

Peer-Reviewed Scientific

Alzheimer's Disease

After applying external electromagnetic fields ranging 5 to 8 Hz, significant improvements were detected in Alzheimer's patients. These included improved visual memory, drawing ability, performance, spatial orientation, mood, short-term memory and social interactions.

R. Sandyk, "Alzheimer's Disease: Improvement of Visual Memory and Visuoconstructive Performance Treatment with Picotesla Range Magnetic Fields," *International Journal of Neurosci*, 76(3-4), June 1994, p. 185-225.

R. Sandyk, et al., "Age-related Disruption of Circadian Rhythms: Possible Relationship to Memory Impairment and Implications for Therapy with Magnetic Fields," *International Journal of Neurosci*, 59(4), August 1991, p. 259-262.

Ankle Sprain

Double blind, placebo-controlled study indicated that treatment with two 30-minute sessions of non-invasive pulsed radio frequency therapy is effective in significantly decreasing the time required for edema reduction in patients with lateral ankle sprains.

A.A. Pilla & L. Kloth, "Effect of Pulsed Radio Frequency Therapy on Edema in Ankle Sprains: A Multisite Double-Blind Clinical Study," *Second World Congress for Electricity and Magnetism in Biology and Medicine*, 8-13 June 1997, Bologna, Italy, p. 300.

Arthritis

This study revealed that experimentally induced inflammation and suppressed arthritis in rats was significantly inhibited as a result.

Y. Mizushima, et al., "Effects of Magnetic Field on Inflammation," *Experientia*, 31(12), December 15, 1975, p.1411-1412.

Double blind, placebo-controlled research study on the effects of pulsed electrical fields over a 4-week period showed significant improvement in patients.

J.C. Reynolds, "The Use of Implantable Direct Current Stimulation in Bone Grafted Foot and Ankle Arthrodeses: A Retrospective Review," *Second World Congress for Electricity and Magnetism in Biology and Medicine*, 8-13 June 1997, Bologna, Italy.

Review article on the treatment of patients with psoriatic arthritis with magnetic fields, the authors state that an alternating low-frequency magnetic field improves the clinical state of afflicted joints.

V.D. Grigor'eva, et al., "Therapeutic Use of Physical Factors in Complex Therapy of Patients with Psoriatic Arthritis," *Vopr Kurortol Fizioter Lech Fiz Kult*, (6), 1995, p. 48-51

Study on juveniles suffering from rheumatoid arthritis examined effects of low-frequency magnetic fields. The three groups showed 58%, 76%, 37% percent beneficial effects from the treatment.

E.A. Shlyapok, et al., "Use of Alternating Low-Frequency Magnetic Fields in Combination with Radon Baths for Treatment of Juvenile Rheumatoid Arthritis," *Vopr Kurortol Fizioter Lech Fiz Kult*, 4, 1992, p. 13-17.

Low frequency magnetic fields in patients suffering from rheumatoid arthritis and osteoarthritis was the focus of this study. Patients with stages 1 & 2 rheumatoid arthritis as well as patients with osteoarthritis deformans, showed the beneficial effects from treatments..

V.D. Grigor'eva, et al., "Therapeutic Application of Low-Frequency and Constant Magnetic Fields in Patients with Osteoarthritis Deformans and Rheumatoid Arthritis," *Vopr Kurortol Fizioter Lech Fiz Kult*, 4, 1980, p. 29-35.

Bone Fractures

A group of 83 adults with un-united fractures were examined for the effects of bone grafting and pulsed electromagnetic fields for this study. Results showed a successful healing rate of 87% in the original 38 patients treated with bone grafts and PEMF for un-united fractures with wide gaps,

malalignment, and synovial pseudarthrosis. Of the 45 patients that were not successfully treated with PEMF and had bone grafting, when re-treated with pulsing electromagnetic fields, achieved a 93% success rate.

C.A. Bassett, et al., "Treatment of Therapeutically Resistant Non-unions with Bone Grafts and Pulsing Electromagnetic Fields," Journal of Bone Joint Surg, 64(8), October 1982, p. 1214-1220.

Examining the effects of pulsing electromagnetic fields on 125 patients suffering from un-united fractures of the tibial diaphysis, showed a healing success rate of 87%.

C.A. Bassett, et al., "Treatment of Un-united Tibial Diaphyseal Fractures with Pulsing Electromagnetic Fields," Journal of Bone Joint Surg, 63(4), April 1981, p. 511-523.

This review article makes the following observations with respect to the use of pulsed electromagnetic fields in treating un-united fractures, failed arthrodeses, and congenital pseudarthroses. The treatment has been shown to be more than 90 % effective in adult patients.

C.A. Bassett, "The Development and Application of Pulsed Electromagnetic Fields (PEMFs) for Un-united Fractures and Arthrodeses," Clin Plast Surg, 12(2), April 1985, p. 259-277.

This double blind, placebo-controlled study examined the effects of pulsed electromagnetic fields in femoral neck fracture patients undergoing conventional therapy. Results showed beneficial effects relative to controls after 18 months of follow-up.

E. Betti, et al., "Effect of Electromagnetic Field Stimulation on Fractures of the Femoral Neck. A Prospective Randomized Double-Blind Study," Second World Congress for Electricity and Magnetism in Biology and Medicine, 8-13 June 1997, Bologna, Italy.

Results of this double-blind study showed significant healing effects of low frequency pulsing electromagnetic fields in patients treated with femoral intertrochanteric osteotomy for hip degenerative arthritis.

G. Borsalino, et al., "Electrical Stimulation of Human Femoral Intertrochanteric Osteotomies. Double-Blind Study," Clin Orthop, (237), December 1988, . 256- 263.

In this study, 147 patients with fractures of the tibia, femur, and humerus who had failed to benefit from surgery-received treatment with external skeletal fixation in situ and pulsed electromagnetic fields. Results indicated an overall success rate of 73 percent. Femur union was seen in 81 percent and tibia union in 75 percent.

M. Marcer, et al., "Results of Pulsed Electromagnetic Fields (PEMFs) in Un-united Fractures after External Skeletal Fixation," Clin Orthop, (190), November 1984, 260-265

This study examined the effects of extremely low frequency electromagnetic fields (1-1000 Hz, 4 gauss) on new bone fractures of female patients. Results led the authors to suggest that EMF treatment accelerates the early stages of fracture healing.

O. Wahlstrom, "Stimulation of Fracture Healing with Electromagnetic Fields of Extremely Low Frequency (EMF of ELF)," Clin Orthop, (186), June 1984, . 293- 301.

This article discusses the cases of two children with bone malunion following lengthening of congenitally shortened lower legs. Pulsed sinusoidal magnetic field treatment was beneficial for both patients.

F. Rajewski & W. Marciniak, "Use of Magneto therapy for Treatment of Bone Malunion in Limb Lengthening. Preliminary Report," Chir Narzadow Ruchu Ortop Pol, 57(1-3), 1992,. 247-249.

Results of this study found treatment induced pulsing to be beneficial in patients suffering from nonunions unresponsive to surgery.

J.C. Mulier & F. Spaas, "Out-patient Treatment of Surgically Resistant Nonunions Induced Pulsing Current - Clinical Results," Arch Orthop Trauma Surg, 97(4), 1980,.293-297.

This review article notes that the use of pulsed electromagnetic fields began in 1974, and that 250,000 nonunion patients have received the treatment since. The author argues that success rates are comparable to those of bone grafting, and that PEMF treatment is more cost-effective and

free of side effects. The FDA approved PEMF use in 1982, although it remains widely unused due to physician misunderstanding and lack of knowledge concerning the treatment.

A. Bassett, "Therapeutic Uses of Electric and Magnetic Fields in Orthopedics," in D.O. Carpenter & S. Ayrapetyan, (eds.), *Biological Effects of Electric and Magnetic Fields. Volume II: beneficial and Harmful Effects*, San Diego: Academic Press, 1994, . 13-48.

This 7-year study examined data on more than 11,000 cases of non-unions treated with pulsed electromagnetic fields. Results indicated an overall success rate of 75 percent.

A.A. Goldberg, "Computer Analysis of Data on More than 11,000 Cases of Un-united Fracture Submitted for Treatment with Pulsing Electromagnetic Fields," *Bioelectrical Repair and Growth Society, Second Annual Meeting, 20-22 September 1982, Oxford, UK*, . 61.

This study examined the effects of constant magnetic fields in patients with fractures. Results showed that magnetic exposure reduced pain and the onset of edema shortly after trauma.

