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"(Adjuvant) Whole Body Magnetic Field Therapy for Selected Diseases of Elderly Persons in a General Practice"

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Summary
32 patients of a general practice, predominantly with disorders of the locomotor system or other specific diseases were treated with weak pulsed magnetic fields (field strength: max. 4µT) at different time intervals and partly in conjunction with conservative therapy. Two devices were used ("QRS Salut 1" or "Bonvita") with coil-mats built into a mattress.

Upon conclusion of the magnetic field therapy we found a highly significant improvement in mobility among patients and ($p < 0.01$) a reduction in the fingertip to floor distance when bending forward. Furthermore, patients who received drug treatment needed a significantly lower dosage of drugs after completion of the magnetic field treatment.

Keywords: Magnetic field therapy, adjuvant treatment of elderly patients, reduction of drugs, improved mobility

Introduction
In this day and age, when nearly half of the population above 45 years of age is complaining of back pains and also of the peripheral joints (1) - which results in high treatment and rehabilitation costs for this segment of the population - the desire to find complementary treatment methods or alternatives to classical, mostly drug-oriented school medicine has been on the increase.

Hence, an ever growing number of consumers who are becoming more critical and in extreme cases, rejecting school medicine altogether, are gathering information in this by the mass media influenced society about fast-acting therapy methods which are "free from side-effects". This trend extends across nearly the entire broad spectrum of diseases, which a general physician sees for treatment. Since using pulsed magnetic fields in human medicine as adjuvant therapy method starting in the early 70s, treatment of diseases of the locomotor and sustentacular apparatus were of primary concern, using the following two field characteristics:

1. The classical type of magnetic field therapy was using pulsed low-frequency magnetic fields (up to approx. 1000 Hz [pulse repetition] frequency, field strengths in the milli Tesla range, mainly for the treatment of poorly healing bone fractures (7,11,16). Even the German health insurance industry recognized low-frequency magnetic fields temporarily as an "ultima ratio" therapy method (11).

2. The application of presently (still) under-appreciated very weak pulsed low-frequency magnetic fields (with field strengths not exceeding one tenths of the previously mentioned value) as an adjuvant to conventional therapy methods for diseases of the rheumatic type or for attritional symptoms of the locomotor and sustentacular apparatus (9,14), this type of treatment continuous to be subject to debate in circles of physicians who have a negative attitude towards it, despite strict supervision by physicians who are familiar with this biomedical subject matter (11,12,15). Although some critical arguments may be justified, our own research in this area, starting with the empirical report on the double blind trial, indicates that these fields with extremely low current strengths (13) induced within the tissues seem to be effective (4,5,8,10,19). This skeptical attitude, even total refusal, towards this type of therapy is directed predominantly towards diseases outside the rheumatic-degenerative range of diseases, fueled by the general lack of literature on this topic (2).

Material and Methods
The present study originates from an empirical report from a practice of general medicine in a mixed agrarian-industrial region. The population density of the commuter belt around the central town of Knittelfeld where that practice is located, or the urbanized surrounding area is approximately 50,000 inhabitants.

The treating physician who is using the magnetic field therapy has no objections towards it and has several years of experience in this field (8). The two devices used in two examination series are the "Salut I" and the "Bonvita" devices, the latter of which being structurally very similar to the first.

Both plug-in type devices with built-in timer function for a (fixed) application of 8-minute duration consist of a computer-controlled generator section, which is connected to an application mattress (1 x b approx. 180 x 80 cm) via a coaxial cable. The mattress contains 3 integrated flat coil pairs with tapered wire cross-sections, generating magnetic field strengths of varying degree in the primary target regions of shoulder, hip, and knees. For unproven reasons, based on the current state of international scientific research, the weakest applied inductive field is supposed to be near the head and the strongest field in the area of the lower extremities.

