Tobacco and Oral Health

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UCSF
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advancing health worldwide

Oral health is important.

Oral diseases affect more people worldwide than any other health condition of humankind

Untreated tooth decay more prevalent than heart disease, cancer, diabetes, asthma, & upper respiratory infections combined

Oral disease highly prevalent in poor and wealthy countries:

- 91% of US adults age 20-64 have ever had tooth decay
- 46% of US adults age ≥30 currently have periodontitis

Marcenes, et al. (2013) *J Dent Res* 92(7):592-7
Vos, et al. (2012) *Lancet* 380(9859):2163-96
NCHS Data Brief No. 197 May 2015
Eke, et al. (2015) *J Periodontol* 86(5):611-22

Oral health is important.

Poor oral health can substantially restrict daily functioning and have a profound effect on quality of life and overall wellbeing

Treatment Costly:
$124 Billion in oral health expenditures (United States, 2016)

Stark Oral Health Disparities:

- By race/ethnicity, socioeconomic position, and geography
- Health care need Americans most likely to forgo due to cost

The Oral Health Atlas. 2nd ed. Geneva: FDI World Dental Federation; 2015
American Dental Association Health Policy Institute; 2017
Vujicic M, et al. (2016) *Health Aff (Millwood)* 35(12):2176-82.

“Oral health” encompasses multiple conditions

Conclusively or Potentially Connected to Tobacco Use:

Oral and Pharyngeal Cancers
Periodontal Disease
Tooth Loss
Poor Response to Periodontal Tx.
Failure of Dental Implants
Surgical Complications
Dental Caries (?)
Oral Pain (?)

Dry Mouth
Nicotine Stomatitis
Oral Leukoplakia
Oral Infections (?)
Halitosis
Plaque Biofilm Accumulation
Calculus (Tartar)
Tooth Staining

This presentation

Review tobacco + oral health connections

- Primarily periodontal disease
- Primarily the epidemiologic evidence

Focus on cigars:

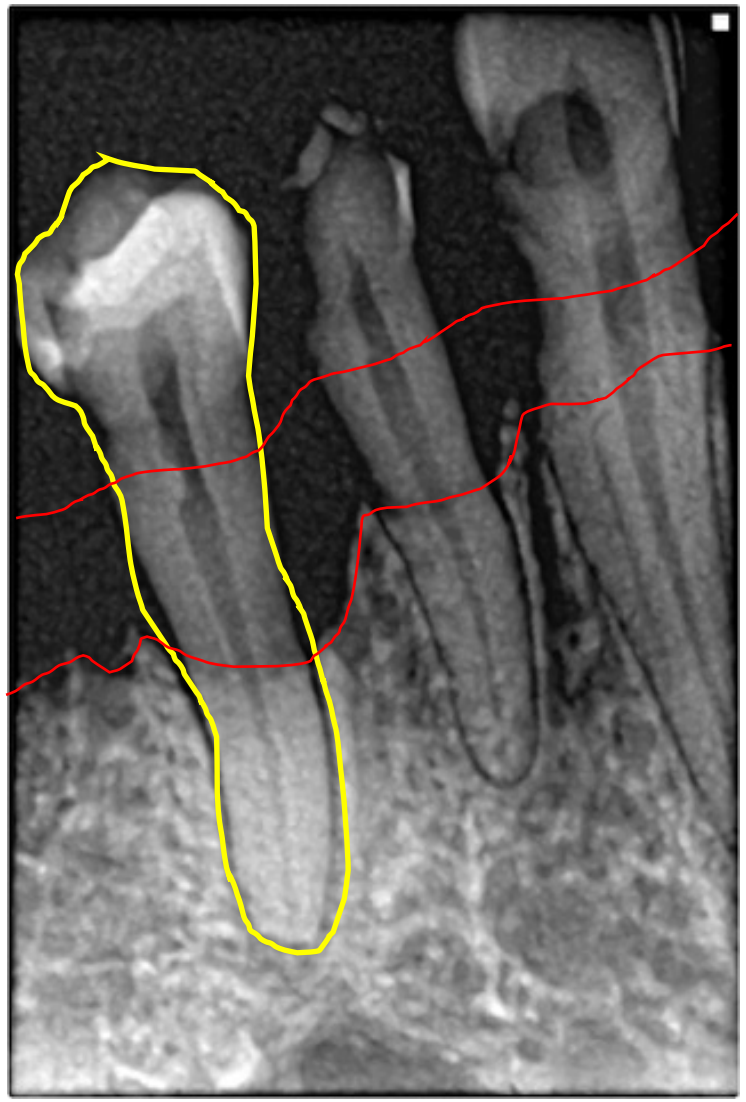
To my knowledge, no studies have examined possible differences in oral health effects by type of cigar, such as premium cigars versus cigarillos or cigarette-like small cigars