G.B. Gromak & G.A. Lacis, "Evaluations of the Efficacy of Using a Constant Magnetic Field in Treatment of Patients with Traumas," in I. Detlav, (ed.), *Electromagnetic Therapy of Injuries and Diseases of the Support-Motor Apparatus. International Collection of Papers, Riga, Latvia: Riga Medical Institute, 1987*, . 88-95.

This review article looks at the history of pulsed electromagnetic fields as a means of bone repair. The author argues that success rates have been either superior or equivalent to those of surgery, with PEMF free of side effects and risk.

C.A.L. Bassett, "Historical Overview of PEM-Assisted Bone and Tissue Healing," *Bioelectromagnetics Society, 10th Annual Meeting, 19-24 June 1988, Stamford, CT*, . 19.

Cancer

This study examined the effects of a rotational magnetic field on a group of 51 breast cancer patients. Results showed a significant positive response in 27 of them.

N.G. Bakhmutskiy, et al., "The Assessment of the Efficacy of the Effect of a Rotational Magnetic Field on the Course of the Tumor Process in Patients with Generalized Breast Cancer," *Sov Med*, (7), 1991, . 25-27.

Results of this study proved that the combination of weak pulsed electromagnetic fields with antioxidant supplementation is beneficial in the treatment of patients suffering from tongue cancer, improving speech, pain control, and tolerance to chemotherapy.

U. Randoll & R.M. Pangan, "The Role of Complex Biophysical-Chemical Therapies for Cancer," *Bioelectrochem Bioenerg*, 27(3), 1992, . 341-346.

Results of this Russian study indicated that the use of whole body eddy magnetic fields, coupled with more conventional cancer therapies is effective in the treatment of patients suffering from a variety of different malignancies.

V. Smirnova, "Anti-Tumorigenic Action of an Eddy Magnetic Field," *Vrach*, 2, 1994, . 25-26

This study examined the effects of whole body magnetic fields (16.5-35 G, 50- 165 Hz) on patients suffering from different forms of cancer. Treatment consisted of 15 cycles, each 1-20 minutes in duration, and was coupled with more traditional cancer therapies. Results showed overall beneficial effects, particularly with respect to improved immune status and postoperative recovery.

V.A. Lubennikov, et al., "First Experience in Using a Whole-Body Magnetic Field Exposure in Treating Cancer Patients," *Vopr Onkol*, 41(2), 1995, . 140-141.

Heart Disease

Results of this study found that the addition of magneto therapy to the treatment of patients suffering from ischemic heart disease and osteochondrosis led to clinical improvements.

I. Rodin, et al., "Use of Low-Intensity Eddy Magnetic Field in the Treatment of Patients with Skin Lymphomas," *Voen Med Zh*, 317(12), 1996, . 32-34. 12

Results of this study involving 23 parasystolic children found that low-frequency magnetic field exposure improved humoral and cellular processes involved in the regulation of cardiac rhythm.

M.A. Dudchenko, et al., "The Effect of Combined Treatment with the Use of Magnetotherapy on the Systemic Hemodynamics of Patients with Ischemic Heart Disease and Spinal Osteochondrosis," Lik Sprava, (5), May 1992, . 40-43.

Results of this study showed exposure to low-frequency alternating magnetic fields had beneficial effects in children with primary arterial hypertension, as seen in the attenuation of sympathetic and vagotonic symptoms.

Y.B. Kirillov, et al., "Magneto therapy in Obliterating Vascular Diseases of the Lower Extremities," Vopr Kurortol Fizioter Lech Fiz Kult, (3), May-June 1992, 14-17.

In this article, the authors propose a new approach to treating atherosclerosis through the alteration of biophysical properties both intracellular and extra cellular. Citing their own preliminary data, they suggest atherosclerotic lesions might be selectively resolved without harming normal blood vessels allowing the lesions to take up the magnetically excitable submicron particles and then applying an external alternating electromagnetic field.

R.T. Gordon & D. Gordon, "Selective Resolution of Plaques and Treatment of Atherosclerosis Biophysical Alteration of "Cellular" and "Intracellular" Properties," Medical Hypotheses, 7(2), February 1981, . 217-229.

This study examined the efficacy of the reinfusion of autologous blood following magnetic field exposure in hypertensive patients. Positive effects were found in 92 percent of patients receiving the treatment.

I.G. Alizade, et al., "Magnetic Treatment of Autologous Blood in the Combined Therapy of Hypertensive Patients," Vopr Kurortol Fizioter Lech Fiz Kult, (1), 1994, . 32-33

This controlled study examined the effects of magneto therapy in patients suffering from neurocirculatory hypotension (low blood pressure) or hypertension (high blood pressure). Treatment consisted of a running pulsed magnetic field generated an "ALIMP" device (0.5 mT, 300 Hz) administered for 20 minutes per day over a course of 10 days. Patients suffering from hypotension did not benefit significantly from the magneto therapy. Hypertension patients, however, showed a marked improvement with respect to symptoms including headache, chest pain, extremity numbness, abnormal systolic and diastolic blood pressure, and work capacity.

L.L. Orlov, et al., "Effect of a Running Pulse Magnetic Field on Some Humoral Indices and Physical Capacity in Patients with Neurocirculatory Hypo- and Hypertension," Biofizika, 41(4), 1996, . 944-948.

This double-blind, placebo-controlled study found that low-frequency, low intensity electrostatic fields (40-62 Hz) administered for 12-14 minutes per day helped normalize blood pressure in patients suffering from hypertension.

T.A. Kniazeva, "The Efficacy of Low-Intensity Exposures in Hypertension," Vopr Kurortol Fizioter Lech Fiz Kult, 1, 1994, . 8-9.

This study examined the effects of low-frequency alternating magnetic fields in patients suffering from arteriosclerosis or osteoarthritis deformans. Treatment involved 10-15 minute daily leg exposures over a total of 15 days. Results showed the treatment to be effective in 80 percent of arteriosclerosis patients and 70 percent of those with osteoarthritis formans.

A.G. Kakulia, "The Use of Sonic Band Magnetic Fields in Various Diseases," Vopr Kurortol Fizioter Lech Fiz Kult, 3, 1982, . 18-21.

This study examined the effects of low-frequency magnetic fields (25 mT) in patients suffering atherosclerotic encephalopathy. Treatment involved 10-15 minute daily exposures over a total of 10-15 applications. Results showed clinical improvements with respect to chest pain, vertigo, headache, and other symptoms.

S.S. Gabrielian, et al., "Use of Low-Frequency Magnetic Fields in the Treatment of Patients with Atherosclerotic Encephalopathy," Vopr Kurortol Fizioter Lech Fiz Kult, 3, 1987, . 36-39.

Chronic Venous Insufficiency

This study examined effects of alternating magnetic fields (15-20 minutes per day over a period of 20 days) in patients suffering from chronic venous insufficiency, varicose veins, and trophic shin ulcers. Results showed good effects in 236 of the 271 patients receiving the treatment. Thirty-four patients reported satisfactory effects. Only one patient experienced no effects.

E.I. Pasyukov, et al., "Therapeutic Use of Alternating Magnetic Field in the Treatment of Patients with Chronic Diseases of the Veins of the Lower Limbs," Vopr Kurortol Fizioter Lech Fiz Kult, 5, 1976, . 16-19.

This study examined the effects of running impulse magnetic fields in patients suffering from vessel obliteration diseases of the legs. Treatment consisted of 15- 20 whole body exposures (0.5-5 mT, 1-2 Hz) lasting 15-20 minutes each. Results showed treatment led to a significant reduction in the number of patients experiencing leg pain while at rest. Among patients previously unable to walk a 500-m distance, 52 percent were able to complete the distance following treatment. Circulation improved in 75-82 percent of patients.

Y.B. Kirillov, et al., "Magnetotherapy for Obliterative Disease of the Vessels of the Legs," Vopr Kurortol Fizioter Lech Fiz Kult, 3, 1992, .. 14-17.

This study found that patients suffering from various oral diseases experienced more rapid healing when treated with both conventional therapies and 30 minutes per day of pulsed electromagnetic fields (5 mT, 30 Hz), as opposed to conventional therapies alone.

V. Hillier-Kolarov & N. Pekaric-Nadj, "PEMF Therapy as an Additional Therapy for Oral diseases,"European Bioelectromagnetics Association, 1st Congress, 23-25 January 1992, Brussels, Belgium.

Depression

This review article examined the literature concerning the use of transcranial magnetic stimulation in the treatment of depression. Results showed the high frequency, repetitive transcranial magnetic stimulation treatment to be an effective, side effect free therapy for depression that may hold promise for treating related psychiatric disorders as well.

M.T. Kirkcaldie, et al., Transcranial Magnetic Stimulation as Therapy for Depression and Other Disorders," Aust N Z J Psychiatry, 31(2), April 1997, . 264- 272.

