Diabetes and Oral Health – A 2-Way Street

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Epidemiology of Diabetes Mellitus

- Overall, ~34.2 million Americans have DM
  - 26.8 million diagnosed; 7.4 million undiagnosed
- 10.2% of total population; 26.8% of adults > age 65

- 34.5% (~88 million) over age 18 have prediabetes
  - (~48-50% of people over age 65)
- High prevalence/incidence tracks with obesity
  - 89% of adults with DM were overweight or obese

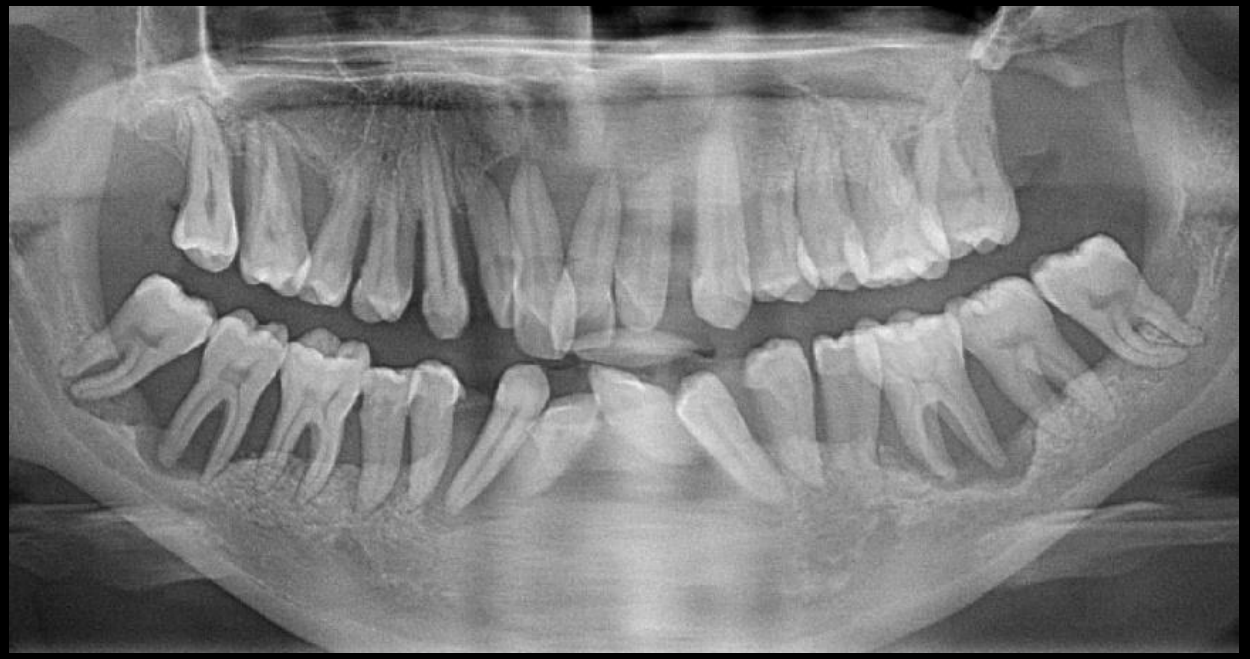
CDC - National Diabetes Statistics Report 2020

Periodontal Changes Associated with Diabetes

- Enlarged, hemorrhagic tissues
- Proliferative gingival tissues
- Increased rate of bone/attachment loss
- Numerous mobile teeth
- Periodontal abscesses - often multiple

