



Short communication

BEWE 2.0: Basic erosive tooth wear examination revisited: Introducing an additional level for more severe erosive tooth wear

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ABSTRACT

The Basic Erosive Wear Examination (BEWE) was proposed in 2008 as a screening tool for tooth wear. The original aim was to create a simple, convenient screening tool to prompt a clinician to record tooth wear. It was not intended to be accurate and was matched to the basic periodontal examination (BPE). Since that time it has been incorporated into dental practice software and has been adopted by Dentists. But the original screening tool created a ceiling effect, particularly at grade 3 which marked a significant progression from slight wear over the surface to almost complete obliteration of the tooth from wear. There was also low reproducibility between scores 0 and 1. The BEWE 2.0 addresses these issues and proposes a single additional score of level 4 to include 2 mm loss of crown height or 2mm horizontal wear along the cervical margin alongside clarifying the differences between scores 0 and 1.

BEWE 2.0

In 2008 a group of academics and dentists published a screening tool for recording erosive tooth wear (ETW) in general practice [1]. The meeting at the time was coordinated by industry. Nearly 20 years later another group of clinical academics, dental practitioners, hygienist and industry met to update the guidance.

Over time the BEWE (Basic Erosive tooth Wear Examination) has become the most commonly used screening tool used in dental practice [2] and has been adopted in the UK by most patient management soft-

ware programmes. The screening tool was designed to capture tooth wear in sextants and to score the most severely affected tooth surface. Early on it was recognised to make the tool as effective as possible, it needed to be simple and time efficient. The sextant score and scoring was designed to mirror the BPE (Basic Periodontal Examination, Council of the British Society of Periodontology) and create a screen for ETW to add to the clinical notes and help inform the patient.

Since that time the BEWE has gradually gained purchase in general dental practice. It has also been used in data collection for research into prevalence of the condition in over 100 research articles [2]. It is taught

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in all UK dental schools and most schools use it clinically to screen for ETW. However, it has not been adopted by regulatory bodies in the UK and elsewhere as being essential for recording ETW. The reasons for this are not clear. Tooth wear affects up to 40 % of the global population [4], and a possibility exists that the current tool needs tailoring for practice needs.

The term BEWE reflected a European focus on erosion with the UK focus on tooth wear. The name was chosen to capture that erosion is often the underlying driver of tooth wear but also to accept that abrasion and attrition are important aetiological factors. The screening tool does not differentiate on causation and allows a change in the surface detail and contour of teeth to be transcribed into an ordinal scale for the clinical notes. The addition of the term tooth wear into the name allows sufficient flexibility to be used for lesions with erosion, abrasion and attrition, singularly or in combination, and also for non-carious cervical lesions (NCCLs).

The approach to the BEWE deliberately paralleled that used for the BPE. Unlike the BPE, it transfers a shape change to a grade which is then recorded in the notes. The BPE uses linear - scale depth measurements using the periodontal probe. This is impossible with ETW when attempting to assess an overall volumetric change and makes it challenging for the index to be reproducible or repeatable. However, when the BEWE was published, many practitioners were not recording the tooth wear experience of patients and so the original aim was to prompt dentists to examine patients and routinely record it in the notes. The action of recording tooth wear and raising the profile was considered more important, despite the challenges.

As common with many other indices, academics chose to use it on populations to estimate the tooth wear prevalence in general practice [5], dental schools [6], within the UK [7] and internationally [8–10]. The framework was based on that of Lussi who used a 50 % cut off across the tooth surfaces [11]. Each surface, of each tooth, in a sextant was examined and the score for most severely affected surface recorded. The original BEWE approached dentine exposure cautiously. Other indices registered dentine exposure [12], but the view at the time for the BEWE was that dentine was not reliably distinguishable from enamel exposure [13].

Limitations of the BEWE

Early tooth wear is one of the most significant risk factors for tooth wear progression [14,15]. It was hoped that by creating an index which recognised wear at the earliest stages, dentists would instigate prevention and help limit progression. For this reason, the grading emphasised early levels of ETW, but it inadvertently created a ‘ceiling effect’ towards the more severe levels. Grade 3 encompassed signs of early to moderate wear with 50 % of the surface affected and could in theory be limited to enamel, but could also represent the complete loss of the clinical crown. This reduction in utility for the clinical presentations of tooth wear may have influenced the adoption of the screening tool in practice.

