



**Effect of Low Intensity Pulsed Ultrasound on New Bone Formation during  
Mandibular Distraction Osteogenesis in Rabbit**

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**A Thesis Submitted in Fulfillment of the Requirements for the Degree of  
Master of Science in Oral and Maxillofacial Surgery**

**Prince of Songkla University**

**2008**

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เลขหมู่	RC930 L52 2008
Bib Key	307163
	31 ค.ศ. 2553

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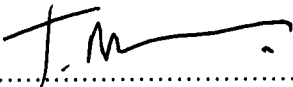
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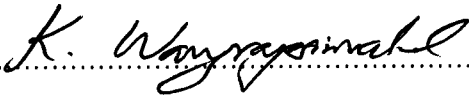
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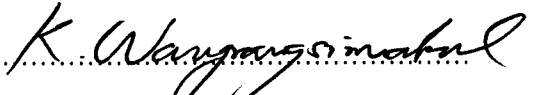


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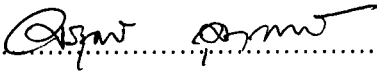
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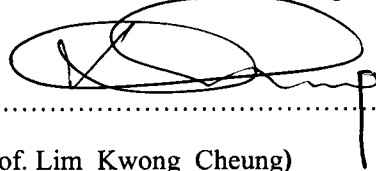
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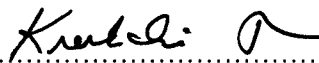


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### **Abstract**

**Objective:** The present study was to assess the effect of low intensity pulsed ultrasound on new bone formation during mandibular distraction osteogenesis in rabbit. **Material and Method:** Twenty four skeletally mature male New Zealand White rabbits underwent distraction osteogenesis at right side of mandible (3 days of latency period; 10 days of distraction period with rate of 0.5mm/12hr). Low intensity pulsed ultrasound (LIPUS) with 1.5 MHz, 30mw/cm<sup>2</sup> was conducted to 12 rabbits for a single 20 min treatment daily and started on the first day of distraction until rabbits were sacrificed on week 0, 2 and 4 after the distraction. Four rabbits were sacrificed at each time point, hence 3 ultrasound groups formed according to the time intervals. Other 12 rabbits followed the same sacrifice scheme without ultrasound treatment, 3 control groups were also formed corresponding to 3 ultrasound groups. Plain X-ray, microhardness test, micro-CT scan, histological examination were performed. **Result:** The animals were well tolerated to the entire distraction and ultrasound treatments. No infection and other complications occurred. All ultrasound groups showed more positive results, especially on week 0 and 2 after the distraction, significant more bone formation and higher surface microhardness were detected by plain X-ray, Micro-CT scan and microhardness test ( $p < 0.05$ ). The similar results revealed by histological evaluation. **Conclusion:** LIPUS accelerates new bone formation during mandibular distraction osteogenesis in rabbit, particularly during distraction and early weeks after the distraction. LIPUS may be an effective modality to shorten the treatment time of distraction osteogenesis.