The device for which a patent has been applied generates complex, layered impulse packets with a maximum adjustable effective field strength (Level 5) of 4 µT, according to the manufacturer. The field strengths of the other adjustment levels are not documented. Both devices used in this series were so-called "Verum" devices, no comparative group was used, hence this series cannot be considered a statistically controlled study. The time period of this report ranges from January 1996 to mid-May 1997, during which the treating physician subjected certain patients to magnetic field therapy based on his many years of experience. The entire group consisted of 32 individuals (average age: 65.3 ± 10, 5a, 20 females and 12 males) with ages ranging from 38 to 84 years.

Therapy series I (see Table 1) for which the "Salut I" device was used, was conducted on a daily basis at approximately the same time every day with the patient lying down (1 hour, based on patient survey), hence no therapy-free days were noted. In series II (see Table 2) the "Bonvita" device was used for treatment at the office, which means that patients received 5 consecutive applications with a 2-day break during weekends. In this case, the treatments lasted 3 weeks, starting on Monday of the 1st week, concluded with a final examination on the Monday of the 5th week. Holidays and missed days of therapy in series II were made up at a later time.

Table 1a
Biographical Data, Diagnosis and Therapy for Series I

Pat. No.	Gender	Age	Diagnosis	Therapy	
1	F	52	Somnipathy Weak concentration Dyscardia	3 weeks, 2 x daily for 8 mins. mornings Level 3a, eves. Level 1	Soporifics Nerve tea
2	M	64			Sporifics
3	F	57			Nerve tea
4	F	38	Multilocular artralgia (shoulder, hip & knee joints) and multilocular neuralgia (BWS, LWS)	3 weeks, 2 x daily for 8 mins., Level 5, NSAR	
5	F	48			
6	F	69	Multilocular artralgia (shoulder, hip & knee joints) and multilocular neuralgia (BWS, LWS)	3 weeks, 2 x daily for 8 mins., Level 5, NSAR	
7	F	70			
8	M	65		3 weeks, 2 x daily for 8 mins., Level 4,	

9	M	82		NSAR
14	F	72	Strong stress pain after TEP Osteoporosis	3 weeks, 3 x daily for 8 mins., Level 5, NSAR
23	F	54	Lumbargia after BS-Op.; Foot Lift weakness, Osteoporosis	4 weeks, 1 x daily for 16 mins., Level 5, NSAR
29	M	63	Pronounced sensation of cold in feet and lower legs (distal); freq. nightly calf pains, morning myalgia of lower legs and starting pain in ankle joints, vascular Doppler test showed no significant min. vascularity	4 weeks, 1 x daily for 16 mins. (eves.), Level 4, no medication
30	M	68		
31	M	70		
32	M	70		

Table 1b
Therapy Success for Series I

Pat. No.	Δ FBA (cm)	Medication Reduction	Therapeutic Success	Remarks
1	N/A	yes (Soporific)	After 1 week improvement of sleep pattern, calm sleep (mostly without interruption), significant increase in daily performance, general psychogenic consolidation.	Dosage of soporifics was reduced, rarely needed (only during extreme psychic stress), continued use of nerve tea.
2				
3		0		continued use of nerve tea.
4	-6	approx. 50%	After 1-1.5 weeks significant improvement in pain levels and improved mobility of spinal column and joints. Subjective improvement in general state of health and performance during the day.	Accompanying medication therapy was reduced, improved general state of health ("feeling refreshed"). Different falling-asleep behavior when used in the evening, but always undisturbed night sleep.
5	-6	approx. 50%		
6	N/A	approx. 30%		
7	-2	approx. 30%		
8	N/A	approx. 50%		
9	N/A	approx. 75%		
14	N/A	approx. 30%	After 2 weeks significant reduction of complaints, longer walking distances.	Crutches used only infrequently. Termination of therapy due to patient relocation.
23	N/A	yes	After 2 weeks significant improvement of Lumbargia, "Foot lift weakness" remained unchanged.	NSAR only required in some cases.
29	N/A		Significant reduction of myalgia, ankle joint pains reduced in the morning, significantly improved sleep quality, cold sensation improved after approx. 3 weeks	
30	N/A			
31	N/A			
32	N/A			

