



شبكة المعلومات الجامعية

بسم الله الرحمن الرحيم



شبكة المعلومات الجامعية
@ ASUNET



شبكة المعلومات الجامعية التوثيق الالكتروني والميكروفيلم



شبكة المعلومات الجامعية

جامعة عين شمس

التوثيق الالكتروني والميكرو فيلم

قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها
علي هذه الأفلام قد أعدت دون أية تغيرات



يجب أن

تحفظ هذه الأفلام بعيدا عن الغبار

في درجة حرارة من ١٥-٢٥ مئوية ورطوبة نسبية من ٢٠-٤٠%

To be Kept away from Dust in Dry Cool place of
15-25- c and relative humidity 20-40%

بعض الوثائق الأصلية تالفة

بالرسالة صفحات لم ترد بالاصل

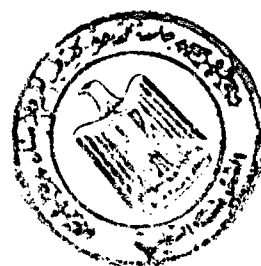
Cone Beam Computed Tomographic Evaluation of Maxillary Sinus Lesions of Dental Origin

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

P.9104

[Signature]
[Signature]

By
Wessam Mohamed Magdy Youssef
(B.D.S 2004)



Cairo University
2011

[Signature]
[Signature]

Supervisors

Prof. Dr. Nashwa Salah Mohamed

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

Dr. Hanaa Mohammed Elshenawy

Lecturer of Oral Radiology
National Research Center

To who makes my dreams comes true

My Great Father and Mother

My Dear husband

ACKNOWLEDGEMENT

I deeply offer my cardial thanks to **Dr. Nashwa Salah**, Professor of Oral Radiology Department, Faculty of Dentistry, Cairo University, for her endless efforts, valuable assistance and moral support during the entire course of this work.

My extreme gratitude and deep thanks to **Dr.Eman Abd El Aziz**, professor of oral Radiology, Cairo Unversity, for he endless help and great support althrough this study.

My sincere thanks are also extended to **Dr. Hanaa El Shinawy.**, Lecturer of Oral Oral Radilogy, National Research Center for her spiritual encouragement, sincere co-operation and valuable advices during this work.

My great thanks are also unlimited to **Dr. Khaled Mohamed Ekram** Assistant lecturer of oral Radiology, Cairo University of for his guidance during preparation of this study.

Table of Contents

Introduction	2
Review of literature.....	4
Maxillary sinus.....	4
Maxillary sinus anatomy.....	5
Maxillary sinus and dental relation.....	10
Maxillary sinus development.....	11
Maxillary sinus diseases	12
Maxillary sinus imaging techniques.....	19
Cone Beam Computed Tomography	22
Aim of the study.....	51
Materials and methods.....	52
Results.....	57
Discussion.....	74
Summary	81
Conclusion.....	83
References.....	84
الملخص العربي	98

Introduction

The maxillary sinus belonging to the nasal and oral cavity is the most susceptible of the all sinus to the invasion by pathogenic bacteria, either through their communication with the nasal cavity, or the product of odontogenic infection (*Brock, 2006*).

The adult maxillary sinus is an air-fill cavity within the body of the maxilla. It is bounded by dento-alveolar portion of maxilla, orbital floor, lateral nasal walls, and lateral wall of the maxilla. In dentate individuals, continued pneumatization and expansion can occur such that only sinus mucoperiosteum (Schneidarian membrane) is left. In edentulous individuals, continued expansion may leave only alveolar bone between sinus and oral cavity (as a result, patients may need an alveolar ridge augmentation prior to dental implant. The roots of the second molars are closest to maxillary sinus, followed by first and third molars, second and first premolars, and canine. Attachment of the labial levator and orbicularis oculi muscles on the lateral wall of the maxilla can direct the spread of infection. Weak lateral wall is more easily penetrated than sinus floor. As a result, odontogenic infections commonly present with soft tissue vestibular/fascial infections, and rarely sinusitis (*Legert et al 2004*).

Diagnosis of dental origin of the disease is mainly based on dental examination, clinical findings and medical history. The review includes the inspection of the oral tissues, looking for inflammation and erythema, despite the fact that this finding is rarely seen in association with maxillary sinus. Inflammation of the soft tissue is rarely caused by maxillary sinusitis due to the absence of veins anastomosed and connecting to the subcutaneous tissue, but chronic

sinusitis is likely to erode some of the sinus wall, causing a visible swelling of soft tissue, particularly at the intraoral (*Rafetto, L. 1999*).