Periodontal Diseases affect supporting structures of the teeth

- Host-mediated inflammation in response to sub-gingival bacteria, causing destruction of tooth-supporting structures

- Can be mild (gingivitis)
- Severe, progressive: can cause tooth loss

- Associated with other chronic and pro-inflammatory conditions (e.g., diabetes)



Genco RJ, Borgnakke WS. (2013) *Periodontol 2000.* 62(1):59-94.
Radiograph image courtesy Dr. Joyce Cheng (Menlo Park, CA)

Tobacco Smoke

Extensive evidence implicates tobacco smoking in periodontal disease

Cross-Sectional:
Smoking + Gingivitis

De la Bergeron (1859)
Pindborg (1947)
Pindborg (1949)
Ludwick (1952)
Shields (1977)

Nationally Representative:
Smoking + Perio. Diagnosis

Ismail (1983)
Tomar (2000)
Do (2008)
Han (2012)
Eke (2015)

Prospective:
Smoking + Bone/Attachment Loss

Bolin (1993)
Bergstrom (2000)
Thomson (2007)
Haas (2014)

Cross-Sectional:
Smoking + Bone/Attachment Loss

Arno (1959)
Brandtzaeg (1964)
Solomon (1968)
Summers (1968)
Sheiham (1971)

Confounder Adjusted:
Smoking + Perio. Diagnosis

Ismail (1983)
Bergstrom (1987)
Bergstrom (1991)
Grossi (1994)
Calsina (2002)
Corraini (2008)

Prospective:
Smoking + Tooth Loss

Krall (1999)
Dietrich (2007)

Reviewed in:
Chaffee BW, Couch ET, Ryder MI. (2016) *Periodontol 2000.* 71(1):52-64.

Tobacco Smoke likely contributes via multiple mechanisms

Change composition of oral microflora in plaque biofilm

Eggert (2001), Apatzidou (2005), Bostrom (2005), Shchipkova (2010), Kumar (2011)

- Open area of research
- Some studies suggest similar pathogens in smokers + non-smokers
- Overall microbial profile appears to differ

Affect the host inflammatory response

Barbour (1997), Johnson (2004), Palmer (2005)

- Impair immune response (neutrophils, antibodies, etc.)
- Stimulate inflammatory cytokines and enzymes

Impair tissue regeneration and repair

Raulin (1988), Sorensen (2012), Kallala (2013)

- Decrease activity of fibroblasts, osteoblasts
- Reduce localized blood flow

Reviewed in:
Chaffee BW, Couch ET, Ryder MI. (2016) *Periodontol 2000.* 71(1):52-64.

Most Studies of Periodontal Disease + Smoking Focus on Cigarette Use

Associations w/ Non-Cigarette Product Use Suggest Generalizable Effects

Periodontal Disease Associated with Use of:

Hookah Waterpipe Tobacco Natto (2005), Bibars (2015), Javed (2016)

Cannabis Thomson (2008), Jamieson (2010), Shariff (2017), Ortiz (2018)

Smokeless (Oral) Tobacco Ernster (1990), Fisher (2005)

Cigars (SEE UPCOMING SLIDES)

Cigars and Periodontal Disease

Baltimore Longitudinal Study of Aging

Albandar JM, Streckfus CF, Adesanya MR, Winn DM. *J Periodontol* 2000; 71: 1874-81

Oral health sub-study (N=705) Cross-sectional analysis

Dates of data collection unclear (1990s?)