This review article notes that transcranial magnetic stimulation has been shown to elicit antidepressant effects, electrically stimulating deep regions of the brain.

C. Haag, et al., "Transcranial Magnetic Stimulation. A Diagnostic Means from Neurology as Therapy in Psychiatry?" Nervenarzt, 68(3), March 1997, . 274-278.

In this theoretical paper, the author argues that deep, low-rate transcranial magnetic stimulation can produce therapeutic effects equivalent to those of electro convulsive therapy but without the dangerous side effects.

T. Zyss, "Will Electro convulsive Therapy Induce Seizures: Magnetic Brain Stimulation as Hypothesis of a New Psychiatric Therapy," Psychiatry Pol, 26(6), November-December 1992, . 531-541.

Diabetes

In this study, 320 diabetics received pulsed magnetic field treatment while 100 diabetics (controls) received conservative therapy alone. Results showed beneficial effects with respect to vascular complications in 74 % of the patients receiving magneto therapy combined with conservative methods, compared to a 28-percent effectiveness rate among controls.

I.B. Kirillovm, et al., "Magneto therapy in the Comprehensive Treatment of Vascular Complications of Diabetes Mellitus," Klin Med, 74(5), 1996, . 39-41.

This study involving 72 diabetics with purulent wounds found that magnetic fields aided healing significantly.

R.A. Kuliev & R.F. Babaev, "A Magnetic Field in the Combined Treatment of Suppurative Wounds in Diabetes Mellitus," Vestn Khir Im I I Grek, 148(1), January 1992, . 33-36.

Diseases of the Larynx

Results of this study found that alternative magnetic field of sound frequency proved to be an effective treatment in patients suffering from acute inflammatory diseases of the larynx.

D.I. Tarasov, et al., "Effectiveness of Local Magnetic Field of the Acoustic Frequency in the Treatment of Patients with Acute Inflammatory Diseases of the Larynx," Vestn Otorinolaringol, (6), November-December 1995, . 11-15.

Endometritis

Results of this study found that the administration of constant magnetic field in combination with other treatment modalities led to significant beneficial effects in patients suffering from acute endometritis following abortion.

V.M. Strugatskii, et al., "A Permanent Magnetic Field in the Combined Treatment of Acute Endometritis After an Artificial Abortion," Vopr Kurortol Fizioter Lech Fiz Kult, (6), November-December 1996, . 21-24.

Epilepsy

This article reports on the cases of three patients with partial seizures who received treatment with external artificial magnetic fields of low intensity. Such treatment led to a significant attenuation of seizure frequency over a 10-14- month period.

P.A. Anninos, et al., "Magnetic Stimulation in the Treatment of Partial Seizures," International Journal of Neurosci, 60(3-4), October 1991, . 141-171.

Experimental results indicated that the administration of modulated electromagnetic fields of 2-30 Hz suppressed epilepsy in rats.

G.D. Antimonii & R.A. Salamov, "Action of a Modulated Electromagnetic Field on Experimentally Induced Epileptiform Brain Activity in Rats," Biull Eksp Biol Med, 89(2), February 1980, .

This review article cites one study in particular in which results showed that pretreatment with 30 minutes of exposure to a 75-mT-pole strength, DC-powered magnetic field significantly prevented experimentally induced seizures in mice.

M.J. McLean, et al., "Therapeutic Efficacy of a Static Magnetic Device in Three Animal Seizure Models: Summary of Experience," Second World Congress for Electricity and Magnetism in Biology and Medicine, 8-13 June 1997, Bologna, Italy.

This article reports on the case of a severe epileptic who experienced a significant lessening of behavior disturbances and seizure frequency following treatment with low frequency, external artificial magnetic fields.

R. Sandyk & P.A. Anninos, "Magnetic Fields Alter the Circadian Periodicity of Seizures," International Journal of Neurosci, 63(3-4), April 1992, . 265-274.

Low frequency, external artificial magnetic field treatment was shown to significantly reduce seizures in four adult epileptic cases.

R. Sandyk & P.A. Anninos, "Attenuation of Epilepsy with Application of External Magnetic Fields: A Case Report," International Journal of Neurosci, 66(1-2), September 1992, . 75-85.

Gastroduodenitis

This controlled study examined the effects of sinusoidally modulated currents (100 Hz) coupled with conventional therapy in children suffering from chronic gastroduodenitis. Children received 8-10 exposures lasting between 6 and 10 minutes. Results showed that the treatment reduced inflammation in 72 percent of patients relative to just a 45-percent rate among controls. About 77 percent of treatment patients experienced elimination of gastro-esophageal and duodenogastral refluxes, compared to 29 percent of controls.

O.V. Bukanovich, et al., "Sinusoidally-Modulated Currents in the Therapy of Chronic Gastroduodenitis in Children," Vopr Kurortol Fizioter Lech Fiz Kult, 2, 1996, . 22-26.

This article reviews the use of magneto therapy in Czechoslovakia. Noting that this modality has been used for more than a decade, the author states that magneto therapy has been shown to be effective in treating **rheumatic diseases, sinusitis, enuresis, and ischemic disorders of the**

findings have also been shown with respect to **multiple sclerosis and degenerative diseases of the retina.**

J. Jerabek, "Pulsed Magneto therapy in Czechoslovakia--A Review," Rev Environ Health, 10(2), April-June 1994, . 127-134.

This review article claims that over a quarter of a million patients worldwide with chronically ununited fractures have experienced beneficial results from treatment with pulsed electromagnetic fields. In addition, the author cites studies pointing to the treatment's efficacy with respect to other conditions such as nerve regeneration; wound healing, graft behavior, diabetes, heart attack, and stroke.

C.A. Bassett, "Beneficial Effects of Electromagnetic Fields," Journal of Cell Biochem, 51(4), April 1993, p. 387-393.

This review article notes that low-intensity millimeter waves have been used for treating a wide variety of medical conditions in the former Soviet Union since 1977, with more than a million patients treated and more than a thousand treatment centers in existence. This therapy has been approved for widespread use the Russian Ministry of Health, and over 300 scientific publications have described its effects. A typical course of treatment involves 10-15 daily exposures ranging from 15 to 60 minutes each.

A.G. Pakhomov, "Millimeter Wave Medicine in Russia: A Review of Literature," Infrared Lasers and Millimeter Waves Workshop: The Links Between Microwaves and Laser Optics, January 21-22, 1997, Brooks Air Force Base, Texas.

This review article notes that low-frequency electromagnetic therapy has been used for a variety of purposes. Those specifically identified the author include **cell growth promotion, pain reduction, improved blood circulation, bone repair, increased wound healing, sedative effects, enhanced sleep, and arthritic relief.**

R.A. Drolet, "Rhumart Therapy: A Non-invasive Cell Regeneration Ion and Anti- Inflammatory Therapy Using LF-EM Fields," Bioelectromagnetics Society, 4th Annual Meeting, 28 June-2 July 1982, Los Angeles, CA, p. 45.

This review article notes that treatment with an "Infita" apparatus, used to deliver low-frequency magnetic fields, has been shown to **improve general hemodynamics and microcirculation in addition to exhibiting anti-inflammatory, sedative, and analgesic effects in Olympic-level Russian athletes.**

A. Zaslavskii, et al., "A Low-frequency Impulse Apparatus for Physical Therapy'Infita'," Med Tehk, 5, 1994, p. 39-41.

This review article cites studies pointing to the efficacy of low-frequency magnetic fields in the treatment of a wide variety of conditions, including **burns, arthritis, fractures, arterial aneurysms, PMS, phantom pain, tuberculosis, ischemic heart disease, hypertension, bronchial asthma, and ulcerated varicose veins, among others.**

V.M. Bogoliubov & L.A. Skurikhina, "Therapeutic Application of Constant and Low-Frequency Magnetic Fields," Vopr Kurortol Fizioter Lech Fiz Kult, (2), 1979, p. 65-72.

This study examined the effects of extremely low frequency magnetic fields in the treatment of a group of 650 patients suffering from a host of various diseases. Treatment consisted 15-25 minute daily exposures 5 days per week over a total of 20-25 days. Most patients experienced improvements after 2-3 exposures. Marked improvements were seen with respect to **analgesic, anti-inflammatory, anti-tumor, and immune-enhancing effects.**

V.I. Kovalchuk, et al., "Use of Extremely-Low-Frequency Magnetic Fields in Clinical Practice," Fizicheskaia Meditizina, 4(1-2), 1994, p. 87

This review article on the use of pulsed magneto therapy in Czechoslovakia points to its efficacy across a variety of conditions, **including joint problems, enuresis, multiple sclerosis, diabetes, and carpal tunnel syndrome.**

J. Jerabek, "Pulsed Magneto therapy in Czechoslovakia: A Review," *First World Congress for Electricity and Magnetism in Biology and Medicine*, 14-19 June 1992, Lake Buena Vista, FL, p. 81.

