PERIODONTAL DISEASES
&
CARDIOVASCULAR SYSTEM

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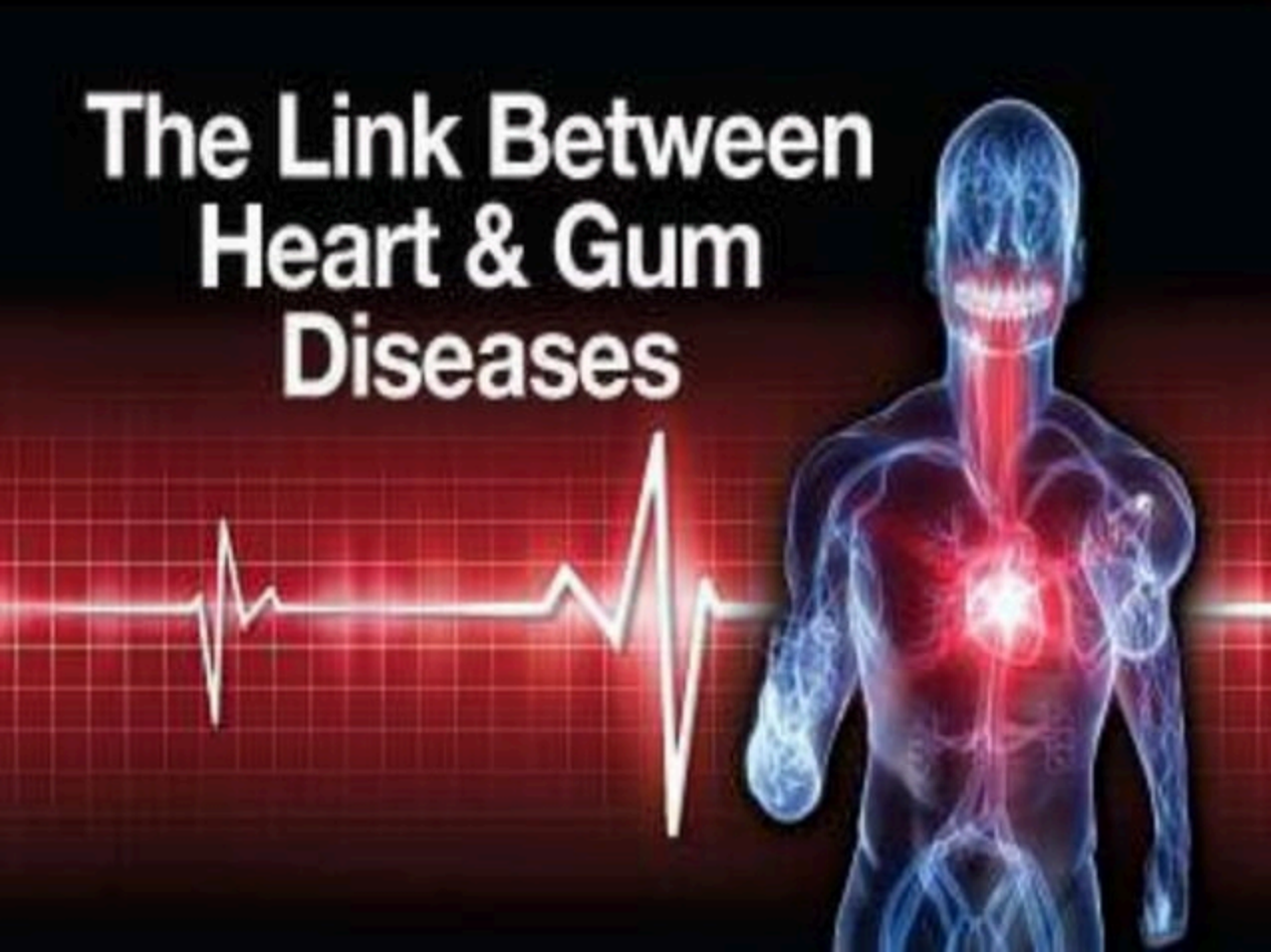
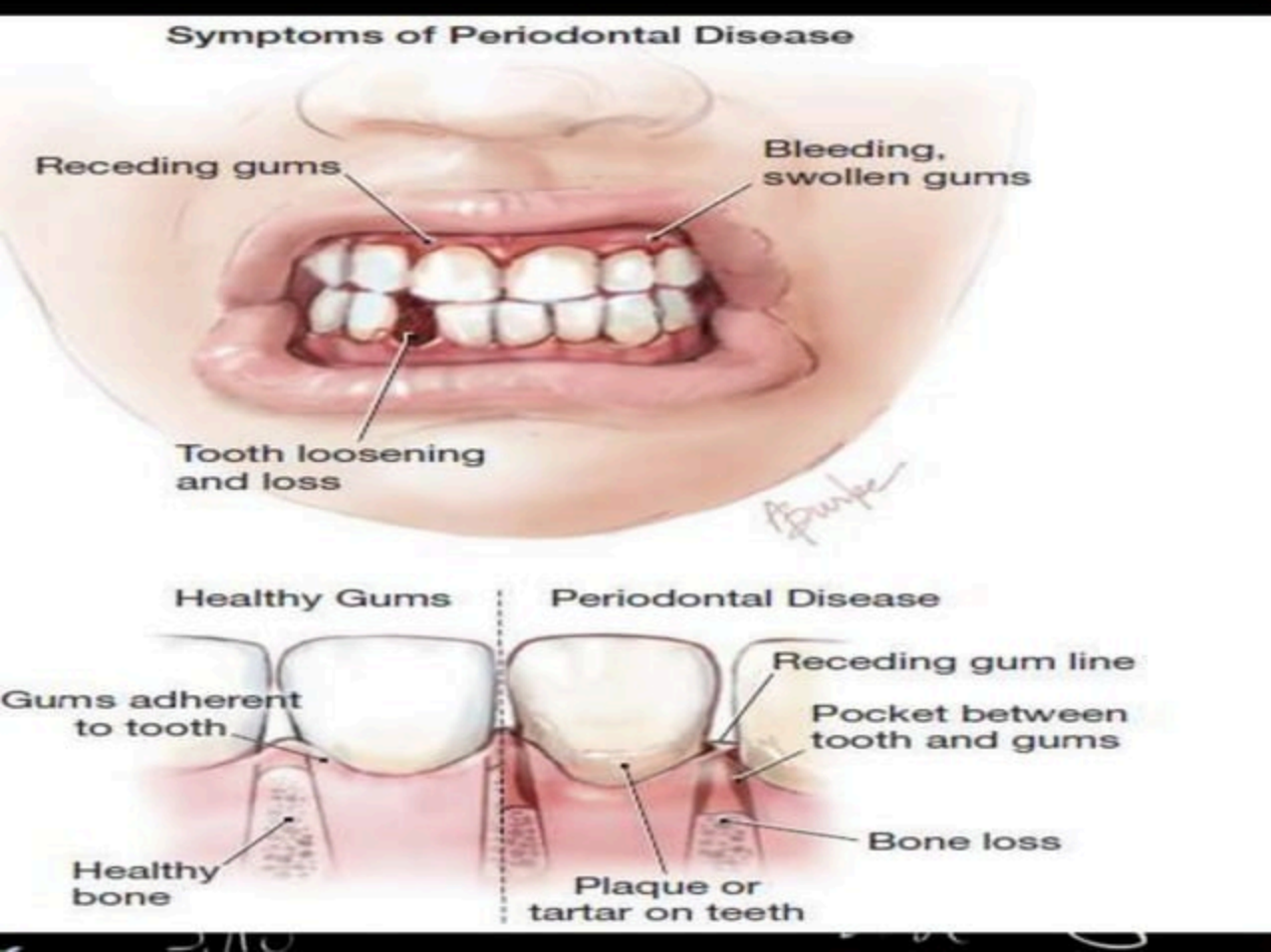
The Link Between Heart & Gum Diseases



