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Analysis of oral health data from 13-15-year-olds from the ELSPAC study

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Introduction

The aim of our study was to analyze oral health state data obtained from 13-15 year old children from the ELSPAC group (European Longitudinal Study of Pregnancy and Childhood) monitored in Brno city which comprises over 5000 children and their families. The ELSPAC is a prospective study in several European countries where the chosen group of children and their families are examined from pregnancy of the mother, birth of the child, up to his/her 18 years of age. Pediatric-anthropological-psychological examinations have already taken place in the 8th, 11th, 13th and currently the examination in the 15th year of age of subjects is in progress. These age phases were chosen in order to record developmental and health changes associated with the prepubertal, pubertal and postpubertal phases of child development. Part of the ELSPAC group was examined to assess oral health in this case-control study.

Objectives

Lack of information on oral health state of children of the ELSPAC group Brno.

Material and Methods

The total number of 780 Caucasian adolescents of Czech nationality, aged 13 to 15 years, selected from the ELSPAC Brno study (children participating in our study) underwent a dental examination at the Clinics of Stomatology, St. Anne's University Hospital and Faculty of Medicine, Masaryk University.
The clinical assessment was carried out by one investigator. The following clinical parameters were assessed: DMFT (WHO 1997 criteria) score, gingival index (GI), plaque index (PI) and calculus index (CSI). Presence/absence of orthodontic anomalies and its severity was recorded (ortho0 = no anomaly, ortho1 = mild anomaly, ortho2 = severe anomaly). Gingivitis was measured using the modified Löe-Silness GI index on teeth 16, 12, 24, 32, 36, 44. This index uses a 0 to 3 scale to assess gingivitis on or adjacent to 6 sites (mid-buccal, mesio-buccal, disto-buccal and mid-lingual, mesio-lingual and disto-lingual) of the individual tooth according to the following criteria: The complete absence of visual signs of inflammation was scored 0. A slight change in color, slight oedema and no bleeding on probing was scored as 1. Visual inflammation, redness, oedema, glazing and bleeding on pressure was scored as 2. Finally, severe inflammation, marked redness, oedema, ulceration and tendency to spontaneous bleeding was scored as 3. The GI for the patient was obtained by adding the indices for the teeth and dividing by six (number of teeth examined). From all individual scores, mean GI scores ± standard deviations (SD) were calculated. The presence of plaque and calculus was recorded according Silness-Löe (PI) and calculus surface index (CSI), respectively without any disclosing agents. The study was performed with the approval of the Committee for Ethics of the Medical Faculty, Masaryk University Brno and informed consent was obtained from all parents (in case of children), in line with the Helsinki declaration before inclusion in the study.

Results

The results are summarized in Tables 1-11 and Graphs 1-8.
Comparison of the DMFT index scores with GI index values provided very interesting results. Significant difference in GI scores ($p < 0.01$) was found between the group in need of treatment and both the other groups (Table 7, Figures 1,2) and in GI to DMFT index (Table 8, Figures 3,4). In D component reciprocally significant differences versus GI values ($p < 0.01$) between groups occurred (Table 9, Figures 5, 6). The difference in GI values between the group ortho=1 and the both other groups (Table 10, Figures 7,8) was also significant ($p < 0.01$). PI values between the control group and the group with gingivitis were significant ($p < 0.05$) while no significant difference was found in CS index (Table 11).

Table 1: Dental status of the cohort

	Number of childeren	GI – mean/tooth	SE

Caries free	188	0.128	0.017
Treated	329	0.150	0.014
At need of treatment	263	0.326	0.024

No significant difference between caries free and treated children. Significant difference ($p < 0.01$) in childeren at treatment need in comparsion to caries free and treated.

Table 2: DMFT index of the cohort

	Number of childeren	GI – mean/tooth	SE
DMFT = 0	188	0.128	0.017
DMFT = 1, 2	233	0.192	0.020
DMFT = 3, 4, 5	221	0.216	0.022
DMFT > 5	138	0.308	0.033

No significant difference between groups DMFT = 1, 2 and DMFT = 3, 4, 5.. Significant lower value in the group DMFT = 0, significantly higher value in the group DMFT > 5 (they differ reciprocally – Bonferonni correction).

Table 3: DT component of the cohort

	Number of childeren	GI – mean/tooth	SE
DT = 0	517	0.142	0.011
DT = 1, 2	209	0.257	0.022
DT > 2	54	0.591	0.074

Significant difference ($p < 0.01$) between groups reciprocally.

