Episode 82 – Tooth Wear April 14, 2023

Introduction

Tooth wear is a common global finding. It is defined as the noncarious loss of mineralized tooth substance (i.e., enamel, dentin, cementum) from mechanical wear (attrition or abrasion), chemical wear (erosion), or a combination. Its multifaceted nature makes identifying one specific cause difficult.

Tooth wear can be characterized as physiological or pathological. Physiological tooth wear occurs from mastication and is most often seen on incisal and occlusal contacting surfaces. It may also occur interproximally, due to friction between adjacent teeth.

Pathological tooth wear is unacceptable levels of mineralized tooth substance loss, characterized by abnormal destruction, which may require treatment. Pathological tooth wear can affect any tooth surface, and may be found in both children and adults.

Tooth wear develops at a relatively slow pace and is often asymptomatic. Thus, individuals may be unaware of the condition. Accordingly, tooth wear may only be discovered during clinical examination. However, increased tooth wear may be symptomatic resulting in tooth hypersensitivity, functional impairment, and compromised aesthetics causing individuals to seek treatment at advanced stages of tooth wear.

Prevalence and severity of tooth wear is likely to increase because of the global decrease in tooth loss. Studies indicate increasing numbers of older adults are retaining more of their natural teeth beyond age 65 years.[1] Consequently, their teeth will be steadily exposed to tooth wear for a greater number of years, making tooth wear a growing oral health concern.

Risk factors associated with tooth wear include dietary habits (mainly high consumption of acidic products), gastroesophageal reflux, aggressive brushing, and mental health conditions. Assessing risk factors associated with tooth wear is necessary to help prevent and reduce tooth wear. [1] [2] [3]

Epidemiology

Epidemiological studies have shown tooth wear is common and increases with age in both primary and permanent dentitions. Global prevalence of tooth wear ranges from 20-60%, with a prevalence of 7-74% in permanent teeth of children and adolescents.

[1] For more information on seniors' oral health listen to Episode 55.

The variability in prevalence rates can be attributed to the different diets and lifestyles of numerous populations, and the use of various indices to assess tooth wear. [2] [4] [5] [6]

A degree of physiological tooth wear is expected throughout life and advancing age is a risk factor for increased tooth wear severity. For example, a systematic review found 17% of 70-year-olds had severe tooth wear, compared to 3% of 20-year-olds. Research shows an average reduction in crown length of 1.0 mm for maxillary central incisors and 1.5 mm for mandibular central incisors by a median age of 70 years can be expected. [5] [7]

Pathological tooth wear is generally a slow process. However, research suggests high active periods of tooth wear likely occur in 'bursts', while at other times tooth wear is relatively inactive. Individual risk factors affect how active the tooth wear process is. Monitoring clients who are ‘at risk’ of tooth wear is important to detect those who may experience more frequent bursts of activity, which may result in more rapid and severe enamel and dentin loss. [5]

Individuals with mental health disorders may also have higher rates of tooth wear. The excessive wear can be due to mechanical forces (e.g., bruxism), or from chemical erosion of acidic drinks, gastric reflux, or frequent vomiting. This is particularly relevant for individuals with certain eating disorders who, despite having typically good oral hygiene, drink large amounts of soft drinks and purge in an effort to lose weight. As a result, individuals with eating disorders have five times the risk of dental erosion in the presence of self-induced vomiting. [4]

Etiology

The exact etiology of tooth wear remains unknown. Several factors contribute to tooth wear, but very often, tooth wear is multifactorial in nature, resulting from attrition, abrasion, and/or erosion. Genetic conditions affecting the enamel and dentin (e.g., amelogenesis imperfecta and dentinogenesis imperfecta) are also potential risk factors that may make teeth more susceptible to tooth wear. [5] [8]

