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A 4 year prospective longitudinal study of progression of dental erosion associated to lifestyle in 13–14 year-old Swedish adolescents

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ABSTRACT

Objectives: To evaluate the progression of dental erosion in 13–14 year-olds after 4 years, and its association with lifestyle and oral health.
Methods: 227 randomly selected 13–14 year-olds from a Public Dental Clinic, Örebro, Sweden, were investigated. A clinical examination was performed which included dental caries/gingival/plaque status, as well as grading of dental erosion at the tooth surface and participant levels in "marker teeth", including buccal/palatal surfaces of 6 maxillary anterior teeth (13–23), and occlusal surfaces of first molars. An interview and a questionnaire regarding drinking habits and other lifestyle factors were completed. All investigations were repeated at follow-up. The participants were divided into high and low progression erosion groups and logistic regression statistics were applied.
Results: 175 individuals participated at follow-up. Progression occurred in 35% of the 2566 tooth surfaces. 32% of the surfaces had deteriorated by one severity grade ($n=51$ individuals) and 3% by two grades ($n=2$ individuals). Boys showed more severe erosion than girls at the follow-up. Among the variables predicting greater progression, a lower severity of erosive wear at baseline had the highest OR (13.3), followed in descending order by a "retaining" drinking technique, more frequent intake of drinks between meals, low GBI and lesser sour milk intake, with reference to the baseline recording. Using these five variables, sensitivity and specificity were 87% and 67% respectively, for predicting progression of erosion.
Conclusions: Progression of erosive lesions in Swedish adolescents aged 13–14 years followed up to age 17–18 years was common and related to certain lifestyle factors.
Clinical Significance: In permanent teeth, dental erosion may develop early in life and its progression is common. Dental health workers should be made aware of this fact and regular screenings for erosion and recording of associated lifestyle factors should be performed.

1. Introduction

Since the mid-90s, dental erosion among children and adolescents has been investigated in many parts of the world and found to be a common condition [1]. A recent meta-analysis estimated the prevalence of erosive wear in permanent teeth of children and adolescents to be about 30% [2].

In groups of 12–14 year-olds, the prevalence of erosion varies widely between 8–65% [3–10]. In Danish 15–17 year-olds, 14% had more than three surfaces eroded [11], while figures for 15 year-old Icelanders and 15–19 year-old Brazilians were 22% and 21% respectively [12,13]. The variations in prevalence in the above mentioned reports, aside from participant selection, may most likely be accounted for by the methodology and grading criteria applied in the different studies. The availability of studies applying more defined criteria for scoring erosive damage, as well as studies conducted on older adolescents, are relatively rare. In 20 year-old Saudi men, the prevalence of dental erosion with dentin involvement was 16% [14], while 22% of Swedish 18–19 year-olds and 15% of Norwegian 16–18 year-olds had erosive lesions into dentin [15]. In a recent study on Swedish 20 year-olds, 18% had severe erosion into dentin [16].

Higher prevalence and severity of dental erosion are more frequently observed in boys than in girls [3,4,8,15,17–20], although

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a few studies have also found the opposite or no gender differences [5,16,21,22]. Dietary factors, especially consumption of acidic drinks, have in a large number of studies been found to be the main etiological factor of dental erosion [3,5,8,19,23–25], while others have not [12,26–27]. Besides consumption of acidic drinks, a lifestyle that may be conducive to such consumption, such as sedentary living, excessive screen viewing activity, as well as being overweight, may contribute to the development of erosive wear [28–35]. But, it is clear that other factors may also contribute to erosive damage, for instance method of drinking and the consumption of sour sweets [23,25,36–39]. Intake of medicines and oral hygiene practices are regarded as risk factors for erosive wear [5,39,40].

The progression of dental erosion has not been thoroughly studied and reports in the literature are scant. In British children, progression of erosion was seen in 27% of those between the ages of 12–14 years [8]. In a 3-year longitudinal study of Dutch children between 11–15 years of age, the progression was common in those with dental erosion [17].

