

### Definitions

**Attrition** Tooth wear resulting from contact between opposing teeth.

**Erosion** A gradual tooth-surface loss process caused by an electrolytic or chemical mechanism without bacteria being involved. The acids causing the erosion may be extrinsic or intrinsic in nature.

**Abrasion** The wearing away of the tooth's outer covering caused by mechanical forces from a foreign object.

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### Definitions (cont.)

**Abfraction** The wedge-shaped lesions in the cemento-enamel junction area. Tooth flexure caused by eccentric occlusal forces during horizontal movements has been proposed as the etiology.

**Demastication** The physiologic wearing away of teeth during chewing. (functional wear)

Etiology of Tooth Wear  
Daniel A. Paesani  
Quintessence Publishing 2010

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### Abrahamsen Definitions

#### Abrasion

- Bruxism
- Toothpaste Abuse

#### Erosion

- Regurgitation
- Coke-swishing
- Fruit-mulling

Thomas C Abrahamsen, D.D.S., M.S.

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### Dzakovich Conclusions

Laboratory studies have not been able to reproduce lateral stress induced lesions  
Toothbrush without dentrifice has not been able to reproduce cervical lesions  
Toothbrush with dentrifice and vertical brush strokes has not been able to reproduce cervical lesions  
Toothbrush with dentrifice and horizontal brush stokes has reproduced cervical lesions identical to abfraction

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### Work of Abrahamsen and Dzakovich

Conclusions:

- "Toothbrush Abrasion" is an incorrect term
- "Toothbrush Recession" occurs
- "Toothpaste Abrasion" occurs
- "Abfraction" due to lateral occlusal forces is doubtful
- "Abfriction" is primarily related to toothpaste and horizontal brushing

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### Characteristics of Attrition

- Wear facets match
- Wear is located in areas of contact
- Wear facets have sharp edges
- Wear of enamel and dentin is even

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### Additional Clinical Signs

- Fractures of teeth and/or restorations
- Tooth Mobility
- Pulpal Necrosis
- Masticatory Muscle Hypertrophy
- Tongue Indentations

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### Characteristics of Erosion

- Wear in locations of no occlusal contact
- Wear facets are dull with dentin cupped and rounded
- Acid will erode tooth structure but not restorations

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### Key Point

In the presence of acid teeth are more easily abraded and wear facets may be present

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**Treatment Options**

- Diet Counseling
- Appliance (night)
- Equilibration (with or without composite)
- Direct Composite (esp. with acid erosion)
- Trial Therapy (splint, composite, provisionals)
- Indirect Restorations

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**Key Points**

1. Patients must recognize their tooth wear as a problem and understand the long term consequences before they will accept treatment
2. Wear cases are often difficult to treatment plan because as teeth wear they move
3. Most wear cases almost always have more than one treatment option

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**How To Treat**

- **Diagnosis** – acid erosion caused by esophageal reflux or attrition with a vertical wear pattern due to a constricted envelope of function
- **Treatment Goals** – restore worn teeth, increase incisor length, correct gingival asymmetry, improve smile aesthetics, restore function, etc.
- **Treatment Plan** – crown lengthen to correct gingival asymmetry and increase incisor length, porcelain veneers or crowns to restore worn teeth and improve smile aesthetics and function
- **Sequencing** – perio, ortho, endo, restorative

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### Developing the Treatment Plan

- Aesthetic Component
- Functional Component
- Structural Component
- Biologic Component

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### Developing the Treatment Plan What Happens When Teeth Wear

- Aesthetics – teeth get shorter decreasing incisal display – teeth erupt causing gingival asymmetry and occlusal plane disharmony
- Function (occlusion) – in horizontal wear overbite and overjet are lost as well as anterior guidance – in vertical wear overbite increases and overjet decreases
- Structural – there is often less tooth structure available to be restored and usually a lack of room for restorations
- Biologic – periodontal health is usually good, but endodontic and crown lengthening procedures are often required

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Aesthetic Component

- Incisal Edge Position
- Tooth Display
- Gingival Levels

Functional Component

- Ant. Guidance
- Overbite and Overjet
- Occlusal Planes

Structural Component (options to gain structure and/or space)

- Orthodontic Intrusion or Extrusion
- Periodontal Crown Lengthening
- Bite Opening
- Endo with Post and Core
- Orthognathic Surgery

