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Abstract
The ultrasound has been confirmed accelerates the cell metabolism, abates convulsion, reduces inflammation, heals the wound and fracture, and regenerates the nerve, etc. The thesis uses Finite Element Modeling (FEM) to simulate the pressure distribution in human arm stimulated by ultrasound, and uses the phantom made from different material stimulated by ultrasound to measure the variation of temperature. We use the different shape’s piezoelectric and contacted area to simulate, discussing what shape and area relative to the pressure. The three frequency of ultrasound in this research are 0.75 MHz、1 MHz and 3 MHz and realize the different frequency penetration deeply.
The imitation material in this thesis are pure water, salt solution and gelatin powder turned into solid, and in this experiment the ultrasound stimulation frequency is 1 MHz and power is 3.6 W. Therefore we aim at 1 MHz proceeding the pressure and temperature to further discussion, and record the phantom variations of temperature which are stimulated by ultrasound, comparing the pressure distribution and temperature rise. Finally we gather the simulate data and experimental result into statistics, understanding the relatedness between pressure and temperature, and the reference and the medical perform verify the result accurately.
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