The focus on the early stage of progression represented the view that diagnosis with subsequent preventive measures might stop progression. Since that time experience has shown the tool was not sufficiently discriminative to allow progression to be accurately assessed. The definition and clinical distinction between grade 0 and 1 was not easily distinguishable. Researchers also recognised this dilemma and often merged the data from 0 and 1 into a single grade [8,9,16]. In a recent European study, less than 3 % of the population had a BEWE score of 0 [17]. Grade 3 also presented a challenge as it captured an extensive range from the early loss of surface detail to the loss of the clinical crown [18].

Changes BEWE 2.0

The group recognised that radical changes to the index might risk confusion and a drop in adoption by those using the original index. For this reason, a modified approach was favoured to capture the original score, but with more accurate definitions and to address the ceiling effect of the existing scale. It would also allow comparison where needed for research prevalence studies between the old and new scale.

The loss of clinical crown height was viewed as an important planning dilemma for clinicians, alongside cervical wear. For this reason, the numerical value of 2 mm loss from the clinical crown height was selected as a measurable change which had clinical implications, but also on planning care. The decision to use 2 mm cut off was pragmatic, but also conveniently achievable using a periodontal probe. The panel could have adopted the 50 % loss to maintain consistency with the index, but this would represent severe, borderline unrestorable tooth wear and create a new ceiling effect. It would also not allow cervical wear to be recorded. Choosing 2 mm means the examining dentist has to estimate the unworn length of the tooth. But the significance of 2 mm was pragmatic and convenient. At the same time loss of horizontal depth associated with cervical wear (NCCLs) also allows this to be estimated.

For cervical wear, a grade 4 is recorded when 2 mm of wear is present at its deepest cross-section, often at the midpoint. This does not have to be present throughout the lesion. Describing a deep non-carious cervical lesion as a grade 4 recognises increased severity and might indicate the need for intervention. The decision to restore worn teeth is a patient-driven process and it cannot occur without consent. However, adding an additional grade to demonstrate that loss of clinical crown height has occurred means BEWE 2.0 recognises a more severely worn, albeit restorable, surface.

Levels of erosive tooth wear

The group recognised the benefit of having a 0 score (Fig. 1), but also that it was uncommon and probably only relevant to the early phase after a tooth had erupted (Table 1). The 0 score represents the pristine health of the tooth without any change to the surface detail. Once a tooth has been functional in the mouth some change will become visible (Fig. 2). The early changes such as rounding of enamel line angles, cusp tips and loss of surface anatomy may help the examiner score the surface but at this early phase the group also recognised that it is challenging to judge what is normal and what is the sign of early change. The distinction for grade 2 as a visible defect but covering less than 50 % of the surface is more reliably scored (Fig. 3). The addition of



Fig. 1. on the central incisors the perikymata are visible and there is no rounding of the mesial or distal edges and scored 0.

Table 1

BEWE 2.0.

Score	Description
0	No visible wear and pristine health
1	Loss of enamel surface texture but no visible defect. Rounding of mesial and distal enamel edges, loss of perikymata.
2	A visible defect involving <50 % of the surface; may include dentine exposure
3	A visible defect involving >50 % of the surface but <2 mm in depth; may include dentine exposure
4	Extensive visible defect involving >50 % of the surface and/or >2 mm in depth



Fig. 2. shows anterior teeth with a score of 2 on the central incisors and 1 on the lateral incisor.



Fig. 3. the picture shows examples of score 1 on the canine, score 3 on the central incisors with more than 50 % of the surface but less than 2 mm loss of incisal height.

score 4, which represents loss of incisal clinical crown height, represents a severe lesion and one that might represent the need to intervene clinically (Fig. 4). It was accepted that the judgement required to define what is 2 mm loss needed an understanding of normal height for teeth. But the BEWE is intended as a screening tool and therefore requiring a degree of judgment is appropriate.

If there is doubt between scores, the advice would be to score the lower value. If a tooth is restored, and the volume exceeded 50 % of that surface in keeping with the original BEWE, it was excluded. If a mouth is fully or mainly restored with full coverage restorations, a BEWE score is not indicated. All teeth erupted in the mouth should be scored. The original BEWE did not score wisdom teeth but in some cases



Fig. 4. score 4 is visible on the central incisors with loss of incisal height more than 2 mm.

the loss of a molar might result in drifting of the last molar into a new position, and so the group advised all teeth fully erupted should be scored.

