

Thesis Title                      Temperature Change in Cat Thigh Produced  
by Continuous Ultrasound Using Stationary  
Technique

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Degree                              Master of Science (Physiotherapy)

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Date of Graduation                23 November B.E. 2536 (1993)

#### ABSTRACT

In general, the dosage determinations of therapeutic ultrasound are usually based on the clinical literatures rather than the scientific literatures. The purpose of this study was to investigate the temperature change produced by 3 doses of the equal total ultrasonic energy with the intensity 0.5, 1.0, and 1.5 W/cm<sup>2</sup> applied by stationary technique. 13 cat-thighs were sonicated with 1 MHz continuous wave ultrasound by 0.5 W/cm<sup>2</sup> for 3 min. (D1), 1.0 W/cm<sup>2</sup> for 1.5 min. (D2), and 1.5 W/cm<sup>2</sup> for 1 min. (D3) in random order. The tissue temperature were measured by 3 needle thermistors, fixing 6 mm. apart with the thermistor guide; at the subcutaneous tissue (T1), the muscle (T2), and the tissue in front of the bone (T3), before, during and immediately after sonication. The temperature changes produced by D1, D2, and D3 at T1 (13.06±5.49%, 19.68±7.7%, and 20.14±8.2%) were significantly greater than at T2 (7.23±2.96%, 8.24±3.17%, and 7.73±3.77%) and at T3

(7.37±4.34%, 11.43±5.38%, and 12.39±8.33%) at  $p < .05$ . The highest tissue temperatures after sonication were attained at T3 (36.60±1.58 °C for D1, 38.02±1.93 °C for D2, and 38.19±2.17 °C for D3) which were lower than the damaging temperature level. A significant difference was found between the percent temperature change at T1 after sonicated by D1 and D3 at  $p < .05$  whereas the percent temperature change at T2 and T3 after sonicated by D1, D2, and D3 showed no significant difference. Although the rates of temperature change in all levels were corresponded to the intensity given, only the rates of temperature change at the muscle tissue (T2) were increased in direct proportion to the ultrasonic intensity for the range of intensity and exposure time as in this study.