Three main types of tooth wear are attrition, abrasion, and erosion. Abfraction[2] is a fourth type of tooth wear recognized by some but is not universally accepted. The level of evidence currently available is too weak to justify it as a separate process as stated by the consensus report of a workshop organized by the European Organization for Caries Research (ORCA) and the Cariology Research Group of the International Association for Dental Research (IADR). [9] [10]

[2] Abfraction refers to wedge-shaped defects primarily found on facial surfaces attributed to parafunctional habits and tensile stresses in the cervical area. The theory of abfraction suggests flexural forces lead to enamel rods breaking away in the cervical region, causing microfractures of cementum and dentin. While these relationships may be contributing factors in abfraction, it is likely clinical signs of abfraction are not simply related to stress concentrations. Rather, they may play a role, along with acid erosion and toothbrush abrasion, in the multifactorial etiology of tooth wear. Also, despite many efforts to demonstrate occlusal forces are the main cause of abfraction, its etiology remains poorly understood and controversial. To date it appears many practitioners accept that abfraction is related to atypical occlusal loading despite there being scarce evidence other than purely theoretical to support this hypothesis. [1] [8] [11] [33]

Attrition

Attrition is the physical loss of mineralized tooth substance caused by tooth-to-tooth contact. It is a major cause of tooth wear, most commonly seen on incisal and occlusal contacting surfaces. It can be due to physiologic mechanisms during mastication, but it is frequently associated with parafunctional activity (i.e., bruxism). [1] [3] [5] [10] [11]

Attrition is caused by the action of opposing teeth and leads to matching facets. The lesions typically are flat, sharp bordered, and glossy. Flattening of canine cusp tips can be an early sign of parafunction, particularly in young individuals. More generalized attrition can affect occlusal and incisal surfaces of all teeth but is most noticeable anteriorly. The enamel becomes flattened, eventually exposing dentin. When dentin is exposed, it remains flat with no 'cupping' or 'scooping'. Matching occlusal wear facets between the arches often develop. In general, well-defined, shiny facets are a good measure for active attrition. [1] [3]

Attrition may also result in increased gingival display shown when smiling due to reduced tooth height. It can also cause tooth or restoration fracture, tooth mobility, and even pulpal necrosis. Several factors are reported to predispose the occurrence of attrition, including coarse porcelain on opposing natural teeth. [1] [5]

Bruxism

Bruxism is a parafunctional activity specified as either sleep or awake bruxism. Children and adults may grind their teeth and not realize it. Many cases of bruxism are mild and may not require treatment. However, severe bruxism can lead to damaged teeth, jaw pain or tiredness, and headache. [12] [13]

Sleep bruxism

Sleep bruxism is the masticatory muscle activity during sleep characterized as rhythmic (phasic) or nonrhythmic (tonic). It is present in ~8-16% of the general population. Sound is often the first indicator of sleep bruxism. If someone grinds their teeth while sleeping, it is not uncommon for a partner, spouse, or parent to hear it first. [14] [15]

Contributing risk factors include sleep disorders involving sleep arousal (e.g., obstructive sleep apnea), and other comorbid conditions including gastroesophageal reflux disorder (GERD). [14]

Awake bruxism

Awake bruxism is the masticatory muscle activity during wakefulness characterized by repetitive or sustained tooth contact and/or by bracing or thrusting the mandible, and is usually a more static clenching. Reported prevalence of awake bruxism is 5-30%. [14]

Awake bruxism is likely more associated with psychological stress and medication. It may be a coping strategy or a habit during deep concentration. [16] [17]

In otherwise healthy individuals, neither type of bruxism is considered a disorder; instead, bruxism represents an activity, or a behaviour. [12] [14]

Etiology

Etiology of bruxism is multifactorial. Risk factors may include:

- Exogenous factors such as smoking, heavy alcohol use, caffeine, medications (e.g., to treat depression [selective serotonin reuptake inhibitors], seizures, ADHD), or substance use (e.g., methamphetamine, ecstasy, cocaine, heroine).
- Psychosocial factors (e.g., stress, anxiety, nervousness).
- Medical conditions (e.g., cerebral palsy, Down syndrome, epilepsy, Rett syndrome,[3] Parkinson's disease, dementia). [13] [14] [16]

