

# Incidental Improvement in Parkinson's Disease with Pulsed Magnetic Treatment When Given for Chronic Back Pain: A Case Report

## Letter to Editor

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### Abstract

Treatment of Parkinson's disease (PD) is complicated and difficult. Transcranial pulsed electromagnetic fields (T-PEMF) have shown promising results in PD however it is expensive, requires medical set-up and thus has limited availability to patients.

We report a patient of PD with chronic back pain (CBP) where full body PEMF, delivered via lying supine on a body gel mattress for certain time, was administered for CBP. A total of 45 sessions of 30 minutes each were given 4-5 times a week. Patient reported relief from CBP but also surprisingly reported incidental improvement in parameters of PD. We discuss the patient.

**Keywords:** Parkinson's Disease; PEMF; Neurodegenerative disorders; Pulsed electromagnetic field

### Dear Editor

There is currently no definitive cure for Parkinson's disease (PD). Prescribed oral medications can have significant side effects and become less effective over time.[1] Pulsed Electromagnetic Field (PEMF), a non-invasive treatment, has shown encouraging results in various medical conditions like chronic back pain (CBP), inflammation, bone healing etc.[2] Transcranial PEMF (T-PEMF), a type of PEMF, delivers magnetic pulses to the brain and has shown improvement in symptoms of PD such as tremors, stiffness, and difficulty with movement and coordination. Full body PEMF, QRS® (Quantron Resonance System) 101 system is effective in various conditions such as chronic back pain (CBP), osteoarthritis, fibromyalgia, and neuropathic pain. It has not been investigated for PD previously.[2]

We report a patient of PD administered full body PEMF for CBP but unexpectedly also reported improved symptoms of PD.

A 69-year-old female patient, 152 cm in height and weighing 72kgs, reported to the Pain Clinic Out Patient Department (OPD) with CBP present for 5 years with pain NRS 9-10. Magnetic Resonance Imaging revealed lumbar spondylosis with disc desiccations at all lumbar disc levels with annular tear and diffuse disc bulges at L4-L5 and L5-S1 levels, ligamentum Flavum Hypertrophy, mild-moderate spinal canal stenosis and significant degenerative facet arthropathy. Patient was a diagnosed case of PD (Hoehn & Yahr stage 3) for 4 years. In the last one year, patient complained of increasing back pain radiating to bilateral lower extremities, tremors, bradykinesia, motor incoordination and difficulty in sitting, walking or standing without support debilitating her daily activities making her wheelchair bound. Citing apprehension, epidural steroids for CBP was refused and

patient consented for PEMF QRS®treatment. A total of 45 sessions over a 12-week period were given. Patient reported improved pain NRS and also in PD parameters. (Table 1).

PD, a neurodegenerative disorder affecting movement and muscle control, is caused by progressive loss of dopamine-producing neurons in the brain leading to a reduction in dopamine available to regulate movement, which results in symptoms such as tremors, stiffness, slow movements, and difficulty with balance and coordination. [1] There is currently no cure for PD, but treatment can help manage symptoms and improve quality of life. Non-invasive brain stimulation techniques like transcranial magnetic stimulation (TMS) [4] and transcranial direct current stimulation (tDCS) [5,6] are being investigated for their potential to improve symptoms without surgery.

PEMF uses low-frequency electromagnetic waves to stimulate cells and tissues in the body and is available in different types of equipment like transcranial PEMF (T-PEMF), localized applicators, whole body mats, pad devices, body wraps, magnetic field chairs etc.

T-PEMF application to the brain stimulates neural activity and modulate brain function to specific regions of the brain, such as the subthalamic nucleus, globus pallidus, and thalamus, regions involved in movement control, and thus improve motor symptoms by modulating the activity of these brain regions and increasing dopamine levels in the basal ganglia.[7] It can be delivered by various tools. Transcranial magnetic stimulation (TMS) induces electric currents in the brain by placing a coil on the scalp and delivers short pulses of magnetic energy to the brain[4]. Low-field magnetic stimulation (LFMS) stimulates the brain by placing a coil on the scalp and delivers continuous magnetic field to the brain.[8] Transcranial direct current stimulation (tDCS), stimulates the brain by placing