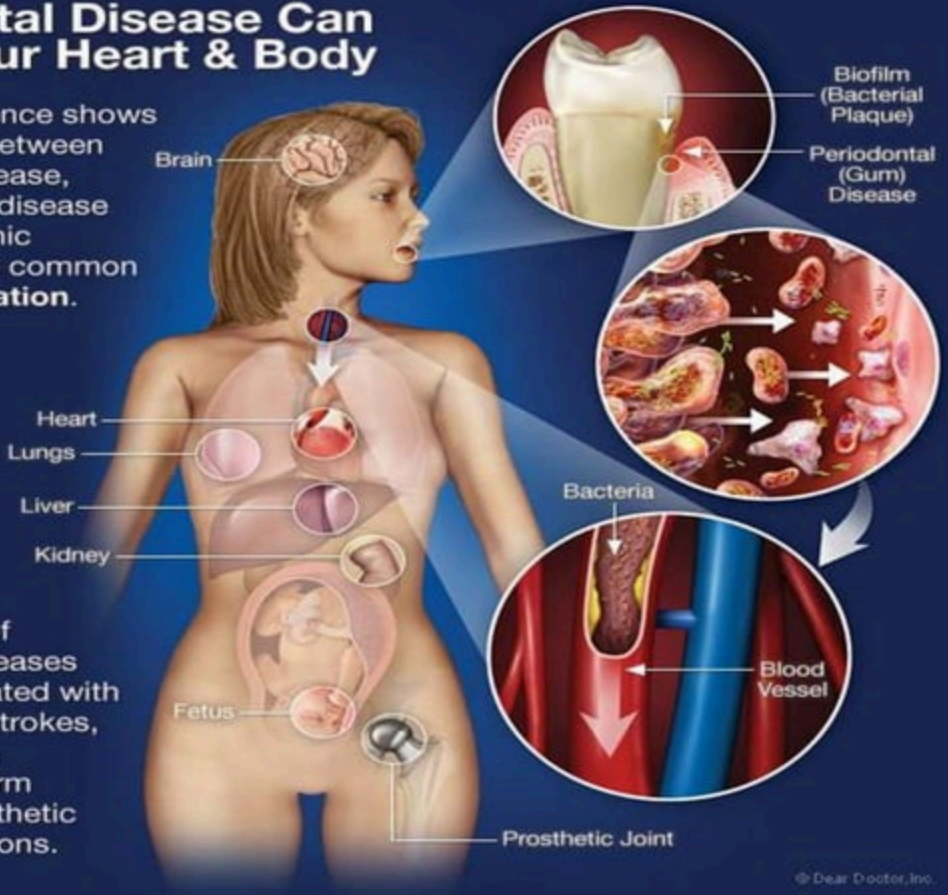
INTRODUCTION

- **Periodontal disease** is an infectious disease but environmental, physical, social & host stresses may affect & modify disease expression.
- Evidences also show the converse sides of relationship between systemic health & oral health i.e., the potential effect of periodontal disease on a wide range of organ system.


Symptoms of Periodontal Disease
Receding gums
Bleeding, swollen gums
Tooth loosening and loss
Healthy Gums
Periodontal Disease
Gums adherent to tooth
Receding gum line
Pocket between tooth and gums
Bone loss
Healthy bone
Plaque or tartar on teeth

Periodontal Disease Can Affect Your Heart & Body

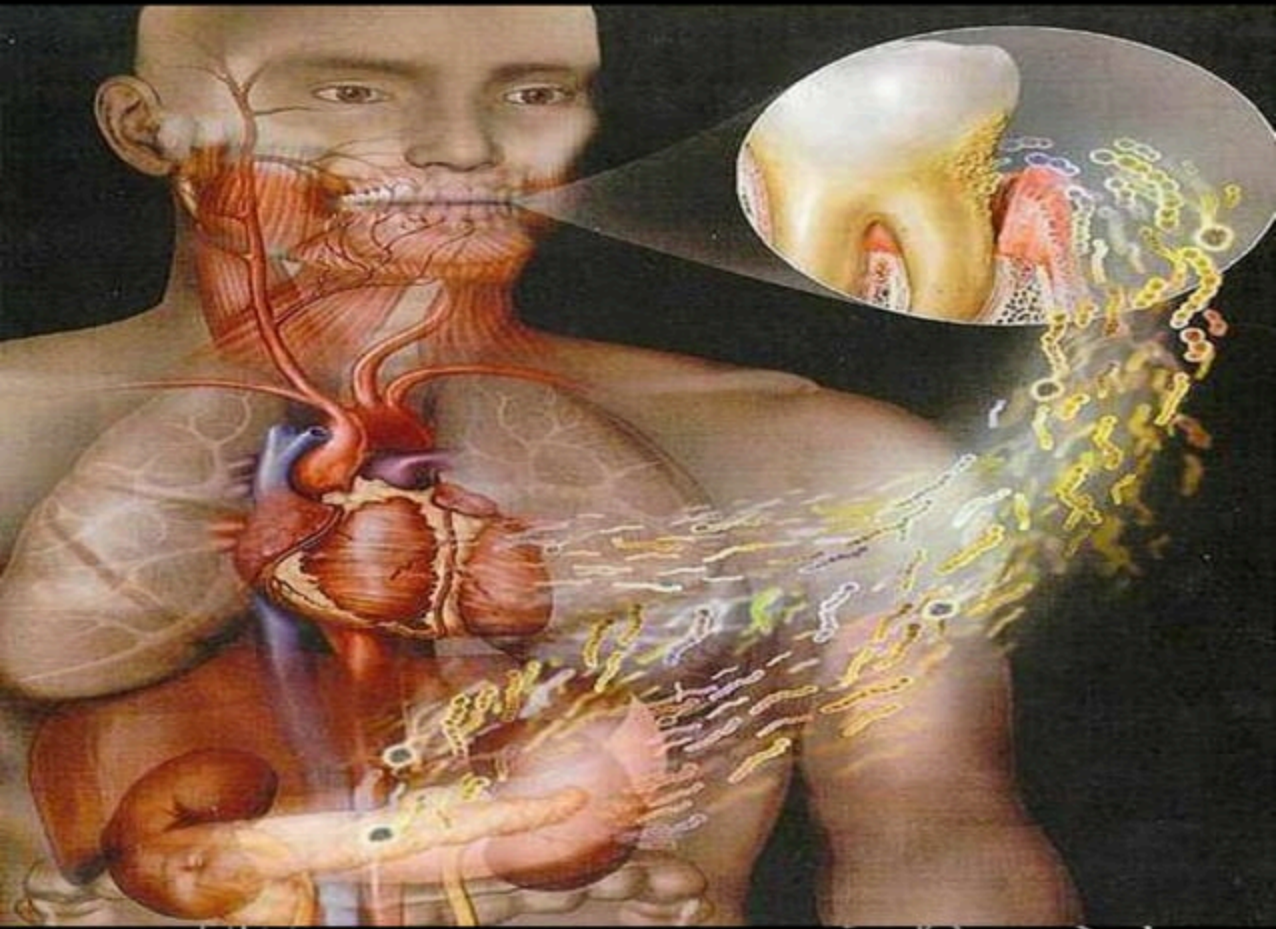
Emerging evidence shows a relationship between periodontal disease, cardiovascular disease and other chronic diseases — the common link is **inflammation.**