Headache

Results of this double-blind, placebo-controlled study demonstrated that the administration of a pulsed magnetic field for less than one hour to headache patients produced significant beneficial effects, as shown subjective patient reports, as well as EEG activity.

O. Grunner, et al., "Cerebral Use of a Pulsating Magnetic Field in Neuropsychiatry Patients with Long-term Headache," *EEG EMG Z Elektroenzephalogr Verwandte Geb*, 16(4), December 1985, p. 227-230

This article reports on the case of an acute migraine patient who was successfully treated with external magnetic fields.

R. Sandyk, "The Influence of the Pineal Gland on Migraine and Cluster Headaches and Effects of Treatment with picoTesla Magnetic Fields," *International Journal of Neurosci*, 67(1-4), November-December 1992, p. 145-171.

This study examined the effects of pulsed electromagnetic fields (20 minutes per day for 15 days) in the treatment of patients suffering from chronic headaches. Results indicated the treatment to be most effective in patients suffering from tension headaches, with 88 percent of such patients reporting positive results. Beneficial results were also experienced patients suffering from migraines (60 percent), cervical migraines (68 %), and psychogenic headaches (60 %).

A. Prusinski, et al., "Pulsating Electromagnetic Field in the Therapy of Headache," *Hungarian Symposium on Magneto therapy, 2nd Symposium, May 16-17, 1987, Szekesfehervar, Hungary*, p. 163-166.

Results of this study indicated that pulsating electromagnetic fields (12 Hz and 5 mT) were an effective prophylactic treatment for patients suffering from cervical and migraine headaches.

J. Giczi & A. Guseo, "Treatment of Headache Pulsating Electromagnetic Field a Preliminary Report," *Hungarian Symposium on Magneto therapy, 2nd Symposium, May 16-17, 1987, Szekesfehervar, Hungary*, p. 74-76.

This placebo-controlled, double blind study examined the effects of pulsed electromagnetic fields (2-5 Hz and flux densities of 3-4 mT) on patients suffering from migraine headaches. PEMFs were administered to the head for 10-15 minutes per day over a period of 30 days. Results showed a mean improvement level of 66 percent in patients receiving the treatment, compared to just 23 percent among controls.

L. Lazar & A. Farago, "Experiences of Patients Suffering from Migraine-Type Headache Treated with Magneto therapy," *Hungarian Symposium on Magneto therapy, 2nd Symposium, May 16-17, 1987, Szekesfehervar, Hungary*, p. 137-140.

Hepatitis

Results of this study showed that the use of magnetic fields was effective in treating patients suffering from viral hepatitis who had previously not benefited from conventional drug therapies.

I.A. Il'inskii, et al., "Experience with the Use of Glucocorticosteroids and Magnetic Fields in the Intensive Therapy of Severe Forms of Viral Hepatitis," *Soviet Medicine*, 9, 1978, p. 72-74.

This study examined the effects of magneto therapy in children suffering from various forms of viral hepatitis. Magneto therapy consisted of alternating magnetic fields applied to the liver area daily over a total of 10-15 days. Results indicated magneto therapy led to more rapid and trouble free recovery.

V.V. Krasnov & A.I. Shilenok, "Magnetotherapy of Hepatitis A and B in Children," *Pediatrics*, 10, 1991, p. 54-57.

Herniated Disk

This double blind, placebo-controlled study examined the effects of magneto therapy in patients following herniated disk surgery. Results showed that 52 percent of patients receiving the treatment compared to 30 percent of controls reported being free of symptoms at the time of hospital release.

K. Perjes, et al., "Effect of Magneto therapy on Recovery After Herniated Disk Surgery," *Hungarian Symposium on Magneto therapy, 2nd Symposium, May 16-17, 1987, Szekesfehervar, Hungary*, p. 159-162.

Hip Problems

This double-blind study examined the effects of pulsed electromagnetic fields on loosened hip prostheses. Results showed an increase of bone density in all patients receiving PEMF treatment compared to only 60 percent of controls. The authors argue such findings suggest PEMF elicits early bone reconstruction, which enhances early weight bearing.

G. Gualtieri, et al., "The Effect Pulsed Electromagnetic Field Stimulation on Patients Treated of Hip Revisions with Trans-Femoral Approach," *Second World Congress for Electricity and Magnetism in Biology and Medicine, 8-13 June 1997, Bologna, Italy*.

This study examined the effects of pulsed electromagnetic fields (50 Hz, 50 G) in treating aseptic loosening of total hip prostheses. PEMF therapy consisted of 20 minutes per day for 6 days per week over a total of 20 such sessions and was begun, on average, a year and a half following the start of loosening. Results showed PEMF to have some beneficial effects with respect to loosened hip arthroplasties, although it was not effective in patients suffering severe pain due to extreme loosening.

K. Konrad, "Therapy with Pulsed Electromagnetic Fields in Aseptic Loosening of Total Hip Prostheses: A Prospective Study," *Clinical Rheumatology*, 15(4), 1996, p. 325-328.

Joint Disease

Results of this 11-year study involving 3014 patients found pulsed magnetic field treatment at low frequencies and intensities to be a highly effective, side effect free therapy for joint disease.

E. Riva Sanseverino, et al., "Therapeutic Effects of Pulsed Magnetic Fields on Joint Diseases," *Panminerva Med*, 34(4), October-December 1992, p.187-196.

Kidney Problems

This review article notes that placebo-controlled studies have shown positive results concerning the use of pulsed magnetic field therapy in the treatment of secondary chronic pyelonephritis.

V.A. Kiyatkin, "Pulsed Magnetic Field in Therapy of Patients with Secondary Chronic Pyelonephritis," *Second World Congress for Electricity and Magnetism in Biology and Medicine, 8-13 June 1997, Bologna, Italy*.

Lung Disease

This study examined the effects of low-frequency magnetic fields coupled with conventional therapies in rats suffering from inflammatory lung disease. Results showed that rats receiving the magnetic fields experienced significant reductions in lung abscesses and associated symptoms, and similar beneficial effects were seen among a group of 165 human patients receiving comparable treatment.

L.V. Iashchenko, "Low-Frequency Magnetic Fields in the Combined Therapy of Inflammatory Lung Diseases," *Probl Tuberk*, 3, 1988, p. 53-56.

Lupus Erythematosus

This review article examined the data concerning pulsed magnetic fields in the treatment of lupus erythematosus. Studies indicate that the treatment can be beneficial due to its anti-inflammatory and analgesic effects, its positive action on microcirculation, and immunological reactivity.

I.V. Khamaganova, et al., "The Use of a Pulsed Magnetic Field in the Treatment of Lupus Erythematosus," *Ter Arkh*, 67(10), 1995, p. 84-87.

Results of this study indicated that the bitemporal application of ultrahigh frequency electromagnetic fields to the hypothalamo-hypophyseal area daily over a period of 18-20 days had beneficial effects in patients suffering from systemic lupus erythematosus.

V.D. Sidorov, et al., "The Immunomodulating Effect of Microwaves and of an Ultrahigh-Frequency Electrical Field in Patients with Systemic Lupus Erythematosus," *Vopr Kurortol Fizioter Lech Fiz Kult*, (4), 1991, p. 36-40.

Multiple Sclerosis

This article reports on the case of a 55-year-old female chronic progressive multiple sclerosis patient who received a single external application of low magnetic fields (7.5-picotesla; 5-Hz frequency), which lasted 20 minutes. The treatment quickly led to improvements in a variety of areas, including fatigue, sleep, vision, bladder function, movement and speech problems, and mood.

R. Sandyk, "Rapid Normalization of Visual Evoked Potentials picoTesla Range Magnetic Fields in Chronic Progressive Multiple Sclerosis," *International Journal of Neurosci*, 77(3-4), August 1994, p. 243-259.

This study reports on four cases of multiple sclerosis that experienced improvements in visuospatial and visuomotor functions following treatment with external application of low magnetic fields.

R. Sandyk, "Further Observations on the Effects of External picoTesla Range Magnetic Fields on Visual Memory and Visuospatial Functions in Multiple Sclerosis," *International Journal of Neurosci*, 77(3-4), August 1994, 203-27

This article reports on the case of a 50-year-old female chronic progressive multiple sclerosis patient who received a single external application of low magnetic fields who experienced significant improvements following the treatment.

