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A comparison of rheumatoid arthritis and fibromyalgia patients and healthy controls exposed to a pulsed (200 microT) magnetic field: effects on normal standing balance.

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Specific weak time varying pulsed magnetic fields (MF) have been shown to alter animal and human behaviors, including pain perception and postural sway. Here we demonstrate an objective assessment of exposure to pulsed MF's on Rheumatoid Arthritis (RA) and Fibromyalgia (FM) patients and healthy controls using standing balance. 15 RA and 15 FM patients were recruited from a university hospital outpatient Rheumatology Clinic and 15 healthy controls from university students and personnel. Each subject stood on the center of a 3-D forceplate to record postural sway within three square orthogonal coil pairs (2 m, 1.75 m, 1.5 m) which generated a spatially uniform MF centered at head level. Four 2-min exposure conditions (eyes open/eyes closed, sham/MF) were applied in a random order. With eyes open and during sham exposure, FM patients and controls appeared to have similar standing balance, with RA patients worse. With eyes closed, postural sway worsened for all three groups, but more for RA and FM patients than controls. The Romberg Quotient (eyes closed/eyes open) was highest among FM patients. Mixed design analysis of variance on the center of pressure (COP) movements showed a significant interaction of eyes open/closed and sham/MF conditions [F=8.78(1,42), P<0.006]. Romberg Quotients of COP movements improved significantly with MF exposure [F=9.5(1,42), P<0.005] and COP path length showed an interaction approaching significance with clinical diagnosis [F=3.2(1,28), P<0.09]. Therefore RA and FM patients, and healthy controls, have significantly different postural sway in response to a specific pulsed MF.

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