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EDITORIAL

Current erosion indices—flawed or valid?

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Erosive tooth wear is a common condition in some industrialised societies and can be considered a 'new' condition triggered by changing diet and behaviour in our societies. Erosive tooth wear is becoming increasingly significant in the long-term health of the dentition and the overall well being of those who suffer its effects. Following the decline in tooth loss in the 20th century, the increasing longevity of teeth in the 21st century will render the clinically deleterious effect of wear more demanding upon the preventive and restorative skills of the dental professional. Awareness of dental erosion by the public is still not widespread, and dental professionals worldwide are sometimes confused by its signs and symptoms and its similarities and differences from the other categories of tooth wear, namely abrasion, attrition and abfraction.

Understanding its aetiology has advanced, and research in the field has considerably increased during the last decades. Whilst in the seventies, less than five studies per year were published about erosion; this number was still below ten in the 1980s and has now risen to about 50 studies per year. Prevalence data, however, are still scarce.

A PubMed search identified only 28 publications in the years 1986–1996 about the prevalence of erosion, increasing the number to 66 publications from different countries over the world in the last decade (Fig. 1). Information about the relevance of erosive wear for oral health with respect to its prevalence is far from complete. Even though the field of epidemiology of dental erosion is growing, respective research tools are not firmly established, resulting in a situation where a critical and constructive discussion is not only necessary but also possible.

The workshop held in Basle in April 2007 took place approximately a decade after the release of the Vol. 104, No. 2 of the European Journal of Oral Sciences reporting on the results of the workshop on aetiology, mechanism and implications of dental erosion (supported by the International Life Sciences Institute ILSI). Nowadays, research on erosion is increasingly establishing itself and gaining more and more attention.

The workshop was organised in three parts; the first part recapitulating the state of the current situation by describing actual knowledge of diagnosis and risk factors and by reviewing current indices. In doing this, one problem emerged: A considerable number of different indices are used all over the world, varying in type concerning assessment, scale, choice of teeth and other styles, resulting in non-comparability. The variation in these indices renders them a research tool of limited relevance.

It is, however, not only the variety of indices, but also the lack of knowledge about their validity, which might flaw current approaches. The indices used today basically emerged from the tooth wear index [2] or the erosion index published by Eccles [1]. These pioneering approaches were developed from personal experience and from findings in small patient groups but have been used until today, although often modified, without further validation.

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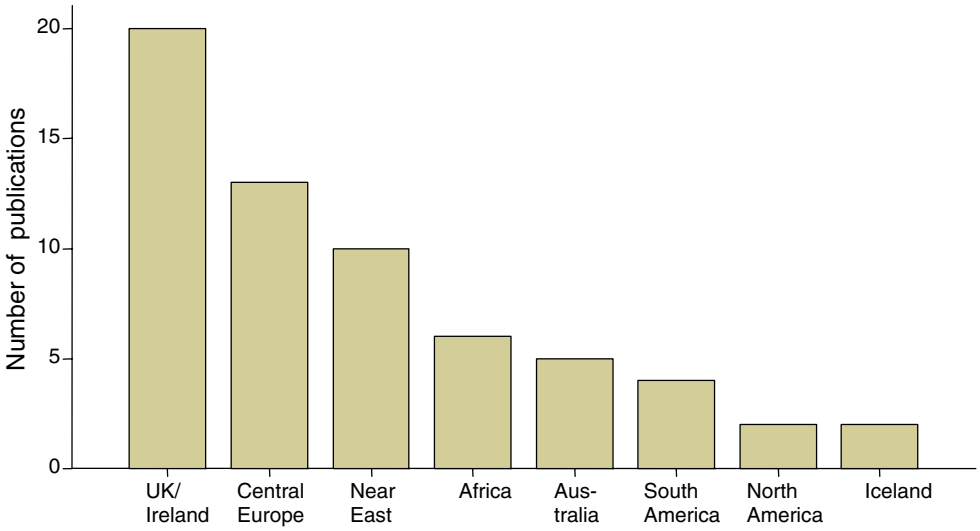

Fig. 1 Number of publications from 1997–2007 identified in PubMed using the search terms 'dental erosion' and 'prevalence'

The second part of the workshop aimed to raise a critical discussion about basic elements of indices:

–Is diagnosing exposed dentine a suitable tool for grading erosive loss?