R. Sandyk, "Successful Treatment of Multiple Sclerosis with Magnetic Fields," *International Journal Neurosci*, 66(3-4), October 1992, p. 237-250.

This article reports on the cases of three patients suffering from long-time symptoms of multiple sclerosis who received treatment with extra cerebral pulsed electromagnetic fields over a period of between 6 and 18 months. Results showed all three patients experienced significant improvements in cognitive functions.

R. Sandyk, "Progressive Cognitive Improvement in Multiple Sclerosis from Treatment with Electromagnetic Fields," *International Journal of Neurosci*, 89(1- January 1997, p. 39-51.

This is a report on the cases of two chronic multiple sclerosis patients exhibiting severe speech problems. Symptoms were completely resolved following 3-4 weeks of treatment with pulsed electromagnetic fields.

R. Sandyk, "Resolution of Dysarthria in Multiple Sclerosis Treatment with Weak Electromagnetic Fields," *International Journal of Neurosci*, 83(1-2), November 1995, p. 81-92.

The cases of three female multiple sclerosis patients exhibiting suicidal behavior are discussed in this article. Treatment with pulsed pico tesla-level electromagnetic fields resolved the suicidal behavior in all three patients, an improvement that was maintained over a follow-up period of 3.5 years.

R. Sandyk, "Suicidal Behavior is Attenuated in Patients with Multiple Sclerosis Treatment with Electromagnetic Fields," *International Journal of Neurosci*, 87(1- 2), October 1996, p. 5-15.

This article reports on the cases of two multiple sclerosis patients suffering from chronic ataxia who performed poorly on human figure drawing tests administered to measure body image perception. Treatment with extra cerebral applications of picotesla flux electromagnetic fields led to improvements in gait and balance as well as normalization in body image perception as seen on a repeat of the same test each patient.

R. Sandyk, "Effect of Weak Electromagnetic Fields on Body Image Perception in Patients with Multiple Sclerosis," *International Journal of Neurosci*, 86(1-2), July 1996, p. 79-85.

This article reports on the cases of three multiple sclerosis patients suffering from a chronic progressive course of the disease who experienced a reduction in tremors following treatment with brief external applications of pulsed EMFs of 7.5-pT intensity.

R. Sandyk & L.C. Dann, "Weak Electromagnetic Fields Attenuate Tremor in Multiple Sclerosis," *International Journal of Neurosci*, 79(3-4), December 1994, p. 199-212.

This article reports on the cases of three female multiple sclerosis patients with poor word fluency who experienced a 100-percent increase in word output following 4-5 sessions of treatment with external applications of extremely weak electromagnetic fields in the pico tesla range of intensity.

R. Sandyk, *Improvement in Word-fluency Performance in Patients with Multiple Sclerosis Electromagnetic Fields*, " *International Journal Neurosci*, 79(1-2), November 1994, p.75-90.

This article reports on the cases of three multiple sclerosis patients experiencing continuous and debilitating daily fatigue over the course of several years. Treatment with extracranially applied picotesla flux electromagnetic fields dramatically improved symptoms of fatigue in all three patients.

R. Sandyk, *Treatment with Weak Electromagnetic Fields Improves Fatigue Associated with Multiple Sclerosis*, *International Journal of Neurosci*, 84(1-4), February 1996, p. 177-186.

Results of this double blind, placebo-controlled study found that pulsed electromagnetic fields administered daily over a period of 15 days proved to be an effective treatment in reducing spasticity and incontinence associated with multiple sclerosis.

A. Guseo, *Double-Blind Treatments with Pulsating Electromagnetic Field in Multiple Sclerosis*, *Hungarian Symposium on Magneto therapy, 2nd Symposium, May 16-17, 1987, Szekesfehervar, Hungary*, p. 85-89.

Results of this double-blind, placebo-controlled study indicated that pulsed electromagnetic fields administered daily over a period of 15 days is a generally effective treatment in reducing symptoms associated with multiple sclerosis, with the most positive improvements involving the alleviation of spasticity and pain.

A. Guseo, *Pulsing Electromagnetic Field Therapy of Multiple Sclerosis the Gyuling-Bordacs Device: Double Blind, Crossover and Open Studies*, *Journal of Bioelectr.*, 6(1), 1987, p. 23-35.

Results of this double blind, placebo-controlled study indicated that exposure to magnetic fields produced beneficial clinical effects in patients suffering from cerebral paralysis and in patients with multiple sclerosis.

A. Sieron, *The Variable Magnetic Fields in the Complex Treatment of Neurological Diseases*, *European Bioelectromagnetics Association, 3rd International Congress, 29 February - 3 March 1996, Nancy, France*.

Muscle Injury

This study examined the effects of pulsed electromagnetic fields in patients suffering from peripheral muscle paralysis. Treatment consisted of 20-minute exposures (2-50 Hz, 70 G). Results showed 50-Hz pulsed electromagnetic fields to be the most effective level of treatment and that such therapy enhanced muscle irritability in peripheral paralysis patients as well as in healthy controls.

L. Mecseki, *The Study of the Efficacy of Magneto therapy in Peripheral Paralysis*, *Hungarian Symposium on Magneto therapy, 2nd Symposium, 16-17, May 1987, Szekesfehervar, Hungary*, p. 149-158.

Neck Pain

This double blind, placebo-controlled study examined the effects of low-energy pulsed electromagnetic fields administered via soft collars on patients suffering from persistent neck pain. Results indicated significantly beneficial effects following three weeks of treatment.

D. Foley-Nolan, *Low Energy High Frequency (27.12 MHZ) Therapy for Persistent Neck Pain. Double Blind Placebo Controlled Trial*, *Bioelectromagnetics Society, 12th Annual, June 10-14, 1990, San Antonio, TX*, p. 73.

Nerve Damage

This controlled study found that exposure to pulsed electromagnetic fields enhanced the speed and degree of peripheral nerve regeneration twofold in rats with experimentally severed sciatic nerves.

H. Ito C.A. Bassett, Effect of Weak, Pulsing Electromagnetic Fields on Neural Regeneration in the Rat, Clin Orthop, (181), December 1983, p. 283-290.

Results of this controlled study demonstrated that treatment with 15 minutes per day of pulsed electromagnetic fields enhanced recovery time of experimentally injured nerves in rats.

A.R. Raji R.E. Bowden, Effects of High-peak Pulsed Electromagnetic Field on the Degeneration and Regeneration of the Common Peroneal Nerve in Rats, Journal of Bone Joint Surg, 65(4), August 1983, p. 478-492.

Results of this study indicated that the use of pulsed electromagnetic fields on experimentally divided and sutured nerves in rats sped up regeneration of damaged nerves and the time it took for limb use to be recovered.

A.M. Raji, An Experimental Study of the Effects of Pulsed Electromagnetic Field (Diapulse) on Nerve Repair, Journal of Hand Surg, 9(2), June 1984, p. 105-112.

This study examined the effects of a Soviet Polyus-1 low-frequency magnet therapy device used to administer approximately 10 mT for approximately 10 minutes in patients with optic nerve atrophy. Patients underwent 10-15 sessions per course. Results showed that vision acuity in patients with low acuity values (below 0.04 diopters) improved in 50 percent of cases. It was also found that the treatment improved ocular blood flow in cases of optic nerve atrophy. Optimal benefits were experienced after 10 therapy sessions.

L.V. Zobina, Effectiveness of Magneto therapy in Optic Nerve Atrophy. A Preliminary Study, Vestn Oftalmol, 106(5), September-October 1990, p. 54-57.

Neurological Disorders

This study examined the effects of magneto therapy on patients suffering from nervous system diseases. Treatment consisted of 10-12 6-minute exposures (10- 20 kG, 0.1-0.6 Hz). Results indicated beneficial effects in 25 of the 27 patients receiving the treatment.

A.A. Skorometz, Magnetic Impulse Therapy of Patients with Spondylogenic Diseases of the Nervous System, Fizicheskaia Meditzina, 3(1-2), 1993, p. 41-43.

Results of this study found that the use of magnetic fields (30-35 mT, 10 and 100 Hz) produced beneficial effects in 93 percent of patients suffering from nerve problems.

A.G. Shiman, Use of Combined Methods of agnetoelectrotherapy in the Treatment for Polineuropathies, Vopr Kurortol Fizioter Lech Fiz Kult, (5), 1993, p. 38-41.

Osteoarthritis

Results of this double blind, placebo-controlled study indicated that exposure to pulsed electromagnetic fields had beneficial effects in the treatment of patients suffering from painful osteoarthritis of the knee or cervical spine. PEMF therapy consisted of 18 exposures lasting 30 minutes and administered 3-5 times per week.