Our aim was to study prospectively the progression of dental erosion over four years in a group of 13–14 year-old adolescents, and its association with some lifestyle and oral health factors. The hypothesis was that dental erosion would progress during the study period, among both genders and especially so in boys, and also be associated with a certain lifestyle and oral health.

2. Methods

2.1. Participants and procedures

The baseline study for this follow-up took place during 2005–2007 [3]. In that study, 303 adolescents aged 13–14 years at the Public Dental Service in Nora and Storå, Region Örebro County Council, Örebro, Sweden, were offered to participate of which 227 accepted. The present study is a follow-up after 4 years, and all of the original 227 participants (who had remained as recall patients within the Public Dental Service during the study period, May 2009–January 2012) were invited to participate. Data collection took place during the participant's regular dental examination. Clinical and questionnaire examinations were identical to the baseline study except for addition of recording of consumption of alcoholic beverages to the questionnaire [3].

2.2. Clinical examination

Assessment of dental erosion was performed according to previously described methodology and grading was done according to a commonly used erosion scale (Table 1) [14]. An additional scale was used for grading molar cuppings (Table 2) [3]. The two scales were combined based on the highest erosion grades scored on the anterior teeth (Table 1) and first molar teeth (Table 2): no erosion (score 0), mild erosion (score 1), moderate erosion (score 2), severe erosion (score 3) and very severe erosion (score 4), (Table 3). So, the severest score, either for incisors or molars, determined the "holistic" score in Table 3. For example, if an individual had a molar with >1 mm cupping (grade 3) but only grade 1 affecting the incisors, the individual was graded as severe erosion (grade 3).

All gradings were performed by the principal investigator (AH) and intra-examiner concordance was tested by performing two successive blind assessments after an interval of two to four weeks in 13 individuals, who did not participate in this study. The tooth surfaces were dried using compressed air and grading was performed in an ordinary clinical setting. In cases of difficulties with deciding the severity of dental erosion between two grades on the scale, the lower grade was chosen. Surfaces that were impossible to grade because of orthodontic brackets, retainers, fillings or enamel hypoplasia were excluded, which was also the case on some surfaces that had been intensely polished after removal of orthodontic brackets.

Visible plaque index (VPI) and Gingival bleeding index (GBI) were recorded as "yes" or "no" in maxillary anterior teeth, according to Ainamo and Bay [41]. In order, VPI was assessed first followed by GBI, and if necessary, the teeth were then polished with prophy paste before grading of tooth wear. Dental caries, DMFT and DMFS, was recorded and radiographic examination performed on the basis of individual indication. The examiner (AH) was blinded from baseline data and the result from questionnaires during the follow-up examination.

2.3. Questionnaire investigation

The questionnaire was divided into two parts. The first part was a written inquiry, regarding some lifestyle factors. It was filled in by the patient at home, and returned by mail to the clinic. The questions comprised oral hygiene routines, oral or gastrointestinal symptoms (never/monthly/weekly/daily/always), intake of medicines (yes or no), general health (often sick—yes or no) and if they had a habit of retaining acidic soft drinks in the mouth before swallowing (yes or no). Other questions included: frequency of physical activity (frequency per week), screen-viewing habits (hours per day), body height/weight, whether they had tried to increase or reduce their weight (yes or no), and if either parent were born outside Sweden (Sweden/Nordic countries/Europe/Others). Types and frequency of intake of certain dietary items were estimated and recorded as numbers of times per month/week or day. These were: water, all types of acidic soft drinks, milk, yogurt, sour milk, tea, coffee, sweets, sour sweets, chewing gum, ice cream, popsicle, biscuits, snacks, cheese, dried and fresh fruits. The second part of the questionnaire was conducted as an oral interview by a specially trained dental assistant during the clinic visit. All current beverage consumption, and estimated previous consumption one year ago, was recorded in detail; carbonated soft drinks, still drinks, sport drinks, juice, water, milk, tea, coffee, and some alcoholic beverages (wine, beer, cider, alcopop). The amount and frequency of each portion was estimated, and the daily or

Table 1
Ordinal scale used for grading severity of dental erosion on buccal and lingual surfaces of maxillary anterior teeth [14].

