

The background of the slide features a large, semi-transparent watermark of the University of Toronto seal. The seal is circular and contains the text 'UNIVERSITY OF TORONTO' around the perimeter and 'INTEGRA SANITAS' in the center. It also depicts a figure holding a staff and a book.

# *Tannslitasje-pasienten*

*veivalg hvis årsaken er primært mekanisk eller på grunn av syreangrep*

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# Dental lesions

Carious etiology

Non-carious etiology

Developmental

Toxic

Hereditary

Acquired

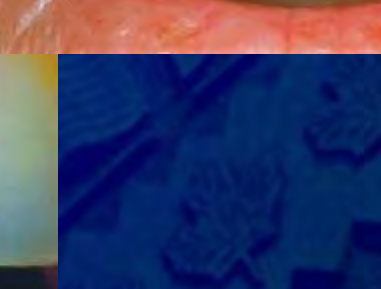
Discoloration

Fracture

(Tooth) Surface lesions



# Management?





# Tooth surface lesions

Erosion (clinical diagnosis)

*Original Definition:* Progressive loss of hard dental tissue by chemical processes not involving bacterial action



## Erosion:

ASTM: American Society for Testing & Materials Committee on Standards:

*"The progressive loss of a material from a solid surface due to mechanical interaction between that surface and a fluid, a multicomponent fluid, impinging liquid or solid particles"*



# Erosion examples:





# Tooth surface lesions

~~Erosion~~      Corrosion!

“Progressive loss of hard dental tissue by chemical processes not involving bacterial action”





~~Erosion~~

Corrosion:

grade 1

grade 2

grade 3



# Tooth surface lesions

~~Erosion Corrosion~~

Abrasion (clinical diagnosis)

“Loss by wear of dental tissue caused by friction of a foreign substance (dentifrice, toothbrush, objects)”





# Tooth surface lesions

~~Erosion Corrosion~~

Abrasion

**Attrition** (clinical diagnosis)

“Loss by wear of surface of tooth or restoration caused by tooth to tooth contact during mastication or parafunction”