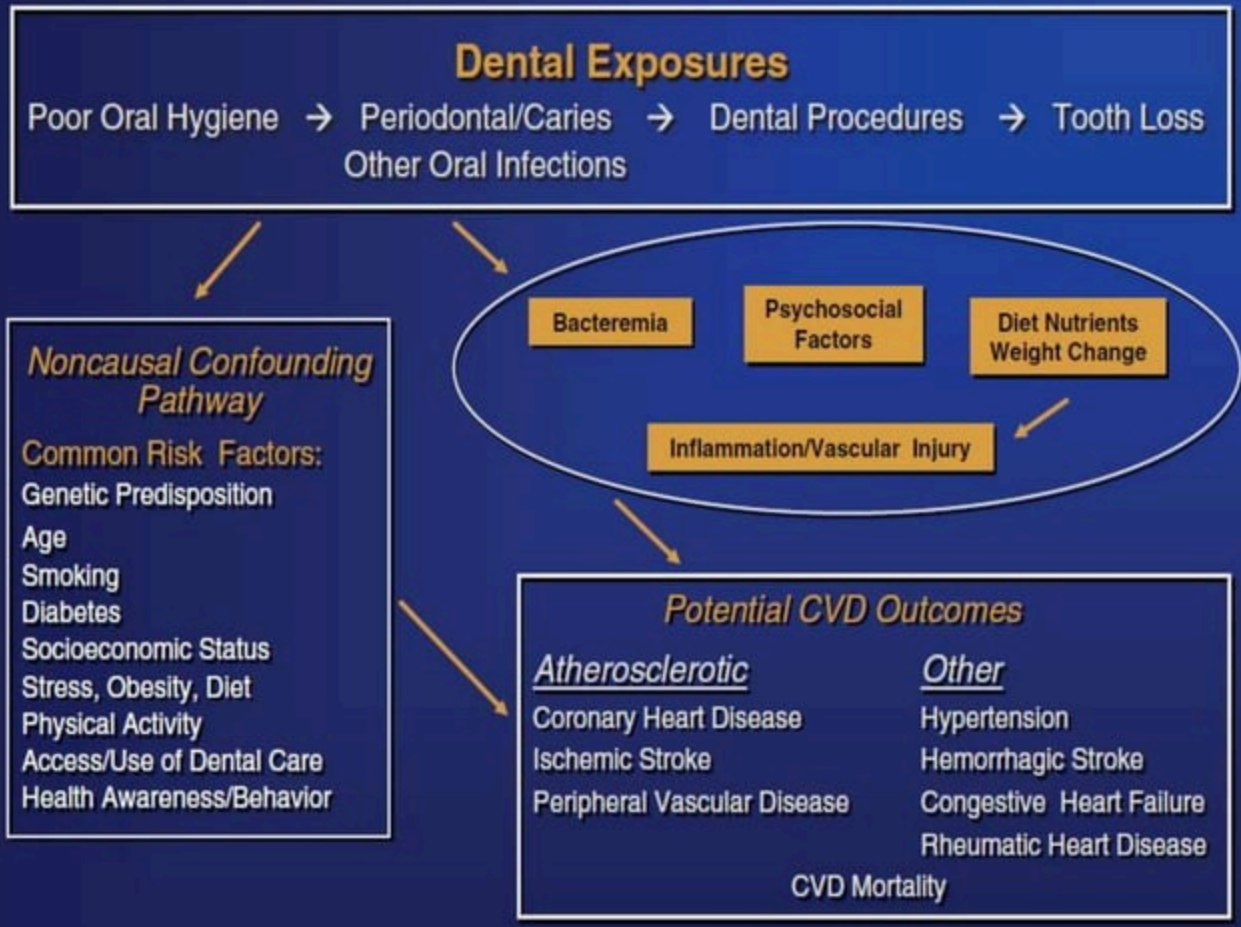
The presence of periodontal diseases may be associated with heart attacks, strokes, kidney disease, diabetes, preterm births and prosthetic joint complications.