Risk assessment

The final area for discussion was the cumulative score which some members of the group supported, and others did not (Table 2). The original paper used the cumulative score as a risk assessment and was based on adding the maximum score from each sextant together to give a scale from 0-18. However, this has the potential to underestimate risk when the wear is localised. For instance, if severe ETW was present on the anterior teeth but less advanced posteriorly, this patient could have a cumulative score of 3 or 4. Despite their high risk on this area, the cumulative score based on the original paper would indicate a low - risk patient. The original score for a low risk assumed ETW presented evenly throughout the mouth. While it was recognised that the cumulative score remained valuable to some clinicians as a risk assessment, the guidance has changed to recognise that the distribution of ETW can vary. The maximum score from any one sextant was deemed as the most important way to identify risk.

The protocol for using the BEWE is, for some, matching the clinical practice used for recording the BPE. This was designed to reduce the time spent examining the patient’s teeth and allow the scoring to be as simple as possible. The removal of a cumulative score and adoption of a maximum score was made to acknowledge that ETW is sometimes localised.

The panel selected to keep score 3 as it represented an evolution from score 2 and eliminated a jump from 2 to 4 representing another ceiling effect. Identifying a mouth with a score 3 may not require

Table 2

Risk levels represented by highest sextant score.

Risk Level	Criteria	Clinical Management
Low	No score higher than 1	<ul style="list-style-type: none"> • Routine maintenance and observation • Repeat assessment at every new examination or periodically
Medium	No score higher than 2	<ul style="list-style-type: none"> • Provide oral hygiene and dietary advice • Consider fluoride measures • Restorations not normally indicated • Repeat assessment at every new examination
High	Any score higher than 3	<ul style="list-style-type: none"> • Provide oral hygiene and dietary advice • Consider fluoride measures • Restorations may be indicated • Repeat assessment at every new examination

restorative intervention, but it should provoke a preventive approach. Also the panel did not want to radically change the screening tool. Keeping a sextant based score also allowed a consistency with the sequence for the BPE and also for recording the BEWE in the software.

The group considered it was essential to screen using BEWE 2.0 for every new patient assessment, and in the absence of a baseline score. The frequency of re-assessment is guided by risk assessment. The decision on whether to treat needs to be patient - driven and whilst level 4 means substantial loss of clinical crown height, some patients might perceive this as justification for intervention whilst others may not, and so choose to keep the condition under review. It is not the purpose of a screening tool to define when to intervene, but a discussion of the possibilities tailored to the scores recorded is appropriate. An increase in score might represent progression, but to judge this for an individual over time is beyond the scope of a screening tool. They are not designed to be repeatable or reproducible but may guide the patient and dental care professional on options.

The BEWE 2.0 can be used to grade primary teeth as it represents a shape change. Deciduous molars or the mixed dentition can be graded but the clinical interpretation of a treatment need would differ in a younger person and may not drive intervention.

Conclusion

BEWE 2.0 maintains the purpose of the original as a screening tool to be repeated at all new clinical examinations. Its primary purpose is to prompt the examining oral health care professional to screen and record the outcome in the clinical records for ETW and to inform the patient. The authors recognise that research authors will use and possibly adapt it for prevalence studies, but the main priority is a screening tool to be used in general dental practice. This paper explains the changes made to the BEWE, primarily the addition of grade 4 to assess loss of clinical crown height and cervical horizontal loss. Changes in risk assessment to emphasise the maximum score rather than the cumulative score, and to score all teeth including 3rd molars, are also included.

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Declaration of competing interest

