

Erosive tooth wear among preschool children in Hong Kong

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Authors' contributions

DD conceived the ideas, collected and analysed the data, drafted the manuscript and approved the manuscript to be submitted.

CKJ conceived the ideas, collected and analysed the data, performed critical revision and approved the manuscript to be submitted.

GSS conceived the ideas, collected and analysed the data, performed critical revision and approved the manuscript to be submitted.

LA conceived the ideas, trained the examiner, analysed the data, performed critical revision and approved the manuscript to be submitted.

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1 **Erosive tooth wear among preschool children in Hong Kong**

2 **Summary**

3 **Objective:** This study aimed to assess the prevalence of erosive tooth wear among 3- to 5-year-
4 old children in Hong Kong and to determine the effect of socioeconomic factors, dental habits
5 and oral hygiene on their dental erosive wear status.

6 **Methods:** Stratified random sampling was adopted. Their parents were asked to complete a
7 questionnaire regarding their children's backgrounds. A single examiner evaluated the children
8 for erosive tooth wear using Basic Erosive Wear Examination (BEWE) criteria. Multiple
9 logistic regression was used to determine the relationship between erosive wear and the
10 children's socioeconomic factors, dental habits and oral hygiene.

11 **Results:** 1,204 children participated in this study. Prevalence of erosive tooth wear (BEWE
12 score>0) was 14.9%. Among these, 153 children (12.8%) had initial wear, 21 children (1.8%)
13 had distinct tooth loss and five (0.4%) had severe erosive wear. Prevalence of erosive wear
14 among the 3-, 4- and 5-year-old children was 10.7%, 15.0% and 17.7%, respectively.
15 Increasing age, the low education of mother and high plaque scores were risk factors of erosive
16 wear ($p<0.05$).

17 **Conclusion:** Prevalence of erosive tooth wear is low among preschool children in Hong Kong.
18 The erosive tooth wear prevalence increased with increasing age, lower education of mother
19 and poorer oral hygiene.

20 **Introduction**

21 Dental erosion and erosive tooth wear have been recognized as an important dental health
22 concern¹. They both are defined as the irreversible loss of hard dental tissue via chemical
23 dissolution with acid and no bacterial involvement². While dental erosion is caused by acids
24 only, erosive tooth wear is the loss of the chemically softened dental hard tissue by abrasive
25 forces. These abrasive forces will remove the softened layer on enamel, causing hard tooth
26 substance loss. Erosive tooth wear is a multifactorial and cumulative process³. Physiological
27 tooth surface loss is an age-related phenomenon and occurs throughout life. However, it is
28 considered pathological when the degree of tooth destruction is unacceptable and excessive or
29 the rate of tooth loss is rapid, causing aesthetic, sensitivity and functional problems⁴. The
30 prevalence and severity of dental erosion have been increasing in child populations⁵. The
31 primary teeth are more susceptible to erosive wear compared with permanent teeth due to the
32 less mineralized and thinner enamel³. Severe erosion progressing into the dentine and pulp can
33 cause tooth hypersensitivity, the loss of vertical dimension and an altered dental appearance⁶.
34 More importantly, children with dental erosion in their primary teeth have a significantly
35 increased risk of erosion in their permanent teeth⁷. Thus, detection and prevention in early
36 childhood will help to prevent erosive tooth loss in the permanent dentition.

37 Recently, erosive tooth wear in children has gained more interest in the dental public health
38 and pediatric dentistry. However, epidemiological studies on dental erosion in preschool
39 children are limited in number¹. Studies have revealed a wide variation of erosion prevalence
40 among countries, ranging from 0.6%⁸ to 98.4%⁹. In Greece, epidemiological surveys using the
41 basic erosive wear examination (BEWE) reported that the majority (>75%) of the preschool
42 children had erosive tooth wear⁹. Similarly, a high prevalence (75%) of dental erosion among
43 Australian preschool children was reported¹⁰. In Germany, an epidemiological survey found
44 that 45% of preschool children had dental erosion⁵, whereas another study investigating erosive

45 tooth wear by using pre-orthodontic study models reported that 74% of them had at least one
46 primary tooth with erosion⁷. In China, two studies reported a lower prevalence of erosion there
47 than in other countries: 15.1% in the Shanghai province¹¹ and 5.7% in the Guangxi and Hubei
48 provinces¹².