Table 4: Orthodontic anomalies in the cohort

	Number of childeren	GI – mean/tooth	SE
Ortho = 0	428	0.145	0.013
Ortho = 1	283	0.266	0.021
Ortho = 2	69	0.315	0.044

No significant difference between groups ortho=1 and ortho=2. Significant difference ($p < 0.01$) between the group ortho=1 and the both other groups.

Table 5: GI – mean values

	Number of childeren	GI – mean/tooth	SE
Cohort	780	0.204	0.011

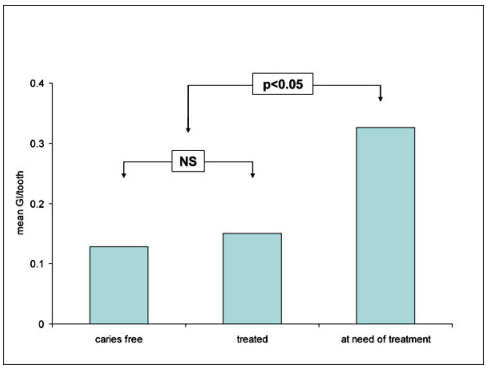

Fig. 1: Mean GI vs dental status

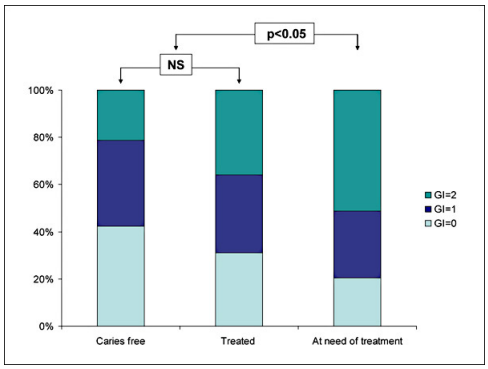

Fig. 2: Distribution of GI vs dental status

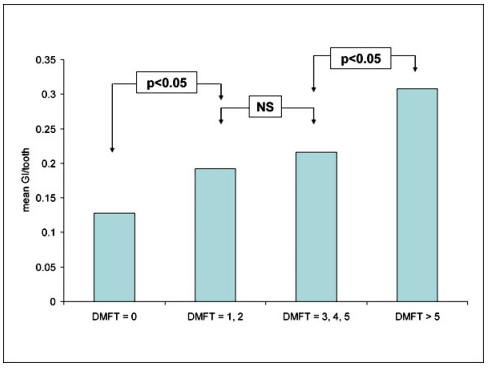

Fig. 3: Mean GI vs caries experience

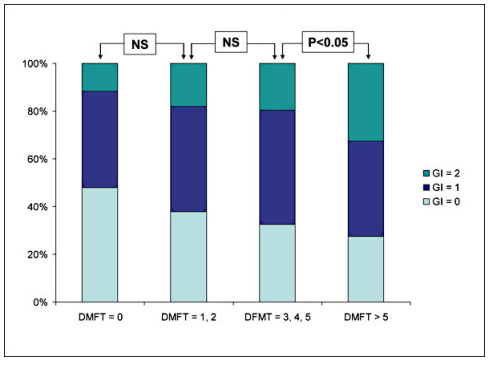

Fig. 4: Mean GI vs caries experience

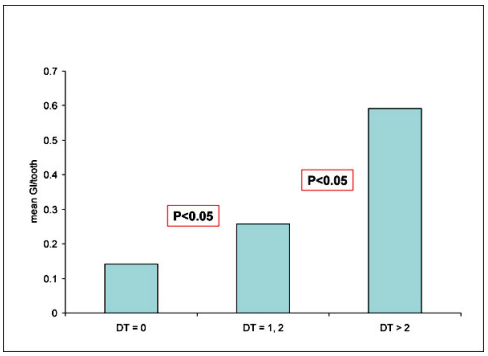

Fig. 5: Mean GI vs DT

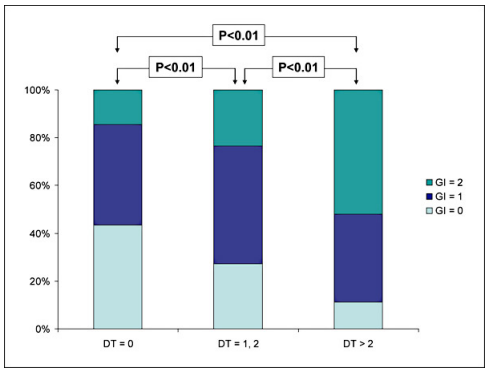

Fig. 6: Distribution of GI vs no. of decayed teeth

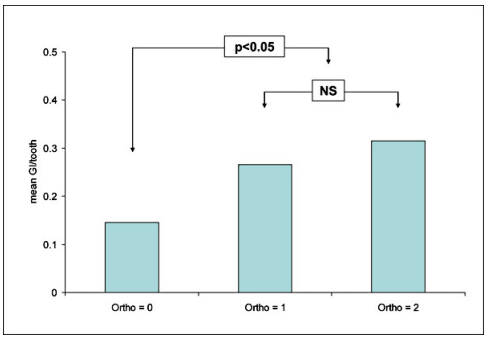

Fig. 7: GI vs ortho. anomalies

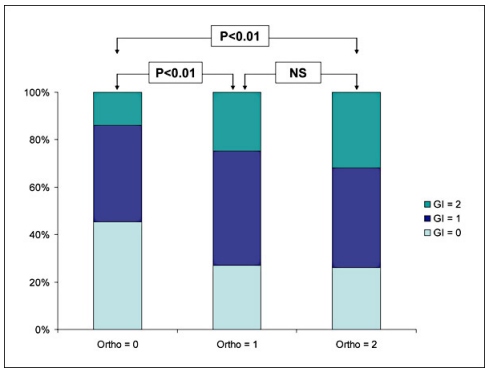

Fig. 8: Distribution of GI vs. ortho anomalies

Table 6: GI – distribution according to the highest value

	Number of childeren	GI values in %		
		G = 0	G = 1	G = 2
All children	780	36.9	43.6	19.5

Table 7: GI in relation to the treatment need

	Number of childeren	Number of children in %		
		G = 0	G = 1	G = 2
Caries free	188	47.9	40.4	11.7
Treated	329	41.0	42.9	16.17
At need of treatment	263	24.0	46.8	29.3

No significant difference between caries free and treated children.
Significant difference ($p < 0.01$) between the group at need of treatment and the both other groups.

Table 8: GI in relation to DMFT index

	Number of childeren	Number of children in %		
		G = 0	G = 1	G = 2
DMFT = 0	188	47.9	40.4	11.7
DMFT = 1, 2	233	37.8	44.2	18.0
DMFT = 3, 4, 5	221	32.6	48.0	19.5
DMFT > 5	138	27.5	39.9	32.6

Significant difference ($p < 0.05$) between groups DMFT=3,4,5 and DMFT > 5.
Significant difference ($p < 0.01$) between groups DMFT=0 and/or DMFT=1,2 versus DMFT > 5.
No significant difference between other groups reciprocally (DMFT=0 versus DMFT=1,2).

