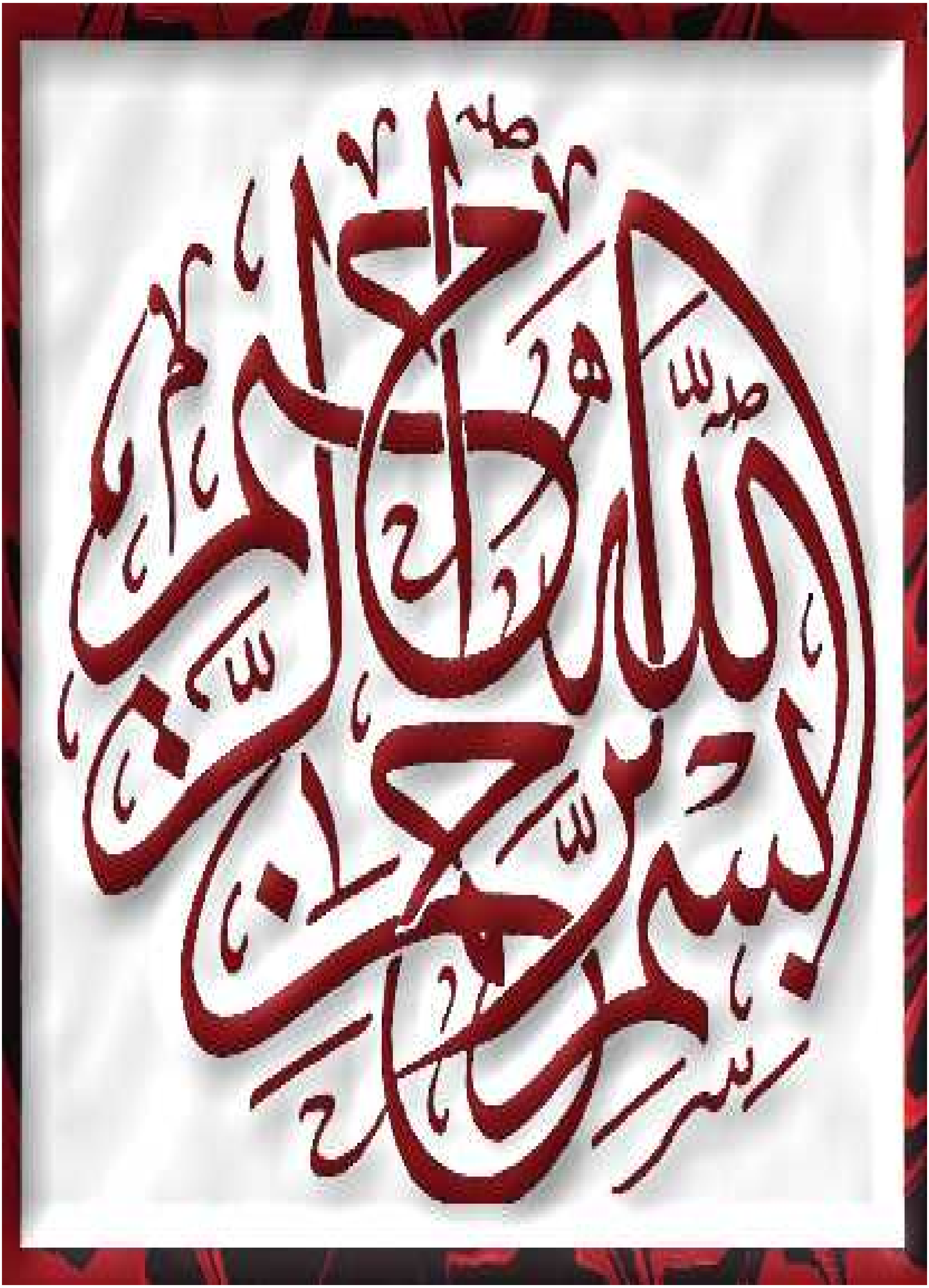
بسم الله الرحمن الرحيم

بسم ا   الرحمن الرحيم

"قالوا سبحانك لا علم لنا إلا ما علمتنا إنك

أنت العليم الحكيم"

سورة البقرة

آية "٣٢"

Panoramic Radiography, Conventional and Reformatted 3D Computed Tomography in Diagnosis of Mandibular Fractures

Thesis

Submitted to the Faculty of Oral and Dental Medicine, Cairo University, in Partial Fulfillment of the Requirements of Master Degree in Oral Radiology

Presented by

Omniya Mahmoud Hussien Abu El-Dahab

B.DS, 2003, Faculty of Oral and Dental Medicine, Cairo University

2008

Supervisors

Dr. Mushira M. Dahaba

Professor, Oral Radiology Department, Faculty of Oral and Dental Medicine, Cairo University

Dr. Mohamed Baher Tewfik, MD

Head and Consultant, Radiology Department, Students' Hospital, Cairo University

Dr. Hany Mahmoud Omar

Lecturer, Oral Radiology Department, Faculty of Oral and Dental Medicine, Cairo University

المشرفون

أ.د/ مشيرة محمد دهبة

أستاذ الأشعة التشخيصية

كلية طب الفم والأسنان

جامعة القاهرة

أ.د/ محمد باهر توفيق

استشاري و رئيس قسم الأشعة التشخيصية

مستشفى الطلبة

جامعة القاهرة

د/ هاني محمود عمر

مدرس بقسم الأشعة التشخيصية

كلية طب الفم والأسنان

جامعة القاهرة

الاشعة البانورامية و الاشعة المقطعية العادية وثلاثية الابعاد فى تشخيص كسور الفك السفلى

رسالة مقدمة إلى

كلية طب الفم والأسنان - جامعة القاهرة

توطئة للحصول على درجة الماجستير

(فرع الأشعة التشخيصية)

من

الطبيبة/ أمنية محمود أبو الذهب

بكالوريوس طب وجراحة الفم والأسنان-٢٠٠٣ –كلية طب الفم و الاسنان

جامعة القاهرة

كلية طب الفم والأسنان

جامعة القاهرة

٢٠٠٨

Aim of the Study

The purpose of this study is to demonstrate the validity of panoramic radiography, conventional and multiplanar reconstructed (MPR) 3DCT in diagnosis of mandibular fractures.