# Tooth surface lesions

~~Erosion~~ Corrosion

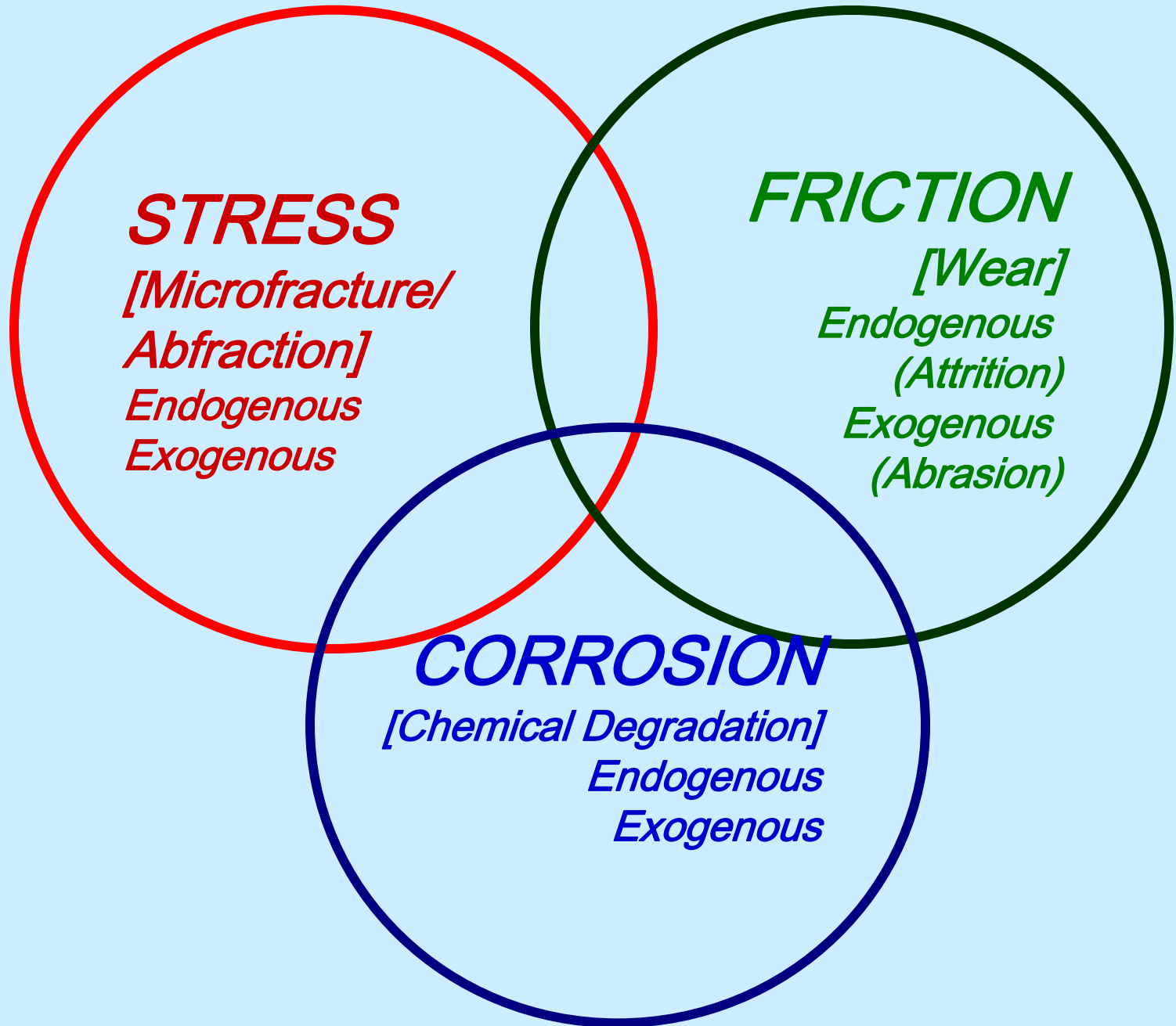
Abrasion

Attrition

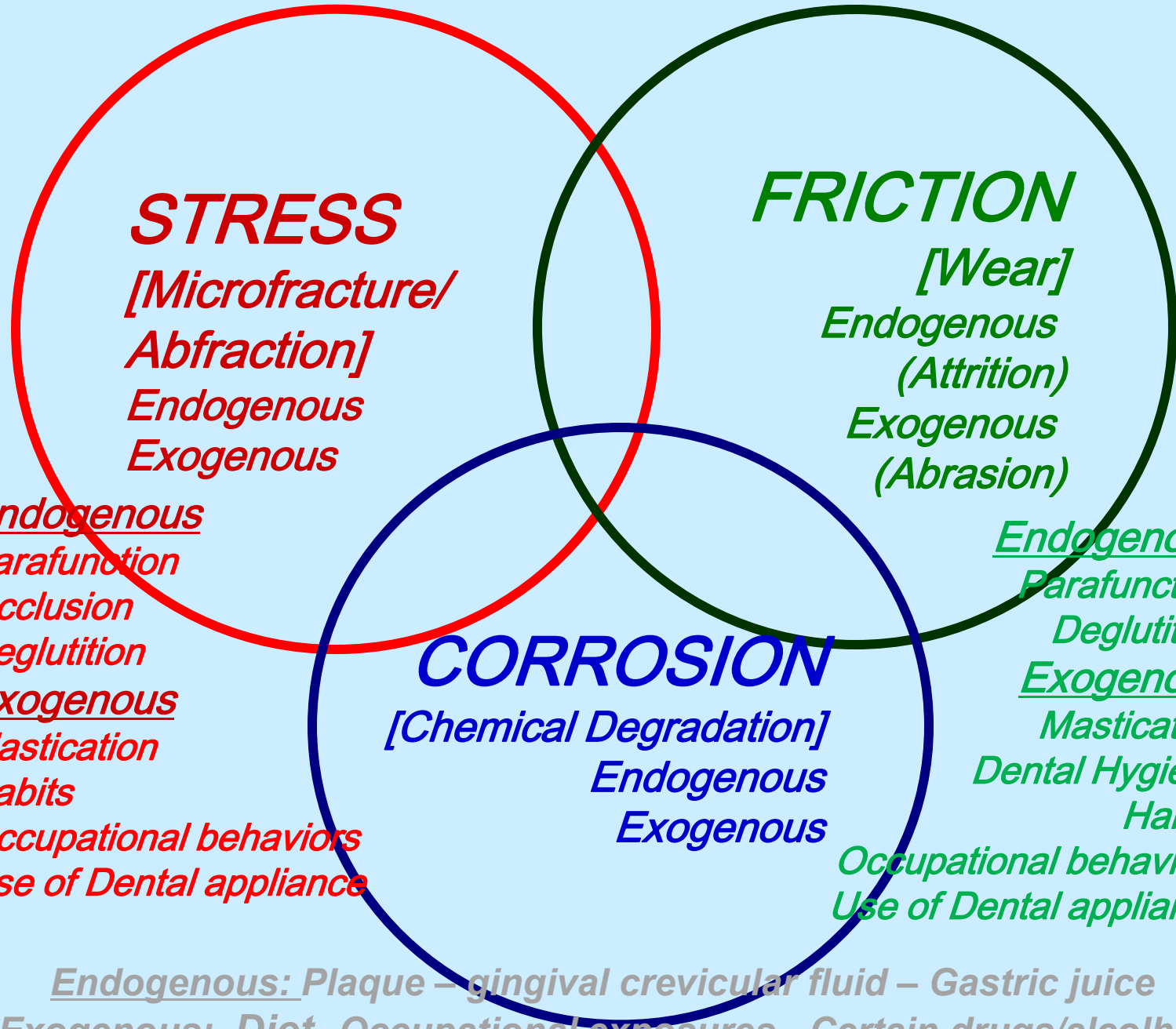
Abfraction (clinical diagnosis)