Determining the primary site of disease in these cases can be a diagnostic dilemma from both clinical and radiographic standpoints. Radiographic examinations such as conventional intraoral periapical radiography, dental panoramic radiography, standard plain films of the paranasal sinuses, Computed Tomography (CT), and Magnetic Resonance Imaging (MRI) can be useful in evaluating sinus disease of odontogenic origin (*Mehra P. Murad H. 2004*).

Two-dimensional radiographs suffer from superimposition artifacts inherent to the scan method frequently resulting in overprojection of maxillary teeth roots onto the sinus floor. Authors of two studies correlating CT scans and OPG images findings confirmed that OPG alone is unreliable in assessing the relationship between the teeth roots and the maxillary sinus (*Sharan A and Madjar D. 2006*).

Cone Beam Computed Tomography (CBCT) proved to be a reliable technique for visualizing anatomical structures in the maxillofacial region and for assessing the relationship of teeth roots to adjacent structures including the maxillary sinus (*Tantanapornkul W, et al., 2007*).

Cone beam computerized technology (CBCT) offers 3-dimensional visualization and more accurate imaging compared to analog and digital radiographs. It is an accurate tool for many clinical oral-maxillofacial indications, with lower radiation doses than computerized tomography (*Ludlow JB, et al., 2003*).

Consequently, this study is performed to evaluate the role of CBCT in examination of maxillary sinus lesions of dental origin.

Review of Literature

Maxillary sinus

Maxillary sinus belonging to the nasal and oral cavity is the most susceptible of the all sinus to the invasion by pathogenic bacteria, either through their communication with the nasal cavity, or the product of odontogenic infection (*Brock, 2006*).

Maxillary sinusitis of dental origin with radiographic signs are characterized by an alteration in tooth pulp whose apex is approaching the floor of the maxillary sinus, apical lesion, radiographic loss of cortical bone which sets the lower limit of maxillary sinus, thickening of the membrane of the sinus space located on the sinus cusp (representing a swelling and thickening of the lining of the sinus), and various sinus space radiopaque degrees (*Selden, 1999*).

Determining the primary site of disease in these cases can be a diagnostic dilemma from both clinical and radiographic standpoints. Radiographic examinations such as conventional intraoral periapical radiography, dental panoramic radiography, standard plain films of the paranasal sinuses, CT, and MRI can be useful in evaluating sinus disease of odontogenic origin (*Mehra P. Murad H. 2004*).

Maxillary sinus anatomy

Maxillary sinus is a pyramidshaped cavity with its base adjacent to the nasal wall and apex pointing to the zygoma. The size of the sinus is insignificant until the eruption of permanent dentition.

The average dimensions

Adult sinus is 2.5 to 3.5 cm wide, 3.6 to 4.5 cm tall, and 3.8 to 4.5 cm deep. It has an estimated volume of approximately 12 to 15 cm³. Anteriorly, it extends to the canine and premolar area. The sinus floor usually has its most inferior point near the first molar region. The size of the sinus will increase with age if the area is edentulous. The extent of pneumatization varies from person to person and from side to side. Nonetheless, this process often leaves the bony lateral and occlusal alveolus paperthin in the posterior maxilla. The maxillary sinus bony cavity is lined with the sinus membrane, also known as the Schneiderian membrane. This membrane consists of ciliated epithelium like the rest of the respiratory tract. It is continuous with, and connects to, the nasal epithelium through the ostium in the middle meatus. The membrane has a thickness of approximately 0.8 mm. Antral mucosa is thinner and less vascular than nasal mucosa (*Van den Bergh JPA, et al 2000*).

Blood supply to maxillary sinus is primarily derived from posterior superior alveolar artery and infraorbital artery, both being branches of maxillary artery. There are significant anastomoses between these 2 arteries in lateral antral wall. Greater palatine artery also supplies inferior portion of the sinus (*Solar P, et al.1999*).

Adult maxillary sinus is an air-fill cavity within body of the maxilla. It is bounded by dento-alveolar portion of maxilla, orbital floor, the lateral

nasal walls, and the lateral wall of the maxilla. In dentate individuals, the continued pneumatization and expansion can occur such that only the sinus mucoperiosteum (Schneiderian membrane) is left. In edentulous individuals, continued expansion may leave only alveolar bone between sinus and oral cavity (as a result, patients may need an alveolar ridge augmentation prior to dental implant. The roots of the second molars are closest to the maxillary sinus, followed by first and third molars, second and first premolars, and canine. Attachment of the labial levator and orbicularis oculi muscles on lateral wall of maxilla can direct spread of infection. Weak lateral wall is more easily penetrated than sinus floor. As a result, odontogenic infections commonly present with soft tissue vestibular/fascial infections, and rarely sinusitis (*Legert et al 2004*).