49 Erosive tooth loss occurring in early childhood may compromise the permanent dentition.
50 These affected children may also require advanced and expensive dental care in the future¹³.
51 The collected data on dental erosion in child populations would be useful for monitoring its
52 prevalence and severity and for taking action as soon as possible. In Hong Kong, few studies
53 have been carried out on school children¹⁴. Based on our latest search on Pubmed on April 10,
54 2018, no data have been published on the prevalence of erosive tooth wear among preschool
55 children in Hong Kong.

56 Therefore, the objectives of this study were to 1) describe the prevalence, distribution and
57 severity of erosive tooth wear and to 2) evaluate socioeconomic background, oral health–
58 related habits and oral hygiene as risk factors of erosive wear in 3- to 5-year-old Hong Kong
59 preschool children.

60

61 **Materials and Methods**

62 This epidemiological study was conducted in kindergartens in Hong Kong, where drinking
63 water has been fluoridated at 0.5 ppm fluoride. This study received approval from the
64 Institutional Review Board of the University of Hong Kong/Hospital Authority Hong Kong
65 West Cluster (UW 16-180). Written parental consent was obtained from each participating
66 child. This survey was carried out from March to July 2016.

67 *Sample size estimation*

68 Based on a Hong Kong population census, the total number of Hong Kong preschool children
69 was approximately 168,000 during the period of study¹⁵. The number of preschool children
70 residing in three main geographical areas in Hong Kong was as follows: 89,000 children in the
71 New Territories (NT), 50,000 in Kowloon (KL) and 29,000 on Hong Kong Island (HK). The
72 sample size estimation was based on the recent prevalence of dental erosion (20%) in Mainland
73 China¹¹, and the confidence interval was set at 5% (CI: 15% to 25%) with a 95% confidence
74 level. The sample size of each age group (3-, 4- and 5-year-old children) was 246. Based on
75 the previous study¹⁶, the anticipated response rate was 80% in Hong Kong kindergartens. Thus,
76 at least 308 children in each age group, or at least 924 children in total, needed to be invited to
77 be involved in the survey.

78 *Sample selection*

79 The selection of the study children was based on a multistage sampling. Hong Kong has three
80 main geographic areas, namely HK, KL and the NT. The ratio of invited schools in HK, KL
81 and NT was 1:2:4, following the ratio of the populations of HK, KL and the NT¹⁵. Registered
82 local kindergartens in each area were numbered sequentially. The present survey involved
83 selecting one kindergarten in HK, two kindergartens in KL and four kindergartens in the NT
84 through a simple random sampling method using a list of random numbers generated via a
85 computer. In Hong Kong, there is no public kindergarten directly operated by the government.
86 The majority of the kindergartens are run by non-profit-making organizations, whereas a small
87 proportion are run by private bodies. Seven selected kindergartens agreed to participate in this
88 study. All participating kindergartens have been operated by non-profit-making organizations.
89 All children in the selected kindergartens were invited to join the study. The inclusion criteria
90 were healthy children aged 3 to 5 years old with written parental consent. Children with severe
91 chronic diseases or those with special needs were excluded.

92 *Questionnaire*

93 Before conducting the survey, a questionnaire and consent form were distributed to each parent
94 of the invited children. Parents were asked to complete a self-administered questionnaire at
95 home. The questionnaire consisted of two parts as follows: 1) demographic background: age,
96 sex, place of birth, mother's and father's education attainment and family income; and 2) dental
97 health-related habits: frequency of tooth brushing, frequency of snacking and previous dental
98 visit. After checking the returned questionnaires, if data were missing, a research assistant
99 called the parents to complete the questionnaires.

100 *Clinical examination*

101 For training and calibrating the BEWE assessment, a set of clinical erosive tooth wear
102 photographs provided by the expert (LA) were used as the references³. A single examiner (CJK)
103 received training through experienced dental epidemiologists (CCH and LA) before conducting
104 the survey. The examiner performed clinical examinations in kindergarten classrooms using a
105 disposable dental mirror with an attached intra-oral light-emitting diode light and a ball-ended
106 WHO CPI probe. The BEWE criteria were used in the present study¹⁷. All surfaces of the
107 primary teeth were examined. The tooth surface with the highest recorded BEWE score in each
108 sextant was used to represent the erosive tooth wear status of the entire sextant. The severity
109 of tooth wear was graded at four levels: score 0 = no tooth surface loss, score 1 = initial enamel
110 loss, score 2 = distinct defect spanning less than 50% of the tooth and score 3 = hard tissue loss
111 of more than 50%. In addition, the decayed missing and filled tooth index (dmft) was adopted
112 following to the diagnostic criteria of the WHO. Caries experience was considered to be "yes"
113 if dmft score > 0, and "no" if dmft score = 0. Oral hygiene status was recorded using the visible
114 plaque index (VPI). In addition, the visible plaque on the buccal and lingual surfaces of six
115 index teeth (55, 51, 63, 71, 75 and 83) was recorded as present (1) or absent (0). The VPI score

116 was then calculated as the ratio of the number of surfaces with plaque to the total number of
117 surfaces examined.

