>0.455 \pm 0.063</math> gm/cm<sup>2</sup> with significant of (p&lt;0.00). In Group II a, the BMD mean of Ultra distal before treatment was <math>0.445 \pm 0.079</math> gm/cm<sup>2</sup> and became <math>0.594 \pm 0.078</math> gm/cm<sup>2</sup> with a significant result of (p&lt;0.03). The T-score mean was <math>-2.950 \pm 0.629</math> % and became <math>-2.493 \pm 0.703</math> %, the significant was (p&lt;0.041). In Group I b, the BMD mean of Ultra distal before treatment was <math>0.462 \pm 0.087</math> gm/cm<sup>2</sup> and became <math>0.470 \pm 0.101</math> gm/cm<sup>2</sup> with significant of (p&lt;0.001) and the mean value of T-score before treatment was <math>-2.423 \pm 0.794</math> % and became <math>-2.336 \pm 0.922</math> % and the significant was (p&lt;0.005). <i>Discussion and conclusion:</i> The selective modified exercise program three times per week for six months combined with APS treatment has been shown to have a positive effect on BMD. Physical therapists should educate patients about Osteoporosis and encourage them to follow preventive measures, including adequate calcium and Vitamin D intake, exercise and cessation of smoking.</p>		
Key words	1.	Bone mineralization.
	2.	BMD.
	3.	APS therapy.
	4.	APS therapy.
	5.	Exercise Program.
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**ELECTRONIC GUIDE TO THESES APPROVED BY  
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PREPARED BY NERVEEN ABD EL SALAM ABD EL KADER AHMED**

Author	:	Naglaa Fathi Ewais.
Title	:	Three-dimensional range Of motion analysis of the upper extremity in normal subjects.
Dept.	:	Department of Basic Science.
Supervisors	1.	Mohsen Mohamed EI Sayyad.
	2.	Wadida Hassan Abd EI kadder.
	3.	Amal Ahmed Fawzy.
Degree	:	Doctoral.
Year	:	2005.
Abstract	:	
<p><b>Background:</b> diagnosis and treatment of many orthopedic and neurological disorders could benefit from assessing range of motion of the upper extremities. Only a few studies are published regarding normal range of upper extremities, and most of them are from the western hemisphere. <b>The purposes:</b> this study was conducted to provide normal values of active range of upper extremity of the Egyptian population measured by three dimensional analysis systems and to study the effect of gender and dominance on those values. <b>Subjects:</b> the study was conducted on two groups, their ages ranged from 18 to 22 years. Group (A) included 30 subjects (15 males &amp;15 females), group (B) involved 50U subjects (250 males&amp; 250 females). <b>Design:</b> it was a one shot study; measurements were recorded from one side (dominant side) in group B, while the measurements were taken from both sides (dominant and non-dominant side) in group A. <b>Results:</b> The 3-D angles in male subjects were 144.23°, 54.15°, 148.1°, 72.38° and, 78.31° for shoulder flexion, hyperextension, abduction, int. rotation, and ext. rotation respectively The 3-D angles of elbow flexion, wrist flexion, and wrist extension were 149.02°, 60.7° 2, and 53.76° respectively. In female subjects, the kinematics measurement of the 3-D angles of shoulder flexion, hyperextension, abduction, int. rotation, and ext. rotation were 144.95, 51.1°, 147.07°,74.33°, and 78.19° respectively. For elbow flexion, wrist flexion, and extension were 151.3°, 60.97°, and 53.57°. <b>Conclusion:</b> This study demonstrated excellent intra-rater reliability, and found differences in 3-D motion analysis of upper extremity in males and females. Some differences between dominant and non-dominant were found in females, but no differences found in male's subjects. The introduction of 3-D analysis in standardization of human movement provides a language for clinical evaluation in the practice of physical therapy.</p>		
Key words	1.	ROM.
	2.	upper extremity.
	3.	joint angles.
	4.	three-dimensional analysis of motion.
	5.	Gender.
	6.	race.
Arabic Title Page	:	تحليل ثلاثي الأبعاد لمدى حركة الطرف العلوي للأشخاص الطبيعيين.
<b>Library register number</b>	:	<b>1157-1158.</b>



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

Author	:	Shimaa Nabil Abol Azm.
Title	:	Plantar pressure distribution with different body weights in normal subjects.
Dept.	:	Department of Basic Science.
Supervisors	1.	Soad Mohamed.
	2.	Samy Nasif.
	3.	Amal Fawzy.
Degree	:	Doctoral.
Year	:	2005.
Abstract	:	
<p>Foot is one of the most important weight bearing and shock absorbing structures in the human body during ambulation. The approach to caring for the painful foot is undergoing significant change within the physical therapy community. However, there is gap of knowledge in studying the effect of body weight on plantar pressure distribution. This study was conducted to investigate the effect of increasing body weight on the distribution of plantar pressure in normal subjects. 300 normal subjects (160 females and 140 males) participated in the study with average weight <math>79.25 \pm 5.26</math> kg, average standard weight <math>66.88 \pm 5.8</math> kg, average age <math>21.95 \pm 3.2</math> years and average height <math>172.72 \pm 5.26</math> em. subjects were equally divided into four groups according to body weight. The plantar pressure distribution was measured for every subject under which points four points of each foot during static condition. These points were mid heel, big toe, head of 1<sup>st</sup> metatarsal, and lateral aspect of the foot. Comparison between the four groups were done using ANOVA test. The results revealed significant difference between the four groups while, there was no significant difference at the lateral aspect of the foot. on the level of mid heel there was high significant difference between the four groups. There was significant difference between GI, GII, and GIII, respectively. On the other hand there was no significant difference between GII and GIII. On the level of head of 1<sup>st</sup> metatarsal there was significant difference between the four groups. There was no significant difference between GI and GII, while there was high significant difference between the other groups. There was no significant difference between GI, GII, and GIII respectively. While there was high significant difference between GI, and GIV. Other comparisons were statistically insignificant. On the level of lateral aspect of the foot, there was no significant difference between the four groups. Independent t test was used to compare the pressure distribution between dominant and non-dominant foot, which revealed a significant increase with increasing weight. So, with increasing bodyweight, care should be taken to reduce pressure under specific points of the foot. And the design of footwear should also be changed according to the percentage of overweight.</p>		
Key words	1.	foot.
	2.	plantar pressure.
	3.	body weights.
	4.	biomechanics
	5.	foot ulcers.
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