D.H. Trock, The Effect of Pulsed Electromagnetic Fields in the Treatment of Osteoarthritis of the Knee and Cervical Spine. Report of Randomized, Double Blind, Placebo Controlled Trials," Journal of Rheumatology, 21(10), 1994, p. 1903-1911.

This double blind, placebo-controlled study showed that treatment with pulsed electromagnetic fields yielded significant benefits in patients suffering from osteoarthritis of the knee or cervical spine. PEMF therapy (25 G, 5-24 Hz) consisted of 18 30-minute exposures over a period of 3-4 weeks.

A.J. Bollet, Treatment of Osteoarthritis with Pulsed Electromagnetic Fields, European Bioelectromagnetics Association, 2nd Congress, 9-11 December 1993, Bled Slovenia, p. 46.

This controlled study examined the effects of changeable magnetic fields coupled with more conventional therapies in the treatment of patients suffering from osteoarthritis. Magnetic therapy consisted of daily 20-minute exposures for a total of 12 sessions. Results showed more rapid

improvements of immunological indices and alleviation of symptoms associated with the disease among patients receiving the combination therapy compared to those treated only conventionally.

L. Yurkiv, The Use of Changeable Magnetic Field in Treatment of Osteoarthritis, European Bioelectromagnetics Association, 3rd International Congress, 29 February-3 March 1996, Nancy France.

Osteochondrosis

This study examined the effects of alternating magnetic fields (50 Hz, 10-50 mT) combined with conservative therapy in patients suffering from spinal osteochondrosis. Treatment consisted of 20-minute exposures over a total of 20- 25 such exposures per course. Results showed clinical benefits in 95 percent of patients receiving the combination treatment compared to just 30 percent among controls.

L.L. Butenko, The Use of Alternating Magnetic Fields in Spinal Osteochondrosis, Mechanisms of Biological Action of Electromagnetic Fields, 27-31 October 1987, Pushchino, USSR, USSR Academy of Sciences, Research Center for Biological Studies, Inst. of Biological Physics, Coordination Council of Comecon Countries and Yugoslavia for Research in the Fields of Biological Physics, p. 183.

Osteoporosis

This study examined the effects of pulsed electromagnetic fields on postmenopausal osteoporosis in 10-month-old female rats. Results showed that EMF treatment for one hour per day for 4 months with a 30-gauss maximum pulse reduced bone mass loss to within 10 percent, while a 70-gauss maximum pulse reduced bone mass loss entirely.

M. Hinsenkamp, Preliminary Results in Electromagnetic Field Treatment of Osteonecrosis, Bioelectrochem Bioenerg.30, 1993, p. 229-236.

This study examined the effects of long-term pulsing electromagnetic fields in the form of repetitive pulse burst waves over a period of 6 months in osteoporotic rats. Results showed increased bone volume and formation activity.

S. Mishima, The Effect of Long-term Pulsing Electromagnetic Field Stimulation on Experimental Osteoporosis of Rats, Sangyo Ika Daigaku Zasshi, 10(1), March 1, 1988, p. 31-45.

This controlled study examined the effects of pulsed electromagnetic fields in women suffering from postmenopausal osteoporosis. Treatment consisted of daily 30-minute exposures for 20 days every six months. Results showed that PEMF treatment combined with 100 IU per day of nasal spray synthetic salmon calcitonin arrested bone decrease and significantly increased bone mass relative to patients receiving drug therapy alone.

T.W. Bilotta, Influence of Pulsed Electromagnetic Fields on Post-Menopausal Osteoporosis, First World Congress for Electricity and Magnetism in Biology and Medicine, 14-19 June 1992, Lake Buena Vista, FL, p. 78.

Results of this study found the use of total-body low-frequency magnetic fields (60 G, 50-100 Hz) to be effective in the treatment of patients suffering from osteoporosis-related symptoms. Treatment consisted of a total of 15 exposures of 30 minutes each.

G. Saveriano S. Ricci, Treatment of Senile Osteoporosis Caused Rachialgia with Low-Frequency PEMFs, Journal of Bioelectr, 8(2), 1989, p. 321.

Pancreatitis

This study found that sinusoidal and continuous low-frequency alternating magnetic field generated a Polius-1 apparatus exhibited beneficial effects in patients suffering from chronic pancreatitis.

A.A. Fedorov, The Use of a Low-frequency Magnetic Field in the Combined Therapy of Chronic Pancreatitis, Vopr Kurortol Fizioter Lech Fiz Kult, (5), September-October 1990, p. 28-30.

Parkinson's Disease

This article reports on the case of a 73-year-old male Parkinson's patients suffering from disabling resting and postural tremors in the right hand, as well as other symptoms. Two successive 20-minute treatments with AC pulsed electromagnetic fields of 7.5-picotesla intensity and 5-Hz

frequency sinusoidal wave led to improvements in visuospatial performance and a legible signature. Significant improvements in Parkinsonian motor symptoms were also seen following additional treatments.

R. Sandyk, Brief Communication: Electromagnetic Fields Improve Visuospatial Performance and Reverse Agraphia in a Parkinsonian Patient, International Journal of Neurosci, 87(3-4), November 1996, p. 209-217

This article reports on the case of a medicated 61-year-old Parkinson's patient who experienced rapid reversal of symptoms following a single external application of picotesla-range magnetic fields.

R. Sandyk R.P. Iacono, Reversal of Visual Neglect in Parkinson's Disease Treatment with picoTesla Range Magnetic Fields, International Journal of Neurosci, 73(1-2), November 1993, p. 93-107.

This article reports on four Parkinson's patients who experienced significant improvement in symptoms following treatment with picotesla-range magnetic fields. Two additional patients suffering from Parkinson's-related dementia experienced significant improvements in visuospatial impairment.

R. Sandyk, Magnetic Fields in the Therapy of Parkinsonism, International Journal of Neurosci, 66(3-4), October 1992, p. 209-235.

Noting that transcranial magnetic stimulation (TMS) is a new and noninvasive method of direct cortical neuron stimulation, this review article discusses recent studies showing that TMS has led to improvements in symptoms associated with Parkinson's disease and depression.

M.S. George, et al., "Transcranial Magnetic Stimulation: A Neuropsychiatric Tool for the 21st Century," Journal of Neuropsychiatry Clin Neurosci, 8(4), Fall 1996, p. 373-382.

This article reports on the cases of two Parkinson's patients who experienced improvements in motor symptoms following treatment with external application of weak electromagnetic fields in the picotesla range.

R.Sandyk, Parkinsonian Micrographia Reversed Treatment with Weak Electromagnetic Fields, International Journal of Neurosci, 81(1-2), March 1995, p. 83-93.

This article reports on the case of a no medicated 49-year-old male Parkinson's patient who experienced a dramatic improvement in motor, depressive, and cognitive symptoms following treatment with brief extracranial applications of picotesla-range electromagnetic fields.

R. Sandyk, "A Drug Naive Parkinsonian Patient Successfully Treated with Weak Electromagnetic Fields, International Journal of Neurosci, 79(1-2), November 1994, p. 99-110.

This article reports on the case of a 61-year-old Parkinson's patient who experienced improvements in the severity of motor problems 30 minutes after treatment with external application of weak electromagnetic fields in the picotesla range. Sham treatment had no such effects in the same patient.

R. Sandyk R.P. Iacono, Reversal of Micrographia in Parkinson's Disease Application of picoTesla Range Magnetic Fields, International Journal of Neurosci 77(1-2), July 1994, p. 77-84.

This article reports on the cases of five medicated Parkinsonian patients who experienced improvements in motor, behavioral, and autonomic functions, and in visuoconstructional tasks following treatment with extracranial application of magnetic fields in the picotesla range.

R. Sandyk, Reversal of a Visuoconstructional Deficit in Parkinson's Disease Application of External Magnetic Fields: A Report of Five Cases, International Journal of Neurosci, 75(3-4), April 1994, p. 213-228.

This article reports on the cases of four medicated Parkinsonian patients who experienced reversal of visuospatial impairments as measured the Clock Drawing Test following treatment with externally applied weak electromagnetic fields of picotesla-range intensity.

R. Sandyk, Reversal of Visuospatial Deficit on the Clock Drawing Test in Parkinson's Disease Treatment with Weak Electromagnetic Fields, International Journal of Neurosci, 82(3-4), June 1995, p. 255-268.

This article reports on the case of a Parkinson's patient suffering from severe movement problems who received treatment with external artificial weak magnetic fields with a frequency of 2 Hz and intensity of 7.5 picotesla over a period of 6 minutes. Results showed a significant attenuation in disability and near total reversal of the symptoms lasting approximately 72 hours. The patient then applied equivalent magnetic fields on a daily basis at home. Sustained improvement was seen throughout an observation of one month.