Periodontal Changes Associated with Diabetes

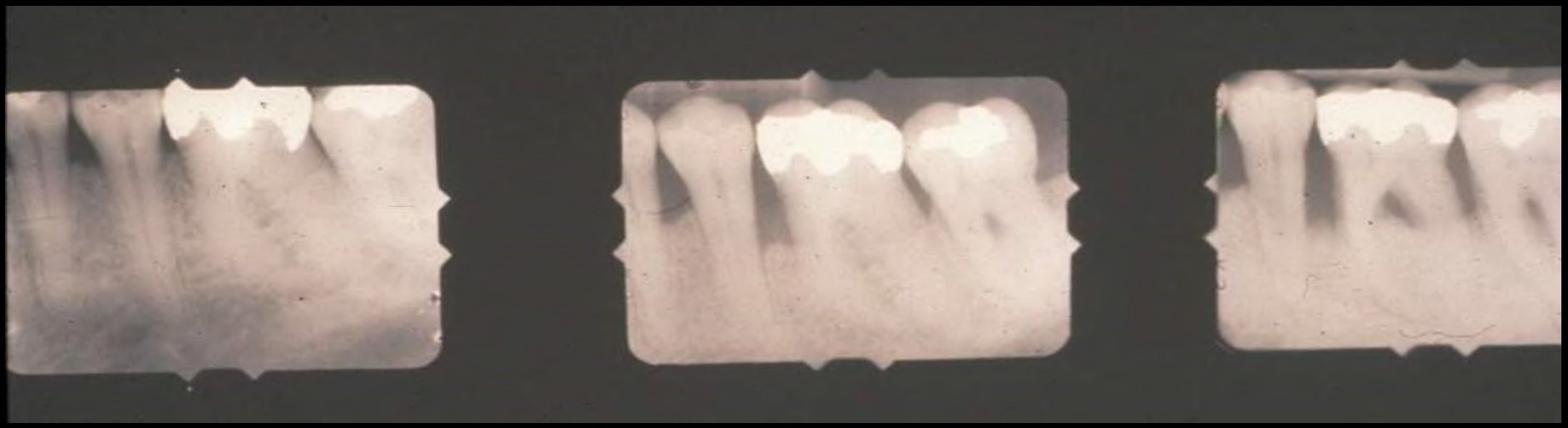
- Common sign is more rapid bone/attachment loss than expected given oral hygiene (sometimes, it's obvious)



29 YOHF; severe bone/attachment loss

Periodontal Changes Associated with Diabetes

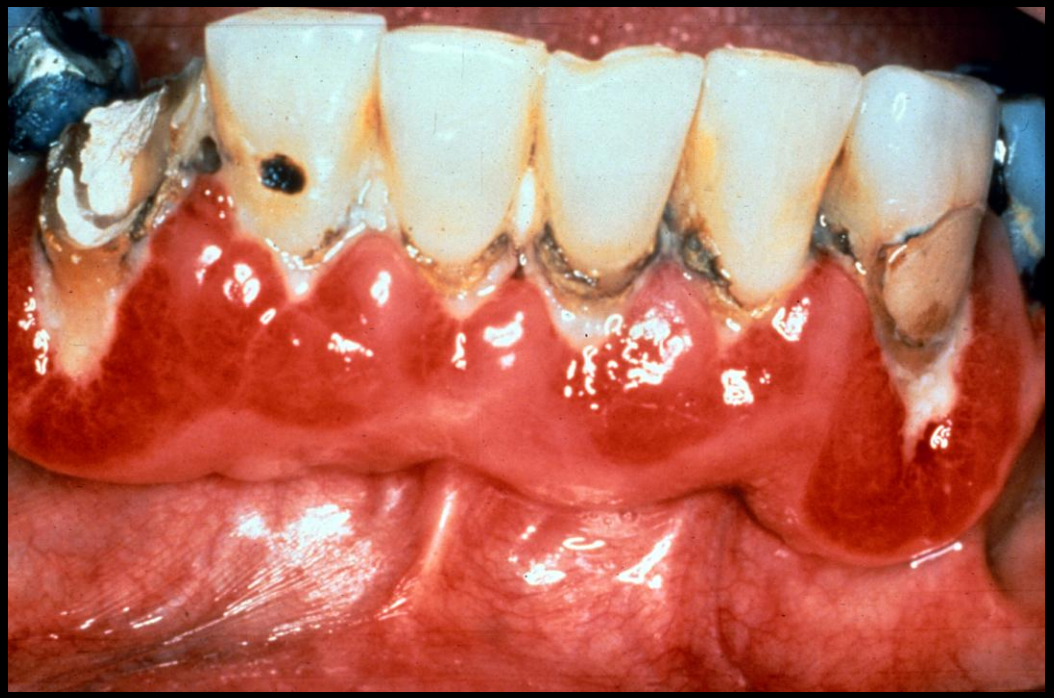
- Common sign is more rapid bone/attachment loss than expected given oral hygiene