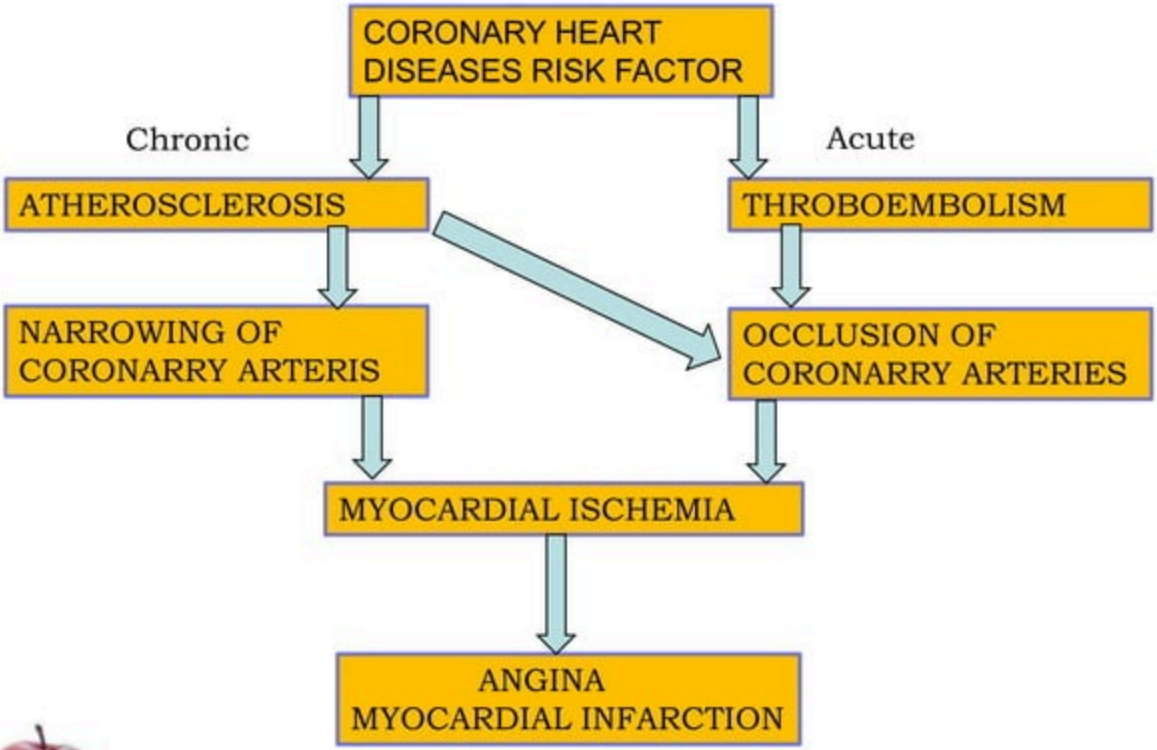
Periodontal Disease & Coronary Heart disease/Atherosclerosis

- To further explore the periodontal disease & CHD/atherosclerosis association, investigators have studied specific disorders & medical outcomes to determine their relationship to periodontal status.
- In cross sectional studies of patients with acute myocardial infection compared with age & gender matched control patients, MI patients had significantly worse dental health than did controls.