Table 2a
Biographical Data, Diagnosis and Therapy for Series II

Pat. No.	Gender	Age	Diagnosis	Therapy
10	F	56	Irritated hemarthrosis after implantation of a knee endoprosthesis, severe Gonarthrosis	3 weeks, 1 x daily for 16 mins., Level 3c, NSAR
11	F	70	Diabetes mellitus, diabetic foot, diabetic Angio-, Neuro-, and Retinopathy	4 weeks, 1 x daily for 16 mins., Level 5, no medication
12	M	72	Pseudoradicular pain in the entire spinal column	3 weeks, 1 x daily for 16 mins., Level 4, NSAR
13	F	84	Polyarthritis, polyarthrosis	4 weeks, 1 x daily for 16 mins., Level 5, NSAR
15	F	67	Suspicion of loosened endoprosthesis, hip and knee joint pain	4 weeks, 1 x daily for 16 mins., Level 5, NSAR
16	M	80	Cervical Syndrome,stress-related headaches, lumbar sciaticalgia due to deg. lumbar spinal column changes	4 weeks, 1 x daily for 16 mins., Level 5, no medication
17	F	70	Chronic cervical syndrome, stress-related headaches, hip and knee joint complaints, degenerative joint changes	3 weeks, 1 x daily for 16 mins., Level 5, NSAR
18	M	62	Cervical syndrome, shoulder-arm-syndrome (both sides), acute headache relapses after SHT, Coxalgia	3 weeks, 1 x daily for 16 mins., Level 4, no medication
19	F	77	Massive, degenerative changes of cervical spinal column, radiation into the occipital region and both arms	3 weeks, 1 x daily for 16 mins., Level 5, NSAR
20	M	50	Cervical syndrome, Epicondylitis, rad. dext. lumbargia relapses	3 weeks, 1 x daily for 16 mins., Level 5, no medication
21	F	56	Pseudoradicular complaints in cervical and lumbar spinal column	3 weeks, 1 x daily for 16 mins., Level 4, no medication
22	M	55	Pseudoradicular lumbar spinal column complaints Coxalgia	3 weeks, 1 x daily for 16 mins., Level 3c, no medication
24	F	76	Pain in lumbar spinal column, pelvis-leg region (both sides) after pubic bone fracture, Osteoporosis	4 weeks, 1 x daily for 16 mins., Level 5, no medication
25	F	59	Lumbar Syndrome Relapse	3 weeks, 1 x daily for 16 mins., Level 5, no medication
26	F	73	Lumbar Syndrome Relapse	3 weeks, 1 x daily for 16 mins., Level 3c, no medication
27	F	66	Lumbar Syndrome Relapse	3 weeks, 1 x daily for 16 mins., Level 3c, no medication
28	F	73	Selected diffuse sceletal complaints, include diffus metastasizing N. Coli	4 weeks, 1 x daily for 16 mins., Level 5, analgesics

Table 2b
Therapy Success for Series II

Pat. No.	∆ FBA (cm)	Medication Reduction	Therapeutic Success	Remarks
10	N/A	yes	Significant pain reduction, decreasing hemarthrosis, improved mobility	Initial NSAR, was reduced to occasional intake after great stress
11	N/A		Pain reduction (feet), reduced secretion from plantar fistulas, partial healing of small plantar ulcers	
12	-8	40-60%	Significant pain reduction after only 1 week	
13	N/A	40-60%	Improved mobility and reduced pain in most joints during night sleep	
15	N/A	40-60%	Rapid improvement of subjective complaints, mobility remained unchanged	
16	-7		Improved mobility	
17	N/A	yes	Improved mobility in cervical spinal column, infrequent headaches, knee and hip joints more mobile	
18	N/A		Rapid reduction of arm and hip joint pain, headache relief	Reduction of NSAR from daily intake to 1-2 x per week after greater stress
19	N/A	40-60%	Satisfactory improvement of arm joint complaints, headache relief	
20	N/A		Satisfactory improvement of complaints, primarily of cervical spinal column, later also in elbow region	
21	N/A		Improvement primarily in lumbar spinal column, later also in cervical spinal column	
22	-5		Good improvement in spinal column symptoms, improved general state of health	
24	N/A		Good reduction in pain, significant improvement of general state of health	Improved night sleep already after 1st week of therapy
25	-7		Good improvement in mobility and pain reduction	
26	-4		Satisfactory improvement in mobility, significant pain reduction	
27	-7		Improved mobility	
28	N/A	0	Satisfactory pain reduction, improved mobility using the same analgesic dosage	Improved night sleep, significant improvement in general state of health

