بسم الله الرحمن الرحيم

شبكة المعلومـــــات الجامعية

التوثيق الالكتروني والميكروفيلم

شبكة المعلومات الجامعية

جامعة عين شمس

التوثيق الالكتروني والميكروفيلم

﴿ قـــسـم ﴾

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها
علي هذه الأفلام قد اعدت دون آية تغيرات

يجب أن

تحفظ هذه الأفلام بعيداً عن الغبار

في درجة حرارة من 15 – 20 مئوية ورطوبة نسبية من 20-40 %

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15 – 25c and relative humidity 20-40 %

بعض الوثائق الأصلية تالفة

بالرسالة صفحات

لم ترد بالأصـــل

EFFICACY OF DIFFERENT PULSE FREQUENCIES OF HIGH VOLTAGE GALVANIC STIMULATION ON THE TORQUE OF THE QUADRICEPS MUSCLE

By

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B. Sc., in Physical Therapy

Thesis

Submitted to Department of Basic Sciences in Partial Fulfillment for the Requirement of Master Degree in Physical Therapy

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Abstract

Background: The pulse frequency selection during electrical stimulation is critical because it determines the peak force output and the rate of fatigue during treatment. However selection of specific pulse frequency generally has been a subjective decision on the part of the investigator and still there is a continuos argument and confliction among therapist about the accurate pulse frequency. The purpose: of this study was to investigate the effective pulse frequency either (20,60,100) pulses per second (PPS) that could be used to increase the torque of the quadriceps muscle and investigated the possible pulse frequency that could produce muscle soreness after 48 hours of stimulation. Subjects: Forty-five healthy male physical therapy students (X age 19.5 years SD=1.96) assigned randomly to equal three groups. Methods: The isometric torque of the non-dominant quadriceps was evaluated at 60 degrees of knee flexion, using Akron rehabilitation system, first before training then at the end of the second, fourth and sixth weeks of training. High voltage was administered three times a week for 6 week at pulse frequencies of 20 PPS for group I, 60 PPS for group II and 100 PPS for group III. The duty cycle of the stimulator was set at 10 seconds on and 10 seconds off. The subjects trained at the maximum tolerable voltage for 15 minutes per session. Muscle soreness was evaluated 48 hours after stimulation using short form of McGill pain questionnaire. ANOVA was done to determine the significance differences in the quadriceps torques. Student-t-test was performed to further distinguish between the effect of the 3 pulse frequencies. Results: The results revealed that high voltage produced significant increase in the quadriceps muscle torque (53%, 59%, and 67.7%) respectively ($P < 0.0001$). But without significance difference among the 3 pulse frequencies ($P > 0.05$). Muscle soreness rating by the 3 groups was not statistically significant. Discussion and Conclusion: The finding revealed that high voltage can improve the strength of normal innervated muscles and 100 PPS having an advantage over the (20 and 60 PPS) in terms of strength gained.

Key Words: High voltage, pulse frequencies, quadriceps.

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Acceptance

I have examined the final copy of this thesis for the form and content and recommended that it will be accepted in partial fulfillment of the requirements for the master degree in physical therapy.

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Dedication

To my parents,

Without their support and love I couldn't complete this work.

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LIST OF ABBREVIATION

ά	Alpha
ATP	Adenosine triphosphate
Ca	Calcium
DNA	Deoxyribonucleic acid
EMS	Electromyostimulation
ES	Electrical stimulation
FES	Functional electrical stimulation
FFR	Force frequency relationship
Hz	Hertz
HFF	High frequency fatigue
HVPC	High voltage pulsed current
LFF	Low frequency fatigue
LVNMS	Low voltage neuromuscular stimulation
mA	millie Amber
MPQ	McGill pain questionnaire
ms	millie second
MTIC	Maximum tolerated isometric contraction
MVC	Maximum voluntary contraction
MVIC	Maximum voluntary isometric contraction
MVIT	Maximum volition isometric torque
N.m	Newton meter
NMES	Neuromuscular electrical stimulation
PD	Pulse Duration
PPI	Present pain intensity
PPS	Pulses per second
QF	Quadriceps femoris
SCI	Spinal cord injury
TENS	Transcutaneous electrical nerve stimulation
VAS	Visual analogue scale

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