Second Application of Low-energy Shock Waves Has a Cumulative Effect on Free Nerve Endings

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The aim of this study is to evaluate whether the repeated shock wave application provides a cumulative effect regarding the degeneration of cutaneous nerve fibres, comparing with the degeneration effects associated with the single application. We used 36 male rats. Four rats were study controls. Shock waves were applied to the left first globular foot pad of the remaining 32 rats. After 14 days, 16 of these rats received a second, identical shock-wave application. The foot pads of the rat hind paws were then resected on days 7, 14, 28 and 42 after final shock wave application. Foot pad sections were processed immunohistochemically using antibodies to protein gene product (PGP) 9.5 and calcitonin gene-related peptide (CGRP). We compared the number of epidermal nerve fibres between rats receiving one application of shock waves and rats receiving two applications. During the first four weeks, there was nearly complete degeneration of epidermal nerve fibres in both groups. By the end of six weeks, re-innervation of the epidermis had begun in the single application group. Re-innervation occurred significantly more slowly in the repeated application group than in the single application group. These data show that a second application has a cumulative effect on nerve fibres.
The results of the present study suggest that multiple applications of low-energy shock waves could provide longer-lasting antinociceptive effect, comparing with a single application.