Signs and symptoms

Bruxism can lead to tooth surface loss, especially in conjunction with acid erosion. Other effects may include:

- Masticatory muscle hypertrophy
- Mobile, hypersensitive, or cracked teeth
- Tooth pain
- Wear or fracture of restorations, including implant retained restorations
- Indentations (scalloping) on the sides of the tongue or lip
- Linea alba of the buccal mucosa.[4]
- Tired or tight jaw muscles, or a locked jaw that will not open or close completely
- Jaw, neck, or face pain or soreness
- Pain that feels like an earache
- Dull headache starting in the temples. Headache especially upon waking
- Sleep disturbances such as restlessness during sleep, waking frequently during the night, and difficulty getting to sleep
- Daytime sleepiness [5] [12] [13] [15] [16] [18]

Diagnosis

Bruxism diagnosis involves:

- Review of medical history and symptoms, and
- Clinical examination to assess for worn and damaged teeth and dental restorations; muscle, facial, and/or jaw pain or tenderness.
- Polysomnography (sleep study) may be required to detect sleep-related disorders and assess muscle activity during sleep. [4]

Management strategies

Management is aimed at reducing unwanted consequences of bruxism (e.g., protecting teeth and restorations from wear or fracture). Strategies may include:

- Intraoral splints to protect the dentition and restorations.
- Behavioural measures (e.g., mindfulness to keep teeth apart during the day, stress management, sleep hygiene, biofeedback).
- Pharmacological measures (e.g., Botox administration[5]).

[3] Rett syndrome is a rare genetic neurological disorder that leads to severe impairments, affecting the child's ability to speak, walk, eat, and breathe easily. The hallmark of Rett syndrome is near constant repetitive hand movements. [37]

[4] Tissue scalloping and linea alba can also be consequences of functional activity, such as swallowing.

[5] Refer to Episode 54 for discussion on botulinum toxin use in dentistry.

- Avoiding caffeine, alcohol, and tobacco use.
- Referral to appropriate medical practitioner if bruxism is related to anxiety, substance use, sleep apnea, prescribed medications, etc. [13] [14]

Dental abrasion

Dental abrasion is the pathologic physical loss of mineralized tooth substance caused by objects other than teeth. Several factors are reported to cause abrasion including:

- Use of an abrasive toothpaste, hard bristles, and a vigorous brushing technique
- Use of toothpicks and miswaks[6]
- Consumption of abrasive foods
- Consumption of vegetables that have not been properly washed and still contain trace amounts of soil
- Chewing abrasive materials such as tobacco
- Continuous exposure to dust and grit
- Other factors such as pipe-smoking, thread biting, and holding hairpins between the teeth can cause abrasion in the involved tooth surface(s) [1] [10]

Cervical abrasions are commonly seen as V-shaped notches in the cervical regions of facial surfaces of one or more teeth. They are characterized by sharply defined margins and smooth surfaces. Despite the belief that cervical abrasions are caused by toothbrushes, toothpaste, and brushing techniques, a definite conclusion is difficult to draw, as other factors such as erosion may also play a role in the development of abrasion lesions. [1]

Notching of the incisal edges on maxillary central incisor teeth is often seen as a result of habits such as the biting pins, nails, tacks, and opening hairpins with teeth. Abrasion lesions can also be seen on occlusal surfaces. For example, the action of abrasive food generally occurs over the whole occlusal surface producing a wear area, as opposed to facets, which are characteristic of attrition. When compared with those caused by erosion, abrasion lesions are associated with relatively shallow cupping and exposed dentin that is not usually hypersensitive. Lack of hypersensitivity is attributed to the formation of a mechanical smear layer that blocks exposed dentinal tubules. Management strategies include avoiding causative factors. [1] [3]