118

119 Approximately 10% of the participating children were randomly re-examined on the day of the
120 examinations to assess the intra-reliability reproducibility. At least 30 other children were
121 examined between the duplicated examinations so that the examiner did not remember the first
122 scoring. Following the dental examinations, a child oral health report was submitted to the
123 parent of each child. Following the research proposal that the institutional review board
124 accepted, no intervention was provided in the school setting. Rather, parents were advised to
125 seek further treatment on their own.

126

127 *Statistical analysis*

128 Data analysis was carried out using the software SPSS 24.0 for Windows (SPSS Inc., Chicago,
129 USA). A chi-square test was performed to analyse the difference in the prevalence of erosive
130 tooth wear according to the distribution of children's demographic characteristics (age, sex,
131 birthplace, parents' education, family income) and dental habits (frequency of tooth brushing),
132 frequency of snacking, dental visit experience and caries prevalence. Analysis of variance was
133 also performed to assess the difference in oral hygiene status (VPI score) according to the
134 prevalence of erosive wear. Cohen's Kappa statistics was used to assess the intra-examiner
135 reliability. Logistic regression analysis was adopted to analyse the effects of independent
136 variables on erosive tooth wear prevalence. The independent variables were sex, age,
137 birthplace, parents' education levels, monthly family income, frequency of daily snacking,
138 frequency of daily tooth brushing, dental visit experience, dental caries experience and VPI
139 score. A backward stepwise procedure was performed. The final model comprised only
140 variables that were statistically significant. The level of statistical significance was set at 0.05.

141

142 **Results**

143 A total of 1,700 preschool children in seven kindergartens were invited to join the study. The
144 flow of the recruiting and sampling selection is displayed in Figure 1. The response rate was
145 high (89%, 1,514/1,700). Of these 1,514 children, 214 were excluded due to the age of the
146 children (younger than 3 or older than 6), absence on that day or uncooperative behaviours. Of
147 the 1,300 children examined, 7.4% did not return their questionnaires. Therefore, a total of
148 1,204 children with returned questionnaires were included in the study. Among the 1,204
149 children recruited, 229 were in HK, 453 were in KL and 522 were in the NT. The ratio of
150 participating children on HK, in KL and in the NT was 2:4:5, whereas the ratio of the Hong
151 Kong population was approximately 1:2:4¹⁵. Thus, proportional sample weights were
152 conducted on the 1,204 children with a completed questionnaire. The following descriptive
153 data and further statistical analysis were weighted.

154

155 Among the study children, 541 (46%) were boys, and 1,081 (90.8%) were born in Hong Kong.
156 Their mean age (SD) was 4.7(0.3) years. A total of 178 (14.9%) children had erosive tooth
157 wear (BEWE > 0). Among them, 153 children (12.8%) had initial tooth wear, whereas 21
158 children (1.8%) had distinct tooth loss, and five (0.4%) had severe erosive tooth wear. The
159 mean (SD) of the BEWE cumulative score of the six sextants in each child was 0.3(0.9), with
160 the range stretching from 0 to 10. The intra-examiner reliability for erosion examination was
161 good, as indicated with a Kappa value of 0.78.

162

163 The prevalence and severity of erosive tooth wear by sex and age are described in Table 1. The
164 prevalence of erosive tooth wear among the 3- , 4- and 5-year-old children was 10.7%, 15.0%
165 and 17.7%, respectively. The prevalence of erosive tooth wear increased with increasing age

166 among the study children (χ^2 test, $p = 0.03$). No statistically significant association was found
167 between sex and erosive tooth wear prevalence in preschool children. The prevalence and
168 severity of erosive tooth wear in the six sextants are presented in Table 2. The maxillary
169 anterior primary teeth (11%) had a higher prevalence and had more severe erosive tooth wear
170 compared with other areas, whereas the mandibular molars had the lowest prevalence of
171 erosive tooth wear.

