

Diet, Adiposity, Physical Activity and Periodontitis Risk

Anwar T. Merchant DMD, ScD

**Departments: Nutrition, Harvard School of Public Health
Oral Health Policy and Epidemiology, Harvard School of
Dental Medicine**

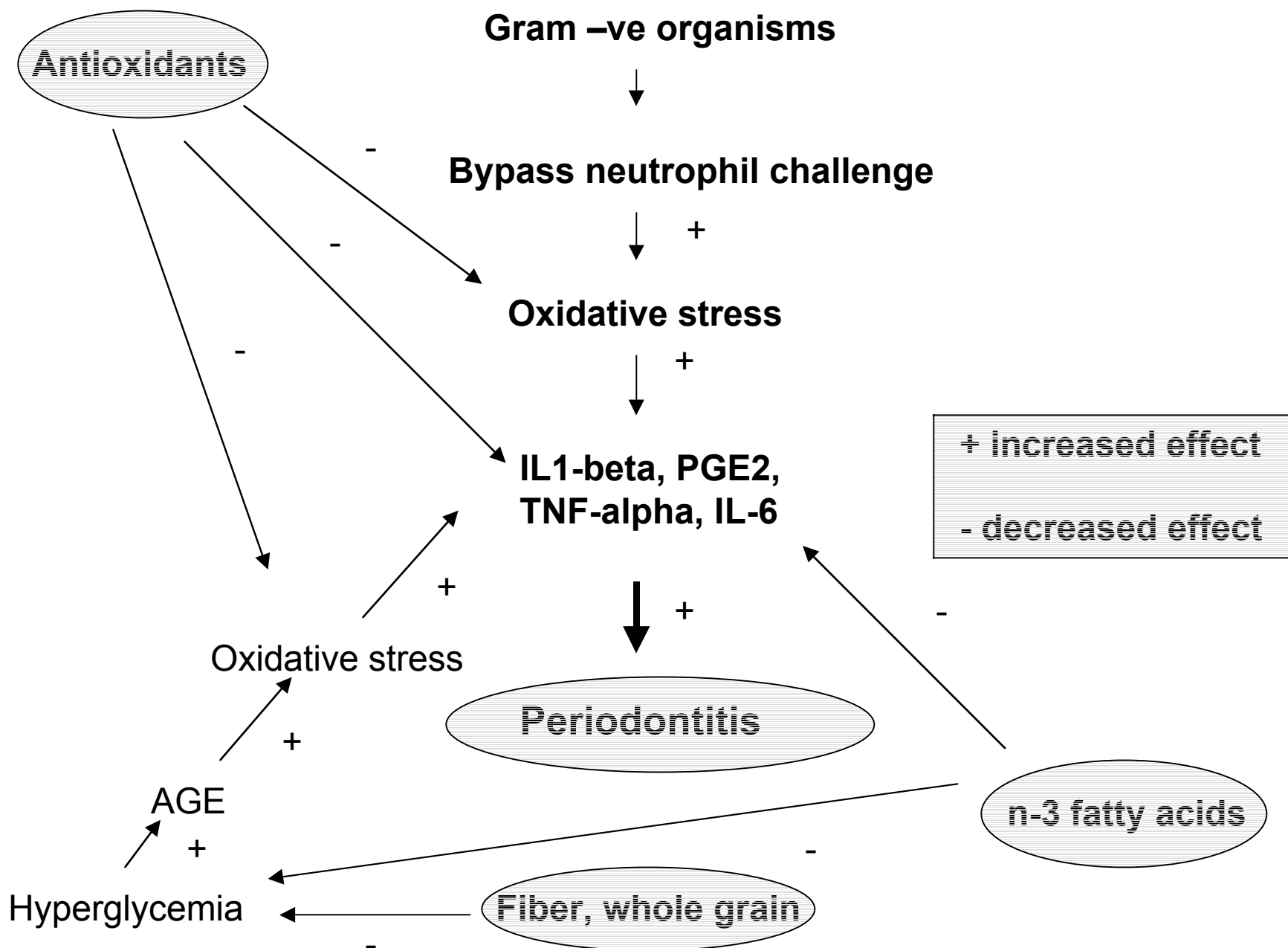
Email: anwar_merchant@hsdm.harvard.edu

Role of diet

- Antioxidants and essential fatty acids
 - Reduce oxidative stress
 - Reduce inflammation
 - Enhance immune response
- **Even in well-nourished populations**
- Fiber intake improves insulin sensitivity