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References

- [1] D.W. Bartlett, C. Ganss, A. Lussi, Basic Erosive Wear Examination (BEWE): a new scoring system for scientific and clinical needs, *Clin. Oral Investig* 12 (2008) S65–S68, <https://doi.org/10.1007/s00784-007-0181-5>.
- [2] F. Marschner, P. Kanzow, A. Wiegand, Anamnestic risk factors for erosive tooth wear: systematic review, mapping, and meta-analysis, *J. Dent.* 144 (2024) 104962, <https://doi.org/10.1016/J.JDENT.2024.104962>.
- [3] Council of the British Society of Periodontology, Basic periodontal examination (BPE), (n.d.), accessed. https://www.bsperio.org.uk/assets/downloads/BSP_BPE_Guidelines_2019.pdf, November 17, 2025, accessed.
- [4] N. Schlueter, B. Luka, Erosive tooth wear - a review on global prevalence and on its prevalence in risk groups, *Br. Dent. J.* (2018) 224, <https://doi.org/10.1038/sj.bdj.2018.167>.
- [5] B. Dixon, M.O. Sharif, F. Ahmed, A.B. Smith, D. Seymour, P.A. Brunton, Evaluation of the basic erosive wear examination (BEWE) for use in general dental practice, *Br. Dent. J.* 213 (2012) E4, <https://doi.org/10.1038/sj.bdj.2012.670>.
- [6] J. Fares, S. Shirodaria, K. Chiu, N. Ahmad, M. Sherriff, D.W. Bartlett, A new index of tooth wear. Reproducibility and application to a sample of 18- to 30-year-old university students, *Caries Res.* 43 (2009) 119–125, <https://doi.org/10.1159/000209344>.
- [7] M.H.M. Li, E. Bernabé, Tooth wear and quality of life among adults in the United Kingdom, *J. Dent. Press* (2016), <https://doi.org/10.1016/j.jdent.2016.09.013>.
- [8] D.W. Bartlett, A. Lussi, N.X. West, P. Bouchard, M. Sanz, D. Bourgeois, Prevalence of tooth wear on buccal and lingual surfaces and possible risk factors in young European adults, *J. Dent.* 41 (2013) 1007–1013, <https://doi.org/10.1016/j.jdent.2013.08.018>.
- [9] M.A. Awad, D. El Kassas, L. Al Harthi, S.B. Abraham, K.S. Al-Khalifa, M.E. Khalaf, R. Al Habashneh, D. Bartlett, Prevalence, severity and explanatory factors of tooth wear in Arab populations, *J. Dent.* 80 (2019) 69–74, <https://doi.org/10.1016/j.jdent.2018.09.011>.
- [10] N.X. West, M. Davies, A. Sculean, S. Jepsen, R. Faria-Almeida, M. Harding, F. Graziani, R.G. Newcombe, J.E. Creeth, D. Herrera, Prevalence of dentine hypersensitivity, erosive tooth wear, gingival recession and periodontal health in seven European countries, *J. Dent.* 150 (2024), <https://doi.org/10.1016/j.jdent.2024.105364>.
- [11] A. Lussi, Dental erosion clinical diagnosis and case history taking, *Eur. J. Oral Sci.* 104 (1996) 191–198. <http://www.ncbi.nlm.nih.gov/pubmed/8804886>.
- [12] B.G. Smith, J.K. Knight, A comparison of patterns of tooth wear with aetiological factors, *Br. Dent. J.* 157 (1984) 16–19, <https://doi.org/10.1038/sj.bdj.4805401>.
- [13] C. Ganss, J. Klimek, A. Lussi, Accuracy and consistency of the visual diagnosis of exposed dentine on worn occlusal/incisal surfaces, *Caries Res.* 40 (2006) 208–212, <https://doi.org/10.1159/000092227>.
- [14] F. Marro, S. O'Toole, E. Bernabé, D. Bartlett, V. Aránguiz, Associated risk factors with quantitative erosive tooth wear progression, *J. Dent.* 123 (2022) 104179, <https://doi.org/10.1016/j.jdent.2022.104179>.
- [15] M. Harding, H. Whelton, S. Shirodaria, D. O'Mullane, M. Cronin, Is tooth wear in the primary dentition predictive of tooth wear in the permanent dentition? *Rep. Longitud. Study Community Dent. Health* 27 (2010) 41–45, <https://doi.org/10.1922/CDH>.
- [16] S. O'Toole, E. Bernabé, R. Moazzez, D. Bartlett, Timing of dietary acid intake and erosive tooth wear: a case-control study, *J. Dent.* 56 (2017) 99–104, <https://doi.org/10.1016/J.JDENT.2016.11.005>.
- [17] N.X. West, M. Davies, A. Sculean, S. Jepsen, R. Faria-Almeida, M. Harding, F. Graziani, R.G. Newcombe, J.E. Creeth, D. Herrera, Prevalence of dentine hypersensitivity, erosive tooth wear, gingival recession and periodontal health in seven European countries, *J. Dent.* 150 (2024) 105364, <https://doi.org/10.1016/J.JDENT.2024.105364>.
- [18] M. Lorens, I. Tomaszewska, Methods for assessing and measuring tooth wear—applications in clinical research and a comparison of the basic erosive wear examination, tooth wear index and tooth wear evaluation system version 2.0, *J. Oral Rehabil.* 0 (2025) 1–11, <https://doi.org/10.1111/JOOR.70104>.