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## Cytokine changes with microcurrent treatment of fibromyalgia associated with spine trauma

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**Purpose:** Patients who have Fibromyalgia syndrome (FMS) associated with spine trauma have moderate to severe pain levels and distinct pain descriptors and physical examination findings. Currently there is no effective treatment for this type of fibromyalgia. Microamperage current provides physiologic current flow and has been used in the treatment of pain syndromes. Two frequencies, 40 Hz and 10 Hz were observed to reduce pain in FMS associated with spine trauma. This retrospective analysis of patients receiving microcurrent treatment for FMS associated with spine trauma uses subjective pain scores as a primary outcome measure. Accompanying changes in inflammatory cytokines are examined in a subgroup of the same patient population to test the hypothesis that microcurrent treatment using two specific frequencies produces substantial measurable objective and subjective outcomes supporting the efficacy of this treatment.

**Methods:** A total of 54 consecutive patients meeting the ACR diagnostic criteria for fibromyalgia were treated with two frequencies, 40Hz and 10Hz on a two channel microamperage current device. Blood samples on a subset of six patients were analyzed using a recycling immune affinity chromatography system to identify objective changes accompanying subjective pain scores.

**Results:** Five patients did not tolerate treatment. The remaining 49 patients reported reduction in pain on a 10-point visual analog scale (VAS) from an average baseline score of  $7.3 \pm 1.2$  to  $1.3 \pm 1.1$  with the first treatment ( $P < 0.0001$ ). Thirty-one patients reported symptomatic relief from fibromyalgia following an average of 8 treatments. Median time to improvement was 2 months and the actuarial recovery curve reached 100% at 4.5 months. Interleukin-1, Interleukin-6 and substance P levels were all reduced from 330 pg/ml to 80 pg/ml ( $p=0.004$ ) from 239 pg/ml to 76 pg/ml ( $p=0.0008$ ) and from 180 pg/ml to 54 pg/ml ( $p=0.0001$ ) respectively in the first 90-minute treatment. Tumor Necrosis Factor (TNF- $\alpha$ ) was also reduced from 305 pg/ml to 78 pg/ml ( $p=0.002$ ). During the same time period, beta-endorphin and cortisol both increased from an average of 8.2 pg/ml to 71.1 pg/ml ( $p=0.003$ ) and 14.7 mg/ml to 105.3 mg/ml ( $p=0.03$ ) respectively.

**Conclusions:** In a retrospective study based on analysis of subjective VAS pain scores for 54 patients, symptoms of fibromyalgia associated with spine trauma were successfully treated with two specific frequencies, 40Hz and 10Hz and microamperage current. In a sub group of the same patients, subjective pain improvement scores were accompanied by substantial reduction in serum levels of the inflammatory cytokines IL-1, IL-6 and TNF- $\alpha$  and the neuropeptide substance P. Beta-endorphin release and increases in serum cortisol were also observed in these patients during the same treatment period. The subjective outcomes scores and changes in biological markers for pain and pro-inflammatory cytokines observed in response to this treatment protocol are important preliminary findings. Based on the observations reported in this analysis, controlled prospective clinical studies to evaluate the clinical efficacy of microcurrent treatment of FMS associated with cervical spine trauma are warranted.

### Biography

Carolyn McMakin developed Frequency Specific Microcurrent (FSM) in 1996. She has a part-time clinical practice and does Clinical Research and Teaches FSM seminars in the US and abroad. She consults with and treats professional teams and elite athletes. She has lectured at the National Institutes of Health and at conferences on fibromyalgia and the differential diagnosis and treatment of chronic pain syndromes. She has authored seven peer-reviewed articles, four book chapters and two abstracts in the areas of chronic pain and differential diagnosis. Her textbook, "Frequency Specific Microcurrent in Pain Management" was published by Elsevier in 2010.

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