Role of diet

- Dietary antioxidants (for example vitamin C, E, carotenoids) associated with reduced risk of respiratory and helicobacter pylori infections
- Essential fatty acid intake reduces infection risk
- Wholegrain intake reduces risk of CHD and diabetes



Rationale

- Plausible mechanisms for diet and exercise to potentially effect periodontitis
- Modifiable risk factors
- Can potentially affect many people
- Can give clues about disease mechanisms
- In the few reported studies of diet and periodontitis:
 - Exposure badly measured
 - Outcome not periodontitis but bleeding gums
 - Not longitudinal

Objectives

- To prospectively examine the relation of periodontitis risk and
 - Adiposity
 - Physical activity
 - Fiber and wholegrain intake
 - Nut intake
 - Fruits and vegetable intake

Methods

- Health Professionals Follow-up Study (HPFS)
 - prospective cohort study of the etiology of heart disease and cancer among US males
 - dentists (58%)
 - began in 1986 with 51,529 men aged 40-75 years
 - comprehensive validated diet survey, lifestyle including physical activity, and medical history
 - updated every 2 years (diet every 4 years)

Outcome

- Radiographic assessment:
 - dental radiographs taken between 1986 and 1998 for 166 participants
 - periodontist measured radiographic bone loss (mm) at two interproximal sites
 - ≥ 5 mm bone loss at one or more site=periodontitis
- Questions (updated every 2 years) asking for
 - professional diagnosis of periodontitis
 - tooth loss

Statistical methods

- Pooled logistic regression for analysis of self-reported periodontitis
- Generalized linear models for analyses of mean bone loss and mean intake
- All analyses adjusted for age, smoking, diabetes, alcohol intake, total energy, BMI

Relative Risk (RR) of periodontal disease by quintiles of waist circumference*

Median quintile, inches	RR (95%CI)
Q1, 33.5	1.00
Q2, 35.8	0.97 (0.80-1.19)
Q3, 37.3	1.14 (0.94-1.37)
Q4, 39.3	1.19 (0.97-1.46)
Q5, 42.8	1.41 (1.17-1.71)

* Adjusted for age, smoking, physical activity, BMI, alcohol intake, calories. p-value for trend<0.001

Relative Risk (RR) of periodontal disease
by quintiles of cumulatively averaged physical activity*

Median METs/quintile	RR (95%CI)
Q1, 3.0	1.00
Q2, 10.7	1.07 (0.99-1.21)
Q3, 19.4	0.93 (0.81-1.06)
Q4, 32.6	0.97 (0.85-1.12)
Q5, 58.8	0.87 (0.76-1.01)

* Adjusted for age, smoking, BMI, alcohol intake, calories.
p-value for trend=0.02

Fiber and whole grain

- Mean intakes comparing periodontitis and no periodontitis (diagnosis by radiograph):
 - Cereal fiber, 3.7 versus 5.4 g/d, p-value=0.001
 - Wholegrain, 1.1 versus 1.7 servings/d, p-value=0.03
- Risk of self-reported periodontitis comparing low to high intakes:
 - Cereal fiber, RR=0.89, 95% CI 0.77-1.03, p-value for trend=0.04
 - Wholegrain, RR=0.81, 95% CI 0.70-0.93, p-value for trend=0.001

Nuts

- Source of vitamin E, n-6 and alpha-linolenic acid, and fiber
- Mean bone loss comparing men eating less and more nuts (2.44 versus 2.19, p-value=0.26)
- Risk of self-reported periodontitis comparing low to high nut intake:
RR=0.83, 95%CI 0.72-0.96 (comparing men eating at least some nuts to almost never)

Fruits and vegetables

- Risk of self-reported periodontitis comparing low to high intakes:
RR citrus fruit =0.82, 95%CI 0.72-0.94
RR leguminus vegetables=0.88, 95%CI 0.77-1.01
- Similar with missing teeth
- Not enough variation in exposure to evaluate bone loss

Strengths and Limitations

Strengths

- Prospective study
- Good quality data
- Diet validated and measured well
- Self-reported periodontitis validated
- Results of self-reported and x-ray diagnosed periodontitis consistent
- Long follow-up

Limitations

- Few men with x-rays and hence sample small
- Mostly depends on self-reported periodontitis

Conclusions

- Early results show that periodontitis risk may be reduced by:
 - Exercising regularly
 - Keeping a small waistline
- Eating more:
 - Cereal fiber and wholegrain (Approximately one bowl of high fiber breakfast cereal and one bran muffin or one serving of beans)
 - Citrus fruits
 - Legumes
 - Nuts
- Need to evaluate associations further with more x-ray diagnosed cases