Title: Electro-Acupuncture and Massage Mobilizes Mesenchymal Stem Cell into Circulation in Canines

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Background/Introduction: Acupuncture and massage are types of soft tissue mechanotherapy often used to treat neuromusculoskeletal disorders. Electro-acupuncture (EA) is a form of acupuncture where a small electric current is passed between pairs of acupuncture needles; whereas instrument-assisted soft tissue manipulation (IASTM) is a type of therapeutic massage that uses rigid devices. The aim of this proof-of-concept study was to explore the effects of EA and IASTM on bone-marrow derived mesenchymal stem cells (BMSC) circulation levels in canines.

Materials/Methods: 10 healthy, pet-owned dogs (5 males; 5 females) were recruited. All EA and IASTM treatments took place in the dogs’ homes, with owners present, to minimize animal stress. Peripheral blood draws were taken immediately before and 2h after each treatment. For EA, a 0.3mm x 75mm needle was inserted into 6 acupoints. Needle pairs were stimulated at 20 Hz for 30 min using the EA instrument. For IASTM, an examiner used instruments and their hands to massage bilateral back and gluteal regions for 30 min. Mononuclear cells were isolated and flow cytometry was used to acquire data for analysis. All procedures were conducted according to the Indiana University Institutional Animal Care and Use Committee and national standards.

Results: Dogs were of different breeds (ages 2-15 yr). 3 dogs had osteoarthritis in at least one hind limb joint. A significant, 76.4%, increase in circulating BMSCs was found with EA treatment (p = 0.05). IASTM also led to a significant, 138.6%, increase in BMSC circulation levels (p = 0.04).

Conclusions: This novel pilot study found EA and IASTM both stimulate BMSCs into circulation. Future research is needed linking findings to pain and functional outcomes in musculoskeletal conditions. The home environment had benefit since the dogs were in familiar surroundings, but using dogs of the same breed in a more standardized environment may help to reduce variability. Findings suggest that soft tissue mechanotherapies can serve as non-invasive and non-pharmacological approaches to mobilize endogenous BMSCs into circulation, having important implications in clinical practice and veterinary medicine since stem cells have known anti-inflammatory and pro-healing effects.

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References:


Figure 1: Soft Tissue Mechanotherapies. a) A dog relaxes while receiving EA. A dog receives massage by b) hand, prior to and after receiving massage with c) a rigid device, as components of the IASTM treatment. d) A peripheral venous blood draw from a dog’s forepaw.