Grade	Criteria
0	No visible changes, developmental structures remain, macro-morphology intact.
1	Smoothened enamel, developmental structures have totally or partially vanished. Enamel surface is shiny, matt, irregular, "melted", rounded or flat, macro-morphology generally intact.
2	Enamel surface as described in grade 1. Macro-morphology clearly changed, facetting or concavity formation within the enamel, no dentinal exposure.
3	Enamel surface as described in grades 1 and 2. Macro-morphology greatly changed (close to dentinal exposure of large surfaces) or dentin surface exposed by $\leq$1/3.
4	Enamel surface as described in grades 1, 2 and 3. Dentin surface exposed by >1/3 or pulp visible through the dentin.

Note: Approximal erosion and presence of "shoulder" should be recorded.

Table 2
Ordinal scale used for grading cuppings on occlusal surfaces of first permanent molars [3].

Grade	Criteria
0	No cupping/intact cusp tip
1	Rounded cusp tip
2	Cupping ≤ 1 mm
3	Cupping > 1 mm
4	Fused cuppings: at least two cuppings are fused together on the same tooth

weekly consumption was calculated as L/year. A more detailed description of the questionnaire examination is given elsewhere [3].

2.4. Statistical analyses

Sample size calculation, with 80% power and a 5% significance level and discordant proportion of 10%, resulted in a minimum of 127 participants in the study (McNemar's test). The calculation is based on 7% [8] of the individuals showing an expected progression of erosion to severe or very severe erosion (grade 3 and 4) between 13–14 and 18–19 years of age. The total baseline sample (aged 13–14 years) included 227 individuals, so even with some drop-outs during the follow-up period the original sample size was deemed to be adequately large.

In addition to scoring the severity of dental erosion on the marker teeth, Simplified Erosion Partial Recording System (SEPRS) was calculated. This system presents the highest erosion score from the palatal surfaces of central maxillary incisors (according to Table 1) (tooth numbers 11and 21) and from cupping scores (according to Table 2) of mandibular first permanent molars (tooth numbers 36 and 46) (four surfaces in all) [3]. SEPRS thus provides one score per individual and is based on the highest score recorded on one of these four surfaces.

The erosion score assigned to each tooth surface on all the graded anterior teeth (buccal and palatal) was compared between baseline and follow-up, and registered as unchanged (0), one grade of progression (+1) and two grades of progression (+2). The mean progression was calculated and the material was divided into three groups according to the mean change: low progression group 0–0.2 scale steps, middle group >0.2–0.5 and high progression group >0.5 steps.

Differences between the high and low progression groups were tested by the Mann–Whitney *U*-test regarding the variables of gender, consumption of drinks, dietary habits, oral hygiene habits, physical activity, Body Mass Index (BMI), and oral and general health factors. Adjusted logistic regression analysis (forward conditional method) was performed with high and low progression of erosion as dependent variable using a selection of reported variables that had theoretical relevance or differed statistically significantly between the high and low progression groups according to the Mann–Whitney *U*-test. All independent variables were dichotomized into two categories before being entered into the logistic regression. Odds ratios (OR) with confidence interval (95%) were calculated for each independent variable. All analyses were performed using IBM SPSS Statistics 23 (IBM Corporation, 1 New Orchard Road, Armonk, New York). $P < 0.05$ were considered statistically significant.

2.5. Ethical considerations

An informed consent was signed by the participants or by a parent in cases of under-aged adolescents. Approval from the Regional Ethical Review Board in Uppsala, Sweden, was obtained prior to the start of the study (no. 2009/031). If there was a diagnosis of dental erosion or some other oral pathology, the patient was informed about the condition and preventive or other treatment were carried out free of charge (both at the baseline and follow-up examination).

3. Results

Intra-examiner concordance between the two successive gradings of dental erosion in maxillary anterior teeth and cuppings on first molars in 13 individuals was 77.4%. Of the original 227 patients, 175 (77%) completed the examination at the follow-up (mean age = 17.9 year, SD 0.87, 54% males). The mean follow-up time was 50.9 months (four years and three months) with a range of 41–63 months. Of the 52 non-participants, 42 declined to participate or lived elsewhere and ten failed to return the signed

Table 3
Combined erosion scale from grading of maxillary anterior teeth (Table 1) and molar cuppings (Table 2).