Table 9: DT component in relation to GI

	Number of childeren	Number of children in %		
		G = 0	G = 1	G = 2
DT = 0	517	43.5	42.0	14.5
DT = 1, 2	209	27.3	49.3	23.4
DT > 2	54	11.1	37.0	51.9

Significant difference ($p < 0.01$) between groups reciprocally.

Table 10: Orthodontic anomaly severity in relation to GI

	Number of childeren	Number of children in %		
		G = 0	G = 1	G = 2
Ortho = 0	428	45.3	40.7	14.0
Ortho = 1	283	26.9	48.4	24.7
Ortho = 2	69	26.1	42.0	31.9

No significant difference between groups ortho=1 and ortho=2.
Significant difference ($p < 0.01$) between groups ortho=0 and both other groups.

Table 11: Plaque and calculus indices

Group	**HYGI_PI N**	**HYGI_PI mean**	**HYGI_PI SD**	**HYGI_PI median**	**HYGI_PI 25% quartile**	**HYGI_PI 75% quartile**
Control	287	0.233449	0.589414	0.000000	0.00	0.000000
Gingivitis	489	0.901840	1.095154	1.000000	0.00	1.000000
Total	776	0.654639	0.993815	0.000000	0.00	1.000000
Group	**CSI N**	**CSI mean**	**CSI SD**	**CSI median**	**CSI 25% quartile**	**CSI 75% quartile**
Control	288	0.666667	2.753522	0.000000	0.000000	0.000000
Gingivitis	493	0.681542	2.780230	0.000000	0.000000	0.000000
Total	781	0.676056	2.768653	0.000000	0.000000	1.000000

Significant difference in mean values of PI index (but not of CSI index) between both groups.

Conclusions

On the basis of our results we can conclude that DMFT score of the ELSPAC group has not reached the level suggested by WHO (WHO goals for 2010). The results have demonstrated relationship between GI and DMFT especially in D component, and between GI and orthodontic anomalies. The results suggest that early caries treatment and maintenance of oral hygiene are important for gingival health especially in children with orthodontic anomalies. Our results cannot be compared with those of ELSPAC studies performed in other countries because no results on oral health state have been reported.

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Abbreviations

ELSPAC = European Longitudinal Study of Pregnancy and Childhood

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