

THE WORN DENTITION – PATHOGNOMONIC PATTERNS OF ABRASION & EROSION

by Thomas C. Abrahamsen, D.D.S., M.S., F.A.C.P.

AXIOM - RECOGNITION OF ABNORMAL REQUIRES THE COMPARISON TO NORMAL

AXIOM – NON-CARIOUS LOSS OF TOOTH STRUCTURE IS ABNORMAL !

Attrition - the **pathologic** wear of teeth from **abrasion** and **erosion**

Abrasion - the **pathologic** wear of teeth from a mechanical/rubbing process

Erosion - the **pathologic** wear of teeth from a chemical/dissolving process

Pathognomonic Wear Pattern - the non-carious loss of tooth structure collectively based on the quantity and juxtaposition of **all** the worn teeth in an entire arch and the relationship of **both** arches to each other that is consistently specific to the cause

ETIOLOGY of the FIVE MAJOR CAUSES

A. ABRASION

- 1. Bruxism**
- 2. Toothpaste Abuse**
Miscellaneous

B. EROSION

- 1. Regurgitation**
- 2. Coke-Swishing**
- 3. Fruit-Mulling**
Miscellaneous

Cupping or Cratering - the non-carious invaginations on the surfaces of teeth caused by either **abrasion** or **erosion**

A. ABRASION

1. Bruxism

a. Wear Pattern

- loss of tooth structure is progressively greater toward the anterior due to unfavorable leverage changes created by eccentric posterior interferences which increases the force applied to the anterior teeth
- only exception is the anterior open-bite
- wear pattern is same with mutually protected occlusal scheme (immediate posterior disclusion)

b. Type of Person

- stressed

c. Additional Facts

- cupping or cratering very common, but not from bruxism; it is most often due to toothpaste abuse because people tend to brush their teeth with the same vigor that they brux
- bruxism is the grinding/rubbing of teeth together with mandibular movement in an unaware subconscious mental state
- clenching is teeth together without movement and cannot abrade teeth
- **ALL people brux**; therefore, wear from bruxism always evident and in combination with all other causes

d. Diagnostic Confirmation

- recognition of wear pattern
- wear facets of hand-articulated casts will match-up

A. ABRASION continued

2. Toothpaste Abuse

a. Wear Pattern

- facial surface of mandibular canines and premolars are worn the most
- anatomical details of all affected surfaces are faded with a sandblasted appearance

b. Type of Person

- overzealous horizontal toothbrusher
- dislikes color of teeth
- fearful

c. Additional Facts

- cupping or cratering can occur from toothpaste alone
- type of toothbrush does not wear teeth; it is from the toothpaste delivered by the toothbrush
- toothbrush determines the shape because of filament deflection
- toothbrush wears gingival - recession
- all-inclusive term "toothbrush abrasion" inadequate and misleading
- can be in combination with all other causes

d. Diagnostic Confirmation

- recognition of wear pattern
- worn surfaces of hand-articulated casts do not coincide
- have patient demonstrate toothbrushing style:
 - use their own toothbrush
 - question frequency and length of time
 - note speed, pressure of stroke, and what tooth surfaces they are spending the most time cleaning

New Terminology:

toothbrush can damage gingiva - ***Toothbrush Recession***

toothpaste can damage teeth - ***Toothpaste Abrasion***

⊘ old paradigm - "***Toothbrush Abrasion***"

B. EROSION

1. Regurgitation

a. Wear Pattern

- loss of tooth structure is progressively greater toward the anterior due to action of the projectile vomitus and tongue position
- acid dissolves tooth structure amorphously from the free margin of the gingiva at the lingual surface of the maxillary anterior teeth
- maxillary posterior teeth are worn more than mandibular posterior teeth especially the palatal surface
- mandibular anterior teeth not affected because they are protected by the tongue

b. Type of Person

- bulimic – complex psychological disorder characterized by binge-eating and self-induced vomiting
- patients will rarely admit their eating disorder

c. Additional Facts

- cupping or cratering very common
- elevated silver alloys can be present
- can be in combination with other causes, but never coke-swishing or fruit-mulling because they are time consuming and the binge/vomiting process is rapid

d. Diagnostic Confirmation

- recognition of wear pattern
- worn surfaces of hand-articulated casts do not coincide
- confession by patient
- test silver alloy placed at lingual surface of maxillary anterior teeth to determine activity

B. EROSION continued

2. Coke-Swishing

a. Wear Pattern

- posterior teeth worn greater than anterior teeth due to tongue position
- mandibular 1st molar is worn the most due to gravity and early childhood age this habit begins
- cupping or cratering when present has sharp enamel edges

b. Type of Person

- dislikes sensation of carbonation in throat
- swishes to eliminate carbonation before swallowing for comfort

c. Additional Facts

- person takes a long time to consume one can of soda and therefore not a high volume drinker
- can occur with any carbonated soft drink
- elevated silver alloys can be present
- can be in combination with other causes, but never regurgitation or fruit-mulling because fruit-mullers do not drink soda

d. Diagnostic Confirmation

- recognition of wear pattern
- worn surfaces of hand-articulated casts do not coincide
- patient will freely admit habit