Clinical periodontal examination

Self-reported current and former use of cigarettes, cigars, pipes

N=3 current (daily) cigar users

Combined in analysis with former heavy cigar users current/former pipe users (N=56)

Combined group: higher prevalence of moderate/severe periodontal disease than non-smokers (18% vs. 6%), but lower than current cigarette smokers (26%)

Cigars and Periodontal Disease

Veterans Affairs Dental Longitudinal Study

Krall EA, Garvey AJ, Garcia RI. *J Am Dent Assoc* 1999; 130: 57-64.

VADLS enrolled veterans (not VA pt.) in 1960s

Original cohort (N=1231): Boston area, 100% male, 97% white

This analysis: N=690; up to 23 years follow-up since 1968

- Defined tobacco used based on status during follow-up
- Exclusive use of cigars (N=50), cigarettes (N=131), or pipe (N=32)

Outcome: Tooth sites with ≥40% alveolar bone loss on radiograph

- Non-smokers (8%) vs. smokers of cigars (16%), cigarettes (16%), pipe (14%)

Outcome: Confounder-adjusted model for tooth loss since baseline

- Smokers of cigarettes, pipes, or cigars all more tooth loss than non-smokers
- But not statistically significantly different from each other

Cigars and Periodontal Disease

NHANES I

Ismail AI, Burt BA, Eklund SA. *J Am Dent Assoc* 1983; 106: 617-21.

Nationally representative, cross-sectional, 1971-1975

This analysis: Adults ages 25-74 (N=2948)

Current users of cigars (N=53), cigarettes (N=1146), or pipe (N=50)

Outcome: Periodontal Index (PI) -- mean scores; higher score is worse

Mean PI			
Nonsmoker	1.0		
Former smokers	1.1	Cigar smokers*	1.3
Cigarette smokers*	1.6	Pipe smokers*	1.3

**not statistically significant by product*

Cigars and Periodontal Disease

Population Assessment of Tobacco and Health (PATH)

Vora MV, Chaffee BW. *J Am Dent Assoc* 2019; 150: 332-44.e332.

Nationally representative, prospective, ongoing

This analysis: Adults (ages ≥18), Cross-sectional, Wave 1 (2013-2014), N=32,320

Current regular users of only traditional, cigarillos, or filtered cigars (weighted 1.1%)

Outcomes: Self-reported ever history

Adjusted Odds Ratios (95% CI), reference: tobacco never users			
	Gum Disease	**Gum Disease Tx.**	**Pre-Cancer Oral Lesions**
Cigarette smokers	**2.2 (1.9, 2.6)**	**1.5 (1.3, 1.7)**	**2.0 (0.9, 4.1)**
Cigar smokers	**1.9 (1.4, 2.7)**	**1.5 (1.2, 2.0)**	**1.2 (0.2, 6.2)**

Cigars and Periodontal Disease

Population Assessment of Tobacco and Health (PATH)

Nationally representative, prospective, ongoing

Potential to use PATH study to examine oral health outcomes by cigar type

Wave 4 Public Use Files,
Unweighted Cell Counts

(not accounting for dual use with other products, like cigarettes)

	N
Traditional cigar only	**402**
Cigarillo only	**698**
Filtered cigar only	**283**
Traditional + Cigarillo	**120**
Traditional + Filtered	**32**
Cigarillo + Filtered	**121**
All Three	**48**

Unpublished analysis

Summary

- Combustible tobacco use strongly associated with worse periodontal condition
- Likely this association extends to cigar use
- Most findings based on relatively small number of cigar users
- No epidemiologic data by cigar type (premium vs. other) for periodontal disease