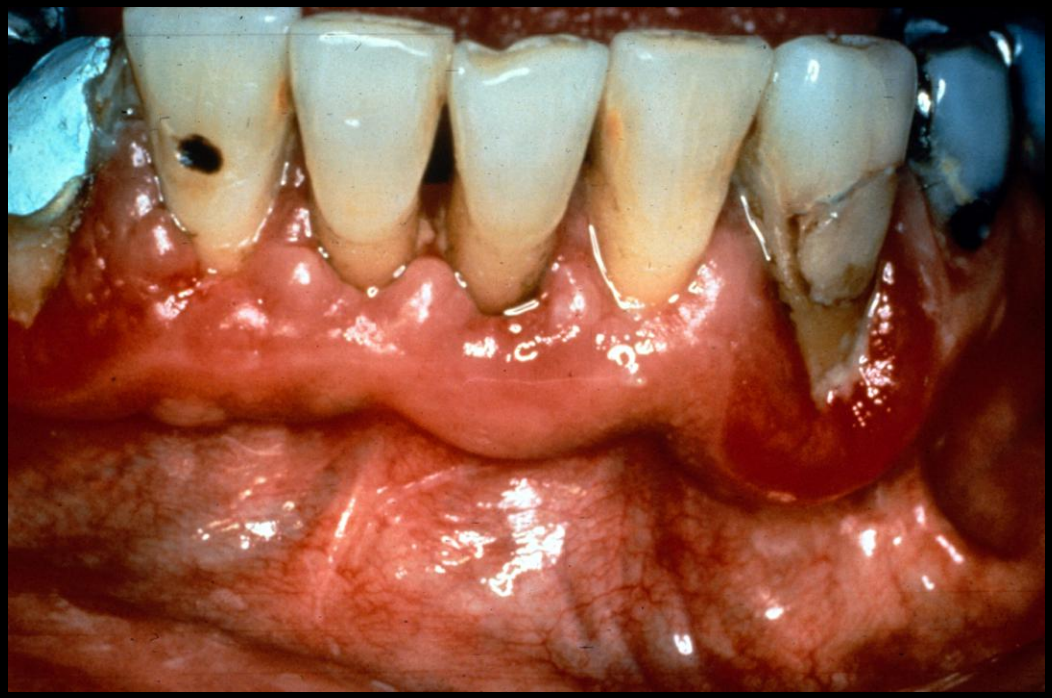
Time 0 4 years 8 years

Periodontal Treatment - Diabetes

Poor healing after therapy

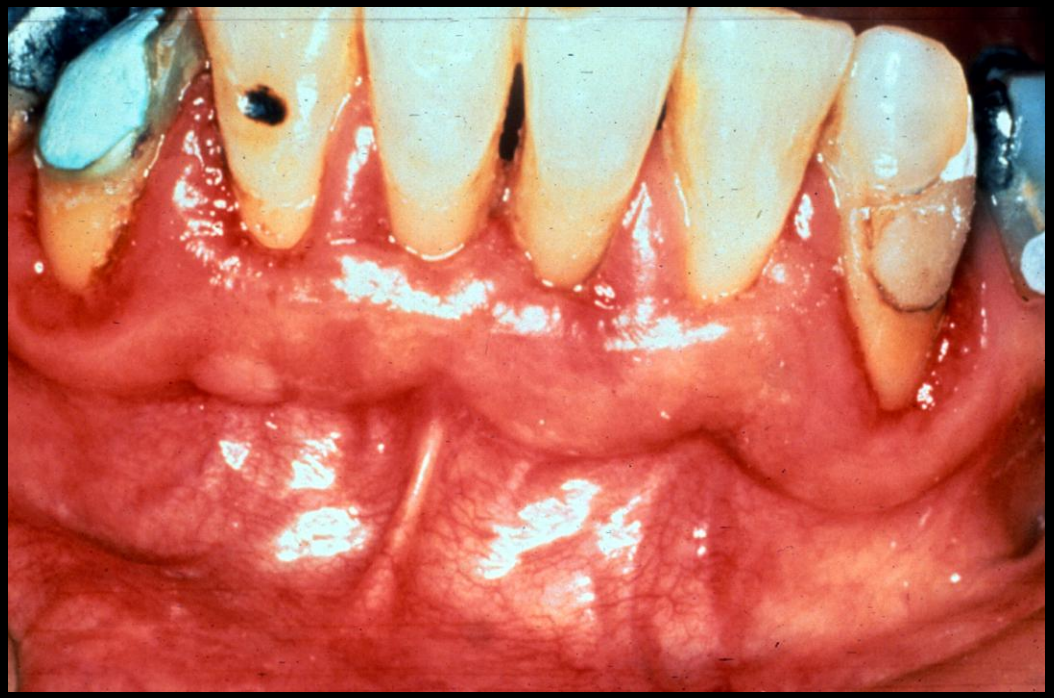


Initial Presentation



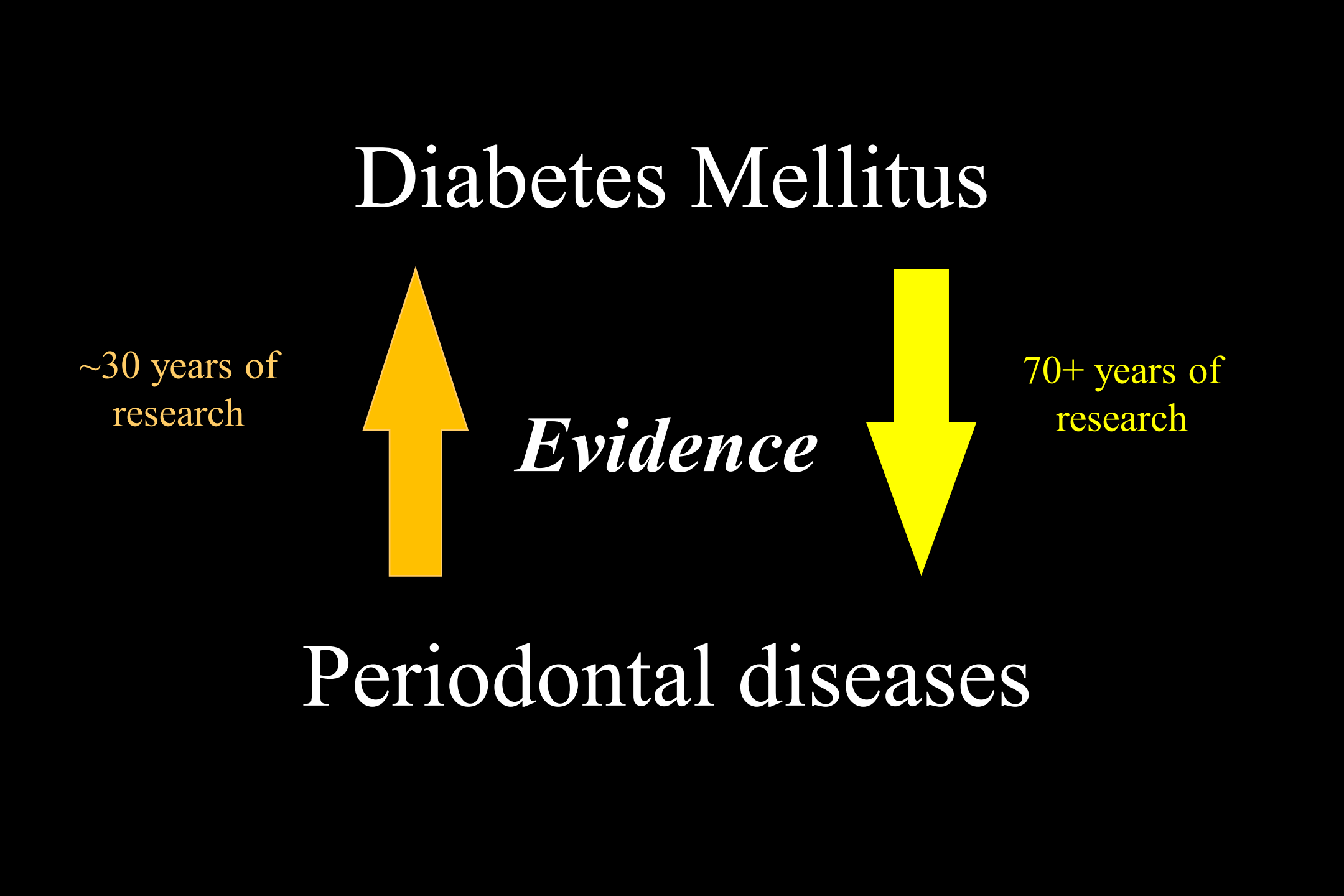
Post-SCRP