172

173 In the bivariate analysis (Table 3), children's age (ages 3, 4 and 5), father's and mother's
174 education levels (primary, secondary and tertiary), frequency of daily snacking (≤ 2 times, > 2
175 times) and VPI scores were statistically associated with the prevalence of erosive tooth wear
176 (BEWE >0) ($p < 0.05$). However, no significant differences were found in the erosive tooth wear
177 prevalence among sex (boy/girl), birthplace (Hong Kong/others), family income (low, middle
178 and high), tooth brushing (once or less/ twice a day), dental visit experience (yes/no) and caries
179 experience (dmft >0).

180

181 The results of the logistic regression are displayed in Table 4. Three variables, including
182 children's age, mother's education attainment and VPI scores, remained in the final model,
183 whereas other variables were not statistically significant. Increasing age, low education
184 attainment of the mother and high VPI scores were risk factors of erosive tooth wear ($p < 0.05$).
185 Children aged 4 and 5 years had a higher chance of having erosive tooth wear with the
186 respective odds ratios (OR) of 1.6 and 1.9 compared with those aged 3 years. Children whose
187 mothers had completed primary school only had a higher chance (2.35 times) of having erosive
188 tooth wear compared with those whose mothers had completed tertiary- or university-level
189 education ($p < 0.05$). In addition, children with VPI scores (score 1) had a significantly higher

190 chance (29 times) of having erosive tooth wear compared with those without plaque (VPI score
191 0).

192

193 **Discussion**

194 Erosive tooth wear has gained more recent interest due to evidence of the striking prevalence
195 of erosion^{5,18}. However, information on dental erosion among preschool children in Asia is
196 limited^{11,19}. In Hong Kong, the present study was the first epidemiological survey to report
197 erosive tooth wear among kindergarten children. Compared with previous findings in Mainland
198 China^{11,12}, the prevalence of erosive tooth wear (BEWE>0) found in the present study was
199 similar (approximately 15%). In contrast, a higher prevalence of erosive tooth wear in Europe
200 was reported: 32.0%²⁰ and 70.6%⁷ in Germany, and 78.8% in Greece²¹. The present results are
201 in accordance with the previous review reporting that Chinese preschool children had a
202 significantly lower prevalence of erosive tooth wear compared with those from other
203 countries²².

204 Differences in erosion prevalence among global studies may be due to different erosion scoring
205 systems, different index teeth and possibly different diagnostic criteria. Various dietary habits
206 and feeding patterns are possibly another reason. Research has indicated that several soft
207 drinks, acidic foodstuffs and medications with low pH, which children commonly consume,
208 cause erosive tooth wear in primary teeth²². Possibly, Chinese lifestyles and dietary habits may
209 not have a deleterious effect on dental erosion during early childhood. In Hong Kong, the
210 majority (85%) of preschool children seldom consume soft drinks or consume less than one
211 glass per day²³. Nevertheless, rapid changes in terms of lifestyles and food consumption have
212 occurred with urbanization and market globalization over the past decade. This may have an

213 impact on the dental health and nutritional statuses of child populations. Surveillance data are
214 required to observe dental erosion and to take preventive measures whenever necessary.

215 Various diagnostic criteria and indices have been used for screening for erosive tooth wear.
216 Unlike with the assessment of dental caries status, the decayed, missing and filled teeth (dmft)
217 index is commonly adopted. Several dental erosion indices, such as the Smith and Knight tooth
218 wear index²⁴ and Simplified Scoring Criteria for Tooth Wear Index²⁵, are available. To date,
219 no agreement has been reached regarding which index is superior to the others. The BEWE
220 index was developed in 2007 and has been proposed to be used by clinicians to identify erosive
221 tooth wear risk at the patient level¹⁷. In the present study, the BEWE index was adopted because
222 it is a simple and validated quantitative tool that is practical for screening young children due
223 to being less time-consuming²⁶. Moreover, the BEWE index has been widely adopted by
224 previous researchers, thus allowing for direct comparison with other studies globally^{5,14,21}.

225 However, it should be noted that some limitations of using the BEWE index should be
226 addressed. For instance, the BEWE index is recorded according to the highest BEWE score
227 (the most severely affected tooth) in a sextant; thus, no information regarding the type of
228 affected tooth surface (buccal, lingual, occlusal etc.) exists. In this survey, approximately 10%
229 of the participating children were randomly re-examined to monitor the intra-reliability
230 reproducibility. It is desirable to have at least 7 days in between the first and second
231 examinations. However, it would cause significant interruption to the teaching of the
232 kindergarten classes. The second examination was therefore performed on the same day. At
233 least 30 other children were examined between the duplicated examinations so that the
234 examiner did not remember the first scoring. In addition, the survey had limited resources and
235 time constraints. The expert (LA) trained the examiner through the E-learning materials. No
236 kappa scores between the expert and the examiner were shown in the present study.