- This association between poor dental health and myocardial infarction was independent of known risk factors for heart diseases such as age, cholesterol level, hypertension, diabetes & smoking.
- There may be a greater risk for CHD related events such as MI when periodontitis affects a greater number of teeth in mouth as compared to subjects having periodontitis of fewer

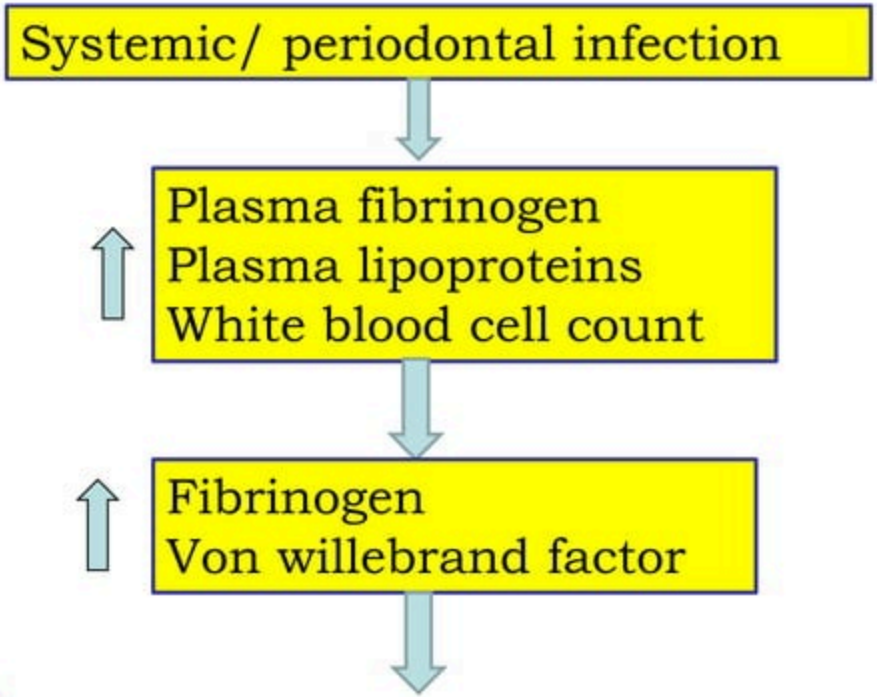

Dental Exposures
Poor Oral Hygiene → Periodontal/Caries → Dental Procedures → Tooth Loss
Other Oral Infections
Noncausal Confounding Pathway
Common Risk Factors:
Genetic Predisposition
Age
Smoking
Diabetes
Socioeconomic Status
Stress, Obesity, Diet
Physical Activity
Access/Use of Dental Care
Health Awareness/Behavior
Bacteremia
Psychosocial Factors
Diet Nutrients Weight Change
Inflammation/Vascular Injury
Potential CVD Outcomes
Atherosclerotic
Coronary Heart Disease
Ischemic Stroke
Peripheral Vascular Disease
Other
Hypertension
Hemorrhagic Stroke
Congestive Heart Failure
Rheumatic Heart Disease
CVD Mortality


CORONARY HEART DISEASES RISK FACTOR
Chronic
Acute
ATHEROSCLEROSIS
THROBOEMBOLISM
NARROWING OF CORONARRY ARTERIS
OCCLUSION OF CORONARRY ARTERIES
MYOCARDIAL ISCHEMIA
ANGINA
MYOCARDIAL INFARCTION

ISCHEMIC HEART DISEASE

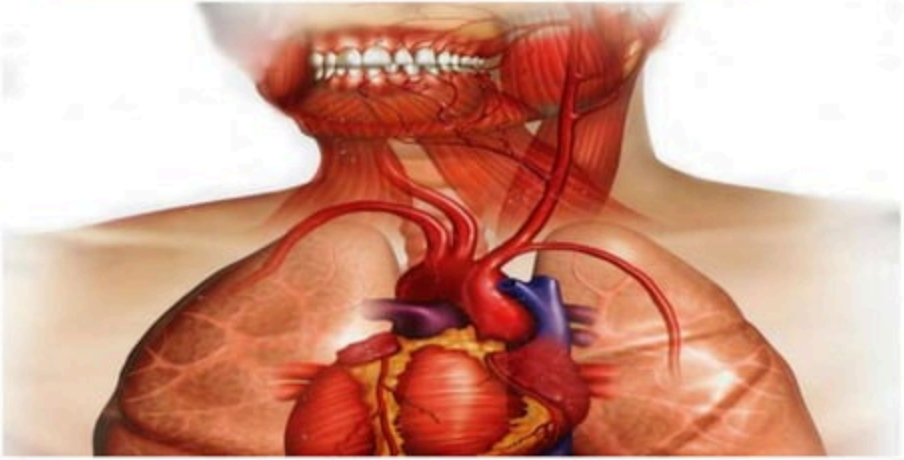
- IHD is associated with the process of atherogenesis and thrombogenesis.

- Increased viscosity of blood may promote major ischemic heart disease and cerebrovascular accident by increasing risk of thrombus formation.