R. Sandyk, Magnetic Fields in the Treatment of Parkinson's Disease, International Journal of Neurosci, 63(1-2), March 1992, p. 141-150.

Peripheral Neuritis

In this study, patients suffering from peripheral neuritis were exposed to high frequency electromagnetic radiation on acupuncture points. EMR was generated Electronica-EnF, Aria, and Porog devices with tunable frequencies ranging between 53 and 78 GHz. Treatments were daily and lasted 25 minutes. Results showed full restoration of nerve function in 87 percent of patients.

O. Vassilenko and N.F. Vassilenko, Use of Extremely High Frequency Electromagnetic Radiation for Treating Peripheral Neuritis, Second World Congress for Electricity and Magnetism in Biology and Medicine, 8-13 June 1997, Bologna, Italy.

Pseudoarthrosis

In this study, 92 congenital pseudoarthrosis patients received treatment with pulsing electromagnetic fields. Results indicated a 76-percent rate of lesion recovery.

J.S. Kort, et al., Congenital Pseudoarthrosis of the Tibia: Treatment with Pulsing Electromagnetic Fields, Clin Orthop, (165), May 1982, p. 124-137.

In this study, 34 patients with congenital pseudoarthrosis-associated infantile nonunions received treatment with pulsing electromagnetic fields. Results indicated that 50 percent experienced full healing, 21 percent experienced healing with need for protections, and 29 percent experienced failure. The majority of failures were among men with a history of early fracture. Following the demonstration of coil effects, the PEMF treatment was combined with surgical realignment, immobilization, and grafting.

C.A. Bassett, Congenital Pseudarthroses of the Tibia: Treatment with Pulsing Electromagnetic Fields, Clin Orthop, (154), January-February 1981, p. 136-148.

In this study, 29 congenital pseudoarthrosis patients received extremely low frequency pulsing electromagnetic fields. Results: Over 70 percent experienced full healing, 21 percent experienced healing with need for protections, and 29 percent experienced failure. The majority of failures were among men with a history of early fracture.

C.A. Bassett, A Non-operative Salvage of Surgically resistant Pseudarthroses and Non-unions Pulsing Electromagnetic Fields. A Preliminary Report, Clin Orthop, May 1977, p. 128-143.

This study examined the effects of pulsed electromagnetic fields on 91 patients with congenital pseudoarthrosis of the tibia. Results showed an overall success rate of 72 percent.

C.A. Bassett M. Schink-Ascani, Long-term Pulsed Electromagnetic Field (PEMF) Results in Congenital Pseudarthrosis, Calcif Tissue Int, 49(3), September 1991, p. 216-220.

Psychiatric Disorders

Noting the well-established dangers associated with electro convulsive therapy, the author, in this theoretical article, argues that transcranial magnetic stimulation should be looked at as an alternative psychiatric treatment. The author asserts that TMS has several advantages over ECT in that it is painless, noninvasive, and more effective on deep structures of the brain.

T. Zyss, Deep Magnetic Brain Stimulation - The End of Psychiatric Electroshock Therapy? Medical Hypotheses, 43(2), 1994, p. 69-74.

Respiratory Problems

Results of this study showed that the use of low-frequency magnetic fields helped to prevent and treat critically ill patients suffering from pyoinflammatory bronchopulmonary complications, and to prevent such complications as well.

G.A. Mozhaev Ilu Tikhonovskii, The Prevention and Treatment of Suppurative inflammatory Complications in the Bronchopulmonary System During Prolonged Artificial Ventilation, Anesteziol Reanimatol, (4), July-August 1002, p. 47-51.

This article reports on the case of a schizophrenic patient suffering from respiratory difficulties associated with neuroleptic withdrawal. Treatment using external application of picotesla-range magnetic fields quickly attenuated the severity of such problems.

R. Sandyk K. Derpapas, Successful Treatment of Respiratory Dyskinesia with picoTesla Range Magnetic Fields, International Journal of Neurosci, 75(1-2), March 1994, p. 91-102.

Sexual Disorders

Results of this placebo-controlled study showed that magneto therapy exhibited beneficial effects with respect to cavernous blood flow in male patients suffering from sexual problems.

I.I. Gorpinchenko, The Use of Magnetic Devices in Treating Sexual Disorders in Men, Lik Sprava, (3-4), March-April 1995, p. 95-97.

This double blind, placebo-controlled study examined the effects of weak magnetic fields in men suffering from various sexual disorders, including decreased erection and premature ejaculation. The three different magnetic stimulators used included the BiopotenzorEros, Bioskan-1 devices. All patients wore one of the three devices for a 3-week period. Results showed full restoration of sexual function in 38 percent of patients in the Biopotenzor group, 31 percent in the Eros group, 36 percent in the Bioskan-1 group, and in just 15 percent of the controls. Improvements in sexual function were seen among 42 percent, 39 percent, 47 percent, and 18 percent, respectively.

I.I. Gorpinchenko, The Use of Magnetic Devices in Treating Sexual Disorders in Men," Lik Sprava, (3-4), 1995, p. 95-97.

Sleep Disorders

Results of this double blind, placebo-controlled study indicated that low-energy emission therapy significantly improved sleeping patterns among patients suffering from chronic psychophysiological insomnia. Therapy was administered 3 times per week, always in late afternoon and for 20 minutes, over a period of 4 weeks.

R. Hajdukovic, Effects of Low Energy Emission Therapy (LEET) on Sleep Structure, First World Congress for Electricity and Magnetism in Biology and Medicine, 14-19 June 1992, Lake Buena Vista, FL, p. 92.

This double blind, placebo-controlled study examined the effects of low-energy emission therapy (27 MHz amplitude-modulated electromagnetic fields) in patients suffering from insomnia. Treatment consisted of 3 exposures per week over a 4-week period. Results showed significant increases in total sleep time among patients in the treatment group relative to controls.

M. Erman, Low-Energy Emission Therapy (LEET) Treatment for somnia," Bioelectromagnetics Society, 13th Annual Meeting, 23-27 June 1991, Salt Lake City, UT, p. 69.

This review article notes that studies have found low-energy emission therapy to be effective in the treatment of chronic insomnia, and suggests that it may also be of value for patients suffering from generalized anxiety disorders.

C. Guilleminault B. Pasche, Clinical Effects of Low Energy Emission Therapy, Bioelectromagnetics Society, 15th Annual Meeting, 13-17 June 1993, Los Angeles, CA, p. 84.

Spinal Cord Injury

Results of this study found that exposure to constant magnetic fields improved healing in rats with experimentally induced spinal cord injury, and in human patients suffering from spinal cord trauma as well.

E.V. Tkach, Characteristics of the Effect of a Constant Electromagnetic Field on Reparative Processes in Spinal Cord Injuries, Zh Nevropatol Psikhiatr, 89(5), 1989, p. 41-44.

This study examined the effects of functional magnetic stimulation used to treat spinal cord injury in seven male patients. Results showed the treatment to be an effective noninvasive approach.

M.K. Sheriff, Neuromodulation of Detrusor Hyper-reflexia Functional Magnetic Stimulation of the Sacral Roots, British Journal of Urology, 78(1), July 1996, p. 39-46.

Stroke

Results of this study demonstrated that treatment with sinusoidal modulated currents coupled with Tran cerebral magnetic fields proved more effective than either therapy on its own in the treatment of stroke patients during the period of early rehabilitation.

F.E. Gorbunov, The Effect of Combined Transcerebral Magnetic and Electric Impulse Therapy on the Cerebral and Central Hemodynamic Status of Stroke Patients in the Early Rehabilitation Period, Vopr Kurortol Fizioter Lech Fiz Kult, (3), May-June 1996, p. 21-24.

This study found that exposure to pulsed electromagnetic fields following focal cerebral ischemia provided significant protection against neuronal damage, in rabbits.

G. Grant, Protection Against Focal Cerebral Ischemia Following Exposure to a Pulsed Electromagnetic Field, Bioelectromagnetics, 15(3), 1994, p. 205-216.

Results of this study pointed to the efficacy of magnetic field therapy in the treatment of patients suffering from a variety of conditions associated with different brain vascular diseases.

N.Y. Gilinskaia, Magnetic Fields in Treatment of Vascular Diseases of the Brain, Magnitologija, 1, 1991, p. 13-17.

Tendonitis

Results of this double blind, placebo-controlled study indicated that pulsed electromagnetic field therapy exhibited significant beneficial effects in the treatment of patients suffering from persistent rotator cuff tendonitis.

