



شبكة المعلومات الجامعية

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

Ain Shams University Information Network  
جامعة عين شمس

شبكة المعلومات الجامعية

@ ASUNET



# شبكة المعلومات الجامعية التوثيق الالكتروني والميكروفيلم



شبكة المعلومات الجامعية

# جامعة عين شمس

التوثيق الالكتروني والميكروفيلم

## 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 نم ترد بالاصل

**Impact of Chronic Periodontitis on the  
angiographic severity of Coronary Artery  
Disease**

Thesis

Submitted for partial fulfillment of Master degree in Cardiology

Presented by

Rabie Mahmoud Mohammad Hendawy

MB Bch

Supervised by

**Soliman Gharib, MD**

Professor of Cardiology

Faculty of Medicine

Cairo University

**Esam Baligh, MD**

Assistant Professor of Cardiology

Faculty of Medicine

Cairo University

**Samar El Kholi, MD**

Professor of Periodontology

Faculty of Oral and Dental Medicine

Cairo University

2011

312VCP

## **Contents**

• Introduction.....	1
• Review of the literature.....	3
• Coronary Heart Disease (CHD).....	3
▪ Anatomy of the coronary arteries.....	3
▪ Epidemiology of CAD.....	10
▪ Pathogenesis of Atherosclerotic CAD.....	13
▪ Risk Factors of CVD.....	23
▪ C- Reactive Protein and CVD.....	33
▪ Infections and CVD.....	38
▪ Angiographic grading of CAD.....	40
• Chronic Periodontitis (CP).....	50
• Chronic Periodontitis and Atherosclerotic CAD.....	63
• Patients and Methods.....	67
• Results.....	75
• Discussion.....	96
• Summary.....	105
• References.....	107

## List of tables

<b>Table No.</b>	<b>Title</b>	<b>Page No.</b>
1	Segment weighing factor in syntax score calculation	44
2	Lesions adverse characteristic scoring in syntax score	45
3	Syntax score algorithm	50
4	Basic characteristics of the studied patients	75
5	Basic characteristics of the studied patients	76
6	<i>Comparison between GP-I and GP-II as regard basic characteristics.</i>	77
7	Distribution of CAD as regard number of diseased vessels.	78
8	Distribution of patients as regard SYNTAX score.	79
9	Distribution of the studied patients as regard PD.	81
10	Comparison between GP-I and GP-II as regard periodontal indices.	82
11	PD and in single, two and three vessel CAD.	83
12	PD in Syntax score CAD subgroups.	84
13	Correlation between CAD severity and PD.	85
14	GI and PI and number of diseased coronary vessels.	87
15	GI and PI and Syntax coronary scores.	88
16	The correlation between number of diseased coronaries and Periodontal indices.	89
17	The correlation between Syntax score and Periodontal indices.	89
18	hs-CRP and number of diseased coronaries.	90
19	hsCRP and Coronary Syntax score.	91

20	hs-CRP and Periodontal PD.	92
21	The correlation between hs-CRP and CP indices.	93
22	ROC curve analysis and Area Under the Curve of the periodontal parameters	95
23	Cutoff points, Sensitivity and Specificity of Periodontal parameters.	95

## List of Figures

<b>Fig. No.</b>	<b>Title</b>	<b>Page No.</b>
1	Initiation of atherosclerosis	15
2	Activating Effect of LDL Infiltration on Inflammation in the artery	16
3	Progression of atherosclerosis	18
4	Role of Macrophage Inflammation of the Artery	20
5	Definition of the coronary tree segments	41
6	Bifurcation lesions classification	48
7	The supporting tissues of the tooth	52
8	Clinical features of CP	54
9	Example 1 of Syntax score calculation	72
10	Example 2 of Syntax score calculation	73
11	Percentage of cases and controls.	77
12	Distribution of patients as regard the number of diseased vessels.	79
13	Distribution of CAD according to SYNTAX score.	80
14	Distribution of periodontitis as regard PD.	81
15	Periodontal indices in patients (GP-I) and control (GP-II).	82
16	Mean PD values in single, two and three vessel CAD.	84
17	PD and Coronary Syntax score subgroups.	85
18	Correlation between SYNTAX score and PD.	86
19	Correlation between number of diseased vessels and PD.	86
20	GI and PI in CAD Patients subgroups according to number of diseased vessels.	87
21	GI and PI in CAD Patients subgroups according to Syntax score.	88
22	hs-CRP and number of diseased coronary vessels.	90
23	Mean hs-CRP in Syntax score subgroups.	91
24	Mean hsCRP values and PD.	92