B. EROSION continued

3. Fruit-Mulling

a. Wear Pattern

- Posterior teeth worn greater than anterior teeth due to the position of the pulp of the citrus fruit when mulled
- maxillary and mandibular posterior teeth worn equally
- cupping or cratering when present has abraded enamel edges

b. Type of Person

- health-conscious
- high consumption of fruit with swallowing delay
- often vegetarian

c. Additional Facts

- elevated silver alloys can be present
- can be in combination with other causes but never regurgitation or coke-swishing

d. Diagnostic Confirmation

- recognition of wear pattern
- abraded enamel edges peripheral to cups/craters of hand-articulated casts will match-up
- patient will reluctantly admit habit

ABRASION and EROSION

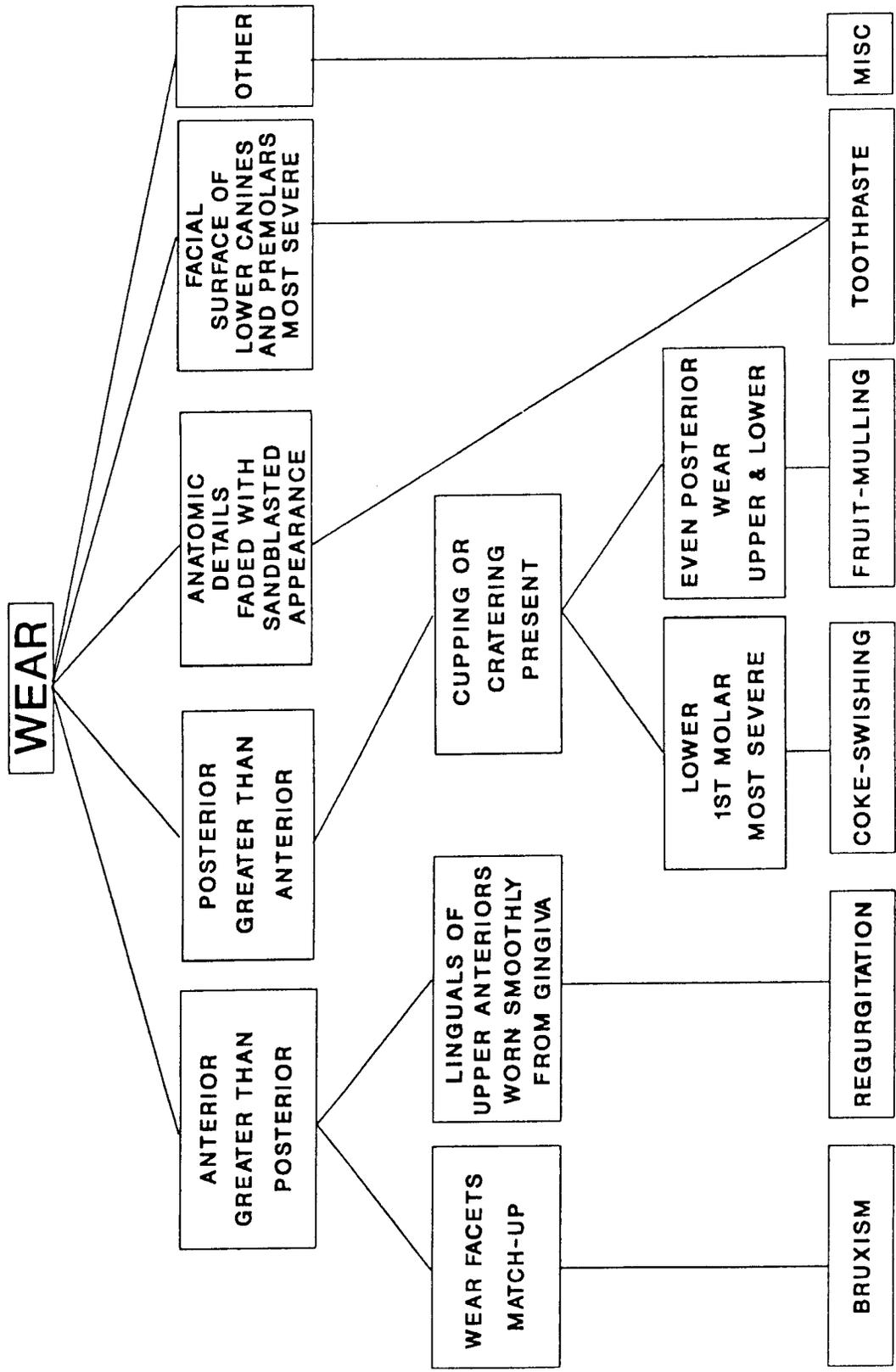
Miscellaneous

- a. Wear Pattern
 - will be unique to the habit
- b. Type of Person
 - anybody
- c. Additional Facts
 - comprise a very small percentage of the worn dentition patients you will encounter
 - can be in combination with the other five major causes
- d. Diagnostic Confirmation
 - first eliminate the characteristics of the other five major causes of the worn dentition and then discuss oral habits with patient

