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Prevalence of gingival recession and study of associated related factors in young UK adults

Seong J.[a], Bartlett D.[b], Newcombe R.G.[c], Claydon N.C.A.[a], Hellin N.[a], West N.X.[a,*]

[a] Periodontology, Clinical Trials Unit, Bristol Dental School, Lower Maudlin Street, Bristol, UK
[b] Prosthodontics, Kings College London Dental School, London, UK
[c] Institute of Primary Care and Public Health, Cardiff University, Cardiff, UK

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ABSTRACT

Objectives: To determine the prevalence of gingival recession (GR) and associations with dentine hypersensitivity (DH), erosive toothwear (BEWE), gingival bleeding (BOP) and periodontal pocketing (PPD) in young European adults.

Materials and Methods: This is a secondary analysis using data collected from 350 UK participants enrolled in a European cross sectional study of 3187 young adults. GR, BOP, PPD, DH (participant and clinician assessment) and BEWE were recorded. A questionnaire assessed demographics, oral hygiene and lifestyle habits.

Results: 349 participants completed the study. GR, BOP and PPD showed the same pattern of distribution, prevalence increasing from incisors to molars in upper and lower arches for buccal and palatal scores. Every participant exhibited recession affecting at least 1 tooth, 42% having a maximum recession of 4–8 mm. There was a significant and linear association demonstrating an increase in maximum recession with age. DH and BEWE produced a similar pattern to buccal periodontal indices, the premolars being most affected. Maximum recession correlated significantly with maximum DH (participant and Schiff), PPD, BOP, BEWE (scores of 2/3), BMI ($\geq 25\ kg/m^2$) and unsystematic brushing motion. 94% of the study population exhibited some BOP at one or more sites. 5% of the population had periodontal pocketing ≥ 4 mm, 46% had DH and 80% BEWE 2/3.

Conclusion: Widespread recession and gingivitis with minimal periodontal disease was observed. Every participant exhibited at least one tooth with recession. Many teeth did not exhibit DH despite prevalent recession and severe erosive toothwear. Recession correlates to a number of oral and lifestyle variables.

Clinical Significance: Recession in young adults is multifactorial and highly prevalent. It can result in DH and consequential increase in demand for treatment relating to both pain and aesthetics. Further research is needed to understand the underlying aetiology to prevent recession occurring.

1. Introduction

Gingival recession is defined as the exposure of the root surface due to migration of the gingival margin apical to the amelo-cemental junction (ACJ). Recession affects a significant proportion of the population according to the systematic review of Heasman et al [1]. Chrysanthakopoulos [2] reported a prevalence of 64%, with higher [3,4] and lower percentages documented in the literature [5,6]. Consequences of recession include dentine hypersensitivity and cervical tooth wear, affecting quality of life due to regular pain episodes, poor aesthetics and ultimately loss of function. The prevalence of gingival recession is high in populations with high [7–11] as well as low standards of oral hygiene [4,8,12,13].

The presence of gingival recession in the population has generally been associated with poor oral hygiene, periodontal disease and its management [13], resulting in increased loss of attachment. The overall prevalence of periodontitis, however, is generally low in a young population. In UK cohort data collected by the World Health Organisation in 2005, 97% of 15–19 year olds had no evidence of periodontal disease. This figure fell to 25% in those aged 35–44 [14]. Kassebaum et al [15] meanwhile found the prevalence of severe periodontitis increased gradually with age, showing a steep increase between the third and fourth decades of life that was driven to a peak in incidence at around 38 years old.

Whilst periodontal disease may not be a common problem in the young, gingivitis is very common and indeed regarded as a necessary pre-requisite for the subsequent development of periodontitis [16,17]. Hugoson and Jordan [18] showed that 68% and 69% of Swedish

* Corresponding author at: Periodontology, Clinical Trials Unit, Bristol Dental School, Lower Maudlin Street, Bristol, BS1 2LY, UK.
E-mail address: n.x.west@bristol.ac.uk (N.X. West).

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individuals in their 20 s and 30 s respectively were diagnosed as having gingivitis. Assessment of gingivitis and its severity in the population, by visual observation and bleeding on probing, is therefore of value with regards to the risk of future periodontal disease and subsequent recession.

Gingival recession tends to increase with age [3,10] and due to increased life expectancy and retention of natural teeth, is likely to rise in the future. With a modest reduction in periodontal support, gingival recession of ≤3 mm accompanies aging and may be considered physiologic [19]. However, age does not determine gingival recession that occurs in individuals not susceptible to periodontitis and with good standards of oral hygiene. It is thought that recession of healthy gingivae could be a consequence of multiple other factors. These include repeated use of low level insult to a vulnerable area with a thin gingival phenotype and areas with a lack of keratinised mucosa [20], the first tooth brushed in the mouth, the duration and frequency of tooth brushing, toothbrush bristle shape and type, traumatic tooth brushing [21,22], tooth position or teeth not well supported in the bony alveolar housing amongst others [23]. Indeed the development of recession in otherwise healthy gingivae could be considered to be multifactorial. With these concepts in mind, short-term longitudinal tooth brushing studies of manual and power brushing have demonstrated gingival trauma [24–27], suggesting brushing is implicated in gingival recession. However, more recent work [7] failed to show this association. A meta-analysis [1] failed to support or refute the association between tooth brushing and non-inflammatory gingival recession.

