

# **Magnetic stimulation prototype with selective technical characteristics for long bones fractures consolidation**

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## **Abstract**

The magnetic stimulation devices development, used as helping for fractures treatments, has been broadly investigated. The magnetic stimulation device here presented was designed for long bones application; with stimulation wave type selection, which change among sine, square and triangular wave. For each wave type, the frequency and magnetic field variations are evaluated in order to apply and establish physiologic comparisons in an experimental design (not presented in this paper). The prototype is limited to work in low frequency (10 - 100 Hz) for magnetic field levels reported as successful treatments in the long term in clinical literature (up to 2 mT). The device has a coil failure and overcurrent protection system. The applied stimulation technique is non-invasive through an elliptic Helmholtz coil, which generates a perpendicular magnetic field to the bone axis. Finally, the magnetic stimulation device was simulated in Flux 3D, and its performance were evaluated based on the available technical test characteristics.