Periodontal Treatment - Diabetes



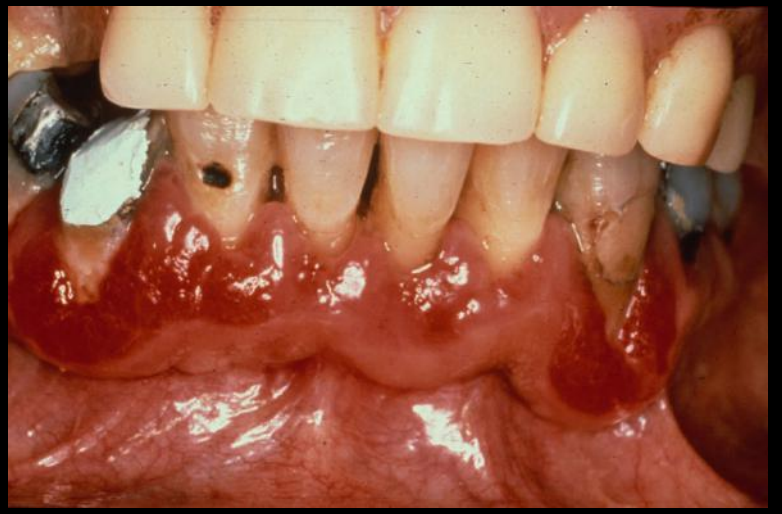
After dx and tx of DM

1 year post-SCRP


Diabetes Mellitus
~30 years of research
Evidence
70+ years of research
Periodontal diseases

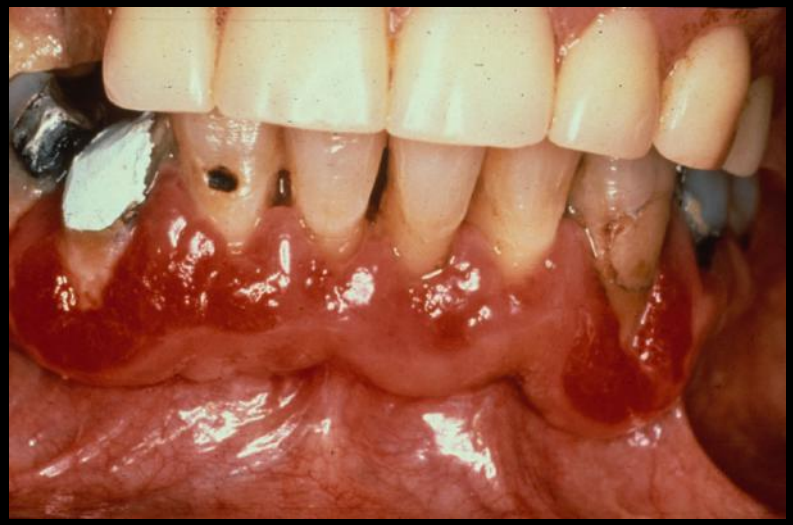
Diabetes and Periodontal Diseases

- Is diabetes associated with increased prevalence or severity of gingivitis/periodontitis?
- Does level of glycemic control affect degree of gingival inflammation or periodontal destruction?