Grade	Localization	Criteria
0 = No erosion	Anterior teeth	No visible changes, developmental structures remain, macro-morphology intact
	Molars	No cupping/intact cusp tip
1 = Mild erosion	Anterior teeth	Smoothened enamel, developmental structures have totally or partially vanished. Enamel surface is shiny, matt, irregular, "melted", rounded or flat, macro-morphology generally intact
	Molars	Rounded cusp tip
2 = Moderate erosion	Anterior teeth	Enamel surface as described in grade 1. Macro-morphology clearly changed, facetting or concavity formation within the enamel, no dentinal exposure
	Molars	Cupping ≤ 1 mm
3 = Severe erosion	Anterior teeth	Enamel surface as described in grades 1 and 2. Macro-morphology greatly changed (close to dentinal exposure of large surfaces) or dentin surface exposed by ≤1/3
	Molars	Cupping > 1 mm
4 = Very severe erosion	Anterior teeth	Enamel surface as described in grades 1, 2 and 3. Dentin surface exposed by >1/3 or pulp visible through the dentin
	Molars	Fused cuppings: at least two cuppings are fused together on the same tooth

consent and were therefore not included in the follow-up study. The 52 dropouts were compared to the participants ($n = 175$) as to the variables collected in the baseline study at age 13–14 years. No significant differences in gender or age (13 or 14 years) were found. However, non-participants reported a significantly lower frequency of intake of: carbonated soft drinks other than cola-type drinks ($P = 0.008$), ice cream ($P = 0.03$), cheese ($P = 0.02$), and a more frequent intake of: fruit drinks ($P = 0.046$), juice ($P = 0.012$) and carbonated soft drinks between meals ($P = 0.018$). As regards the clinical variables, non-participants had greater severity of erosion according to SEPRS ($P = 0.038$) and lower GBI ($P = 0.021$) compared to the participants.

Frequency distribution of erosion scores in maxillary anterior teeth and cuppings in first molars at baseline and follow-up by gender are shown in Figs. 1–4. Frequency distribution of SEPRS are shown in Fig. 5 and the scores were not significantly different between boys and girls at baseline ($P = 0.38$) but was so at follow-up ($P = 0.001$). The prevalence of severe/very severe erosion (Table 3) according to SEPRS was at baseline for boys 9.5% and at follow-up 14.9%. The corresponding figures for girls were for baseline and follow–up, 2.5% and 6.3% respectively (Fig. 5).

Dental erosion was graded on 1881 buccal and lingual surfaces of maxillary anterior teeth and cuppings on 685 molar occlusal surfaces both at baseline and at follow-up (Table 4). Of the 2566 surfaces graded at follow-up, the severity of erosive wear was scored as improved in 93 surfaces (3.6%). These surfaces were recorded as unchanged in the statistical analyses. In 30% of the participants there was a deterioration in erosion by one severity grade on one or more surfaces ($n = 51$ individuals) or by two grades ($n = 2$ individuals). 830 tooth surfaces (32.3%) had changed by one severity grade and 67 (2.6%) had changed by two grades, giving a total of 34.9%. 1.4% of all recorded surfaces had progressed to severe erosion (33 surfaces in 9 individuals). 234 surfaces were not graded on both occasions due to unerupted teeth (canines) at baseline, orthodontic or extensive restorative treatment between baseline and follow-up. Maxillary anterior teeth showed more erosive progression than first molars, 43.2% and 12.1% respectively. Progression of erosion was most common in canines, 13/23 (56.4%), though only one of the canines had deteriorated into severe erosion (grade 3) and it was least common in upper first molars 16/26 (7.8%). Buccal surfaces of maxillary anterior teeth showed more progression than palatal surfaces, 48% and 38.2%, respectively. No more than +2 scale steps of progression was seen. In total, 403 surfaces had deteriorated among the girls and 494 surfaces in boys, the difference being not statistically significant (data not shown).

At baseline 59 individuals showed none/minimal signs of maxillary anterior erosion and cupping on first molars (erosion score 0 or 1). Of these, 45 individuals were assessed as grade 2 or more in at least one tooth at follow-up, which gives an incidence of 76%.