237 In the current study, a strong association was found between the age and erosive tooth wear
238 prevalence. Similarly, a systematic review concluded that the prevalence of erosive tooth wear
239 increased linearly with increasing age among preschool children²². Without any intervention,
240 an erosive lesion will progress with time. As seen from the previous findings, the majority
241 (75%) of Hong Kong schoolchildren each had at least one sextant with early signs of dental
242 erosion¹⁴, thus indicating an increase of erosion prevalence from early to late childhood.
243 Because erosive damage to their permanent teeth may compromise their dentition for their
244 entire lifetimes and requires extensive restorative procedures, dental practitioners should be
245 aware of erosive tooth wear when performing regular check-ups in young children. If early
246 signs of dental erosion are observed, potential risk factors should be ruled out. Healthy
247 lifestyles and dietary advice should be given to parents. If necessary, interceptive interventions
248 should be implemented to prevent severe erosion in the permanent dentition.

249 Studies have revealed that the acquired pellicle acting as a perm-selective membrane may have
250 a protective effect on dental erosion by preventing contact between the tooth surface and
251 acids²⁷. Proteins and calcium- and phosphate-binding peptides at the base of the pellicle layer
252 may be of key relevance for preventing erosive tooth wear²⁸. Contradictorily, the results of our
253 study indicated that visible dental plaque had a strong relationship with erosive tooth wear in
254 the study population. Similar results indicated that poor oral hygiene was a significant risk
255 factor for dental erosion among preschool children in Greece²¹. Plaque accumulation in young
256 children may be associated with other erosive risk factors, such as lower education, improper
257 oral health habits and consumption of acidic foodstuffs, thus influencing the development of
258 dental erosion. However, primary molars that are more likely to have higher plaque
259 accumulation had lower erosive tooth wear prevalence than primary incisors that are less likely
260 to have plaque accumulation. The VPI used in the present study indicated the overall plaque
261 accumulation and oral hygiene. The question remains if specific plaque retention on lesions

262 may be related to the occurrence of erosive tooth wear. Further study is required to confirm or
263 refute the relationship between plaque and erosive tooth wear in young children.

264 Conflicting results were reported regarding the relationship between socioeconomic factors and
265 the prevalence of dental erosion^{29,30}. In the present study, the mother's education was
266 significantly related to erosive tooth wear in the multivariate analysis, whereas the father's
267 education and family income were not. This indicates that the mothers, rather than the fathers,
268 had a greater influence on their children's erosive tooth wear. It is anticipated that mothers with
269 low educational attainment may nurture their children inappropriately, which may predispose
270 them to tooth wear. In Hong Kong, a recent survey also reported a high caries prevalence in
271 preschool children whose mothers had completed primary education only³¹. Considering this
272 information, assessing socioeconomic background, particularly on the maternal side, may be
273 useful for identifying high-risk groups before implementing early preventive measures in
274 young children.

275 The present study had several strengths, such as a large sample size (1,204 participating
276 children), high response rates (89%), representative samples via the adoption of stratified
277 cluster random sampling and good intra-examiner reliability (kappa value 0.78). Proportional
278 sample weights were conducted. It should be noted that since the two decimal places (round
279 up) were used, thus, the weighted descriptive total number (1,191) slightly deviated from the
280 original data (1,204). Certain limitations in this survey should be taken into consideration. The
281 present study was complemented to the Hong Kong oral health survey focussing on dental
282 caries and oral health, and the details of potential erosive risk factors, such as acidic dietary
283 substances and gastroesophageal reflux diseases, were not included in the questionnaire. This
284 may possibly lead to bias during the multivariate analysis. Additional exploratory studies with
285 in-depth analysis of the interplay among nutritional factors and underlying diseases should be
286 carried out. Nevertheless, the present results provided useful information regarding the

287 prevalence and severity of erosive tooth wear, in addition to highlighting the relationship
288 between demographic background and tooth wear in children. These findings can serve as
289 baseline data for monitoring erosive tooth wear status or planning effective community-based
290 preventive measures in the future.

291 **Conclusion**

292 The prevalence of erosive tooth wear is low among preschool children in Hong Kong. The
293 prevalence of erosive tooth wear in the study children increased with increasing age, lower
294 education of the mother and poorer oral hygiene.

