

“Correlation between Maxillary Sinus Pathosis and Periapical Lesions using Cone Beam Computed Tomography: A Retrospective Study”

Thesis

Submitted to the Faculty of Dentistry, Ain Shams University,
in partial fulfillment of the requirements for the Master's Degree
in Oral Radiology department

Presented by

Mona Ahmed Mohamed Sobhy Elattar

mona.ahmed.elattar@dent.asu.edu.eg 01227177741
B.D.S, Ain Shams University-2011

Supervised by

Dr. Walaa Mohamed Hamed

Associate Professor of Oral & Maxillo-Facial Radiology
Faculty of Dentistry-Ain Shams University

Dr. Mostafa Saad El-Din Mostafa

Associate Professor of Oral & Maxillo-Facial Radiology
Faculty of Dentistry-Ain Shams University

Faculty of Dentistry
Ain Shams University
2019

Dedication

I would like to thank my beloved family for their endless patience, support, encouragement and most importantly, for their presence in my life and being by my side throughout difficulties and prosperities. I also dedicate this effort to the soul of my great, magnificent and unique father Professor Dr. Ahmed Mohamed Sobhy Elattar vice dean of the Faculty of Law, Ain Shams University.

Acknowledgment

I would like to express my deep gratitude to Assistant Professor Dr. Walaa Mohamed Hamed for her rich guidance and motivation, and Assistant Professor Dr. Mostafa Saad El-Din Mostafa for his effective assistance and rich pieces of advice. I could not have imagined having a better mentors and advisors. Special thanks to all my colleagues at our department of Oral and Maxillo-Facial Radiology, Faculty of Dentistry, Ain Shams University.

List of contents

Dedication	I
Acknowledgment	II
List of figures	IV
List of tables	VII
List of abbreviations	IX
Introduction and review of literature	1
Aim of the study	32
Patients and methods	33
Results	46
Discussion	56
Summary and conclusion	65
Recommendations	68
References	69
Arabic summary	

List of figures

Figure No.	Comment	Page No.
1	Diagram of MS showing the shape and walls : (A) A view from the front and (B) A view from the side	2
2	3D CBCT image showing the six bony walls of antrum: lateral, anterior, medial, posterior, inferior and superior walls	3
3	3D CBCT image showing the six bony walls of antrum: (A) Anterior, (B) Superior, (C) Posterior, (D) Medial, (E) Lateral and (F) Inferior	3
4	Radiopaque band parallel to floor of MS indicating sinus mucosal thickening	6
5	Sagittal CBCT image revealing mucosal thickening parallel to the sinus wall	6
6	Coronal CT scan showing obstruction of ostium and bilateral rhinogenic sinusitis	8
7	AP on periapical radiograph. Notice that it is noncorticated (indicating that it arise inside the sinus), dome-shaped radiopaque mass	9
8	AP on cropped panoramic radiograph	9
9	Coronal MDCT image showing MMS that causes radiopacification in the sinus and expansion into the nasal fossa	11
10	Cropped panoramic radiograph revealing a dome-shaped radiopacity of retention cyst occupying the left MS	11
11	Sagittal CBCT image showing antrolith in the sinus	13
12	Sagittal CBCT image showing sinus	14

	polyp	
13	PL in upper left second molar tooth, not easily detected in (a)periapical radiograph, but clearly seen with reactive mucosal thickening in CBCT images (b) sagittal, (c)coronal and (d)axial cuts	23
14	Drawing panoramic curve on the axial window	38
15	2mm cross sections interval selection	38
16	Choosing cross-sectional cuts that included MS completely and applying filter of sharpness (1x)	39
17	Evaluation of the underlying sinus pathology and recording its type (Mucosal thickening and periostitis)	39
18	Sinus pathology in the cross-sectional window above the PL (Mucosal thickening and periostitis)	40
19	Adjustment of the axial, sagittal, coronal cuts and reference lines in order to get the largest lesion size on the MPR screen	40
20	Selection of (launch quick box) on the axial window	41
21	Adjustment of the range of images that included the PL completely and spacing distance of 1mm	41
22	Measurement of PL's bucco-lingual dimension using the ruler tool from the measure box (highest record)	42
23	Measurement of PL's mesio-distal dimension using the ruler tool (highest record)	42
24	0.5mm cross sections interval selection from the DVR screen	43

25	Alignment of the reference lines along the root with the PL, choosing cross-sectional cuts that included PL completely and applying filter of sharpness (1x).	43
26	Measurement of PL's vertical dimension using the ruler tool (highest record)	44
27	Measurement of the distance between the PL superior border and the sinus floor using the ruler tool (lowest record)	44
28	Bar chart representing distribution of types of MS pathosis in groups A and B.	48

List of tables

Table No.	Illustration	Page No.
1	The frequencies, percentages (%) and results of z test for determination of the relation between "group A" and "group B"	47
2	The frequencies, percentages (%) and results of z test for the types of maxillary sinus pathosis in group A and B	47
3	Chi-square test for the determination of the relation between "type of maxillary sinus pathosis" and "size of the periapical lesion (PL) [by score]"	48
4	Fisher exact test for determination of the relation between "type of maxillary sinus pathosis" and "size of the periapical lesion (PL)"	49
5	Descriptive statistics of the size of periapical lesion [by major dimension] associated with different types of MS pathosis	50
6	One way analysis of variance for the determination of the difference between the means of recorded PLs major dimension (sizes)	50
7	Multiple Comparisons Bonferroni Method	51
8	Chi-square test for the determination of the relation between "type of maxillary sinus pathosis" and "distance between MS floor and superior border of PL [by score]"	51
9	Fisher exact test for mucosal thickening	52

	and sinus polyp.	
10	Fisher exact test for mucosal thickening and antral pseudocyst.	53
11	Fisher exact test for mucosal thickening and non specific opacification (partial).	53
12	Descriptive statistics of the distance between MS floor and PL superior border associated with different types of MS pathosis	53
13	One way analysis of variance for the determination of the difference between the means of the recorded distances between PL superior border and sinus floor	54
14	Chi-square test for the determination of the relationship between "distance between MS floor and PL superior border" and "periostitis"	55

List of abbreviations

Abbreviation	Full form
2D	Two dimensional
3D	Three dimensional
AP	Antral pseudocyst
BL	Buccolingual
Ca(OH)₂	Calcium hydroxide
CBCT	Cone beam computed tomography
CBCTPAI	Cone beam computed tomography periapical index
CT	Computed tomography
DICOM	Digital Imaging and Communications in Medicine
DVR	Dental volume reformat
FOV	Field of view
GP	Gutta percha
HS	Highly significant
ICC	Intraclass correlation coefficient
ICRP	International Commission on Radiological Protection
MD	Mesiodistal
MDCT	Multidetector computed tomography
mm	Millimeters
MMS	Mucocele of maxillary sinus
MPR	Multiplanar reformatting
MRI	Magnetic resonance imaging
MS	Maxillary sinus
mSv	Millisievert
PL	Periapical lesion
PR	Periapical radiolucency
SD	Standard deviation
TMJ	Tempromandibular joint
μSv	Microsievert