Erosion

Dental erosion is the chemical loss of mineralized tooth substance caused by exposure to acids not derived from oral bacteria. It can be caused by extrinsic (exogenous) or intrinsic (endogenous) acids. Extrinsic acids are related to diet, lifestyle, and environment, mainly affecting facial and occlusal surfaces. Intrinsic erosion is caused by gastric acid coming into the oral cavity. Gastric fluid has a pH of ~1.0, so its erosive potential is high. Intrinsic erosion is related to conditions such as GERD, alcohol use disorder, recurrent vomiting associated with pregnancy (hyperemesis gravidarum), and eating disorders (e.g., bulimia nervosa). In addition to eroding teeth, excessive vomiting

[6] Miswak is a traditional chewing stick prepared from the roots, twigs, and stem of *Salvadora persica* tree. It has been used as a tooth cleaning method in many parts of the world for thousands of years. [36]

leads to dehydration and reduced salivary flow, both of which increase erosion. [3] [10] [19]

Intrinsic erosion is most often seen on palatal surfaces of maxillary anterior teeth (causing a concave depression of the entire palatal surface) and occlusal surface of posterior teeth. Often an intact ring of enamel is spared and remains present around the gingival area of the teeth, likely due to acid neutralization by gingival crevicular fluid. Mandibular anterior teeth are relatively less affected than maxillary anterior teeth. [3]

Risk factors

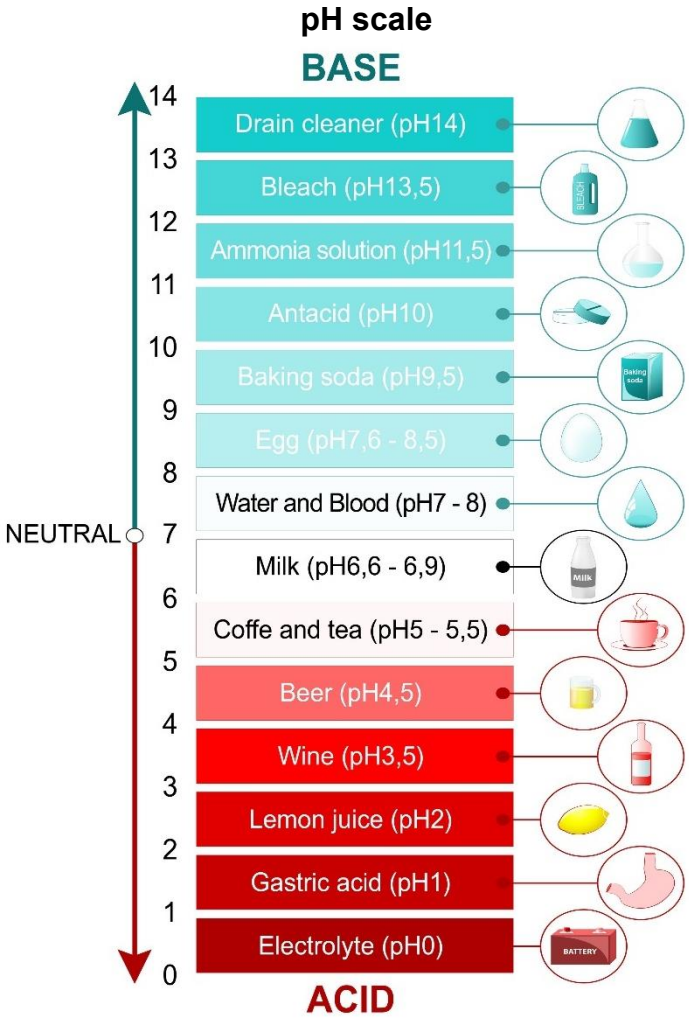
Hyposalivation increases acidity. Thus, individuals with chronic dry mouth are much more susceptible to acid erosion. Saliva normally keeps the oral cavity in the 7.0 pH range (neutral) due to its ability to buffer acids. The critical pH of enamel and dentin is 5.5 and 6.5, respectively. These values represent the pH at which saliva is no longer saturated with calcium and phosphate and tooth substrate can dissolve. [4] [11] [20]