295 **Why this paper is important to paediatric dentists.**

- 296 • This study contributes to the current information on erosive tooth wear in the primary
297 teeth of preschool children.
- 298 • The present findings can serve as baseline data for monitoring erosive tooth wear status
299 in children or for planning effective preventive measures in the future.

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Table 1 Prevalence and severity of erosive tooth wear in 3- to 5-year-old children in Hong Kong

	N	Prevalence (BEWE>0)	Highest BEWE Score				BEWE score sum Mean (SD)
			0	1	2	3	
Sex							
Male	541	86 (15.9%)	455 (83.9%)	67 (12.4%)	17 (3.1%)	3 (0.6%)	0.4 (1.0)
Female	650	92 (14.2%)	558 (85.8%)	86 (13.2%)	4 (0.6%)	2 (0.3%)	0.3 (0.8)
Age							
3	307	33 (10.7%)	274 (89.3%)	33 (10.7%)	0 (0%)	0 (0%)	0.1 (0.5)
4	426	64 (15.0%)	363 (85.2%)	51 (12%)	10 (2.3%)	2 (0.5%)	0.3 (1.0)
5	458	81 (17.7%)	376 (82.1%)	68 (14.8%)	11 (2.4%)	3 (0.7%)	0.4 (1.0)
Total	1191	178 (14.9%)	1013 (85%)	153 (12.8%)	21 (1.8%)	5 (0.4%)	0.3 (0.9)

Table 2 Distribution of the severity of erosive tooth wear in each sextant

Sextant	BEWE Score			
	0 (no erosion)	1 (initial loss)	2 (hard tissue loss <50%)	3 (hard tissue loss > 50%)
Upper anterior teeth	1057 (88.7%)	123 (10.3%)	10 (0.8%)	2 (0.2%)
Upper right posterior teeth	1133 (95.1%)	54 (4.5%)	3 (0.3%)	1 (0.1%)
Upper left posterior teeth	1154 (96.9%)	37 (3.1%)	0 (0%)	0 (0%)
Lower anterior teeth	1119 (93.9%)	61 (5.1%)	12 (1.0%)	0 (0%)
Lower right posterior teeth	1181 (99.1%)	7 (0.6%)	2 (0.2%)	1 (0.1%)
Lower left posterior teeth	1175 (98.6%)	15 (1.3%)	2 (0.1%)	0 (0%)

Table 3 Erosive tooth wear according to variables studied

Variable (N)	BEWE>0 (n,%)	p-value
Children examined (1191)	179 (15.0%)	
Sex		0.401
Male (541)	86 (15.9%)	
Female (650)	92 (14.2%)	
Age		0.030
3 (307)	33 (10.7%)	
4 (427)	64 (15.0%)	
5 (457)	81 (17.7%)	
Birthplace		0.896
Hong Kong (1081)	162 (15.0%)	
Others (110)	17 (15.5%)	
Father's education		0.024
Primary (71)	14 (19.7%)	
Secondary (697)	117 (16.8%)	
Tertiary or above (424)	48 (11.3%)	
Mother's education		0.001
Primary (102)	22 (21.6%)	
Secondary (684)	117 (17.1%)	
Tertiary or above (406)	40 (9.9%)	
Family income (HK\$)		0.240
15,000 or lower (425)	66 (15.5%)	
15,001-30,000 (420)	70 (16.7%)	
30,001 or more (347)	43 (12.4%)	
Frequency of daily snacking		0.027
2 times or fewer (676)	88 (13.0%)	
More than 2 times (516)	91 (17.6%)	
Frequency of tooth brushing		0.542
Once a day or less (410)	58 (14.1%)	
Twice or more (782)	121 (15.5%)	
Dental visit experience		0.830
Yes (214)	33 (15.4%)	
No (977)	145 (14.8%)	
Dental caries experience (dmft >0)		0.121
Yes (552)	92 (16.7%)	
No (639)	86 (13.5%)	

Table 4 Prevalence of erosive tooth wear (BEWE score > 0) and significant variables

Variables	BEWE score > 0 (n,%)	Odds ratio	95% CI	p-value
Age				0.018
3*	33 (10.7%)			
4	64 (15.0%)	1.61	1.02-2.55	
5	81 (17.7%)	1.90	1.22-2.96	
Mother's education				0.003
Tertiary or above*	40 (9.9%)			
Secondary	117 (17.1%)	1.81	1.22-2.67	
Primary	22 (21.6%)	2.35	1.30-4.24	
VPI score		29.83	10.26-86.73	<0.001
Constant		0.027		<0.001

*reference category, CI = Confidence interval