Systemic/ periodontal infection
Plasma fibrinogen
Plasma lipoproteins
White blood cell count
Fibrinogen
Von willebrand factor

Blood viscosity

Ischemic heart disease



THROMBOGENESIS

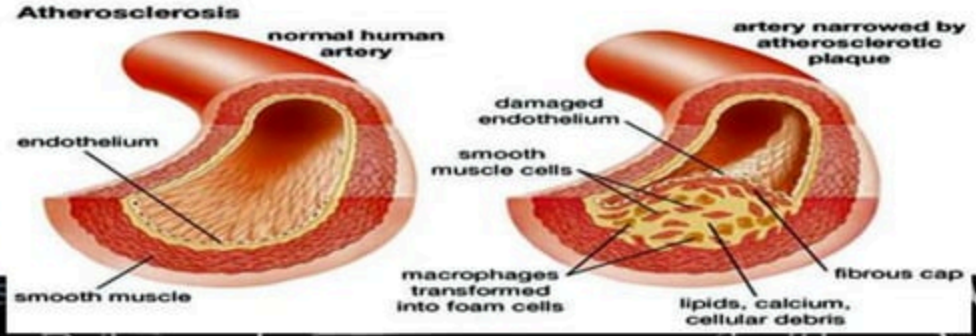
- Platelet aggregation plays a major role in thrombogenesis,& most cases of acute MI are precipitated by thromboembolism.
- Oral organisms may be involved in coronary thrombogenesis.
- Platelet selectively bind some strains of Streptococci sanguis, a common component of supragingival plaque & Porphyromonas gingivalis, a pathogen closely related with periodontitis.

- Aggregation of platelets is induced by the platelet aggregation associated protein (PAAP) expressed on some strains of these bacteria.

- It results in formation of thromboemboli and resultant cardiac and pulmonary changes.