Most soft drinks (regular and diet) have a pH ranging from 2.5-3.5, with an average pH of 3.4 for carbonated drinks and fruit juices. Soft drinks also contain acids with erosive potential, mainly carbonic acid, phosphoric acid, malic acid, and citric acid. [8] [21]

Dental erosion is associated with drinking methods. Frequent consumption of fruit drinks, carbonated beverages, and fruit juice, as well as bedtime consumption, increases dental erosion severity. Sipping, holding the drink longer, or swishing it around the mouth causes a more pronounced pH drop. Erosive potential is enhanced by higher temperature of the beverage. Conversely, gulping or straw use while drinking reduces risk of acid erosion. Consuming dairy after an acid challenge will help raise the pH and remineralize the teeth. [8] [21]

Sport drinks (average pH of 3.3) have become popular with the general population, especially adolescents and young adults. Sport drinks aim to prevent dehydration, and enhance athletic physical performance before, during, or after sporting activity. They replace fluids and electrolytes lost by sweating and supply a boost of carbohydrates. The benefits of sport drinks over water alone in reducing the effect of dehydration resulting from exercise on cardiovascular dynamics, temperature regulation, and exercise performance have been questioned. For most individuals engaged in physical activity, no clear evidence was found to support the additional performance benefits of sport drinks over water alone. [21] [22]

Substance use has been associated with erosion. Cocaine is acidic, whether in its powdered or solid form. Mixed with saliva, it coats teeth with an acidic solution that can break down tooth enamel and lead to dental erosion and tooth loss. Methamphetamine use is associated with hyposalivation, dehydration, increased consumption of carbonated sugary soft drinks, and poor oral hygiene. This combined with the low pH of meth and the drug's capacity to increase motor activity (e.g., chewing, tooth grinding and clenching) results in severe tooth wear and destruction. [4] [23]



Extrinsic acid sources [3] [4] [24]

Source	Examples	
Dietary	Juice Soft drinks, iced tea Sport drinks, energy drinks Fresh fruit Salad dressings Vinegar Wine Sour candies	
Drugs	Acetylsalicylic acid (aspirin) Chewable vitamin C tablets Methamphetamine Cocaine	
Environmental / occupational	Vapours	Battery, munition, galvanizing, and fertilizer factories
	Liquids	Wine tasters Swimmers (hypochlorous acid from chlorine used in swimming pools)

Average pH of beverages [22] [25] [26] [27] [28] [29] [30] [31]

