

***Evaluation of Interleukin-6, Matrix  
Metalloproteinase-8 and Osteoprotegerin levels in  
both Chronic and Aggressive Periodontitis patients***

**Thesis submitted in partial fulfillment of the requirements of the  
Master Degree in Oral Medicine, Periodontology, and Oral Diagnosis  
Faculty of Dentistry  
Ain Shams University**

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تقييم مستوى كل من الأنترلوكين-٦ والماتريكس ميتالوبروتينيز-٨  
والأستيوبروتجرين في مرضى التهاب الأنسجة الداعمة حول السنية  
المزمن والهجومى

رسالة مقدمة توطنة للحصول علي ماجستير طب الفم , علاج اللثة و التشخيص  
كلية طب الاسنان , جامعة عين شمس

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## AKNOWLEDGMENT

*First and for most, thanks to ALLAH who is the most Gracious and most Merciful.*

*I would like to express my deepest thanks, gratitude and profound respect to **Prof.Dr. Hadir El-Dessouky**, Professor of Oral Medicine, Periodontology and Oral Diagnosis, Faculty of Dentistry, Ain-Shams University. For her endless encouragement, great help, extreme patience, valuable guidance, and immeasurable support, will always be sincerely remembered.*

*I am also deeply thankful to **Dr. Ahmed Abdel Aziz Hassan** Lecturer of Oral Medicine, Periodontology, and Oral Diagnosis, Faculty of Dentistry, Ain Shams University For his continuous guidance which was of paramount importance for the progress and completion of this work, will always be deeply remembered.*

*My deepest thanks and sincere gratitude as well as appreciation to **Prof.Dr. Ola Ibrahim Ahmed**, Professor of Medical Microbiology & Immunology Faculty of Medicine Ain shams University for her valuable advice, devoted effort, and unique cooperation.*

*My sincere gratitude to the chairman of Oral Medicine, Periodontology, Oral Diagnosis and Radiology Department, Ain Shams University and all faculty and staff member for their sincere help and cooperation.*

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## **DEDICATION**

*To the soul of my father who taught me the value of  
learning.*

*To the person I admire most, my mother who offered me  
unconditioned support throughout the course of my life.*

*To my husband who has been a great source of motivation  
and inspiration, and to my beautiful angels Nour and  
Mohamed.*

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## **List of Abbreviations**

<b>AAP</b>	American Academy Of Periodontology
<b>Aa</b>	Aggregatibacter actinomycetemcomitans
<b>AgP</b>	Aggressive periodontitis
<b>CAL</b>	Clinical Attachment Level
<b>CP</b>	Chronic periodontitis
<b>CRP</b>	C-reactive protein
<b>ECM</b>	Extracellular matrix
<b>ELISA</b>	enzyme-linked immunosorbent assay
<b>GAgP</b>	Generalized aggressive periodontitis
<b>GCF</b>	Gingival crevicular fluid
<b>HbA1c</b>	Hemoglobin A1C
<b>IFN</b>	Interferon
<b>Ig</b>	Immunoglobulin
<b>IL-6</b>	Interleukin-6
<b>IL- 1Ra</b>	IL-1 receptor antagonist
<b>LPS</b>	Lipopolysaccharides
<b>MMPs</b>	Matrix metalloproteinases
<b>MPO</b>	Myeloperoxidase
<b>OPG</b>	Osteoprotegerin
<b>OSM</b>	Oncostatin M
<b>PBI</b>	Papillary Bleeding Index



<b>PD</b>	Periodontal disease
<b>PDL</b>	Periodontal ligament
<b>Pg</b>	Porphyromonas gingivalis
<b>PG</b>	Prostaglandins
<b>PI</b>	Plaque index
<b>PMNs</b>	Polymorphonuclear granulocytes
<b>PPD</b>	Probing pocket depth
<b>RANKL</b>	Receptor activator of nuclear factor kappa B ligand
<b>SDD</b>	Subantimicrobial-dose doxycycline
<b>TGF-<math>\beta</math></b>	Transforming growth factor- $\beta$
<b>Th1</b>	T- helper type 1
<b>TIMP</b>	Tissue inhibitors of matrix metalloproteinases
<b>TNF</b>	Tumor necrosis factor
<b>TNF-<math>\alpha</math></b>	Tumor necrosis factor- $\alpha$
<b>T2DM</b>	Type 2 diabetes mellitus
<b>UWS</b>	Unstimulated whole saliva

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# **INTRODUCTION**

Periodontal disease (PD) is a chronic bacterial infection characterized by persistent inflammation, connective tissue breakdown and alveolar bone destruction. Contributing inflammatory mediators and tissue destructive molecules have been detected in the gingival tissue, gingival crevicular fluid (GCF) and saliva of patients affected by periodontitis.<sup>(1)</sup>

Chronic periodontitis (CP) is characterized by the occurrence of an irreversible destruction of periodontal supporting tissues. Disease appears to result from a complex interaction between the periodontopathogenic bacteria and the host immunoinflammatory response. Periodontal loss is considered to occur as cycles of acute-activity episodes that alternate with prolonged periods of quiescence.<sup>(2)</sup> The disease progression involves a network of interacting molecular pathways including proinflammatory mediators, reactive oxygen species, matrix metalloproteinases (MMPs), and their MMP inhibitors and regulators.<sup>(3)</sup> Type I collagen is the main extracellular matrix component of periodontal tissues, and

thus, collagen degradation is regarded as one of the key factors in uncontrolled destructive lesions.<sup>(4)</sup>

Aggressive periodontitis (AgP) is characterized by a rapid loss of clinical attachment and alveolar bone and normally affects young adults. As opposed to chronic periodontitis, the amount of biofilm and calculus accumulation in aggressive periodontitis subjects is inconsistent with the severity and progression of the periodontal destruction. It is subdivided into localized and generalized form, according to the extent of the periodontal destruction. Diagnosis of aggressive periodontitis requires exclusion of the presence of systemic diseases that may severely impair host defenses and lead to premature tooth loss.<sup>(5,6)</sup>

Interleukin-6 (IL-6) is an important cytokine involved in the regulation of host response to tissue injury and infection.<sup>(7)</sup> It is produced by a variety of cells, such as monocytes, fibroblasts, osteoblasts and vascular endothelial cells in response to inflammatory challenges. It plays an important role in B-cell differentiation and in T-cell proliferation, while IL-6, synergistic with