Compared to the low erosion group, the high progression group demonstrated at baseline: significantly higher intake of all drinks (including coffee, tea, water, etc.) between meals ($P < 0.05$), lower intake of sour milk ($P < 0.05$), more frequent medicine intake ($P < 0.05$), tooth pain ($P < 0.05$) and a "retaining" drinking technique ($P < 0.01$), lower VPI and GBI ($P < 0.05$) and lower mean erosion scores on 13–23 ($P < 0.01$). At follow-up, the high progression group reported more frequent intake of sour candy ($P < 0.05$), dry mouth during the night ($P < 0.05$), lesser intake of tea for breakfast ($P < 0.05$), milk for lunch ($P < 0.05$) and sugar-containing non-cola drinks ($P < 0.05$). No significant differences were seen between the two groups as regards dental caries, BMI, oral hygiene habits or variables associated with a sedentary lifestyle.

For the whole sample, the yearly consumption of carbonated soft drinks increased from 38 to 48 L, and the consumption of all acidic soft drinks from 119 to 132 L. The reported yearly consumption of acidic alcoholic beverages (alcopop, wine and cider) was 8 L (range 0–156 L, SD 20 L) at follow-up (not recorded at baseline), and there was no difference in consumption between High and Low progression groups.

In the adjusted logistic regression analysis, gender and all variables (independent) that were found to be significantly different between the high and low progression groups (dependent) were entered and the conditional forward method applied (Table 5). Among the variables predicting high progression measured at follow up, a lower severity of erosive wear at baseline had the highest OR (13.3), and followed in order of decreasing OR: retaining drinking technique, more frequent drink intake between meals, low GBI and lesser sour milk intake, all with reference to the baseline recording. Using the above five variables, sensitivity and specificity were 87% and 67%, respectively, and Nagelkerke R square 0.53.

4. Discussion

The dropout of 23% (52/227 individuals) resulted in an attendance rate of 77% (175/227 individuals) which is deemed

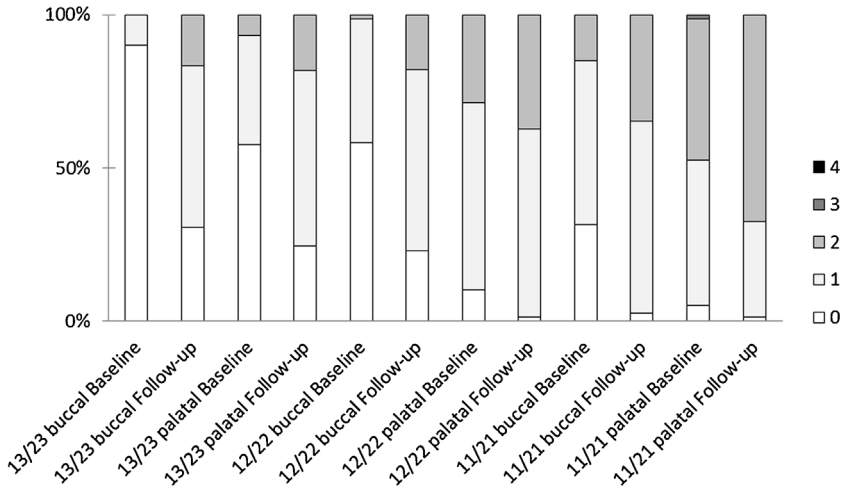

Fig. 1. Frequency distribution of maxillary anterior tooth erosion scores in girls at baseline and follow-up (Scale according to Table 1).