Beverage	pH		pH
Water			
Tap water	7.2	San Pellegrino sparkling natural mineral water	5.0
Aquafina regular water	6.1	Vitamin Water Zero Rise Orange	3.5
Perrier Mineral Water	5.3	Dasani Strawberry Flavoured Water	3.2
Dasani regular water	5.0	Vitamin Water Tropical Citrus	3.0
Soft drinks			
Canada Dry Club Soda	5.2	Sprite Zero	3.1
Barq's Root Beer Diet	4.6	Nestea Iced Tea	3.0
A&W Root Beer Diet	4.4	Snapple Lemon Iced Tea	3.0
A&W Root Beer Regular	4.3	Snapple Raspberry Iced Tea	3.0
Barq's Root Beer Regular	4.3	Crush Orange	2.9
Snapple Plain Tea	4.0	Dr. Pepper Regular	2.9
Lipton's Iced Tea	3.9	Lipton's Lemon Iced Tea	2.9
7-Up Diet	3.7	Squirt	2.9
Coca-Cola Diet	3.4	Canada Dry Ginger Ale	2.8
Dr. Pepper Diet	3.4	Minute Maid Orange Soda	2.8
Mountain Dew Diet	3.4	Snapple Diet Lemon Iced Tea	2.6
Sprite	3.4	Snapple Lemonade	2.6
7-Up Regular	3.2	Coca-Cola Cherry	2.5
Mountain Dew Regular	3.2	Coca-Cola Classic	2.5
Sprite Regular	3.2	Pepsi Regular	2.5
Pepsi Diet	3.1	Snapple Pink Lemonade	2.5
Snapple Diet Pink Lemonade	3.1	Schweppes Tonic Water	2.4
Juices			
V8 Vegetable Juice	4.2	Minute Maid Apple Juice	3.7
Campbell's Tomato Juice	4.0	Dole Pineapple Juice	3.4
Tropicana Orange Juice with Calcium	4.0	Capri Sun Surfer Cooler	3.1
Juicy Juice Berry	3.8	Lemon juice	2.3
Sport Drinks			
Gatorade Fruit Punch	3.0	Gatorade Lemon Lime	3.0
Gatorade Orange	3.0	Powerade Zero Grape	3.0
Gatorade Citrus Cooler	3.0	Propel Berry	3.0
Energy Drinks			
Red Bull	3.4	5 Hour Energy Lemon-Lime	2.8
Monster M-80	3.3	Full Throttle	1.5
No Fear	3.0	Rock Star	1.5
Other			
Milk	6.7	Black coffee	5.5
Unsweetened almond mild	6.5	Beer	4.0
Black tea	6.3	Wine	3.1

Average pH of sour candies [32]

Candy	pH	Candy	pH
Sweetarts	3.0	Sweet Tarts Shock	2.4
Sour Gummi Bears	3.0	Lemon Heads	2.4
Big Stuff Pacifier Sucker	3.0	Mentos Fruit Chews	2.4
X-treme Airheads	3.0	WarHeads Sour Rips Roll	2.3
Shockers	2.5	Sour Skittles	2.2
Sour Punch Straws	2.5	Airheads Cherry Chew	2.0
Skittles	2.5	Wonka Nerds Grape	2.0
Baby Bottle Pop Powder	2.5	Now and Later Cherry Chew	1.9
Brach's Gummi Bears	2.5	Too Tart Extra Sour Goo	1.9
Sqwigglies Gummi Worms	2.5	Wonka Pixy Stix Powder	1.9
Wonka Laffy Taffy	2.5	Wonka Fun Dip Powder	1.8
Starburst	2.4	WarHeads Sour Spray	1.6

In children, dental erosion is most often caused by dietary acids from juice, soda, fresh fruit, and sour candies. In adults, although dietary acids also may cause dental erosion, it more often is associated with GERD, especially if it affects molar occlusal surfaces. Identifying GERD is important because the risk of developing esophageal adenocarcinoma later in life is approximately 43 times greater in individuals with untreated GERD than in those without GERD. Note that children and adolescents may experience GERD. For example, GERD is suspected if severe erosion is associated with loss of primary molar occlusal-surface anatomy. [4]

Erosive lesions typically present as bilateral concave defects without the chalkiness or roughness associated with bacterial acid decalcification. In early stages, erosion affects the enamel, causing a shallow, smooth, glazed surface. If erosion continues, dentin exposure will occur. Evidence of 'cupping' of occlusal surface of posterior teeth and incisal edges of the anterior teeth is usually found. Also, restorations may protrude from the adjacent tooth surface. [3]

Dental erosion in children most often affects occlusal surfaces of first primary molars, followed by occlusal surfaces of second primary molars and then mesial-cusp tips of permanent first molars. The first sign of erosion on first primary molars is on cusp tips; the erosion then progresses to encompass the entire occlusal surface. The lingual surfaces of maxillary incisors may display erosion if a child has a tongue-thrust swallow, which propels acidic liquid forward during swallowing. [4]

Strategies for managing erosive tooth wear may include:

- Avoiding dietary acids between meals and reduce intake of acidic beverages.
- Avoiding swishing or straining liquid between the teeth, or holding the liquid in the mouth.
- Drinking with a straw positioned behind the front teeth can minimize bathing the teeth.
- Drinking water while eating, and rinse with water after consuming acidic drinks, candies, or foods.

