

## Prevention of Erosive Tooth Wear

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**Received:** October 19, 2020; **Published:** November 27, 2020

### Abstract

The aim of this paper is to review and summarize the preventive measures to eliminate or minimize the effect of contributing factors in erosive tooth wear (ETW).

From the early stages of the (ETW) the causative factor/s has to be identified and assessed carefully in order to prescribe the right intervention and prevent teeth from continuous structure loss. ETW severity could be measured using tooth wear index TWI and/or basic erosive wear exam BEWE which have been used widely for clinical and research applications. The intervention varies from simple advice to complex full mouth rehabilitation based on the severity and the causative factors. Traditionally, the causative factors (attrition, abrasion and erosion) have been dealt with separately, however, the recent literature indicates the multifactorial nature of ETW. Hence, the intervention should be based on the involved cause/s.

In this article, the main causative factors will be highlighted in addition to evidence-based preventive measures that could be applied in the different ETW clinical presentations.

**Keywords:** *Erosive Tooth Wear (ETW); Basic Erosive Wear Exam (BEWE); Tooth Wear Index (TWI)*

### Introduction

Erosive tooth wear (ETW) could be defined as loss of dental hard tissues from causes other than caries, trauma or developmental disorders [1]. It usually results from the combined factors of erosion, abrasion, and/or attrition [2]. Some see it as a consequence of the aging process and refer to it as physiological wear, however, the prevalence of ETW within the younger population is not negligible [3-5]. In fact, the numbers are increasing within that last few decades which implicate a pathological nature in a significant number of cases. For instance, the Dental Health Survey of 1993 in the UK showed that 25% of 11-year-olds had significant erosion (the chemical form of wear) [4,5]. It has been noticed that the rate of ETW fluctuates throughout the life of the teeth, depending on the risk factors and their magnitude of contribution to the wear process. A study has shown that controlling some risk factors by maximizing prevention advice has led to some reduction in the wear rate [6]. So, eliminating the causative factors could play an integral role in slowing down the ETW progression to the minimum.

This article will be reviewing the preventive measures that have been implemented and tested clinically.

### ETW severity measurement

There are multiple grading and scoring systems that could be applied clinically to assess the severity of the ETW lesions. These grading systems aim to establish a way of communicable language between the practitioners and to prescribe the right intervention based on

how severe is the ETW in a specific case. However, the lack of international standardization of these grading systems making it difficult to reach standardized guidelines for clinical intervention [7].

Among various indices, the ETW index (TWI) and the basic erosive wear exam (BEWE) are two of the widely used indices clinically and in research applications. They were introduced by Smith and Knight in 1984 and Bartlett, *et al.* 2008 respectively, and they are dedicated to measure and monitor ETW of a multifactorial origin [8,9]. As a guide for managing the ETW cases, BEWE has proposed intervention guidelines emphasizing the preventive measures especially when the wear lesions are still within the initial stages. For instance, BEWE does not suggest any restorative intervention until a cumulative score of  $\geq 14$  which indicates a case with a high risk of ETW. At the early stages of ETW it is recommended to stick to the preventive measures i.e. (Oral hygiene and dietary assessment, advice, fluoridation measures, and periodic observation...) [9] (Figure 1).

<b>Risk Level</b>	<b>Management</b>	<b>Time Interval</b>
<b>None: 0-2</b>	Routine maintenance and observation.	3 years
<b>Low: 3-8</b>	OHI, Dietary assessment and advice. Routine maintenance and observation.	2 years
<b>Medium: 9-13</b>	OHI, dietary assessment and advice. Identify causes and implement avoidance strategies. Consider fluoride measures or another method to increase surface resistance. Avoid placement of restorations. Monitor with study casts, photos or silicone impressions. Advise patients to use a toothpaste specially formulated to protect against the effects of acid wear.	6-12 months
<b>High <math>\geq 14</math></b>	As above in addition to: Avoid placement of restorations, but in cases of severe progression, consider special care that may involve restorations.	6-12 months