“Loss of tooth surface at the cervical areas of teeth believed to be caused by tensile and compressive forces during tooth flexure”









# **STRESS**

*[Microfracture/  
Abfraction]  
Endogenous  
Exogenous*

*Endogenous  
Parafunction  
Occlusion  
Deglutition  
Exogenous  
Mastication  
Habits  
Occupational behaviors  
Use of Dental appliance*

# **FRICTION**

*[Wear]  
Endogenous  
(Attrition)  
Exogenous  
(Abrasion)*

*Endogenous  
Parafunction  
Deglutition  
Exogenous  
Mastication  
Dental Hygiene  
Habits  
Occupational behaviors  
Use of Dental appliance*

# **CORROSION**

*[Chemical Degradation]  
Endogenous  
Exogenous*

*Endogenous: Plaque – gingival crevicular fluid – Gastric juice  
Exogenous: Diet -Occupational exposures - Certain drugs/alcohol*



# Patient management



# Patient management - Strategy 1

1. Establish status
2. Restore

Carious & non-carious lesions



# Patient management - Strategy 1

## Symptomatic

1. Establish status
2. Restore  
cariious & non-cariious  
lesions

Diagnosis and etiology  
is of limited interest.  
...perhaps only for the  
sake of guessing  
prognosis...

DANGER:  
Unpredictive  
treatment  
outcome!



# Patient management - Strategy 2

## Symptomatic

1. Establish status

2. Restore

carious & non-carious lesions

Diagnosis and etiology is of limited interest. Perhaps only for the sake of estimating prognosis.

## Causal

1. Diagnose correctly

Carious vs non-carious

2. Identify etiology

a. carious

b. non-carious lesions

3. Restore

Carious & non-carious lesions

4. Reduce risk

a. carious

b. non-carious lesions



# Diagnosis



*Abrasion-attrition-corrosion?*



*Abfraction-abrasion-corrosion?*





*Abrasion-corrosion?*



*Abrasion-corrosion?*



*Abrasion-attrition-corrosion?*



*Abfraction-abrasion?*



*Attrition-corrosion?*



???!