- Rinsing the mouth with water, a sodium bicarbonate rinse, or milk after vomiting.
- Chewing sugar free gum by promoting salivary flow, as saliva helps buffer and remove acids.
- Drinking milk along with acidic meals or beverages, which contributes to remineralization and helps neutralize acids.
- Rinsing with water rather than brushing teeth immediately after consuming acidic foods or beverages. [24]

Tooth wear indices

Many tooth wear indices have been developed globally to evaluate and monitor tooth wear. The literature identifies different indices for clinical and laboratory use and specific indices for attrition, abrasion, erosion, and multifactorial tooth wear. The production of so many indices does not allow for ready comparison of results between different research groups. One area of consensus is the recognition of dentin exposure as an indicator for substantial loss of tooth tissue. An ideal index should be simple to understand and use, clear in its scoring criteria, and be demonstrably reproducible. [33]

Basic erosive wear examination index

The basic erosive wear examination (BEWE) index was devised in 2008 as a screening tool to help with routine clinical examinations. BEWE ranks tooth wear (by sextant from 0 to 3), summing up the total area of tooth loss (on a scale of 0 to 18), and ranking the extent of risk from none to high.

Tooth wear severity is evaluated systematically:

- Teeth should ideally be cleaned before the clinical exam.
- Buccal, occlusal and/or incisal, and lingual surfaces are assessed in each sextant under good lighting.
- Third permanent molars are generally excluded but are considered if they replace a second permanent molar.
- Restorations covering more than 50% of the total surface are excluded and other surfaces in the sextant used to indicate the score.
- No sign of erosive tooth wear is allocated a BEWE score of zero.
- Initial loss of surface texture (brightness loss, opaque surface or 'frosted glass' appearance) is scored one.
- Distinct wear hard tissue loss affecting <50% of the surface area is scored two.
- Loss affecting >50% of the surface is graded three.
- When doubt occurs between different scores, the lesser BEWE score is used.
- Each sextant is scored based upon the worst affected surface in the sextant.
- Scores are recorded in a grid format.
- Each sextant score can be added together to give a maximum value of 18 to determine the overall score. The overall score guides clinical management actions alongside risk and client factors.[7] [34]

[7] Refer to the additional resources section below for articles on the BEWE system.

BEWE index [34] [35]

Score	Description
0	No erosive tooth wear
1	Initial loss of surface texture (brightness loss, opaque surface or 'frosted glass' appearance)
2	Distinct defect, hard tissue loss, less than 50% of the surface area. Dentin may be involved
3	Hard tissue loss in more than 50% of the surface area. Dentin may be involved
BEWE index assesses the damage according to the surfaces affected regardless its depth in dentin. Sextants' cumulative assessment (maximum 18) defines the BEWE index value. Total mouth score: 0 – 2 = no risk; 3 – 8 = low risk; 9 – 13 = medium risk; 14+ = high risk	

Management according to BEWE risk level [35]

Risk level (overall score)	Management
None (0 – 2)	Routine maintenance and observation Repeat at 3-year intervals
Low (3 – 8)	Oral self-care and dietary assessment and advice Routine maintenance and observation Repeat at 2-year intervals
Medium (9 – 12)	Oral self-care and dietary assessment and advice Identify main etiological factor(s) for tooth wear and develop strategies to reduce impact Consider fluoridation measures or other strategies to increase resistance of tooth surfaces Ideally, avoid placement of restorations, and monitor erosive wear with study casts, photographs, or intraoral scanning Repeat at 6-12-month intervals
High (14+)	Oral self-care and dietary assessment and advice Identify main etiological factor(s) for tooth wear and develop strategies to reduce impact Consider fluoridation measures or other strategies to increase resistance of tooth surfaces Ideally, avoid restorations, and monitor tooth wear with study casts, photographs, or intraoral scanning In cases of severe progression consider special care that may involve restorations Repeat at 6-12-month intervals