Biologic Component

- Periodontal Health
- Pulpal Health
- Caries Removal

— established intra-orally with mock-ups, provisionals, etc.ly

— determined with a diagnostic wax-up on mounted models

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### Key Points

- 1. Start with incisal edge position to establish aesthetic goals
- 2. Mounted models and diagnostic wax-up to establish functional goals

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The diagnostic wax-up integrates the aesthetic goals with the functional goals

#### Aesthetic Goals

- Size
- Shape
- Position
- Color

#### Functional Goals – Stable Occlusion

- Overbite
- Overjet
- Occlusal planes
- Anterior guidance – posterior disclusion

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### Stable Occlusion

- Simultaneous equal intensity centric stops
- No posterior contact in excursive movements
- Anterior guidance in harmony with the patient's envelope of function

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## Acid Erosion

### 2 Types of Acid Erosion

Intrinsic (regurgitated stomach acid)

- Gastroesophageal Reflux (GERD)
- Bulimia

Extrinsic (ingested acid)

- Beverages
- Citrus Fruits

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## Options for Gaining Space

Crown lengthening

Orthodontic intrusion

Bite opening



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## Reasons for Altering Vertical Dimension

- To improve aesthetics
- To improve occlusal relationships
- To gain space for restorations



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**Methods for Determining New Vertical**

- Trial Appliance
- Facial Proportion
- Freeway space
- Tens
- CEJ to CEJ Measurement

“Choose the vertical dimension that requires the least amount of opening to accomplish the aesthetic and functional goals of the case”

Frank Spear, DDS, MSD

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**Laboratory Communication for a Diagnostic Wax-up at New VDO**

- Study Models
- Centric Relation Bite
- Face Bow Transfer
- Incisal Edge Position
- Length of Centrals
- Impression and Pictures of Mock-up
- Series of Photographs
- Written Rx

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**Ways To Find CR**

- Bimanual manipulation
- Lucia jig
- Leaf gauge
- Kois Deprogrammer
- Composite ball
- Others

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### Clinical Signs of Extrinsic Erosion

Beverages (carbonated, sports, and energy drinks)

1. Poolers – wear on occlusals of mandibular posteriors
2. Swishers – facial erosion on maxillary anteriors

Citrus Fruits

1. Citrus
2. Fruit suckers – anterior facial and lingual erosion
3. Citrus fruit mulling – more posterior wear than anterior

Frank Spear DDS, MSD

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### Additional Risk Factors for Acid Erosion

- Acidic foods (healthy diets)
- Occupational hazards
- Sustained recreational drug use
- Low salivary flow

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### Prevention of Erosion

- Avoid or reduce direct contact with acids
- Increase acid resistance with fluoride therapy
- Utilize the benefits of calcium and phosphates
- Provide proper tooth brushing instructions
- Monitor salivary flow
- Make medical referrals when necessary

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### Key Point

Prognosis is very good for acid erosion cases especially when acid source can be eliminated or prevented

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### Dysfunctional Wear

Parafunction - grinding patterns caused by the occlusion most likely due to interferences or instability

Bruxism – grinding most likely initiated by the CNS resulting in patients that will continue to grind even after treatment

Frank Spear DDS, MSD

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### Trial Therapy

- Appliance – check for wear patterns
- Equilibration – in conjunction with composite bonding – check for breakage
- Provisionals – patient has accepted treatment – evaluate for evidence of wear

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## Attrition

### 2 Types of Wear Patterns

1. Horizontal – wear is broad and flat with facets on incisal edges and cusp tips and a loss of overall tooth length - horizontal wear patterns are usually less predictable to treat (cow)
2. Vertical – wear is present on the facial surface of the mand. anterior teeth and the lingual of the max. anteriors and is usually associated with a deep overbite - vertical wear patterns are often more predictable to treat (rat)

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### Goals of Treatment for Horizontal Wear Patterns

Design an occlusion and restorations that fit the grinding patterns of the patient

- Minimize overbite
- Shallow guidance
- Group function (bruxers)

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### Key Point

In protrusive wear pattern, design bite to have mesial of the mandibular premolar contact the distal of the maxillary canine to help share the load so patient wont push with as much force

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### Goals of Treatment for Vertical Wear Patterns

Design an occlusion and restorations that fit the grinding patterns of the patient (use of an incisal guide table is often beneficial)

- Increase overjet
- Decrease overbite

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### Options for Leveling the Occlusal Plane



Crown lengthen and shorten

Orthodontic intrusion

Raise the posteriors



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### Key Point

Which teeth need restorations will often dictate the treatment plan

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