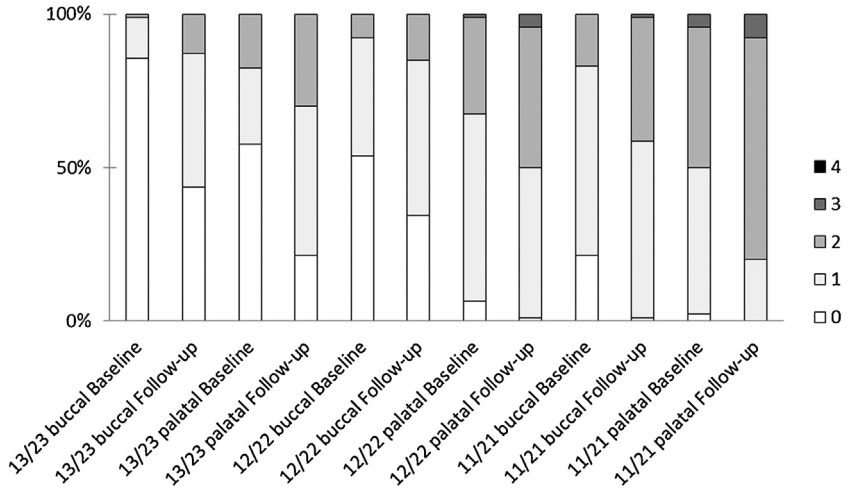

Fig. 2. Frequency distribution of maxillary anterior tooth erosion scores in boys at baseline and follow-up (Scale according to Table 1).

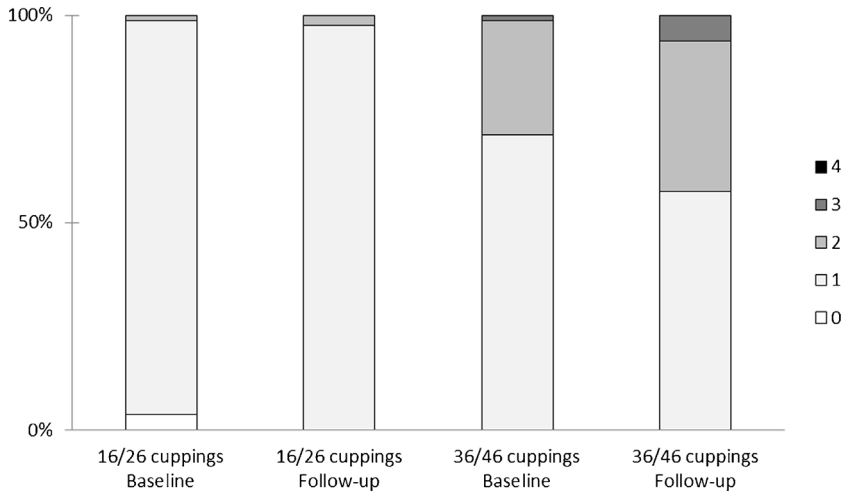

Fig. 3. Frequency distribution of cupping scores in first molars in girls at baseline and follow-up (Scale according to Table 2).

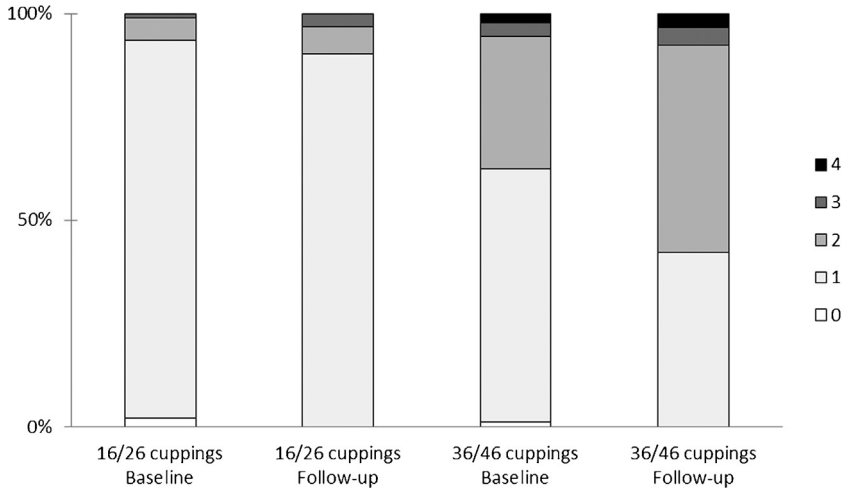

Fig. 4. Frequency distribution of cupping scores in first molars in boys at baseline and follow-up (Scale according to Table 2).