<b>25</b>	<b>Correlation between PD and hs-CRP.</b>	<b>93</b>
<b>26</b>	<b>ROC curve of the periodontal parameters in CAD.</b>	<b>94</b>

## **List of Abbreviations**

<b>CVD</b>	Cardiovascular Disease.
<b>CHD</b>	Coronary Heart Disease.
<b>CAD</b>	Coronary Artery Disease.
<b>CP</b>	Chronic Periodontitis.
<b>CABG</b>	Coronary Artery Bypass Grafts
<b>CAL</b>	Clinical Attachment Loss.
<b>CA</b>	Coronary Angiography.
<b>CVRF</b>	Cardiovascular Risk Factors.
<b>DM</b>	Diabetes Mellitus.
<b>GFR</b>	Glomerular Filtration Rate.
<b>GI</b>	Gingival Index.
<b>HDL</b>	High Density Lipoprotein cholesterol.
<b>hsCRP</b>	High sensitive C- Reactive Protein.
<b>IL-1</b>	Interleukin 1.
<b>IL-6</b>	Interleukin 6.
<b>IL-8</b>	Interleukin 8.
<b>LCA</b>	Left Coronary Artery.
<b>LCX</b>	Left Circumflex artery.
<b>LAD</b>	Left Anterior Descending artery.
<b>LDL</b>	Low Density Lipoprotein cholesterol.
<b>LPS</b>	Lipopolysaccharide
<b>MMP</b>	Matrix Metalloproteinase.
<b>MI</b>	Myocardial Infarction
<b>OM</b>	Obtuse Marginal branch.
<b>OR</b>	Odds Ratio.
<b>PD</b>	Periodontal Pocket Depth.
<b>PDA</b>	Posterior Descending Artery.
<b>PLB</b>	Postero-lateral Branch.
<b>PCI</b>	Percutaneous Coronary Intervension.
<b>PGE-2</b>	Prostaglandin E-2.
<b>PD</b>	Pocket Depth.
<b>PVD</b>	Peripheral Vascular Disease.

<b>PI</b>	Plaque Index.
<b>RCA</b>	Right Coronary Artery.
<b>RR</b>	Relative Risk.
<b>SRP</b>	Scaling and Root Planning.
<b>SMC</b>	Smooth Muscle Cells.
<b>SS</b>	Syntax Score.
<b>TNF-<math>\alpha</math></b>	Tumor Necrosis Factor alpha.
<b>VCAM.1</b>	Vascular Cell Adhesion Molecule 1.
<b>WHO</b>	World Health Organisation.

## AKNOWLEDGMENTS

I would like to express my deepest gratitude and appreciation to **Professor Dr. Soliman Gharib**, professor of Cardiology, Cairo University, for his supervision, valuable contribution with knowledge and advice during the course of this study. Without his support, this work would not have reached its final stages.

My great thanks and appreciation to **Dr. Esam Baligh**, Assistant Professor of Cardiology, Cairo University, for his exact, generous supervision and his expert guidance during the course of this work.

I would like also to express my sincere appreciation and gratitude to **Professor Dr. Samar El Kholy**, professor of Oral Medicine and Periodontology, Cairo University, for her sincere help, advice and support.

**Atherosclerosis** affecting the entire arterial circulation, has many clinical manifestations named **CVD** that include: **CHD**, **Stroke** and **PVD**. Among these manifestations **CHD** is the most important. (**Jukka et al. 2004**) (**Kuller et al. 1998**)

In the last ten years, several epidemiological studies have assessed the association between oral infection and systemic diseases. These studies have provided support that oral infections, specifically **periodontitis** may confer independent risks for different systemic conditions. (**Renvert 2003**)

Since **CVD** are the leading cause of death worldwide, greater attention has been focused on the evidence that infections of the oral cavity might be associated with atherothrombosis.

The established risk factors for **CVD** include male gender, diabetes mellitus, hypertension, smoking and dyslipidemia may explain at least partially the development of coronary artery disease (**CAD**). However, many cases of **CAD** develop in the absence of traditional cardiovascular risk factors.

Periodontal disease, which involves gram-negative bacteria has been reported to be a significant predictor of **CHD**. (**Beck et al. 1996**)

**Chronic Periodontitis** is characterized by inflammatory destruction of the alveolar bone as well as loss of the soft tissue attachment to the teeth. Once initiated, **CP** maintains a slowly progressive and destructive character with periods of exacerbation and remission. (**Ranny 1991**) Periodontitis constitutes an active lever for systemic subclinical inflammation enhancement and eventually contributes to endothelial and vascular dysfunction.

Several epidemiological and case-control studies have indicated associations between **CVD** and **CP**. (**Morrison et al. 1999**) Contradictory conclusions have also been reported in that when controlling for one