

**EFFICACY OF PULSED MAGNETIC FIELD ON BONE  
DENSITY IN JUVENILE RHEUMATOID  
ARTHRITIS**

*A Thesis*

**Submitted in Partial Fulfillment for the Requirements of Doctoral  
Degree in Physical Therapy**

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2009

فاعلية المجال المغناطيسى المتقطع على كثافة العظام فى الروماتويد المفصلى عند الأطفال/ محمد أحمد محمود عيد- المشرفون / أ.د. فاتن حسن عبد العظيم ، أ.د. هالة صلاح الدين محمد طلعت ، د. منال صلاح الدين عبد الوهاب ، د. رقية عبد الشافى سليمان البنا- جامعة القاهرة، كلية العلاج الطبيعى القسم: العلاج الطبيعى لاضطرابات مراحل النمو والتطور وجراحتها عند الأطفال، ٢٠٠٩ . ١٤٧ صفحة فى ترتيبات متعددة.

### المستخلص

يهدف هذا البحث إلى دراسة فاعلية المجال المغناطيسى المتقطع منخفض التردد والشدة على كثافة العظام فى الروماتويد المفصلى عند الأطفال وقد أجرى هذا البحث على ٣٠ مريض تم تقسيمهم عشوائيا إلى مجموعتين متساويتين وهما المجموعة الحاكمة وتضم ١٥ مريض والمجموعة التجريبية وتضم ١٥ مريض أيضاً وشمل البرنامج العلاجى لمرضى المجموعة الحاكمة مجموعة من التمارين العلاجية المختارة وهى (تمارين الإطالة - تمارين التقوية). اما المجموعة التجريبية فقد شمل البرنامج العلاجى نفس مجموعة التمارين المختارة التى خضعت لها المجموعة الحاكمة بالإضافة الى المجال المغناطيسى المتقطع منخفض التردد والشدة على منطقتى اسفل الظهر والحوض. وقد أجريت القياسات لهاتين المجموعتان قبل وبعد الفترة العلاجية والتى امتدت إلى ستة أشهر وقد أثبت التحليل الإحصائي وجود تحسن ذو دلالة إحصائية واضحة لمرضى المجموعتين ولكن ذو دلالة إحصائية عالية فى نتائج المجموعة التجريبية عند مقارنة نتائج ما قبل وبعد العلاج لكل مجموعة.

**الكلمات الدالة :** المجال المغناطيسى - الروماتويد المفصلى عند الأطفال- كثافة العظام.

Efficacy of Pulsed Magnetic Field on Bone Density in Juvenile Rheumatoid Arthritis/ Mohamed Ahmed Mahmoud Eid\*; **Supervisors:** Prof. Dr. Faten Hassan Abd Elaziem\*. - Prof. Dr. Hala Salah El- Din Mohamed Talaat\*\*.- Dr. Manal Salah El-Din Abdel-Wahab\*.- Dr. Rokia Abd El-Shafy Soliman El-Banna\*\*\*, Faculty of Physical Therapy, Cairo University, Doctoral Thesis.

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### **Abstract**

The purpose of this study was to examine the effect of low frequency and low intensity pulsed magnetic field (LFLIPMF) therapy on bone mineral density in children with polyarticular JRA. Thirty children with polyarticular JRA were assigned randomly into two groups of equal number. Each patient of the two groups was evaluated before and after six months of treatment by using dual energy x-ray absorptiometry (DEXA). The evaluation procedure involved measurement of bone mineral density of the femur, lumbar spine, arms and total body. Control group (n = 15) that were treated by the selected physical therapy program (stretching exercises and strengthening exercises in the form of bicycle ergometer and treadmill training) for one hour. Study group (n = 15) that were treated by the same exercise program given to the control group in addition to low frequency and low intensity pulsed magnetic field therapy with a frequency of 33 Hz, intensity of 20G for 30 minutes duration, three sessions were conducted per week (each session lasted one and half hour) for successive six months (24 weeks). **Results:** The collected data was processed and statistically analyzed using paired and unpaired t-test. The results showed a statistically significant improvement in all parameters in both control and study groups but still significant difference were recorded in favor of study group. **Conclusion:** it is possible to conclude that (LFLIPMF) is an effective modality in increasing bone mineral density in juvenile rheumatoid arthritis (JRA).