electrodes on the scalp and delivers a low-level direct current to the brain [5]. Deep brain stimulation (DBS) induces metabolic activation of the subthalamic nucleus and the directly connected globus pallidus which is in line with local and results in remote excitation of neurons by high frequency stimulation by placing electrodes on the scalp and delivering a low-level alternating current to the brain. [9] Helmet-based T-PEMF therapy, involves wearing a helmet that contains electromagnetic coils that deliver a pulsed electromagnetic field to the brain. T-PEMF has been used in various neurological and psychological disorders like PD, Alzheimer's, dementia, depression, anxiety and sleep disorders. It has been investigated as a potential treatment for PD in few studies and may be a promising treatment with improvement demonstrated in motor function and symptoms in multiple clinical trials.[2,7]

Full body PEMF is effective in reducing pain of various musculoskeletal conditions such as osteoarthritis, fibromyalgia, and neuropathic pain. It promotes bone healing in individuals with fractures or bone injuries and is effective in promoting wound healing and tissue regeneration. [3] In the present patient, PEMF QRS® 101 system, available as full body gel mattress was administered for CBP with favorable results. Unexpectedly, decrease in quantitative and qualitative parameters of PD were also noted. The probable mechanisms could be following. Full body PEMF therapy by improving blood flow and tissue oxygenation throughout the body, including the brain may help to reduce inflammation and oxidative stress, known contributors to the development and progression of PD and thus may help to improve muscle function and reduce muscle stiffness.

T-PEMF therapy which requires wearing a special helmet or cap for treatment maybe, uncomfortable to the patient and may limit their mobility during treatment. Moreover, it requires expertise and a

**Table 1:** Quantitative parameters of Back Pain NRS and Parkinson's disease (PD) at different time intervals  
 Numeric Pain Rating Scale (NPRS, range 0-10), Unified Parkinson's disease Rating Scale total score (UPDRS-total, range 0-199), motor score (UPDRS-motor, range 0-108), tremor score (UPDRS-tremor, range 0-8), rigidity score (UPDRS-rigidity, range 0-4) and bradykinesia score (UPDRS-bradykinesia, range 0-36), Postural Instability and Gait difficulty score (UPDRS-PIGD, range 0-30) .Mini-Mental State Examination (MMSE, range 0-30), Pittsburg Sleep Quality Index (PSQI, range 0-21), Beck's Depression Inventory (BDI range 0-63), Geriatric Depression Scale (GDS range 0-30), Parkinson's Disease Quality of Life Questionnaire (PDQ-39 range 0-100), Levodopa Equivalent Daily Dose (LEDD).

	Pre PEMF	Post PEMF after 45 sessions (% improvement)	Follow up Post 3 months (% improvement)	Follow up post 6 months (% improvement)
CBP Pain NRS	10	5 (50%)	4.5 (60%)	4.5 (60%)
UPDRS-total	89	57 (36%)	51 (43%)	47 (47%)
UPDRS-motor	28	21 (25%)	23 (18%)	20 (28%)
UPDRS-tremor	7	3 (57%)	3 (57%)	3 (57%)
UPDRS-rigidity	11	6 (45%)	4 (45%)	4 (45%)
UPDRS-bradykinesia	15	11 (27%)	11 (27%)	12 (27%)
UPDRS-PIGD	28	16 (43%)	10 (64%)	8 (71%)
Hoehn-Yahr scale	3	2	2	2
MMSE	28	30	30	30
PSQI	17	10 (41%)	8 (53%)	7 (59%)
BDI	19	6 (68%)	5 (74%)	4 (79%)
©GDS	18	9 (68%)	8 (74%)	8 (79%)
PDQ-39	66	45 (32%)	40 (39%)	42 (36%)
LEDD Levodopa equivalent daily dose (mg/day)	300	300	300	300

specialized area for therapy. Full body PEMF QRS® 101, on the other hand, has a high translational potential over T-PEMF as it is cheaper, compact with easy operability translating to home treatment and portability. Thus, it offers greater flexibility and comfort.

Further studies to explore the effects of Full body PEMF QRS® 101 system on PD maybe undertaken.

### Conclusion

PEMF QRS® may have a role in decreasing symptoms of PD and should be further explored.

**Author contributions:** JP planned the treatment and edited final draft; NS wrote the first draft and executed the treatment

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