Most indices differentiate between lesions restricted to enamel and lesions exhibiting exposed dentine—the latter are assigned to higher grading scores, thus indicating a more advanced stage of the condition. But does exposed dentine correlate with the amount of tissue loss? Is exposed dentine a prognostic factor for progression, and is exposed dentine easy to diagnose?

–Pathological vs physiological erosive loss: is there a need for relation to age?

Anthropologists consider human tooth wear a normal physiological phenomenon caused by various physical impacts over a life span. Is (erosive) tooth wear possibly a common feature in humans? Should we include all the small cupping and grooving? Has cupping in early age the same significance as in the elderly, and do we need an age-related approach to tooth wear as was originally suggested by Smith and Knight [2]?

The third part of the workshop dealt with the development of a new index: the requirements of which, and the procedures of how to introduce and validate a new epidemiological tool. In addition to the specifically content-related problems, some formal requirements were formulated:

–Information provided

Hitherto, the prevalence of erosion has mostly been expressed as '*x*% of the subjects had at least one tooth with grade *x* or grade *y* erosion', which may overestimate the problem. The new index should deliver a value providing information on how many teeth are affected (e.g. similarly to DMF-T or DMF-S or on a sextant basis). An index can also indicate whether the condition in question requires treatment.

–Applicability

Current indices are subdivided into 2–5 degrees. An index must be meaningful and easy to learn and apply, thus subdivision into degrees must be neither too precise nor too crude. The index must be easy to calibrate and should have a good reproducibility. The findings must be easy for the investigator to communicate to the person doing the documentation.

–Area of applicability

The indices currently most used are intended for clinical application. Erosion is a superficial loss of substance localised on the smooth and occlusal surfaces. It can thus be diagnosed not only clinically but also on photos or on excellent study models. The latter methods are available in many hospitals and practices (e.g. orthodontics). There is, therefore, already an excellent archive (cross-sectional studies), and information can be provided regarding incidence or progression of erosion by direct comparison of models (longitudinal studies) using serial models. An essential requirement for a new index would thus be applicability—both clinically and on models.

–Application targets

Indices can be used as a screening process in field studies, whereby establishing a valid indicator must be possible without being too time consuming. On the other hand, for analytical questions, one may need precise enquiries requiring detailed documentation of findings. Therefore, a further requirement would be availability of a short version and a long version of the same index, so that data would remain comparable despite differing application targets.

The conclusion at the workshop was the consensus that current approaches have significant flaws and that attempts

should be made to develop a new epidemiological tool. This is promoted by efforts of the World Health Report [3] and the WHO Global Oral Health Program [4] to put forward a new strategy of disease prevention and health promotion, where greater emphasis is placed on developing global policies in oral health promotion and oral disease prevention. Subsequently, the development of suitable and validated indicators and indexes would have to be increasingly supported.

To initiate this process in the field of epidemiology of erosive wear, the Basic Erosive Wear Examination (BEWE) was proposed as a result of the workshop. Its aim is to provide a simple scoring system that can, in a first step, be used with the diagnostic criteria of all current indices and allows re-analysis and integration of results from existing studies. The BEWE is a partial scoring system recording the most severely affected surface in a sextant. The cumulative score guides the management of the condition. The score grades the appearance or severity of wear on the teeth from no surface loss, initial loss of surface texture, distinct defect, hard tissue loss less than 50% of the surface area or hard tissue loss more than 50% of the surface area. Vestibular, occlusal and oral surfaces are examined with the highest score recorded.

In time, it should initiate a consensus process in the scientific community and help to avoid the further proliferation of indices. Finally, this process should lead to the development of an internationally accepted, standardised and validated index. The BEWE further aims to increase the awareness of tooth erosion amongst clinicians and general dental practitioners and to provide a guide as to its management.

The results of the workshop can hopefully trigger a widespread and ongoing discussion on research tools for epidemiology in the field of dental erosion, a condition which undoubtedly is of significance for oral health.

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