

Microcurrent Electrical Therapy Preclinical Study Proof of Concept

Preclinical studies have shown that externally applied electrical stimulation can:

- ◆ Cause migration of epithelial and fibroblasts into a wound site^{1,3,6,10}
- ◆ Increase ATP (adenosine triphosphate) concentrations in tissues¹¹
- ◆ Increase protein and DNA synthesis^{3,6,8}
- ◆ Promote healing of soft tissues or ulcers^{4,10,12}
- ◆ Accelerate the recovery of damaged neural tissue⁹
- ◆ Reduce edema⁷, and
- ◆ Inhibit the growth of various pathogens.^{2,5}

¹Santos VNS, Ferreira LM, Horibe EK, Duarte IS. Electric Microcurrent in the restoration of the skin undergone a trichloroacetic acid peeling in rats. *Acta Cir Bras* (serial online) 2004 Sept-Oct; 19(5). Available from [URL:www.scielo.br](http://www.scielo.br)

²Szuminsky NJ, Albers AC, Unger P, Eddy JG. Effect of narrow, pulsed high voltages on bacterial viability. *Phys Ther* 1994 Jul; 74(7):660-7.

³Aaron, R, Ciombor, D. Therapeutic Effect of Electromagnetic Fields in the Stimulation of Connective Tissue Repair. *Journal of Cellular Biochemistry* 1993 52:42-46.

⁴Reger SI, Hyodo A, Reyes ET, Browne EZ. Treatment of pressure ulcers by electrical stimulation. *Rehabil Res Dev Prog Rep* 1992; 29:467-8.

⁵Kincaid CB, Lavoie KH. Inhibition of bacterial growth in vitro following stimulation with high voltage, monophasic, pulsed current. *Phys Ther* 1989 Aug; 69(8):651-5.

⁶Bourguignon GJ, Bourguignon LY. Electric stimulation of protein and DNA synthesis in human fibroblasts. *FASEB J* 1987 Nov; 1(5):398-402

⁷Jayakumar K, Rajagopalan T, Sambasivan M, Bai S. Effect of pulsed electromagnetic field (PEMF) in cerebral oedema. *Neurol India* 1986; 34:241-7.

⁸Korenstein R, Somjen D, Fischler H, Binderman I. Capacitative pulsed electric stimulation of bone cells. Induction of cyclic-AMP changes and DNA synthesis. *Biochim Biophys Acta* 1984 Apr 16; 803(4):302-7.

⁹Raji AR, Bowden RE. Effects of high-peak pulsed electromagnetic field on the degeneration and regeneration of the common peroneal nerve in rats. *J Bone Joint Surg Br* 1983 Aug; 65(4):478-92.

¹⁰Alvarez OM, Mertz PM, Smerbeck RV, Eaglstein WH. The healing of superficial skin wounds is stimulated by external electrical current. *J Invest Dermatol* 1983 Aug; 81(2):144-8.

¹¹Cheng, N, Van Hoof H, Bockx E, Hoogmartens MJ, Mulier JC, De Dijcker FJ, Sansen WM, De Loecker W. The effects of electric currents on ATP generation, protein synthesis, and membrane transport of rat skin. *Clin Orthop* 1982 Nov-Dec;(171):264-72.

¹²Konikoff JJ. Electrical promotion of soft tissue repairs. *Ann Biomed Eng* 1976 Mar; 4(1):1-5.