*"demastication"*



## ***Corrosion – clinical appearance (anterior)***

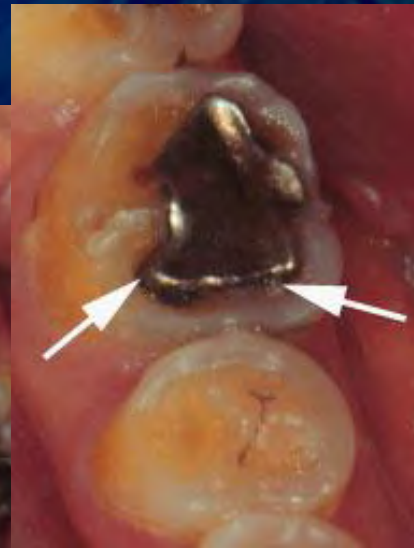
- Broad concavities within smooth surface enamel
- Increased incisal translucency
- Wear on non-occluding surfaces
- Loss of surface characteristics of enamel (perikymata) in young children
- Preservation of enamel "cuff" in gingival crevice is common
- Hypersensitivity





## ***Corrosion – clinical appearance (posterior)***

- Cupping of occlusal surfaces, (incisal grooving) with dentin exposure
- Wear on non-occluding surfaces
- "Raised" amalgam restorations
- Clean, non-tarnished appearance of amalgams
- Preservation of enamel "cuff" in gingival crevice is common





# *Abrasion – clinical appearance*

- Usually located at cervical areas of teeth
- Lesions are more wide than deep
- Premolars and cuspids are commonly affected





## *Attrition – clinical appearance*

- Matching wear on occluding surfaces
- Shiny facets on amalgam contacts
- Enamel and dentin wear at the same rate
- Possible fracture of cusps or restorations



# Attrition vs corrosion





# *Abfraction – clinical appearance*

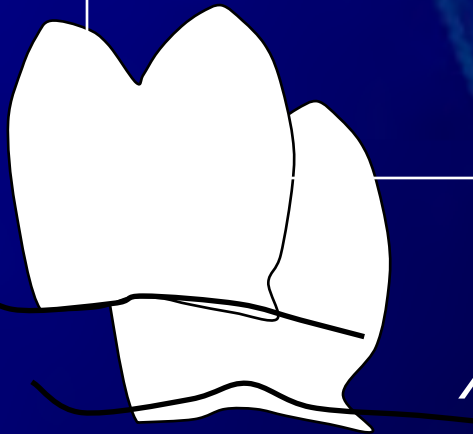
- Affects buccal / labial cervical areas of teeth
- Deep, narrow V-shaped notch
- Commonly affects single teeth with excursive interferences or eccentric occlusal loads





# Cervical loss

<i>Locations: Ling./Bucc.</i>	<i>Buccal</i>	<i>Buccal</i>
<i>Form: U</i>	<i>Wedge</i>	<i>V-form</i>
<i>Edge: smooth</i>	<i>sharp</i>	<i>sharp</i> <i>(sometimes subgingival)</i>
<i>Enamel: smooth</i> <i>often slightly polished</i>	<i>smooth/rough</i>	<i>rough</i>



*Probably:*

*Abrasion*  -----  *Abfraction*



# Abfraction vs Abrasion





# 1. Diagnose correctly

1. Diagnostic Protocol
2. Types of lesions
  - Carious vs non-carious lesions

# 2. Identify etiology (causes)

- (a. carious) & b. non-carious lesions



# 1. Diagnose correctly

1. Diagnostic Protocol
2. Types of lesions
  - Carious vs non-carious lesions

# 2. Identify causes

- (a. carious) & b. non-carious lesions

# 3. Restore

- carious & non-carious lesions





# When to restore: Factors to consider

*Diagnostic protocol*

*Tooth lesion  
Etiology*

*Size of lesion  
Location of lesion*



*Biomechanic (force)  
Esthetic concern*



# Restorative material

## Alternatives

	Veneer	GIC	Composite -GIC -hybrid	Composite resin
Esthetics	++	-	-/+	+
Biological cost	-	++	+	+
Acid resistance	++	--	-/+	+
Wear resistance	++	-	-/+	+
Longevity	++	--/+	-/+	--/++



