

Early Effects of Extracorporeal Shock Wave Treatment on Osteoblast-like Cells: A Comparative Study Between Electromagnetic and Electrohydraulic Devices. [Article]

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Background: Extracorporeal shockwave therapy (ESWT) has been increasingly applied to treat orthopedic and musculoskeletal pathologies. ESWT involves mechanical perturbations that, as with other physical therapies, can result in mechanical stimuli to a large number of cells, including bone cells. The aim of this study was to evaluate the effects of shock waves on osteoblast-like cells (MG63) when using two different generators of shock waves (electrohydraulic and electromagnetic devices), in terms of cell damage, cell viability, osteogenic phenotype expression, and cytokine production.

Methods: MG63 cells were suspended in 1.5 mL screw-cap cryotubes (1×10^6 cells/mL), containing phosphate buffer solution (PBS), which were maintained at 37[degrees]C during all the experimental times. Two levels of energy flux density (EFD) were evaluated for each device: 0.15 to 0.18 mJ/mm² and 0.40 mJ/mm². Cells were then cultivated for 72 hours starting from a concentration of 1×10^4 cells/mL, and biological activity and viability were evaluated 24 and 72 hours after treatment.

Results: The results obtained demonstrate that the factors most affecting osteoblast activity involve both the device and the level of EFD selected, and they must be considered all together.

Conclusions: The use of the electromagnetic device and a level of EFD lower than 0.40 mJ/mm² would appear to induce fewer immediate cytotoxic effects and better stimulate subsequent proliferation and the synthetic activity of MG63.