- **Format**: Abstract

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Pulsed electromagnetic field (PEMF) promotes collagen fibre deposition associated with increased myofibroblast population in the early healing phase of diabetic wound.

Choi MC1, Cheung KK1, Li X1, Cheing GL2.

Author information

1 Department of Rehabilitation Sciences, The Hong Kong Polytechnic University, Hung Hom, Kowloon, Hong Kong SAR, China.

2 Department of Rehabilitation Sciences, The Hong Kong Polytechnic University, Hung Hom, Kowloon, Hong Kong SAR, China. gladys.cheing@polyu.edu.hk.

Abstract

The present study evaluated the effects of PEMF on collagen fibre deposition, collagen fibril alignment and collagen fibre orientation. The potential relationships between collagen fibre deposition and myofibroblast population in diabetic wound healing were also examined. Forty young male streptozotocin-induced diabetic Sprague-Dawley rats were randomly assigned to PEMF group or control group. 2cm × 2 cm square wounds were made at their back. The PEMF group received daily exposure of PEMF to the wounds, while control group was handled in the same manner except that the PEMF device was not activated. Wound tissues harvested on post-wounding day 7, 10 and 14 were fixed, processed and sectioned. The abundance, fibril alignment and fibre orientation of type I collagen were quantified with picro-sirius polarization method and image analysis software (Nikon NIS Element AR). Myofibroblast population data were adopted from our previous study. Correlation between myofibroblast population and collagen fibre deposition was examined. There was significantly greater abundance of type I collagen fibre in the PEMF group than in the control on day 7 (P= .013), but not on day 10 or 14. No significant between-group differences were found in collagen fibril alignment and collagen fibre orientation at any measured time points. Positive correlation was found between collagen fibre deposition and myofibroblast population only on day 7 (r = .729, P = .007). In conclusion, PEMF can significantly increase collagen fibre in the early phase of diabetic wound healing, which is associated with the enhancement of myofibroblast population.

KEYWORDS:

Diabetic wound; Myofibroblast; Pulsed electromagnetic fields; Rat model; Type I collagen

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