**Figure 1:** BEWE intervention guide by Bartlett, *et al.* 2008.

### Diet advice

Once the source/s of tooth wear is identified to be dietary, consumption of acidic diet has to be reduced to the minimum or modified if associated with a hazardous habit. It has been found that the frequency of acidic diet (fruits/ acidic beverages) has more significant influence on ETW rate than the limited intake [10]. It was also found that the quantity of acidic intake might have an effect on increasing the potential of tooth wear [11]. Regarding duration of acidic consumption, if the intake was taking place for more than 10 minutes, the ETW rate has been multiplied by 12.8 and 2.9 times with acidic fruits and acidic drinks respectively [10]. Moreover, habits like holding an acidic drink, swishing, or directing it through a straw to teeth not to the back of the mouth should be eliminated since they are associated with increasing the possibility of having ETW [10]. Excessive alcohol is also associated with tooth wear due to their acidity and intake must be kept below the recommended levels [12].

### GERD/eating disorders

An estimate of 10 - 20% of the population are suffering from Gastroesophageal reflux disease GERD [13]. GERD is strongly associated with palatal tooth wear [14]. For that reason, careful attention during the clinical exam to locate the affected teeth and surfaces and to

correlate it with the potential cause based on history taking. If GERD is suspected, a referral to a gastrologist is indicated to diagnosis and prescribe the proper treatment. In some cases, anti-reflux medications would be prescribed, which based on evidence, could reduce enamel loss from erosion by gastric acids [15]. The National health system NHS in the UK recommended that GERD diagnosed persons should eat smaller and more frequent meals and avoid having the largest meal of the day in the evening. Besides, avoiding anything can trigger symptoms such as coffee, chocolate, alcohol, and fatty or spicy food. Head of the bed have to be raised by up to 20cm to reduce symptoms at night. Stresses can make heartburn and GERD worse, so they should be avoided whenever possible. Moreover, maintaining a healthy weight and Stopping smoking may help to reduce GERD symptoms [16].

Eating disorders that affect oral health are bulimia nervosa and anorexia nervosa. They are all related to voluntary vomiting which patients tend to do mainly to prevent gaining weight. Dental erosion is a manifestation that is observed with these disorders [17]. According to The National Institute for Health and Care Excellence (NICE) patients who are vomiting frequently should have regular dental and medical reviews, delay brushing teeth after vomiting, rinse with non-acid mouthwash after vomiting, and avoid highly acidic foods and drinks [18].

### Role of fluoride in ETW prevention

Fluoride has been proven to have similar activity against ETW as caries at hardening enamel and increasing the resistance to demineralization [19]. Monovalent fluoride which usually exists at neutral pH in toothpaste and mouth rinses, is not that effective, whereas high-concentration, with more acidic pH formulations, provides a higher level of enamel prevention. The most promising are the polyvalent fluoride formulations with the best evidence for effectiveness available for Stannous fluoride SnF<sub>2</sub>. However, the clinical effectiveness to prevent dentine wear has not been demonstrated [20].

### Parafunctional habits

In order to protect further attritional wear for bruxists, an occlusal splint with well-distributed occlusal contact and incisal guidance is often recommended [21]. Recently, it has been found that oral appliances or splints are not proven to reduce bruxism activity in the long term, but they may act as protection from grinding more tooth structures [22]. The splints or mouth guards should provide well distributed occlusal contacts, and they can be made from either heat-cured acrylic or vacuum-formed materials and can be worn in either jaw.

### Conclusion

Careful assessment and understanding of the causative factors and how they are interacting with each other is the key to prevent teeth from ETW. Eliminating the cause by simple advice to change habitual behavior, fluoride application, dental protection devices, and/or medical intervention could be the solution to prevent ETW from progressing. However, all of the preventive measures need to be reassessed and continuously monitored to evaluate its effectiveness and apply some modifications if indicated.

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### Volume 19 Issue 12 December 2020

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