

# Antibacterial effects of extracorporeal shock waves

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Despite considerable knowledge about effects of extracorporeal shock wave therapy (ESWT) on eukaryotic tissues, only little data are available concerning their effect on prokaryotic micro organisms. The objective of the present study was to determine the bactericidal activity as a function of energy flux density and shock wave impulse number. Standardised suspensions of *Staphylococcus aureus* ATCC 25923 and other clinical relevant species were exposed to different impulse numbers of shock waves with an energy flux density (ED) up to  $0.96 \text{ mJ mm}^{-2}$  (2 Hz). Subsequently, viable bacteria were quantified by culture and compared with an untreated control. After applying 4000 impulses, a significant bactericidal effect was observed with a threshold ED of  $0.59 \text{ mJ mm}^{-2}$  ( $P < 0.05$ ). A threshold impulse number of more than 1000 impulses was necessary to reduce bacterial growth ( $P < 0.05$ ). Further elevation of energy and impulse number exponentially increased bacterial killing. ESWT proved to exert significant antibacterial effect in an energy-dependent manner. Certain types of difficult-to-treat infections could offer new applications for ESWT.