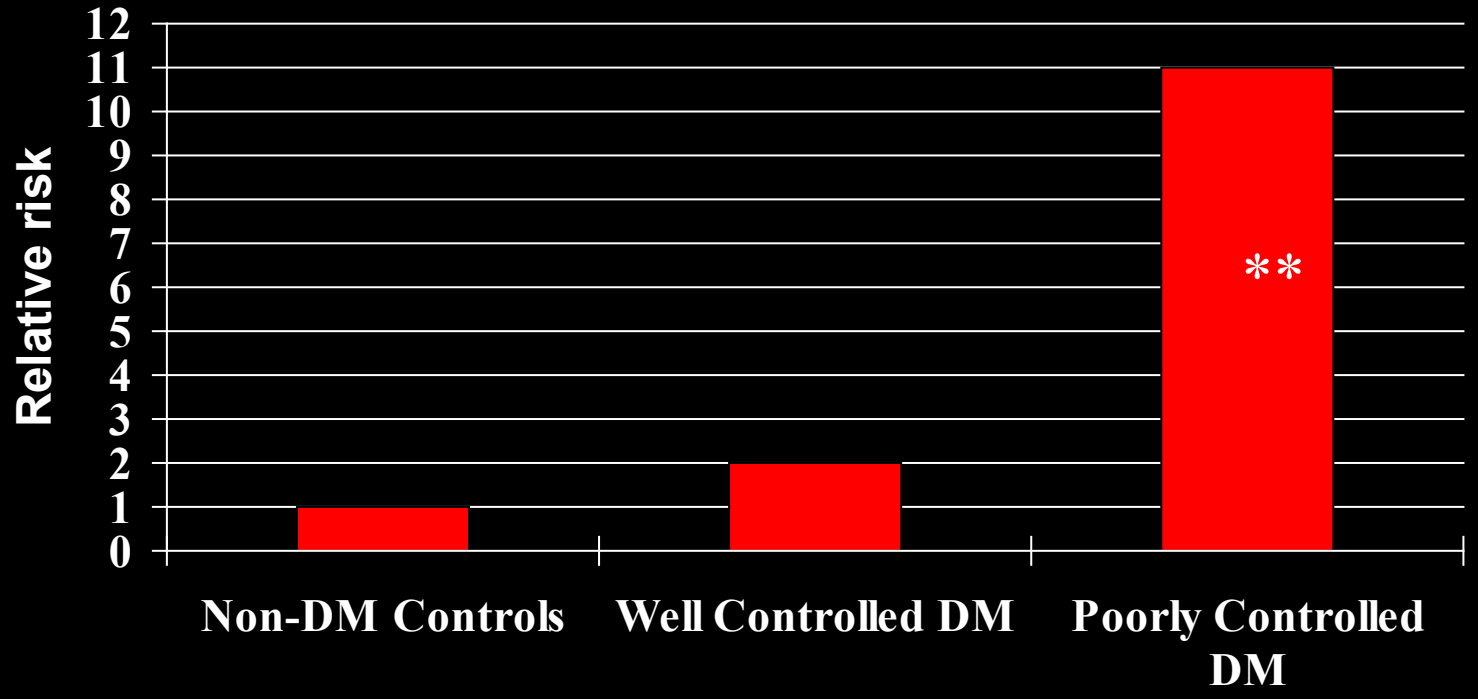


Diabetes and Periodontal Diseases

- Poorly controlled diabetes increases risk of gingival inflammation
- Poorly controlled diabetes increases risk of periodontitis ~3-fold
- Well controlled diabetes does not increase risk of gingivitis or periodontitis
- Glycemic control is key!



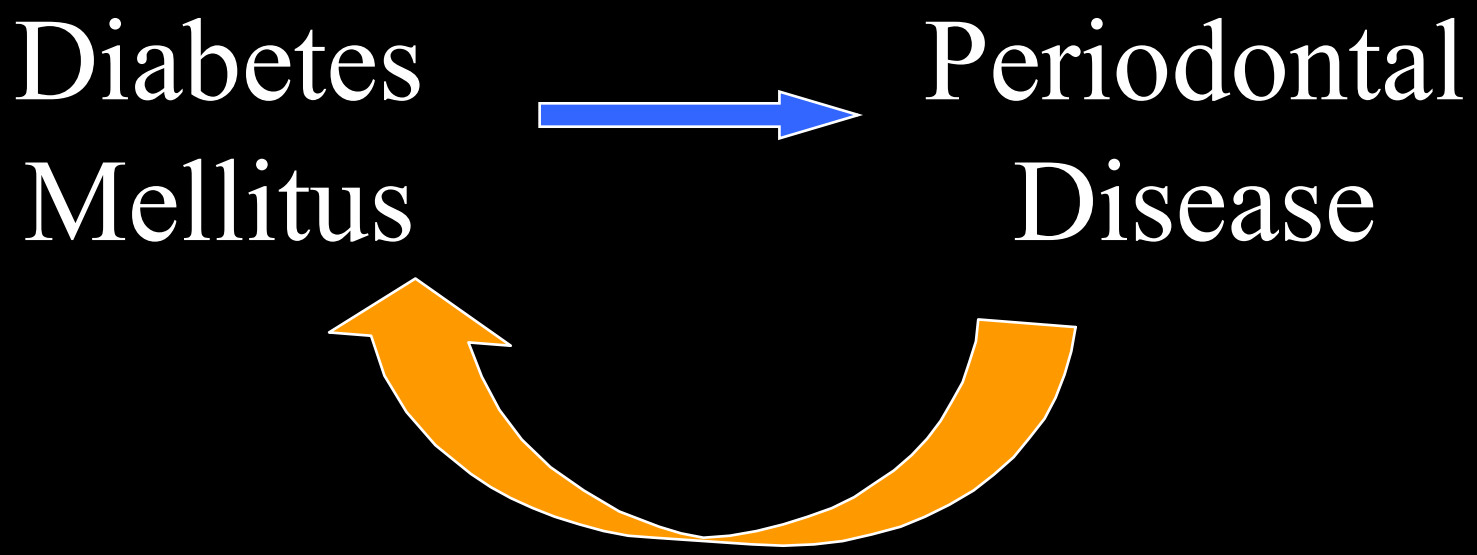
Risk of **Progressive** Bone Loss Over 2 Years



** $p<0.01$

Glycemic control is IMPORTANT!!
Patient must be told that good diabetes control → good periodontal health.