As well as being unsightly, gingival recession exposes root cementum to the oral environment where it is rapidly denuded. Once dentine is exposed it may then become sensitive on stimulation in an acidic environment [21] with pain characterised as sharp, transient and arresting. Epidemiological, clinical studies and case reports have associated tooth sites of high predilection for recession with confirmatory dentine hypersensitivity pain scores and low plaque scores [11,21]. Dentine hypersensitivity is an unpleasant condition which can affect eating and drinking, and in sufferers sensitive to tactile stimuli, result in pain when toothbrushing [28]. It has been demonstrated that dentine hypersensitivity has a negative impact on quality of life [29], furthermore, if toothbrushing is significantly disturbed, oral hygiene may be affected. This highlights the need for further research into gingival recession to identify factors that are associated with it and may be causal.

Non carious cervical lesions (NCCLs) at the cervical margin of the tooth have also been linked to gingival recession, and in some cases, dentine hypersensitivity [30]. In a recent study [31] gingival recession was associated with the presence of NCCLs, 52% of teeth having an exposed CEJ demonstrating a step consistent with an NCCL. NCCLs generally occur on buccal or labial surfaces of teeth along the gingival margin, with erosive toothwear and tooth brushing in an acid environment suggested as aetiological agents for these lesions [32]. Indeed, in the parent study of dentine hypersensitivity prevalence and associated factors [33] there was a strong progressive relationship between dentine hypersensitivity, erosive tooth wear and gingival recession in individuals with a periodontium not exhibiting periodontal disease. Olley et al [34] recently demonstrated that 93% of cervical erosive tooth wear cases have dentine hypersensitivity, supporting previous data that 85% of patients with tooth wear will present with some degree of sensitivity [35]. Whilst tooth brushing method and frequency in an acid oral environment have been implicated in the development of NCCLs, the available data is conflicting [1,36]. The relationship between gingival recession, abrasive and/or erosive tooth wear and dentine sensitivity is therefore complex and as yet, not fully understood.

The nature of the relationship between gingival recession, gingivitis, periodontal probing depth, tooth wear and dentine hypersensitivity needs to be better understood, not least because risk factors for one condition, such as overzealous tooth brushing may be of positive benefit to another. The lack of consistent evidence for the causal effect of some of the risk factors identified for gingival recession, together with the impact these conditions have on health, highlights the need for more research into the disease and its causes.

In 2010 a study designed to evaluate the prevalence of tooth wear, dentine hypersensitivity and gingival recession, together with their associated risk factors was undertaken in adults aged 18–35 in Europe with prevalence of both tooth wear and dentine hypersensitivity shown to be high at 29% and 42% respectively [30,33]. Tooth wear was associated with exposure to both intrinsic and dietary acids, energy drinks, rural residence, snoring, power toothbrush use, dentine hypersensitivity, sleeping medications and smoking. The current publication analyses data from the UK to assess the pattern of gingival recession in young adults aged 18–35 and associations and risk factors with dentine hypersensitivity, erosive tooth wear, gingival bleeding and periodontal probing depths.

2. Methods

2.1. Study design and methodology

This study was an observational, cross-sectional epidemiological study carried out in a young-adult population attending general dental practice for a routine dental examination. NHS Research Ethics Committee approval was obtained, participant oral and written consent gained, with the study conducted to Good Clinical Practice guidelines as laid down by the Declaration of Helsinki and its later amendments. The data reported was part of a larger study called the European Study in Non Carious Cervical Lesions and Dentine Hypersensitivity.

2.2. Clinical examination

Sequential patients of either gender were approached to participate. Recruitment took place from June to October 2011. Consenting volunteers who satisfied protocol inclusion and exclusion criteria were enrolled to the study. Participants were required to be aged 18 to 35 years old, in good health and able and willing to comply with study criteria. Patients with fewer than 5 teeth, having an orthodontic appliance, needing antibiotics for dental treatment or who had undergone local oral anaesthesia were excluded. Patients with bleeding disorders or who were on anticoagulants were also excluded as bleeding on probing scores would have been affected adversely [37]. Similarly, patients who were on pain medication or who had oral anaesthesia in the last 24 h were excluded so that dentine hypersensitivity scores were not compromised. Enrolled patients were allocated sequential study numbers used on all study documentation to preserve anonymity.

Patients enrolled onto the study were first asked to complete a self-administered questionnaire [Fig. 1] to determine demographics and general oral hygiene practices. The questionnaire was designed to identify habits as risk factors for poor oral hygiene and subsequent periodontal disease, including BMI which if high, can reflect a tendency for snacking and an unbalanced diet, dentine hypersensitivity and/or tooth wear. Following completion, the patients were provided with a clinical examination that assessed periodontal indicators, tooth wear and dentine hypersensitivity. Third molars were excluded from all assessments to avoid issues such as partial eruption and second molars were also excluded from dentine hypersensitivity assessments due to access. For consistency and to avoid inter examiner variability, a single trained dental investigator performed all clinical examinations at 15 sites across the South West of the UK.

For buccal and palatal/lingual tooth surfaces, gingival recession and periodontal pocket depth in mm, and presence or absence of gingival bleeding were assessed with a periodontal probe. Buccal and palatal/lingual tooth wear was assessed using the Basic Erosive Wear Examination (BEWE) [38], where 0 = no erosive wear, 1 = early tooth loss, 2 = surface loss < 50%, 3 wear with tissue loss > 50% of the surface, together with the localisation of the lesion. Dentine