During the treatment period, control examinations were conducted in order to adjust individual therapy measures, if necessary. Collectively, there were 18 patients receiving medication (antirheumatics, soporifics, analgesics) based on their complaints. A possible reduction in medication during the treatment period or after the magnetic field treatment was also taken into consideration. Patients who were released "without medication" received no medication for the listed diagnosis. The measure of mobility improvement among patients who suffered from mobility-limiting diseases of the spine was the fingertip-floor distance in cm when bending forward, determined before and after the therapy series (D FBA, Table 1a + 2a).

In evaluating the success of the therapy among the patients, a comparison was made between the intake of medication and the change of fingertip - floor distance before and after the magnetic field therapy, assuming an equal distribution (50% / 50%) of the values in the Chi2 Test.

Results

With respect to a reduction in medication, a significant success was achieved in reducing the dosage among 16 cases in comparison to 2 cases who maintained their dosages ($Chi2 = 10.89$, $df = 1$, $p < 0.001$). All 9 patients who were tested for mobility after the therapy, showing a significant improvement in reducing the fingertip-floor distance ($Chi2 = 0.9$, $df = 1$, $p < 0.01$), indicating an improvement in their mobility. When considering those patients whose successful therapy can only be evaluated qualitatively based on their verbal response, one can deduce a collectively positive effect as a result of the magnetic field therapy. No failures were noted, patients reacted differently, but during the course of treatment, an improvement of varying degree was noted in every case.

Discussion

In a comparison with partially positive results of magnetic field therapy using relatively strong fields (3,6,17,18,20) for diseases of the locomotor and sustentacular system (2), it may be more interesting for scientific, practice-relevant considerations to continue and extend future systematic research efforts on the effects of very weak, magnetically fluctuating impulse fields on other kinds of diseases. This effort should be conducted without the objections stemming from certain interest groups in school medicine in order to avoid a suppression of positive results released to the general public. On the other hand, in order to avoid the promotion of diverse magnetic field therapy devices for the purpose of self-healing among patients gravitating in that direction, emphasis should be placed on the use of these devices adjuvantly by physicians familiar with these devices. Manufacturers often recommend in their brochures and advertisements certain treatment methods by suggesting parameter adjustments (diagrams, field strengths, frequencies, application intervals, field sources) which may not be substantiated by research. Many of these claimed successes which are sometimes based on just one patient, are justifiably criticized by knowledgeable specialists.

In contrast to these claims, this empirical report shall serve as an orientation (no blind trials, no control groups, no rigid marginal conditions of an exact clinical study), which can be repeated by other researchers interested in this method or for further development.

With the exception of individual cases, other groups of diseases besides the diseases of the locomotor and sustentacular system are being treated successfully and the documented therapeutic treatments are repeatable.

Another reason why some researchers exhibit reservations regarding the use of weak magnetic fluctuating fields in human medicine is justifiably based on the uncertainty which of the well-researched or theoretical interactive mechanisms are actually responsible for the observed effects.

No specific receptors are known which operate solely on a physical basis of magnetic field effects, while they have been shown, even structurally, to react with pharmacological agents. Many drug-induced physical-chemical reactions are far from being fully understood with respect to their action and their action can often only be described in a round-about way to specific organic structures or defined control circuits.

Low-frequency, fluctuating magnetic fields, even those with field strengths of nearly 1 Tesla, tend to penetrate the body unhindered, showing no adverse thermal effects. Exceptions are metallic implants which heat up as a result of being irradiated by these fields.

Nevertheless, we have observed on numerous occasions positive effects (4,5,8,10,19), and given the fact that these magnetic fields do not seem to cause any side-effects, based on the present state of science, they do tend to aid in medicated treatment therapies to some degree and, in this sense, should be desirable within a broader treatment spectrum for suffering patients.