A. Binder, Pulsed Electromagnetic Field Therapy of Persistent Rotator Cuff Tendinitis. A Double blind Controlled Assessment, Lancet, 1(8379), March 31, 1984, p. 695-698.

Ulcers (Trophic)

This study examined the use of magneto therapy coupled with galvanization and intratissue electrophoresis in 86 patients suffering from trophic ulcers. A "Potok- 1" apparatus with a density of current equal to 0.05-0.1 mA/cm² was used to create an electrical field. The "MAG-30 apparatus for low-frequency magneto therapy with induction of 30 mT and area of exposure of 20 cm² was applied to a trophic ulcer site at the same time. Results led the authors to conclude that magnetogalvanotherapy is the recommended treatment for trophic ulcers of the lower extremities.

A.V. Alekseenko, Use of Magnetic Therapy Combined with Galvanization and Tissue Electrophoresis in the Treatment of Trophic Ulcers, Klin Khir, (7-8), 1993, p. 31-34.

This review article discusses the theoretical and clinical applications of magnetic field therapy in the treatment of trophic ulcers of the lower limbs.

A. Sieron, Use of Magnetic Field in Treatment of Trophic Leg Ulcers, Pol Tyg Lek, 46(37-39), September 1991, p. 717-719.

This study looked at the effects of conventional trophic ulcer treatment alone and in combination with alternating magnetic field (AMF) or constant magnetic field (CMF) exposures in a group of patients suffering from various types of trophic ulcers of the lower limbs. Results showed an average hospital stay of 31 days in the CMF group and 27 days in the AMF group, compared to 40 days among controls. Based on these and related findings, the authors suggest combination AMF therapy to be most effective.

I.G. Sukhotnik, Comparative Effectiveness of Using Constant and Alternating Magnetic Fields in the Treatment of Trophic Ulcers, Vest Khir, 144(6), 1990, p. 123-124.

This placebo-controlled study examined the effects of pulsed electromagnetic fields in the treatment of decubitus ulcers in hospitalized elderly patients with stage II and III pressure ulcers. Patients received daily PEMF stimulation in conjunction with conventional treatment for a period of up to 5 weeks. The findings were that combined PEMF/conventional treatment was superior to conventional treatment and to the placebo received controls.

S. Comorosan, The Effect of Diapulse Therapy on the Healing of Decubitus Ulcer, Romanian Journal of Physiol, 30(1-2), 1993, p. 41-45.

Results of this study found that the daily use of electromagnetolaser therapy decreased mean healing time in patients suffering from lower extremity trophic ulcers to approximately 18 days, compared with approximately 26 days in patients receiving laser therapy alone.

F.V. Galimzianov, Laser and Electromagnetolaser Therapy for Trophic Ulcers of the Lower Extremities in Chronic Venous Insufficiency, Vestn Khir Im I I Grek, 152(5-6), 1994, p. 70-72.

This double blind, placebo-controlled study found that treatment with non-thermal pulsed electromagnetic energy (PEMET) accelerated wound healing in spinal cord injury patients suffering from stage II and III pressure ulcers. PEMET treatment consisted of pulsed 27.12-MHz energy produced via a Diapulse device. Energy was delivered the use of a treatment head placed in wound dressings, in 30-minute periods twice a day for 12 weeks or until sores healed.

C.A. Salzberg, The Effects of Non-Thermal Pulsed Electromagnetic Energy on Wound Healing of Pressure Ulcers in Spinal Cord-Injured Patients: A Randomized, Double-Blind Study, Wounds: A Compendium of Clinical Research and Practice, 7(1), 1995, p. 11-16.

Urinary Problems

Results of this study showed magneto laser therapy to be effective in the treatment of patients suffering from urolithiasis (stone formation). Magneto laser therapy involved the use of a Milita device with a 35-mT magnetic field.

V.P. Avdoshin, Assessment of Magneto laser Therapy in Comparison with Other Methods of Treatment of Patients with Urolithiasis, Fiz Med, 4(1-2), 1994, p. 102-103.

Wound Healing

This study examined the effects of static magnetic fields on postoperative wounds in 21 patients undergoing plastic surgery. Magnetic patches ranging in thickness from 1 to 6 mm, and 2450 to 3950 G field strength were administered over the area of operation for a total of 48 hours. Thirteen patients received the magnets after pain or edema had appeared and 8 received them prophylactically. Results showed a decrease in pain, edema, and coloration in approximately 60 percent of patients. Such symptoms disappeared entirely in 75 percent.

D. Man, Effect of Permanent Magnetic Field on Postoperative Pain and Wound Healing in Plastic Surgery, Second World Congress for Electricity and Magnetism in Biology and Medicine, 8-13 June 1997, Bologna, Italy.

Results of this study indicated that treatment with pulsating electromagnetic field either alone or in combination with laser therapy exhibited healing effects with respect to peripheral nerve lesions and general wound healing relative to controls.

B. Vukovic-Jankovic, Peripheral Nerve Regeneration Stimulated Pulsating Electromagnetic (PEMF) Field and Laser, Second World Congress for Electricity and Magnetism in Biology and Medicine, 8-13 June 1997, Bologna, Italy.

This double blind, placebo-controlled study examined the effects of a magnetic treatment device taped over the carpal tunnel against wrist pain sustained at work among a group of turkey plant employees. Results showed that the device was effective in alleviating such pain and that it was free of side effects.

M.J. McLean, Treatment of Wrist Pain in the Work Place with a Static Magnetic Device - Interim Report of a Clinical Trial, Second World Congress for Electricity and Magnetism in Biology and Medicine, June 8-13, Bologna, Italy.

Results of this controlled study showed that low-frequency pulsed electromagnetic fields produced significant beneficial cutaneous wound healing effects in rats.

O. Patino, Pulsed Electromagnetic Fields in Experimental Cutaneous Wound Healing in Rats, Journal of Burn Care Rehabil, 17(6 PT 1), 1996, p. 528-531.

After a discussion of the mechanics involved in the use of pulsed electromagnetic energy in the treatment of disease, the author discusses findings from recent studies pointing to the therapy's effectiveness with respect to the treatment of acute soft-tissue lesions.

G.C. Coats, Pulsed Electromagnetic (Short Wave) Energy Therapy, British Journal of Sports Medicine, 23(4), 1989, p. 213-216.

Noting that pulsed electromagnetic fields have been used in bone healing for more than 20 years, this review article cites recent results from both animal and human studies pointing to the efficacy of PEMF in the treatment of soft-tissue injuries as well.

B.F. Sisken J. Walker, Therapeutic Aspects of Electromagnetic Fields for Soft- Tissue Healing, in M. Blank, (ed.), Electromagnetic Fields: Biological Interactions and Mechanisms, Washington, D.C.: American Chemical Society, 1995, p. 277-285.

This double-blind study examined the effects of postoperative nonthermal-pulsed high-frequency electromagnetic fields on edema formation and bruise healing in boys undergoing orchidopexy. Treatment involved exposure 3 times daily for the first 4 days following surgery. Significant effects with respect to rate of bruise resolution were reported in patients receiving the treatment relative to controls.

R.H.C. Bentall H.B. Eckstein, A Trial Involving the Use of Pulsed Electro- Magnetic Therapy on Children Undergoing Orchidopexy, Z. Kinderchir, 17(4), 1975, p. 380-389.

This controlled study examined the effects of pulsed electromagnetic fields in patients suffering from chronic productive inflammation or orbital tissue. PEMF treatment consisted of 7-10 minute daily exposures over a period of 10 days. Controls received conventional treatment only. Both groups showed good improvement, but patients treated with the PEMFs recovered significantly faster than did controls.

L.S. Teren'eva, Treatment of Chronic Productive Inflammation of Orbital Tissues with a Pulsed Electromagnetic Field, Oftalmol Zh, 1, 1996, p. 1-5.

Above studies are just a few of over 10 000 studies being done with pulsating magnetic resonance. The MRS 2000+ designo® is the most-researched and documented magnetic resonance unit in the world. For more studies use the following links:

<http://www.ems-berlin.com/index.htm>

<http://www.certifiedpst.com/pst-research/studies1.html>

<http://www.certifiedpst.com/pst-research/studies3.html>

<http://www.certifiedpst.com/pst-research/studies4.html>

Also: with respect to Dr. Robert O. Becker's book "Cross Currents" (he was twice nominated for the Nobel Prize in Medicine) go to: <http://www.ncbi.nlm.nih.gov/> type in the search field: "Becker RO" and you find all his research on electro medicine. At this website you can type in any search-term to find numerous abstracts for magnetic field /resonance therapy.

2007 - Allie Ochs (almochs@recallex.com) or www.mediconsult.tv