**Key words: Magnetic Field, Juvenile Rheumatoid Arthritis, Osteoporosis.**

## *Acknowledgment*

First and foremost, thanks *God*, the most gracious, the most Merciful.

I wish to express my sincere gratitude and deep appreciation of *Professor Dr. Faten Hassan Abd-Elaziem* Professor and Chairman of Physical therapy Department for Growth and Development Disorders in Children and its Surgery, Faculty of Physical Therapy, Cairo University. She gave me a great deal of her valuable time and effort for completing this work. Her comments and guidance were very helpful to me.

I am truly grateful to *Dr. Manal Salah El-Din Abdel-Wahab*, Lecturer in the Department of Physical Therapy for Growth and Development Disorders in Children and its Surgery, Faculty of Physical Therapy, Cairo University, For her valuable help, support, advice, guidance and effort throughout this work.

It is a great honor to me to express my most sincere and thanks to *Professor Dr. Hala Salah El-Dein Mohamed Talaat* Professor of Pediatric Medicine, Faculty of Medicine, Cairo University, for her valuable supervision and kind advices throughout the whole work.

I can not find the words to express my special thanks to *Dr. Rokia Abd El-Shafy Soliman El-Banna*, Professor in the Department of Biological Anthropology, National Research Center for her guidance and support from the first step of this study.

I wish to express my gratitude and special thanks also to my professors and Colleagues in Physical therapy Department for pediatrics faculty of physical therapy, Cairo University, for their unlimited help, and support.

*Mohamed Ahmed Mahmoud Eid*

2009

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## **List of Abbreviations**

<b>A</b>	: Ampere
<b>ACR</b>	: American College of Rheumatology
<b>ANA</b>	: Anti Nuclear Antibodies
<b>BAP</b>	: Bone-specific Alkaline Phosphatase
<b>BMC</b>	: Bone Mineral Content
<b>BMD</b>	: Bone Mineral Density
<b>CBC</b>	: Complete Blood Count
<b>CRP</b>	: C- Reactive Protein
<b>CT</b>	: Computed Tomography
<b>DEXA</b>	: Dual Energy X-ray Absorptiometry
<b>DPA</b>	: Dual Photon Absorptiometry
<b>DPD</b>	: Deoxypyridinoline
<b>EF</b>	: Electric Field
<b>ELF</b>	: Extremely Low Frequency
<b>ELFMF</b>	: Extremely Low Frequency Magnetic Field
<b>EMF</b>	: Electromagnetic Field
<b>ESR</b>	: Erythrocyte Sedimentation Rate
<b>F</b>	: Frequency
<b>G</b>	: Gauss

<b>Hgb</b>	: Hemoglobin
<b>Hz</b>	: Hertz
<b>JCA</b>	: Juvenile Chronic Arthritis
<b>JRA</b>	: Juvenile Rheumatoid Arthritis
<b>KV</b>	: Kilo Volt
<b>LFLIPMF</b>	: Low Frequency and Low Intensity Pulsed Magnetic Field.
<b>Lymph</b>	: Lymphocytes
<b>mA</b>	: Milli Ampere
<b>MF</b>	: Magnetic Field
<b>mG</b>	: Milli gauss
<b>MD</b>	: Mean Difference
<b>MRI</b>	: Magnetic Resonance Imaging
<b>NS</b>	: Non Significant
<b>NSAID</b>	: Non-Steroidal Anti-Inflammatory Drugs
<b>PEMF</b>	: Pulsed Electromagnetic Field
<b>PMF</b>	: Pulsed Magnetic Field
<b>PGE2</b>	: Prostaglandin
<b>PROM</b>	: Passive Range of Motion
<b>P value</b>	: Probability value
<b>RA</b>	: Rheumatoid Arthritis



<b>RF</b>	: Rheumatoid Factor
<b>ROM</b>	: Range Of Motion
<b>SEF</b>	: Static Electric Field
<b>SD</b>	: Standard Deviation
<b>SMF</b>	: Static Magnetic Field
<b>SPA</b>	: Single Photon Absorptiometry
<b>T</b>	: Tesla
<b>TENS</b>	: Transcutaneous Electrical Nerve Stimulation
<b>VAS</b>	: Visual Analogue Scale
<b>WHO</b>	: World health organization

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