References

1. Abrahamsen TC, "The worn dentition – pathognomic patterns of abrasion and erosion." Int Dent Jour 55 (2005): 268-76
2. Hunter J, "The Natural History of the Human Teeth." 2nd ed. London 1728
3. Abrahamsen TC, "Accurate diagnostic casts from the sophisticated alginate impression-through the eyes of the master." (DVD) American Academy of Restorative Dentistry 1999
4. Shafer W, Hine M, Levy B, "A Textbook of Oral Pathology." 3rd ed. Philadelphia 1974
5. "The American Heritage Dictionary." Boston: Houghton Mifflin Co. 1991
6. Rugh JD, Harlan J, "Nocturnal bruxism and temporomandibular disorders." Adv Neurology(1988): 329-41
7. "Anticaries drug products for over-the-counter human use; final monograph; final rule." Food and Drug Admin, Dept of Health and Human Services, Federal Register, Part II, 21 CFR Part 310 et al, Washington, D.C. (1995)
8. Alexander JF, Saffir AJ, Gold W, "The measurement of the effects of toothbrushes on soft tissue abrasion." J Dent Res 56 (1977): 722-27
9. Silverstone M, Featherstone M, "A scanning electron microscope study of the end-rounding of bristles in eight toothbrush types." Quint Int 19 (1988): 87-107
10. Miller WD, "Experiments and observations of the wasting of tooth tissue variously designated as erosion, abrasion, chemical abrasion, denudation, etc." Dent Cosmos 49 vol.1,2,3 (1907): 1-23,109-24,225-47
11. Sanges G, "Traumatization of teeth and gingiva related to habitual tooth cleaning procedures." J Clinical Perio 3 (1975): 94-103
12. Milosevic A, Slade PD, "The orodental status of anorexics and bulimics." Br Dent J 167 (1989): 66-70

THOMAS C. ABRAHAMSEN, D.D.S., M.S., F.A.C.P.
5241 Teeter Rd
Butler OH, 44822
(419) 883-2206
(419) 883-2206 – FAX
abedds@embarqmail.com



- NOTE: 1. CUPPING OR CRATERING MAY BE PRESENT IN ANY CASE.
2. WEAR FACETS FROM BRUXISM WILL BE PRESENT IN ALL CASES.
3. COMBINATIONS OF CAUSE AND CHARACTERISTICS MAY BE PRESENT IN ANY SINGLE CASE.

In Vitro Reproduction of the Non-Carious Cervical Lesion

by

Thomas C. Abrahamsen, D.D.S., M.S., F.A.C.P.

John Dzakovich, D.D.S., F.A.G.D.



CONCLUSIONS

1. Modern-Day toothpastes carried by the toothbrush create the NCCL
2. Modern-Day toothbrushes without toothpaste do not create the NCCL
3. There is no visually significant correlation between the abrasive index and the size of the NCCL
4. There is no visually significant correlation between firmness of toothbrush and the size of the NCCL
5. The various shapes of the NCCL are due to toothbrush filament deflection
6. The amount and direction of filament deflection is affected by stiffness, juxtaposition of teeth, contours of gingiva and teeth, and pressure
7. Creation of the NCCL occurs with horizontal brushing with toothpaste

References:

- Miller W D, Experiments and observations on the wasting of tooth tissue variously designated as erosion, abrasion, chemical abrasion, denudation, etc.
Dental Cosmos 1907 49: 1-23, 109-24, 225-47.
- Manly R S, A method for measurement of abrasion of dentin by toothbrush and dentifrice.
J Dent Res 1965 44(3): 533-40.
- Sangnes G, Traumatization of the teeth and gingiva related to habitual tooth cleaning procedures.
J Clinical Perio 1976 3: 94-103.
- Abrahamsen T C, The worn dentition - pathognomonic patterns of abrasion and erosion.
Int Dent J 2005 55: 268-76.

NCCL Literature Summary

1728 – Hunter – *Observation Only*

1906 – Black – *Confirms Miller's Conclusion of Toothpaste*

1907 – Miller – *Laboratory Proof: Etiology is Toothpaste*

1908 – Black – *Closed-mindedly Discounts Simplicity of Toothpaste*

1977 – Abrahamsen – *Pathognomonic Patterns Revealed – Claims Toothpaste*

1979 – McCoy – *Tensile/Flexure Theory*

1983 – McCoy – *Pronounces Black to be Expert on Subject*

1984 – Lee, Eakle – *Tensile/Flexure Schematic Paradigm*

1987 – Grippo – *Ca⁺⁺ Ion Transfer Theory*

1988 – McCoy - *Dental Compression Syndrome*

1991 – Grippo – *Term "Abfraction" Introduced*

1995 – Grippo – *Claims Acid Corrosion Reproduction*

1996 – Lee, Eakle – *Literature Review of "Abfraction Hypothesis Reveals No Reproduction by Anyone*

2006 – Abrahamsen, Dzakovich – *Laboratory Proof using Modern Materials: Etiology is Toothpaste*