Taylor et al. *J Periodontol* 1998

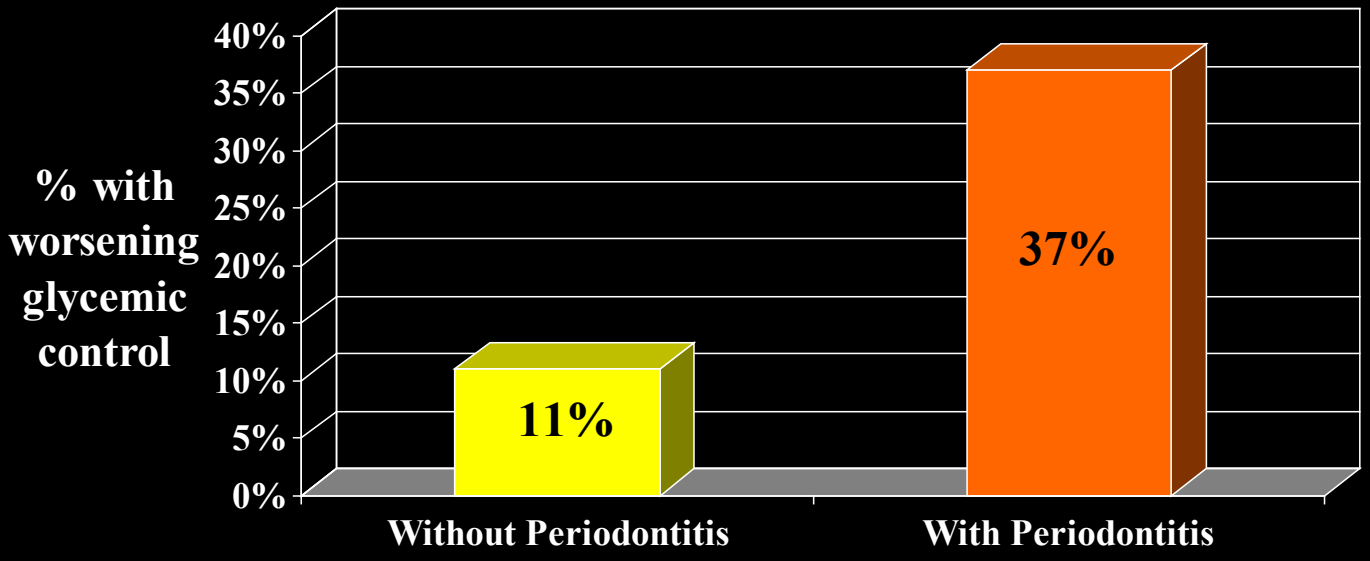


- Effect of periodontitis on metabolic state
- Effect of periodontal therapy on glycemic control

Effects of Periodontal Infection on Glycemia

Does Periodontal Disease Affect Glycemic Control?

- Type 2 DM subjects <u>with</u> severe periodontitis had increased risk of *worsening* glycemic control over 2 years compared to diabetic subjects <u>without</u> periodontitis



Taylor et al. 1996

Diabetes Mellitus

Periodontal Disease

Periodontal Therapy

??

Glycemic Control

Periodontal Treatment and Diabetes Control

- Periodontal treatment often associated with improved glycemic control
  - Especially in patients who show decreased periodontal inflammation after treatment

Treatment of Patients with Diabetes

- Do diabetic patients with periodontitis respond to periodontal therapy?
  - Systematic review of 12 studies comparing results of nonsurgical periodontal therapy in periodontitis patients with and without type 2 DM
  - No significant difference in PD reduction or CAL gain between DM and non-DM patients
  - Patient's level of glycemic control (HbA1c) at baseline did not significantly affect the difference in PD reduction or CAL gain

Hsu et al. *J Clin Periodontol* 2019

Periodontal Treatment & Glycemic Control

- Meta-analysis of 5 controlled periodontal intervention trials examining effect on HbA1c in type 2 DM only; 315 total patients
  - compared SCRP alone (no systemic antibiotics) to no treatment or coronal scaling only
  - studies published 2005-2012
- Overall, SCRP was associated with a significantly greater reduction in HbA1c of 0.65% compared to controls (no heterogeneity among studies)

