



Thesis Title Short Term Stability and Muscle Adaptation in Mandibular Lengthening by Distraction Osteogenesis

Major Program Oral and Maxillofacial Surgery

Short Term Stability and Muscle Adaptation in Mandibular Lengthening by Distraction Osteogenesis

Advisory Committee

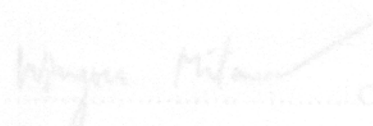
Examining Committee

 Chairman

(Associate Professor Dr. Sittichai Kocutongkaew)

 Chairman

(Associate Professor Dr. Sittichai Kocutongkaew)

 Committee

(Associate Professor Winyou Mitranun)

 Committee

(Associate Professor Winyou Mitranun)

 Committee

(Assistant Professor Wilad Setthayasansuk)

 Committee

(Assistant Professor Wilad Setthayasansuk)

Thongchai Nuntanaranont

..... Committee
(Professor L.K. Chetong)

 Committee

(Associate Professor Phatthana Phuenpathom)

T

เลขหุ้. QM535	T46	2000	C.1
Bib Key.	207732		
/ - = 5 ส.ร. 2544			

Master of Science in Oral and Maxillofacial Surgery
Prince of Songkla University
2000

dc
duck

Thesis Title **Short Term Stability and Muscle Adaptation in Mandibular Lengthening by Distraction Osteogenesis**

Author **Mr. Thongchai Nuntanarannont**

Major Program **Oral and Maxillofacial Surgery**

Academic Year **2000**

Abstract

Sixteen healthy, 5-7 months of age, weighting 2.5-3 kilograms, New Zealand white rabbit were used to study distraction osteogenesis process in the mandible. The modified orthodontic palatal expansion screw was fixed with two bicortical self-tapping titanium microscrews on each side. The fragments were gradually separated for 0.5mm twice a day for 10 consecutive day to achieve a 10-mm distance. The result showed that the animals were well tolerated to the surgical operation and the anesthesia. The modified palatal expansion screw was very stable permitting easy distraction with the relapse distance only 0.56 mm (2.95%). Serial histologic analysis demonstrated longitudinal orientation of collagen with osteoid material forming parallel to the distraction vector. In the early stage of ossification, several areas of cartilagenous foci were seen up to 2 weeks after completion of distraction. The image analysis of the radiographic examination and the Vicker's surface hardness testing revealed new bone formation started immediately after completion of distraction and rapidly increase to the normal level in 4-6 weeks later. The anterior belly of digastric muscle adapted by transient atrophy with initiation of distraction and resolved with time. However in long term observation, some specific myofiber underwent severe atrophy as seen in type II muscle atrophy, which resulted from prolong immobilization. From the gross morphological observation in 6 months after complete distraction group, the muscle of the distraction side was remarkable larger when compared with the opposite side. However, in the histological study, no regeneration of myofiber was found. In the other hand moderate area of fibrosis was seen replacing normal muscle tissue. This finding was probably account for the pseudohypertrophy of the affected muscle. No regeneration of myofiber was detected in any stage of the experiment. This highlights the fact that distraction osteogenesis perhaps no role in genesis of the myofiber. The lengthened segment in 6 months after completion of distraction group showed good stability with no significant statistic different compared to the immediate distractor removal.