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Titel des Beitrags: Dose-dependent new bone formation by extracorporeal shock wave application on the intact femur of rabbits.

Abstract: BACKGROUND: Whereas various molecular working mechanisms of shock waves have been demonstrated, no study has assessed in detail the influence of varying energy flux densities (EFD) on new bone formation in vivo. METHODS: Thirty Chinchilla bastard rabbits were randomly assigned to 5 groups (EFD 0.0, 0.35, 0.5, 0.9 and 1.2 mJ/mm²) and treated with extracorporeal shock waves at the distal femoral region (1,500 pulses; 1 Hz frequency). To investigate new bone formation, animals were injected with oxytetracycline at days 5-9 after shock wave application and sacrificed on day 10. Histological sections of all animals were examined using broad-band epifluorescent illumination, contact microradiography and Giemsa-Eosin staining. RESULTS: Application of shock waves induced new bone formation beginning with 0.5 mJ/mm² EFD and increasing with 0.9 mJ/mm² and 1.2 mJ/mm². The latter EFD resulted in new bone formation also on the dorsal cortical bone; cortical fractures and periosteal detachment also occurred. CONCLUSION: Here, for the first time, a threshold level is presented for new bone formation after applying shock waves to intact bone in vivo. The findings of this study are of considerable significance for preventing unwanted side effects in new approaches in the clinical application of shock waves.

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