PEMF Research 2

http://www.ncbi.nlm.nih.gov/pubmed/20976595(The Preventive Effects of Pulsed Electromagnetic Fields on Diabetic Bone Loss in Streptozotocin-treated Rats (2011). "The results demonstrated that PEMF could partially prevent DM-induced bone strength and architecture deterioration and improve the impaired bone formation. PEMF might become a potential additive method for inhibiting diabetic osteoporosis.")□□

article:

Osteoporos Int. 2011 Jun;22(6):1885-95. doi: 10.1007/s00198-010-1447-3. Epub 2010 Oct 26.

The preventive effects of pulsed electromagnetic fields on diabetic bone loss in streptozotocin-treated rats.

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Abstract

The present study was the first report demonstrating that pulsed electromagnetic field (PEMF) could partially prevent bone strength and architecture deterioration and improve the impaired bone formation in streptozotocin-induced diabetic rats. The findings indicated that PEMF might become a potential additive method for inhibiting diabetic osteopenia or osteoporosis.

INTRODUCTION:

Diabetes mellitus (DM) can cause various musculoskeletal abnormalities. Optimal therapeutic methods for diabetic bone complication are still lacking. It is essential to develop more effective and safe therapeutic methods for diabetic bone disorders. Pulsed electromagnetic field (PEMF) as an alternative noninvasive method has proven to be effective for treating fracture healing and osteoporosis in non-diabetic conditions. However, the issue about the therapeutic effects of PEMF on diabetic bone complication has not been previously investigated.

METHODS:

We herein systematically evaluated the preventive effects of PEMF on diabetic bone loss in streptozotocin-treated rats. Two similar experiments were conducted. In each experiment, 16 diabetic and eight non-diabetic rats were equally assigned to the control, DM, and DM + PEMF group. DM + PEMF group was subjected to daily 8-h PEMF exposure for 8 weeks.

RESULTS:
In experiment 1, three-point bending test suggested that PEMF improved the biomechanical quality of diabetic bone tissues, evidenced by increased maximum load, stiffness, and energy absorption. Microcomputed tomography analysis demonstrated that DM-induced bone architecture deterioration was partially reversed by PEMF, evidenced by increased Tb.N, Tb.Th, BV/TV, and Conn.D and reduced Tb.Sp and SMI. Serum OC analysis indicated that PEMF partially prevented DM-induced decrease in bone formation. In experiment 2, no significant difference in the bone resorption marker TRACP5b was observed. These biochemical findings were further supported by the dynamic bone histomorphometric parameters BFR/BS and Oc.N/BS.

CONCLUSIONS:
The results demonstrated that PEMF could partially prevent DM-induced bone strength and architecture deterioration and improve the impaired bone formation. PEMF might become a potential additive method for inhibiting diabetic osteoporosis.