Introduction

Maxillofacial fractures occur when the facial bones are subjected to forces that exceed their impact tolerance. The more the severe the forces, the greater the likelihood of the fracture. Injury to the facial bones might occur in one or more of the bones. Facial fractures most frequently occur in the zygoma or mandible and, to a lesser extent, in the maxilla. Diagnosis is obvious with a gross deformity or displacement, but in other cases a fracture may be suggested in the history and examination. In such cases, radiographs are mandatory to confirm the fracture **(Dongas 2002, Ceallaigh *et al* 2006, Mohammadi and Mohebbi 2007 and Moliere 2008).**

Mandibular fractures are the next most common facial bone fractures after fractures of the nasal skeleton. These fractures occur most frequently as a result of the raised nature of this bone in the face **(Mohammadi and Mohebbi 2007 and Moliere 2008).**

Successful fracture treatment depends on precise clinical and radiographic examinations to conceptualize the overall injury and to establish a correct diagnosis. Failure to recognize, and the resultant mistreatment, of facial fractures is an important cause for later cosmetic and functional complications, which are difficult or even impossible to correct at a secondary stage (**Klenk and Kovacs 2004).**

Complications of mandibular fractures might consist of fragment malunion or non-union leading to pseudarthrosis in the location of the previous fracture. Other complications include infection resulting in mandibular osteomyelitis, ischemic necrosis of the condylar head, and traumatic damage to the articular disc **(Schuknecht and Valavanis 2003 and Schuknecht and Graetz 2005).**

For many years, physicians relied on two dimensional (2D) radiographs of the facial skeleton including panoramic views to evaluate facial injuries. However, such radiographs were relatively difficult to interpret because of the superimposition of the bony landmarks and defects. The image might miss the displacement of bone fragments, and impair a correct diagnosis **(Marentette and Maisal 1988, Costa e silva *et al* 2003 and Saigal *et al* 2005).**

During interpretation of conventional radiographs, the overlap of structures might impair a proper interpretation of images. The head of the mandibular condyle is often obscured by the superimposition of the skull base so intra-capsular fractures of the mandibular condyle and fractures in the high portion of its condylar process are difficult to be visualized on plain radiographs **(Schimming *et al* 1999 and Costa e silva *et al* 2003).**

The traditional strong role of conventional imaging in assessment of patients with isolated trauma to the viscerocranium is decreasing. Computed tomography is progressively replacing the panoramic radiograph, Water's view, and axial films for maxillofacial trauma. It is increasingly being performed in addition to conventional films to detail and classify trauma to the mandible as well. Imaging thus contributes to accurately categorize mandibular fractures based on location, into alveolar, mandibular proper, and codylar fractures **(Schuknecht and Graetz 2005).**

Early CT scanners produced images of transverse sections through the body, thus avoiding the problem of superimposed tissues. The narrow beam geometry and special collimation effectively eliminated scatter, thus greatly improving the contrast detectability over that of conventional radiographic methods (**Mahesh 2002).**

Three dimensional images were produced by using special softwares. These images provide superior definition of fracture lines (especially horizontal lines) as well as better revealing of the extent of the comminution. Additionally, the display parameters might be adjusted to improve edge sharpness, as well as image contrast and brightness. These additional informations improved the surgeons' ability to plan placement of inter-fragmentary wires and/or plates. Surgeons were also able to more accurately predict those patients requiring immediate bone grafting (**Mayer *et al* 1988, Vannier *et al* 1997, Klenk and Kovacs 2004 and Reuben *et al* 2005).**

2D and 3DCT images could be useful to the clinician in diagnosis and treatment planning. These methods enhance the accuracy of diagnostic decisions and the establishment of appropriate treatment plans. Because the radiographic data are archived as computerized data rather than on films, the images could be manipulated repeatably until desired results are obtained and with minimal loss of resolution **(Alder *et al* 1995 and Costa e silva *et al* 2003).**

That's why this study was performed to assess the validity and exact role of conventional and Multiplannar Reconstructed (MPR) 3DCT as well as panoramic radiography in diagnosis of mandibular fractures.

List of Abbreviations

2D	Two Dimentional
3D	Three Dimensional
CT	Computed Tomography
DPT	Dental panoramic tomogram
kVp	Kilovoltage
mA	Milliamper
MCCT	Multi-channel Computed Tomography
MDCT	Multidetector-row Computed Tomography
MPa	Mega Pascal
MPR	Multiplanar reconstruction
MVA	Motor Vehichle Accident
N	Number of active detector rows
NOE	Naso-orbito-ethmoid
OPG	Orthopantomography
P	Pitch
PA	Posteroanterior
RTA	Raod traffic accident

SC	Section collimation
Sv	Sivelent
SW	Section width
TF	Table feed per rotation
TMJ	Temporomandibular joint

List of Contents

Item	*Page*

List of Tables