Assessment

Tooth wear may be assessed by reviewing the medical history, client risk factors, and completing a comprehensive clinical examination. Strategies to reduce tooth wear include determining the type of tooth wear and causative factors, grading the severity, planning and implementing appropriate treatment, monitoring progress, and evaluating outcomes. [11] [24]

Screening for tooth wear

Screening for tooth wear includes reviewing:

- Client medical history, including all prescription and over-the-counter medications. Frequent antacid use may indicate undiagnosed case GERD. Many medications contribute to dry mouth. Head and neck radiation therapy may affect salivary glands.
- Dental history, including chief complaint such as dentinal hypersensitivity, aesthetic concerns.
- Homecare including toothpaste used, toothbrush bristle hardness, brushing technique, toothpick misuse, oral habits, etc.
- Lifestyle and occupation exposure, e.g., wine tasting, competitive swimming.
- Dietary sources of acidic foods and beverages, including frequency and exposure time of food intake.

Clinical examination would include:

- Head and neck exam to evaluate masticatory muscle function. An enlarged parotid gland may indicate bulimia, alcohol use disorder, or Sjogren's syndrome.
- Intraoral exam to assess for type and degree of tooth wear. A dry field, magnification, and good lighting are helpful to aid early detection of the initial signs of tooth wear, which can be subtle.
- Intraoral photographs, an intraoral scan, and study models may assist in monitoring wear patterns and identifying future areas of wear. [5]

Tooth wear management strategies

Several strategies have been discussed previously; additional strategies may include:

- Providing advice to modify or remove causative factors (e.g., nail biting, pen chewing, pipe use, toothpick misuse).
- Providing advice on how to modify acid intake and frequency.
- Discussing oral self-care (e.g., modifying tooth brushing technique, using soft bristled tooth brush, low abrasive toothpastes, incorporating fluoride).
- Advising clients prone to aggressive brushing to brush with their nondominant hand to allow for conscious brushing pressure. Evaluate brushing techniques. Long, horizontal strokes should be avoided. Clients should brush one to two teeth at a time. Light grip (e.g., pen grasp) and light pressure should be used on the tooth brush. Some power toothbrushes are available with pressure sensors. Remind clients brushing is to remove soft deposits; hard deposits are removed by professional scaling.
- Advising to avoid brushing immediately after an acid exposure (e.g., acidic foods) because brushing in the presence of acid may contribute to a quicker progression of erosive defects. It takes 30 minutes for saliva to return to normal after an acid exposure, as well as for the teeth to remineralize.
- Providing advice to mitigate contributing factors, such as dry mouth.[8]
- Profession treatment may include in-office fluoride application (e.g., fluoride varnish). Fluoride encourages hardening of the tooth structure to resist acid attack and

[8] Refer to episode 55 for strategies to manage dry mouth (xerostomia).

erosion. It also helps to prevent and treat hypersensitivity and encourages remineralization. High fluoride dentifrice may also be recommended.
- Referring to appropriate medical providers if conditions such as GERD, substance use, eating disorders, sleep apnea, etc. are suspected. [5] [11]

Take home messages

- Identifying early signs of erosion, abrasion, and attrition and determining risk factors contributing to tooth wear may help to prevent further loss of enamel and dentin.
- Management of tooth wear will require multiple strategies due to its multifactorial nature.
- Appropriate prevention should be implemented, and multidisciplinary care is the key to treating individuals when conditions such as eating disorders, GERD, substance use are suspected.
- Even though each type of tooth wear has its own clinical appearance when presenting on its own, the types may occur concurrently and interact to create a mixed tooth wear lesion making diagnosis difficult.

Resources

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