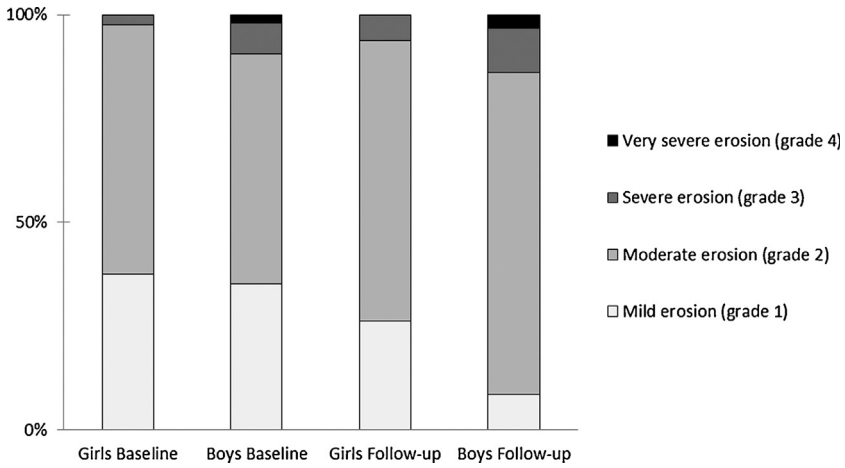

Fig. 5. Frequency distribution of erosion and cupping scores according to SEPRS in both genders at baseline and follow-up (Scale according to Table 3).

Table 4
Progression of erosion and cupping scores in all six upper front teeth (1881 surfaces) and all first molars (685 surfaces) between baseline and follow-up. $n = 175$ individuals. Missing teeth = 234.

Grading—at baseline	Grading at follow-up					Total at baseline
	0	1	2	3	4	
No Erosion (grade 0)	232	443	63			738
Mild erosion (grade 1)		964	357	3		1324
Moderate erosion (grade 2)			446	30	1	477
Severe erosion (grade 3)				23	0	23
Very severe erosion (grade 4)					4	4
Total at follow-up	232	1407	866	56	5	2566

good considering the relatively long follow-up period and acceptable according to the sample size estimation requiring a minimum of 127 individuals needed to detect erosive changes. It was felt that the drop-out would be too numerous if we offered an appointment only for follow-up of dental erosion, so the examination was planned in conjunction with the ordinary recall offered by the County Council/Public Dental Service, which explains the relatively long interval of 41–63 months for follow-up. The non-participants did in some respects differ from the participants and seemed generally to include a more erosion prone group of individuals. A biased result cannot therefore be excluded.

Table 5
Adjusted logistic regression analysis (Forward conditional method). Dependent variable: low ($n = 48$) and high ($n = 58$) progression group. Included dichotomized independent variables from baseline data: All drinks between meals (<2 L/week vs. >2 L/week), sour milk (never/seldom vs. >1 time/month), tooth pain (never/seldom vs. ≥1 time/month), medicine intake (no vs. yes), retaining drinking technique (no vs. yes), VPI (<10% vs. >10%), GBI (no bleeding vs. bleeding ≥1 surface), mean erosion index (<1 vs. >1). Dichotomized independent variables from follow-up: sugared non-cola carbonated soft drinks (1 time/month or less vs. >1 time/week), sour candy (never/seldom vs. >1 time/month), Milk for lunch (<0.3 L/week vs. ≥0.3 L/week), Tea for breakfast (No tea vs. ≥1 time/week), dry mouth at night (never/seldom vs. ≥1 time/month). Gender was also included as an independent variable.