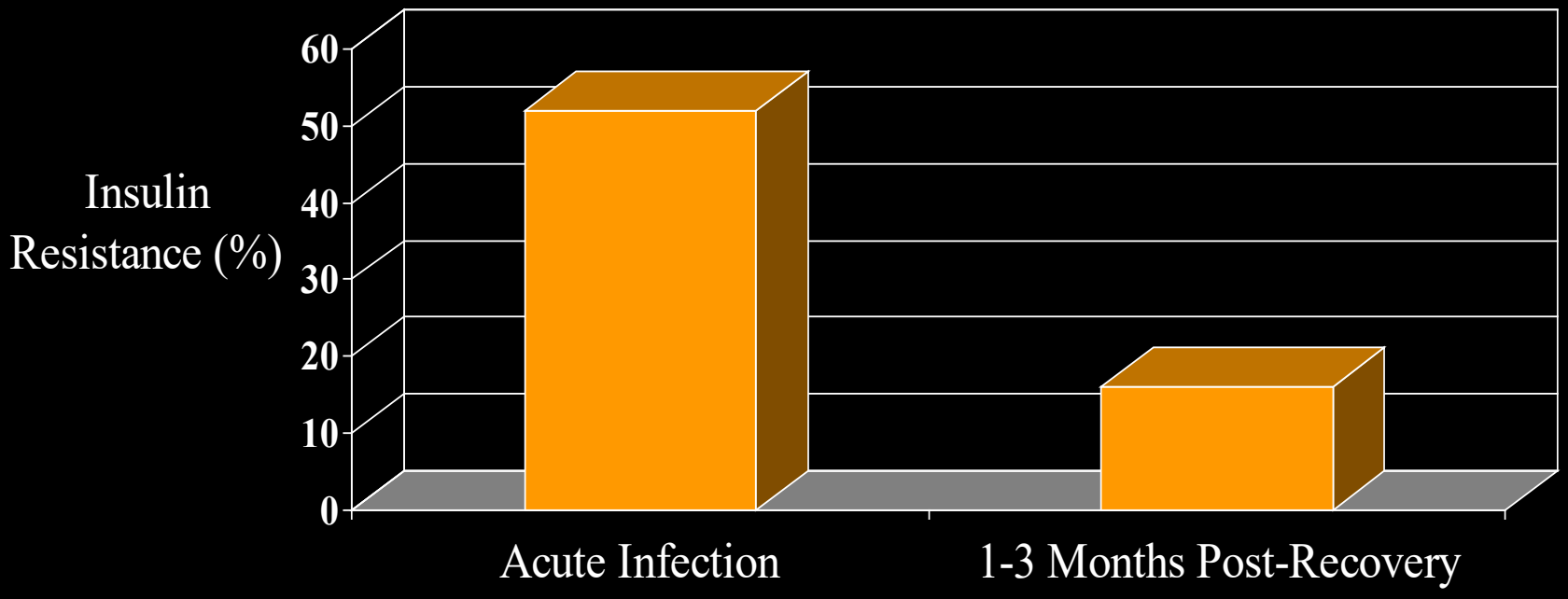
Sgolastra et al. *J Periodontol 2013*

HOW Can Periodontal Disease Affect Diabetes?

- By changing the way the body uses insulin
- Inflammation INCREASES insulin resistance and makes blood sugar harder to control
- Insulin resistance is the major CAUSE of type 2 diabetes!!
  - The body cannot use the insulin that is being made in the pancreas; so blood sugar is not controlled

Infection and Glycemic Control

- Infection increases insulin resistance & alters glycemic control
- Resistance persists after clinical recovery (days-to-months)



Yki-Jarvinen. *J Clin Endocrinol Metab* 1989

Obesity, Periodontal Disease and Diabetes

- Obesity is #1 risk factor for type 2 diabetes
- Obesity INCREASES insulin resistance like inflammation does
  - Adipocytes produce proinflammatory cytokines like TNF-α, which directly change the insulin receptor and prevents insulin from working
- Periodontal inflammation ALSO causes increase in serum levels of inflammatory mediators like TNF-α, which cause insulin resistance like obesity does

Obesity/Illness

Increased Serum TNF-α, IL-6 (Systemic Inflammation)

Insulin Resistance & Poor Diabetes Control

Periodontal Inflammation

Increased Serum TNF-α, IL-6 (Systemic Inflammation)

Diabetes Mellitus

Periodontal diseases

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