

**UNIVERSITI TEKNOLOGI MARA**

**PRENATAL ULTRASOUND  
EFFECTS ON BONE MORPHOLOGY  
AND CHEMICAL CHANGES IN  
YOUNG RABBITS**

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## ABSTRACT

The application of ultrasound technology to the clinical practice of obstetrics has achieved widespread acceptance for more than three decades. Lack of research and findings in prenatal ultrasound effects increases the need to ensure that the benefits outweigh any potential harm considering, the extensive practice of ultrasound in pregnancies. This study is aimed at evaluating the effects of 90 minutes ultrasound exposure (insonation) during middle stage of pregnancy on bone morphology and chemical changes in young rabbits. To investigate such effects, 110 New Zealand White Rabbits (*Oryctolagus Cuniculus*) were exposed to ultrasound at the second stage of pregnancies (duration - 90 minutes; frequency - 7.09 MHz; spatial peak temporal average intensity (SPTA) - 49.4 W/cm<sup>2</sup>; power - 56 W; thermal index (TI) - 0.2; mechanical index (MI) - 1.0). Femurs of five groups of litters (n = 30 litters per group): 1, 2, 3, 4 and 5-month-old were excised and scanned using micro computed tomography Skyscan<sup>TM</sup> 1176. The effects on microstructural changes were measured to detect specific characteristics of the bone morphology, as well as selected chemical changes in young rabbits. Result on bone mineral density of young rabbits revealed there were significant differences between all ages ( $p = 0.03$ ,  $p = 0.01$ ,  $p < 0.001$ ). Microstructural changes on bone porosity showed significant difference in 2-month-old ( $p = 0.02$ ), trabecular thickness showed significant difference in 3-month-old ( $p < 0.001$ ), and trabecular separation of young rabbit showed significant difference at 4-month-old ( $p = 0.04$ ). For selected chemical changes effects analysis, there were significant differences on aspartate aminotransferase 2,3 and 4-month-old of the young rabbits ( $p = 0.03$ ,  $p = 0.05$ ,  $p < 0.001$ ), Alanine aminotransferase showed significant difference in 2-month-old ( $p = 0.03$ ). Alkaline phosphatase showed significant differences in 2 and 3-month-old ( $p = 0.03$ ,  $p = 0.01$ ) and gamma glutamyltransferase showed significant difference in 4-month-old ( $p = 0.03$ ). The results suggest that prenatal ultrasound may have effects on certain parameters between the young rabbit ages. Clinical trials should be carried out in the future to determine whether the same findings are applicable to human.

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