# Restorative planning

- Tooth preparation
  - Minimal extension
  - Supragingival margins
  - No extra undercuts or retention lock
  - Estimated force
    - No compression versus flexure of tooth
    - Wear type
  - Esthetics on anterior teeth and premolars



# 1. Diagnose correctly

1. Diagnostic Protocol
2. Types of lesions
  - Carious vs non-carious lesions

# 2. Identify causes

- (a. carious) & b. non-carious lesions

# 3. Restore

- carious & non-carious lesions
  - Restoration
    - Composites & Bonding



# Abfraction vs. Abrasion



*Glassionomer or  
microfill composite resin*

*Hybrid microfill  
composite resin*



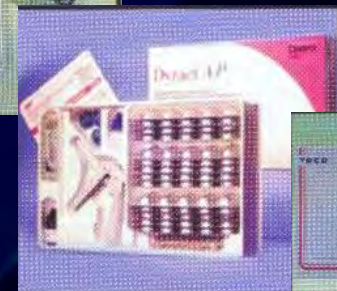
# Glassionomer cement-resin hybrids

Two subgroups

a. Material polymerises without light initiation

b. Light initiation is required

Most products contains 4.5%-6% resin





# Selection of restorative material? Composite resin vs. glassionomer

## Cavity situation:

- Supragingival margin: moisture sensitive
- Cementum gingival margin
- Dentin substrate: sclerotic dentin(?), depth of preparation, tubule orientation

## Etiology:

- High caries risk: need for F-
- Cervical abrasion: wear
- Abfraction: flexion



# 1. Diagnose correctly

1. Diagnostic Protocol
2. Types of lesions
  - Carious vs non-carious lesions

# 2. Identify causes

- (a. carious) & b. non-carious lesions

# 3. Restore

- carious & non-carious lesions
  - Restoration
    - Composites & Bonding

# 4. Reduce risk

- (a. carious) & b. non-carious lesions





# Risk reduction : Corrosion

## Diminish frequency & severity of acid challenges

- Decrease amount/frequency of acidic foods / drinks
- Acidic drinks should be drunk quickly rather than sipped. The use of a straw would reduce the corrosive potential of soft drinks
- If undiagnosed / poorly controlled gastroesophageal reflux is suspected, refer to a physician
- In the case of bulimia, a physician or psychologist referral is appropriate
- A patient with alcoholism should be assisted in seeking treatment in rehabilitation programs



# Risk reduction : Corrosion

## Enhance acid resistance, remineralization and rehardening of the tooth surfaces

- Have the patient use daily topical fluoride at home
- Fluoride can be applied in the office 2-4 times a year. A fluoride varnish is recommended

## Improve chemical protection

- Neutralize acids in the mouth by dissolving sugar-free antacid tablets 5 times a day, particularly after an intrinsic or extrinsic acid challenge
- Dietary components such as hard cheese (provides calcium and phosphate) can be held in the mouth after acidic challenge (e.g., hold cheese in mouth for a few minutes after eating a fruit salad)



# Risk reduction: Corrosion+Friction

Enhance the defense mechanisms of the body  
(increase salivary flow and pellicle formation)

- Saliva provides buffering capacity that resists acid attacks. This buffering capacity increases with salivary flow rate. Saliva is also supersaturated with calcium and phosphorus, which inhibits demineralization of tooth structure
- Saliva reduces tooth friction
- Stimulation of salivary flow by use of a sugarless lozenge or chewing gum should be encouraged



# Risk reduction : Friction

## Decrease abrasive forces

- Use soft toothbrushes and dentifrices low in abrasiveness in a gentle manner
- Do not brush teeth immediately after an acidic challenge to the mouth, as the teeth will abrade easily
- Rinsing with water is better than brushing immediately after an acidic challenge



# Risk reduction: friction, stress, corrosion

## Decrease abrasive forces

- ▣ Gentle use of soft toothbrushes and dentifrices low in abrasiveness
- ▣ No brushing immediately acidic challenges
- ▣ Rinsing with water after an acidic challenge

## Provide mechanical protection

- ▣ Consider application of composites and direct bonding where appropriate to protect exposed dentin
- ▣ Construction of an occlusal guard is recommended if a bruxism habit is present