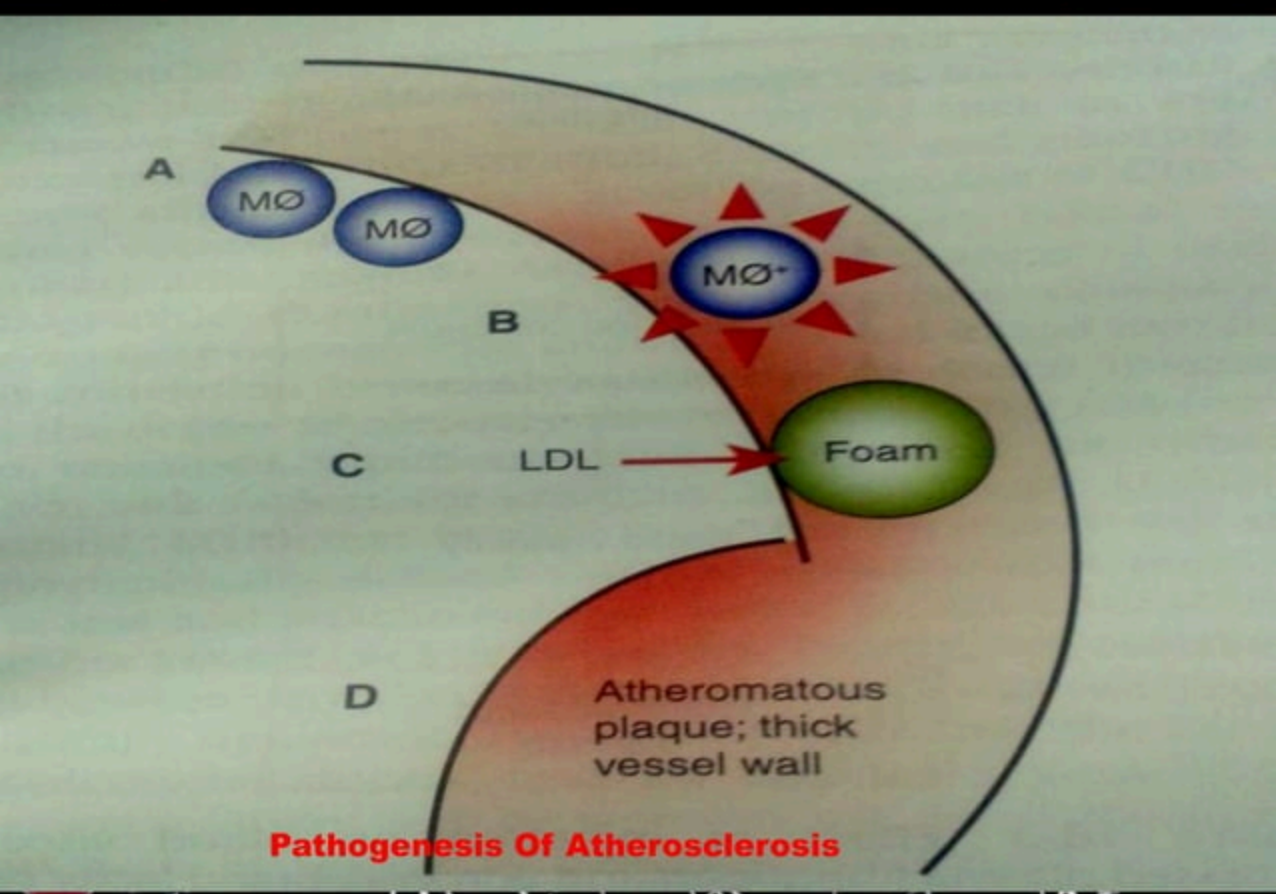
ATHEROSCLEROSIS

- Atherosclerosis is a local thickening of arterial intima,the innermost layer lining the vessel lumen, and the media, the thick layer under the intima consisting of smooth muscle, collagen & elastic fibres.



Pathogenesis

- First, circulating monocytes adhere to the vascular endothelium, mediated by various adhesion molecules including intercellular adhesion molecule-1(ICAM-1), endothelial leukocyte adhesion molecule-1 (ELAM-1) & vascular adhesion molecule-1(VCAM-1).
- After binding of the monocots, they penetrate the endothelium & migrate under the arterial intimae.



Pathogenesis Of Atherosclerosis

- Monocytes now injest the circulating low density lipoprotein (LDL), & form foam cells which are characterstics of atheromatous plaques.
- Proinflammatory cytokines, such as interleukin-1, tumor necrosis factor & prostaglandin E-2 are produced, which propogate the atheromatous lesion.

- Further there is smooth muscle and collagen proliferation within the media, thickening the arterial wall. Atheromatous plaque formation & thickening of vessel wall narrow the lumen & decrease the blood flow.
- Arterial thrombosis occurs after an atheromatous plaque ruptures.

Role of periodontal infection in myocardial infarction

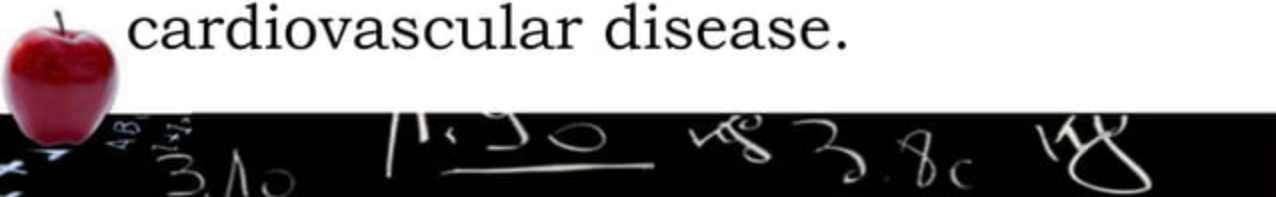
- In several studies of atheromas obtained during endarterectomy, more than half of the lesions contained periodontal pathogens.
- Periodontal diseases result in chronic system exposure to products of these bacteria.
- Low level bacterimia may initiate host responses that alter the coagulability, endothelial & vessel wall integrity, platelet function, resultin in thromboembolic events.

- There is wide variation in host response to bacterial challenge.
- Patients with exuberant inflammatory response have a hyper inflammatory monocyte/ macrophage phenotype.
- Here monocytes secrete increased levels of proinflammatory mediators in response to bacterial LPS compared to normal monocyte phenotype.

- The monocyte cell line is intimately involved in pathogenesis of both periodontal disease and atherosclerosis.
- Diet induced increased LDL level may increase secretion of destructive & inflammatory cytokines by monocytes.
- The presence of an Mϕ phenotype may place patient at risk of both CHD & periodontitis.

- Also, detection of systemic inflammatory markers play an important role in risk assesment for vascular events such as MI & cerebral infarction.
- Acute phase protein such as C- reactive protein (CRP) & fibrinogen are produced in liver in response to inflammatory or infectious stimuli & act as inflammatory markers.
- CRP induces monocytes to stimulate coagulation pathway & increases blood coagulability.

- Recent efforts have focused on periodontitis as a potential trigger for systemic inflammation.
- Serum CRP & fibrinogen levels are often elevated in subjects with periodontitis compared with non periodontitis subjects & may act as intermediary steps in the path way from periodontal infection to cardiovascular disease.



THANK YOU

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