Variables significantly correlated to the high progression group	Sig.	OR	95% CI for EXP(B)	
			Lower	Upper
Erosion index—baseline (mean <1)	0.001	13.3	2.92	62.50
Retaining drinking technique—baseline (yes)	0.044	6.03	1.05	34.72
GBI—baseline (no bleeding)	0.008	6.02	1.59	22.72
Drinks between meals—baseline (>2L/week)	0.015	5.96	1.41	24.27
Sour milk—baseline (never/seldom)	0.024	4.81	1.22	18.87

CI = Confidence interval; Nagelkerke R square 0.53

The scales for grading erosion and cupping are designed to assess erosive wear while attempting to exclude wear caused by attrition and abrasion as much as possible [3,14]. The incisal surfaces are therefore omitted from grading and only buccal and palatal surfaces on the maxillary anterior teeth are included which are the teeth that have been shown to be most common site for dental erosion [1]. In addition, cuppings on the first mandibular molar were recorded which are considered a typical sign of erosive wear [42]. The scales that were used in the present study are more sensitive for grading early stages of erosive wear than other commonly-used indices [25,43–46], and even early changes enamel morphology can be recorded. There are five grades in both scales and due to the nature of an ordinal scale the difference between steps can be small, which may explain why 3.6% of the surfaces were graded as improved between baseline and follow-up. These “improved” surfaces were therefore regarded as unchanged in the statistical analysis of the progression, since the probability of deterioration is less likely and an improvement not possible. The intra-examiner concordance of 77.4% could be regarded as acceptable.

4.1. Incidence and progression of dental erosion

In this study the incidence of dental erosion was 76%. This figure was calculated on the basis of individuals who had a maximum score 0 or 1 at baseline and scored 2 or higher at the follow-up. In a 3-year longitudinal study in 11–15 year-olds, the incidence calculated on erosion-free children decreased with age, and at age 14 there were only a few children left who were erosion-free [17]. A low number of totally unworn tooth surfaces at the age of 13–14 years was also the case in our study, so that to get any meaningful statistics we had to also include the children with lowest degree of erosion (score 1) at baseline for the incidence calculation.

Progression of erosion at the tooth surface level was 34.9% corresponding to 30% at the individual level. We have not found directly comparable figures to the present study and age groups in the literature, but 3-year progression for 11 and 12 year-old children was reported to be 56.3% and 44.9%, respectively [17]. The progression in this study differed between teeth and surfaces with maxillary anterior teeth being most affected. This is not an unexpected finding since these teeth are well-known predilection sites for developing erosive wear [1]. There was no significant gender difference based on the number of surfaces that progressed during the follow-up period; however, boys had a significantly higher prevalence of severe/very severe erosion at follow-up

compared to girls, although there was no significant difference at baseline. An interesting finding was that, in many cases, severe erosion developed early in life, at the age of 13–14 years, showing a risk of severe erosion of permanent teeth even before adolescence, and indicating that dental health workers should pay attention to dental erosion even in young permanent teeth. In summary, progression of erosion lesions is common and boys seem to be at greater risk than girls for developing more pronounced erosion between 13–14 to 17–19 years of age.

4.2. High and low progression groups vs. associated factors

In the bivariate analyses, the high progression group differed significantly from the low progression group as regards several tentative erosion-prone causative factors reported/recorded both at baseline and at follow-up. Dietary factors included were higher consumption of drinks and sour candy, as well all drinks as between meals, and lower intake of ordinary and sour milk, all of which factors have been shown to have a relationship with dental erosion in previous studies [27,47]. Another factor, self-reported in the questionnaire, was a "retaining" drinking technique, whose correlation with the development of erosive wear has been reported on previously [37,38]. The high progression group also presented more tooth pain, probably due to the hypersensitivity caused by the erosion lesions, reported more frequent dry mouth and medicine intake as well as having lower VPI and GBI, all of which are commonly reported findings in erosion subjects [48–51].

Adjusted logistic regression revealed that individuals with lower severity of erosive wear at baseline had the highest OR (13.3) for developing more erosion during follow-up, which was an expected finding. Other significant factors, albeit of lesser predictive strength, in decreasing order were: "retaining" drinking technique, lower GBI, more frequent drinks between meals and less frequent sour milk intake. These five variables gave a high sensitivity (87%) but a relatively low specificity (67%) for predicting erosive wear. Nagelkerke R Square was >0.5 which indicates a good fit of the model.

5. Conclusion

Both the incidence and progression of dental erosion are high between 13–14 and 17–19 years of age. The hypothesis that progression was associated with certain lifestyle factors was fulfilled; that it was higher in boys was not confirmed, although boys developed more severe erosion than girls during the follow-up period.

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